Supplementary material

S1 Table. Search strategy

Search strategy up to November 11 2019 in Medline, Embase and Cochrane Library

Database: Ovid MEDLINE(R) Daily Update <November 11, 2019>, Ovid MEDLINE(R) and In-Process & Other Non-Indexed Citations <1946 to November 11, 2019>

Search Strategy:

1	(disphosphonate* or diphosphonate* or bisphosphonate* or biphosphonate*).mp	26758
2	(alendronate* or aledronic* or fosamax or binosto).mp	5237
3	(risedronic* or risedronate* or risedron* or actonel* or atelvia* or benet*).mp	2115
4	(ibandronic* or ibandronate* or BM210955 or boniva or bonviva).mp	1135
5	(zoledronic* or zoledronate* or aclasta*).mp	5005
6	(RANK ligand inhibitor* or rank ligand or denosumab or AMG 162 or prolia).mp	9553
7	(Selective Estrogen Receptor Modulators or raloxifene or evista or bazedoxifene or Conjugated Estrogens or duavee or lasofoxifene or SERM).mp	8115
8	(teriparatide or TPTD or forsteo or forteo or recombinant human parathyroid hormone or rhPTH or Abaloparatide or Parathyroid hormone or parathyroid hormone-related protein or PTHrP or PTH 1-84).mp	43164
9	(romosozumab or cdp 7851 or cdp7851 or AMG 785 or evenity*).mp	180
10	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9	85467
11	(fracture* or osteoporosis).mp	344223
12	10 and 11	21425
13	(((random* or control?ed or crossover or cross-over or blind* or mask*) adj3 (trial*1 or study or studies or analy*)) or rct).ti,ab,kw	622986
14	12 and 13	2374
15	limit 12 to (controlled clinical trial or randomized controlled trial)	2004
16	14 or 15	3276
17	limit 16 to yr="1996 - 2020"	3124
18	limit 17 to human	2904
19	limit 18 to english language	2770

Notes:

[mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

[ti=title]; [ab=abstract]; [kw=key word]; [adj3=finds terms in any order with two words (or fewer) between them.]

Database: Embase <1974 to 2019 November 11>

Search Strategy:

1	(disphosphonate* or diphosphonate* or bisphosphonate* or biphosphonate*).mp	31776
2	(alendronate* or aledronic* or fosamax or binosto).mp	8255
3	(risedronic* or risedronate* or risedron* or actonel* or atelvia* or benet*).mp	8281
4	(ibandronic* or ibandronate* or BM210955 or boniva or bonviva).mp	5308
5	(zoledronic* or zoledronate* or aclasta*).mp	16170
6	(RANK ligand inhibitor* or rank ligand or denosumab or AMG 162 or prolia).mp	9613
7	(Selective Estrogen Receptor Modulators or raloxifene or evista or bazedoxifene or Conjugated Estrogens or duavee or lasofoxifene or SERM).mp	14967
8	(teriparatide or TPTD or forsteo or forteo or recombinant human parathyroid hormone or rhPTH or Abaloparatide or Parathyroid hormone or parathyroid hormone-related protein or PTHrP or PTH 1-84).mp	71807
9	(romosozumab or cdp 7851 or cdp7851 or AMG 785 or evenity*).mp	492
10	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9	127856
11	(fracture* or osteoporosis).mp	459021
12	10 and 11	41327
13	(((random* or control?ed or crossover or cross-over or blind* or mask*) adj3 (trial*1 or study or studies or analy*)) or rct).ti,ab,kw	887221
14	12 and 13	4260
15	limit 12 to (controlled clinical trial or randomized controlled trial)	3489
16	14 or 15	5970
17	limit 16 to yr="1996 - 2020"	5834
18	limit 17 to human	5476
19	limit 18 to english language	5118

Notes:

[mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

[ti=title]; [ab=abstract]; [kw=key word]; [adj3=finds terms in any order with two words (or fewer) between them.]

Database: https://www.cochranelibrary.com/advanced-search (November 12, 2019)

Search Strategy:

1	((disphosphonate* or diphosphonate* or bisphosphonate* or biphosphonate*) OR (alendronate* or aledronic* or fosamax or binosto) OR (risedronic* or risedronate* or risedron* or actonel* or atelvia* or benet*) OR (ibandronic* or ibandronate* or BM210955 or boniva or bonviva) OR (zoledronic* or zoledronate* or aclasta*) OR (RANK ligand inhibitor* or rank ligand or denosumab or AMG 162 or prolia) OR (Selective Estrogen Receptor Modulators or raloxifene or evista or bazedoxifene or Conjugated Estrogens or duavee or lasofoxifene or SERM) OR (teriparatide or TPTD or forsteo or forteo or recombinant human parathyroid hormone or rhPTH or Abaloparatide or Parathyroid hormone or parathyroid hormone-related protein or PTHrP) OR (romosozumab or cdp 7851 or cdp7851 or AMG 785 or evenity*)):ti,ab,kw (Word variations have been searched)	12244
2	(fracture* or osteoporosis):ti,ab,kw (Word variations have been searched)	26821
3	#1 and #2 with Cochrane Library publication date from Jan 1996 to Nov 2019, in Cochrane Reviews (Word variations have been searched)	32
Notes: [ti=title]; [ab=abstract]; [kw=key word] § PTH 1-84 was excluded from this search due to error: this line contains missing or unrequired syntax		

Search strategy from November 2019 to November 24 2021 in Medline, Embase and Cochrane Library

Database: Ovid MEDLINE(R) Daily Update <November 24, 2021>, Ovid MEDLINE(R) and In-Process & Other Non-Indexed Citations <1946 to November 24, 2021>

Search Strategy:

1	(disphosphonate* or diphosphonate* or bisphosphonate* or biphosphonate*).mp	29085
2	(alendronate* or aledronic* or fosamax or binosto).mp	5753
3	(risedronic* or risedronate* or risedron* or actonel* or atelvia* or benet*).mp	2265
4	(ibandronic* or ibandronate* or BM210955 or boniva or bonviva).mp	1214
5	(zoledronic* or zoledronate* or aclasta*).mp	5771
6	(RANK ligand inhibitor* or rank ligand or denosumab or AMG 162 or prolia).mp	11376
7	(Selective Estrogen Receptor Modulators or raloxifene or evista or bazedoxifene or Conjugated Estrogens or duavee or lasofoxifene or SERM).mp	8666
8	(teriparatide or TPTD or forsteo or forteo or recombinant human parathyroid hormone or rhPTH or Abaloparatide or Parathyroid hormone or parathyroid hormone-related protein or PTHrP or PTH 1-84).mp	46145
9	(romosozumab or cdp 7851 or cdp7851 or AMG 785 or evenity*).mp	305
10	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9	92887
11	(fracture* or osteoporosis).mp	383597
12	10 and 11	23862
13	(((random* or control?ed or crossover or cross-over or blind* or mask*) adj3 (trial*1 or study or studies or analy*)) or rct).ti,ab,kw	732237
14	12 and 13	2612
15	limit 12 to (controlled clinical trial or randomized controlled trial)	2136
16	14 or 15	3565
17	limit 16 to yr="2019 -2021"	382
18	limit 17 to human	306
19	limit 18 to english language	301

Notes:

[mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

[ti=title]; [ab=abstract]; [kw=key word]; [adj3=finds terms in any order with two words (or fewer) between them.]

Database: Embase <2019 November 11 to 2021 November 24 >

Search Strategy:

1	(disphosphonate* or diphosphonate* or bisphosphonate* or biphosphonate*).mp	35005
2	(alendronate* or aledronic* or fosamax or binosto).mp	9005
3	(risedronic* or risedronate* or risedron* or actonel* or atelvia* or benet*).mp	8940
4	(ibandronic* or ibandronate* or BM210955 or boniva or bonviva).mp	5725
5	(zoledronic* or zoledronate* or aclasta*).mp	18485
6	(RANK ligand inhibitor* or rank ligand or denosumab or AMG 162 or prolia).mp	12234
7	(Selective Estrogen Receptor Modulators or raloxifene or evista or bazedoxifene or Conjugated Estrogens or duavee or lasofoxifene or SERM).mp	15986
8	(teriparatide or TPTD or forsteo or forteo or recombinant human parathyroid hormone or rhPTH or Abaloparatide or Parathyroid hormone or parathyroid hormone-related protein or PTHrP or PTH 1-84).mp	79321
9	(romosozumab or cdp 7851 or cdp7851 or AMG 785 or evenity*).mp	827
10	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9	141695
11	(fracture* or osteoporosis).mp	520202
12	10 and 11	46331
13	(((random* or control?ed or crossover or cross-over or blind* or mask*) adj3 (trial*1 or study or studies or analy*)) or rct).ti,ab,kw	1032064
14	12 and 13	4661
15	limit 12 to (controlled clinical trial or randomized controlled trial)	3769
16	14 or 15	6486
17	limit 16 to yr="2019 -2021"	746
18	limit 17 to human	735
19	limit 18 to english language	720

Notes:

[mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

[ti=title]; [ab=abstract]; [kw=key word]; [adj3=finds terms in any order with two words (or fewer) between them.]

Database: https://www.cochranelibrary.com/advanced-search (November 25, 2021)

Search Strategy:

1	((disphosphonate* or diphosphonate* or bisphosphonate* or biphosphonate*) OR (alendronate* or aledronic* or fosamax or binosto) OR (risedronic* or risedronate* or risedron* or actonel* or atelvia* or benet*) OR (ibandronic* or ibandronate* or BM210955 or boniva or bonviva) OR (zoledronic* or zoledronate* or aclasta*) OR (RANK ligand inhibitor* or rank ligand or denosumab or AMG 162 or prolia) OR (Selective Estrogen Receptor Modulators or raloxifene or evista or bazedoxifene or Conjugated Estrogens or duavee or lasofoxifene or SERM) OR (teriparatide or TPTD or forsteo or forteo or recombinant human parathyroid hormone or rhPTH or Abaloparatide or Parathyroid hormone or parathyroid hormone-related protein or PTHrP) OR (romosozumab or cdp 7851 or cdp7851 or AMG 785 or evenity*)):ti,ab,kw (Word variations have been searched)	13481
2	(fracture* or osteoporosis):ti,ab,kw (Word variations have been searched)	30973
3	#1 and #2 with Cochrane Library publication date from Jan 1996 to Nov 2019, in Cochrane Reviews (Word variations have been searched)	6
Notes: [ti=title]; [ab=abstract]; [kw=key word] § PTH 1-84 was excluded from this search due to error: this line contains missing or unrequired syntax		

S2 Table. Example of contact to authors

Dear Dr. Nicola Colacurci,
We are currently working on a systematic review, and came across your study on:
"Raloxifene slows down the progression of intima-media thickness in postmenopausal women".
Do you have any fracture data from this study, and if so would you be willing to share this data?

Many thanks.

Best regards

Mina Nicole Händel, MSc, PhD
Research Unit for Dietary Studies at The Parker Institute
Frederiksberg Hospital
Nordre Fasanvej 57, Vej 8, indgang 11
2000 Frederiksberg
Denmark

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S3 Table. List of excluded studies

Supplemental table 2. List of excluded articles after full text-selection

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
1.	Ackerman	2008	Ackerman, K. E. Is denosumab a safe and effective treatment for postmenopausal osteoporosis? Nature Clinical Practice Endocrinology and Metabolism 2008;4(7):376-377	Wrong outcomes
2.	Adachi	2005	Adachi, J. D.; Adami, S.; Kulkarni, P. M.; Wong, M.; Stock, J. L.. Similar proportions of women lose bone mineral density with raloxifene or alendronate treatment. Journal of Clinical Densitometry 2005;8(3):273-277.	Wrong outcomes
3.	Adachi	2005 a	Adachi, J. D.; Rizzoli, R.; Boonen, S.; Li, Z.; Meredith, M. P.; Chesnut, Iii C. H.. Vertebral fracture risk reduction with risedronate in post-menopausal women with osteoporosis: A meta-analysis of individual patient data. Aging - Clinical and Experimental Research. 2005;17(2):150-156	Systematic review and/or meta-analysis
4.	Adachi	2010	Adachi, J. D.; Lyles, K. W.; Boonen, S.; Colon-Emeric, C.; Hyldstrup, L.; Nordsletten, L.; Pieper, C.; Recknor, C.; Su, G.; Bucci-Rechtweg, C.; Magaziner, J. Subtrochanteric fractures: Results from the HORIZON-Recurrent fracture trial. Osteoporosis International May 2010;1)():S23	Wrong patient population
5.	Adachi	2010	dachi, J. D.; McClung, M.; Cummings, S.; Man, Z.; Lippuner, K.; Farrerons, J.; Torring, O.; Gallagher, J.; Franchimont, N.; San Martin, J.; Wang, A.; Boonen, S. Effect of denosumab on hip fractures in postmenopausal women: A subanalysis of the FREEDOM study. Journal of the American Geriatrics Society April 2010;1)():S24	Conference abstract
6.	Adachi	2009	Adachi, J. D.; McClung, M.; Minisola, S.; Lippuner, K.; Torring, O.; Rizzoli, R.; Man, Z. Fracture incidence in postmenopausal women at higher risk of fracture after 3 years of denosumab treatment. Arthritis and Rheumatism 2009;10)():884	Conference abstract
7.	Adachi	2011	Adachi, J.; Bucci-Rechtweg, C.; Su, G.; Eriksen, E.; Magaziner, J.; Lyles, K.; Colon-Emeric, C.; Boonen, S.; Pieper, C.; Mautalen, C.; Hyldstrup, L.; Recknor, C.; Nordsletten, L.. Zoledronic acid improves health-related quality of life in patients with hip fracture: Results of HORIZON-RFT. Osteoporosis International 2011;1):S140-S142.	Wrong patient population
8.	Adami	2004	Adami, S.; Felsenberg, D.; Christiansen, C.; Robinson, J.; Lorenc, R. S.; Mahoney, P.; Coutant, K.; Schimmer, R. C.; Delmas, P. D.. Efficacy and safety of ibandronate given by intravenous injection once every 3 months. Bone 2004;34(5):881-889.	Wrong outcomes
9.	Adami	2008	Adami, S.; Gatti, D.; Bertoldo, F.; Sartori, L.; Di Munno, O.; Filipponi, P.; Marcocci, C.; Frediani, B.; Palummeri, E.; Fiore, C. E.; Costi, D.; Rossini, M..	Wrong intervention

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			Intramuscular neridronate in postmenopausal women with low bone mineral density. Calcified Tissue International 2008;83(5):301-307.	
10.	Adami	2009	Adami, S.; Giannini, S.; Bianchi, G.; Sinigaglia, L.; Di Munno, O.; Fiore, C. E.; Minisola, S.; Rossini, M. Vitamin D status and response to treatment in post-menopausal osteoporosis. Osteoporosis International February 2009;20(2):239-244	Wrong intervention
11.	Adami	2010	Adami, S.; Gilchrist, N.; Lyritis, G.; Palacios, S.; Pavelka, K.; Resch, H.; Roux, C.; Uebelhart, D.; De Gregorio, L.; Siris, E.; Wang, A.; Moller, G.; Libanati, C.; Cummings, S.. Effect of denosumab on fracture healing in postmenopausal women with osteoporosis: Results from the FREEDOM trial (study sponsored by Amgen Inc.). Bone 2010;1):S63-S64.	Wrong outcomes
12.	Adami	2010 a	Adami, S.; Libanati, C.; Adachi, J.; Boonen, S.; Cummings, S.; De Gregorio, L.; Gilchrist, N.; Lyritis, G.; Moeller, G.; Palacios, S.; Pavelka, K.; Resch, H.; Roux, C.; Uebelhart, D.; Wang, A.; Siris, E.. Denosumab administration is not associated with fracture healing complications in postmenopausal women with osteoporosis: Results from the freedom trial. Journal of Bone and Mineral Research 2010;1):S478-S479.	Conference abstract
13.	Adami	2011	Adami, S.; Palacios, S.; Pavelka, K.; Resch, H.; Roux, C.; Uebelhart, D.; Ho, P. R.; Wang, A.; Siris, E.; Libanati, C.; Adachi, J.; Boonen, S.; Cummings, S.; De Gregorio, L.; Gilchrist, N.; Lyritis, G.; Moeller, G. Freedom trial: Denosumab is not associated with fracture healing complications in postmenopausal women with osteoporosis. Osteoporosis International March 2011;1)():S243-S244	Conference abstract
14.	Adami	2014	Adami, S.; Palacios, S.; Rizzoli, R.; Levine, A. B.; Sutradhar, S.; Chines, A. A. The efficacy and safety of bazedoxifene in postmenopausal women by baseline kidney function status. Climacteric June 2014;17(3):273-284	Systematic review and/or meta-analysis
15.	Adami	2019	Adami, Giovanni; Saag, Kenneth G.; Chapurlat, Roland D.; Guanabens, Nuria; Haugeberg, Glenn; Lems, Willem F.; Matijevic, Radmila; Peel, Nicola; Poddubnyy, Denis; Geusens, Piet. Balancing benefits and risks in the era of biologics. Therapeutic Advances in Musculoskeletal Disease 2019;11:1-6. United Kingdom SAGE Publications Ltd (E-mail: info@sagepub.co.uk) 2019	Systematic review and/or meta-analysis
16.	Agrawal	2006	Agrawal, S.; Krueger, D. C.; Engelke, J. A.; Nest, L. J.; Krause, P. F.; Drinka, P. J.; Binkley, N. C.. Between-meal risedronate does not alter bone turnover in nursing home residents. Journal of the American Geriatrics Society 2006;54(5):790-795.	Wrong patient population
17.	Agrawal	2009	Agrawal, S.; Jain, A.; Mahajan, D.; Raghunandan, C. Correlation of bone mineral density with	Wrong outcomes

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			biochemical markers in post menopausal women. Indian Journal of Clinical Biochemistry July 2009;24(3):262-265	
18.	Albert	2021	Albert, Stewart G.; Wood, Emily. Meta-Analysis of Clinical Fracture Risk Reduction of Antiosteoporosis Drugs: Direct and Indirect Comparisons and Meta-Regressions. Endocrine practice: official journal of the American College of Endocrinology and the American Association of Clinical Endocrinologists 2021;27(11):1082-1092	Systematic review and/or meta-analysis
19.	Almirol	2016	Almirol, E. A.; Chi, L. Y.; Khurana, B.; Hurwitz, S.; Bluman, E. M.; Chiodo, C.; Matzkin, E.; Baima, J.; Leboff, M. S.. Short-term effects of teriparatide versus placebo on bone biomarkers, structure, and fracture healing in women with lower-extremity stress fractures: A pilot study. Journal of Clinical and Translational Endocrinology 2016;5:7-14.	Wrong patient population
20.	Altkorn	2001	Altkorn, D.; Vokes, T. Treatment of postmenopausal osteoporosis. Journal of the American Medical Association 2001;285(11):1415-1418	Systematic review and/ or meta-analysis
21.	Aminorroaya	2019	Aminorroaya, Ashraf; Kachuei, Ali; Amini, Massoud; Karimi Fard, Maryam; Salamat, Mohammad Reza; Hadi Alijanvand, Moluk; Feizi, Awat; Aminorroaya Yamini, Sima; Karimifar, Mansoor. Alendronate improves fasting plasma glucose and insulin sensitivity, and decreases insulin resistance in prediabetic osteopenic postmenopausal women: A randomized triple-blind clinical trial. Journal of diabetes investigation 2019;10(3):731-737	Wrong outcomes
22.	Anastasilakis	2008	Anastasilakis, A. D.; Goulis, D. G.; Polyzos, S. A.; Gerou, S.; Koukoulis, G. N.; Efstathiadou, Z.; Kita, M.; Avramidis, A.. Head-to-head comparison of risedronate vs. teriparatide on bone turnover markers in women with postmenopausal osteoporosis: A randomised trial. International Journal of Clinical Practice 200;62(6):919-924.	Wrong outcomes
23.	Anastasilakis	2009	Anastasilakis, A. D.; Toulis, K. A.; Goulis, D. G.; Polyzos, S. A.; Delaroudis, S.; Giomisi, A.; Terpos, E.. Efficacy and safety of denosumab in postmenopausal women with osteopenia or osteoporosis: A systematic review and a meta-analysis. Hormone and Metabolic Research 2009;41(10):721-729.	Systematic review and/or meta-analysis
24.	Anastasilakis	2019	Anastasilakis, A. D.; Papapoulos, S. E.; Polyzos, S. A.; Appelman-Dijkstra, N. M.; Makras, P. Zoledronate for the Prevention of Bone Loss in Women Discontinuing Denosumab Treatment. A Prospective 2-Year Clinical Trial. Journal of Bone and Mineral Research. 2019	Wrong intervention
25.	Anastasilakis	2021	Anastasilakis, Athanasios D.; Mandanas, Stylianos; Polyzos, Stergios A.; Ntenti, Charikleia; Appelman-Dijkstra, Natasha M.; Yavropoulou, Maria P.;	Extension study

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			Papatheodorou, Athanasios; Makras, Polyzois. Comparative Effect of Zoledronate at 6 Versus 18 Months Following Denosumab Discontinuation. Calcified tissue international 2021;108(5):587-594	
26.	Anonymous	2001	Anonymous. Osteoporosis – Risedronate. Manufacturing Chemist 2001;72(1):23	Conference abstract
27.	Anonymous	2003	Anonymous. Teriparatide (forteo) for osteoporosis Medical Letter on Drugs & Therapeutics 2003;45(1149):9-10	Commentary
28.	Anonymous	2006	Anonymous. Intravenous ibandronate (Boniva). The Medical letter on drugs and therapeutics 2006 Aug 2006;48(1241-1242):68-69	Commentary
29.	Anonymous	2008	Anonymous. Twice-monthly risedronate is as effective as daily dosing for osteoporosis therapy Nature Clinical Practice Endocrinology and Metabolism October 2008;4(10):535	Wrong outcomes
30.	Anonymous	2008 a	Anonymous. The benefits of osteoporosis drugs Australian Journal of Pharmacy May 2008;89(1057):92	Commentary
31.	Anonymous	2008 b	Anonymous. Annual zoledronic acid for osteoporosis. Drug and therapeutics bulletin Dec 2008;46(12):93-96	Systematic review and/or meta-analysis
32.	Anonymous	2009	Anonymous. Teriparatide: new indication. During corticosteroid therapy: no fewer clinical fractures. Unnecessarily inconvenient. Prescrire International Aug 2009;18(102):159	Conference abstract
33.	Anonymous	2019	Anonymous. Practical guidance for use of bisphosphonates in osteoporosis. JBMR Plus 2019;3(Supplement 3):20	Systematic review and/or meta-analysis
34.	Anonymous	2019 a	Anonymous. Ibandronate is a nitrogen-containing bisphosphonate. JBMR Plus 2019;3(Supplement 3):29	Full-text not available
35.	Archer	2016	Archer, D. F.; Freeman, E. W.; Komm, B. S.; Ryan, K. A.; Yu, C. R.; Mirkin, S.; Pinkerton, J. V.. Pooled Analysis of the Effects of Conjugated Estrogens /Bazedoxifene on Vasomotor Symptoms in the Selective Estrogens, Menopause, and Response to Therapy Trials. Journal of Women's Health November 2016;25(11):1102-1111	Systematic review and/or meta-analysis
36.	Aro	2018	Aro, E.; Moritz, N.; Mattila, K.; Aro, H. T. A long-lasting bisphosphonate partially protects periprosthetic bone, but does not enhance initial stability of uncemented femoral stems: A randomized placebo-controlled trial of women undergoing total hip arthroplasty. Journal of Biomechanics 25 June 2018;75():35-45	Wrong patient population
37.	Asaoka	2016	Asaoka, D.; Nagahara, A.; Hojo, M.; Ueyama, H.; Matsumoto, K.; Izumi, K.; Takeda, T.; Komori, H.; Akazawa, Y.; Shimada, Y.; Osada, T.; Watanabe, S.. Efficacy of alfacalcidol and alendronate on lumbar bone mineral density in osteoporotic patients using proton pump inhibitors. Biomedical Reports 2016;5(2):165-170.	Wrong patient population

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
38.	Asi	2019	Asi, Noor; Alahdab, Fares; Mohammed, Khaled; Almasri, Jehad; Farah, Wigdan; Sarigianni, Maria; Muthusamy, Kalpana; Haydour, Qusay; Wang, Zhen; Murad, Mohammad Hassan; Barrionuevo, Patricia; Kapoor, Ekta; Benkhadra, Khalid; Al Nofal, Alaa. Efficacy of pharmacological therapies for the prevention of fractures in postmenopausal women: A network meta-analysis. Journal of Clinical Endocrinology and Metabolism 2019;104(5):1623-1630	Systematic review and/or meta-analysis
39.	Aspenberg	2010	Aspenberg, P.; Johansson, T.. Teriparatide improves early callus formation in distal radial fractures: Analysis of a subgroup of patients within a randomized trial: Analysis of a subgroup of patients within a randomized trial. Acta Orthopaedica April 2010;81(2):236-238	Wrong outcomes
40.	Aspenberg	2016	Aspenberg, P.; Malouf, J.; Tarantino, U.; Garcia-Hernandez, P. A.; Corradini, C.; Overgaard, S.; Stepan, J. J.; Borris, L.; Lespessailles, E.; Frihagen, F.; Papavasiliou, K.; Petto, H.; Caeiro, J. R.; Marin, F.. Effects of teriparatide compared with risedronate on recovery after pertrochanteric hip fracture results of a randomized, active-controlled, double-blind clinical trial at 26 weeks. Journal of Bone and Joint Surgery - American Volume 2016;98(22):1868-1878.	Wrong patient population
41.	Aubailly	2016	Aubailly, M.; Combe, B.; Gaujoux-Viala, C.; Lukas, C.; Morel, J.; Che, H.. Safety of denosumab in postmenopausal osteoporosis and in cancer and bone metastase treatment: A systematic review and meta-analysis. Arthritis and Rheumatology October 2016;68 (Supplement 10):419-420	Conference abstract
42.	Bai	2013	Bai, H.; Jing, D.; Guo, A.; Yin, S.. Randomized controlled trial of zoledronic acid for treatment of osteoporosis in women. Journal of International Medical Research 2013;41(3):697-704.	Wrong patient population
43.	Bala	2013	Bala, Y.; Chapurlat, R.; Felsenberg, D.; Thomas, T.; Laroche, M.; Morris, E.; Zanchetta, J.; Cheung, A.; Ghasem-Zadeh, A.; Zebaze, R.; Seeman, E.; Rizzoli, R.. Risedronate slows or partly reverses microarchitecture deterioration depending on whether remodelling is perturbed or in steady state. Osteoporosis International April 2013;1):S58-S59	Conference abstract
44.	Bala	2014	Bala, Y.; Chapurlat, R.; Cheung, A. M.; Felsenberg, D.; Laroche, M.; Morris, E.; Reeve, J.; Thomas, T.; Zanchetta, J.; Bock, O.; Ghasem-Zadeh, A.; Djoumessi, R. M. Z.; Seeman, E.; Rizzoli, R.. Risedronate slows or partly reverses cortical and trabecular microarchitectural deterioration in postmenopausal women. Journal of Bone and Mineral Research February 2014;29(2):380-388	Wrong outcomes

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
45.	Baran	2001	Baran, D.. Osteoprosis: Efficacy and safety of a bisphosphonate dosed once weekly. Geriatrics 2001;56(3):28-32	Systematic review and/or meta-analysis
46.	Barrionuevo	2019	Barrionuevo, P.; Kapoor, E.; Asi, N.; Alahdab, F.; Mohammed, K.; Benkhadra, K.; Almasri, J.; Farah, W.; Sarigianni, M.; Muthusamy, K.; Al Nofal, A.; Haydour, Q.; Wang, Z.; Murad, M. H.. Efficacy of pharmacological therapies for the prevention of fractures in postmenopausal women: A network meta-analysis. Journal of Clinical Endocrinology and Metabolism 2019;104(5):1623-1630	Systematic review and/or meta-analysis
47.	Bassam	2003	Bassam, E.. Treatment of osteoporosis; HRT, SERM or bisphosphonates? Middle East Fertility Society Journal 2003;8(1):92	Commentary
48.	Beaudoin	2016	Beaudoin, C.; Jean, S.; Bessette, L.; Ste-Marie, L. G.; Moore, L.; Brown, J. P.. Denosumab compared to other treatments to prevent or treat osteoporosis in individuals at risk of fracture: a systematic review and meta-analysis. Osteoporosis International 2016;27(9):2835-2844.	Systematic review and/or meta-analysis
49.	Beaupre	2011	Beaupre, L. A.; Morrish, D. W.; Hanley, D. A.; Maksymowych, W. P.; Bell, N. R.; Juby, A. G.; Majumdar, S. R.. Oral bisphosphonates are associated with reduced mortality after hip fracture. Osteoporosis International 2011;22(3):983-991.	Wrong patient population
50.	Beaupre	2010	Beaupre, L. A.; Morrish, D.; Hanley, D. A.; Juby, A. G.; Maksymowych, W. P.; Bell, N. R.; Majumdar, S. R. Oral bisphosphonate use after hip fracture is associated with reduced mortality. Osteoporosis International May 2010;1)():S337	Wrong patient population
51.	Beck	2008	Beck, T. J.; Michael Lewiecki, E.; Miller, P. D.; Felsenberg, D.; Liu, Y.; Ding, B.; Libanati, C.. Effects of Denosumab on the Geometry of the Proximal Femur in Postmenopausal Women in Comparison with Alendronate. Journal of Clinical Densitometry 2008;11(3):351-359.	Wrong outcomes
52.	Beekman	2019	Beekman, Kerensa M.; Veldhuis-Vlug, Annegreet G.; den Heijer, Martin; Maas, Mario; Oleksik, Ania M.; Tanck, Michael W.; Ott, Susan M.; van 't Hof, Rob J.; Lips, Paul; Bisschop, Peter H.; Bravenboer, Nathalie. The effect of raloxifene on bone marrow adipose tissue and bone turnover in postmenopausal women with osteoporosis. Bone 2019;118():62-68	Wrong outcomes
53.	Bekker	2004	Bekker, P. J.; Holloway, D. L.; Rasmussen, A. S.; Murphy, R.; Martin, S. W.; Leese, P. T.; Holmes, G. B.; Dunstan, C. R.; DePaoli, A. M.. A single-dose placebo-controlled study of AMG 162, a fully human monoclonal antibody to RANKL, in postmenopausal women. Journal of Bone and Mineral Research 2004;19(7):1059-1066.	Wrong outcomes

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
54.	Bellone	2021	Bellone, F.; Morabito, N.; Sottile, A.; Loddo, S.; Corica, F.; Catalano, A.; Gaudio, A. A single dose of zoledronate induces modifications of serum VEGF in osteoporotic postmenopausal women. Annals of the Rheumatic Diseases 2021;80(SUPPL 1):838-839	Conference abstract, with no new data
55.	Bender	2012	Bender, D. A.. Bisphosphonate and vitamin D supplementation for osteoporosis. Focus on Alternative and Complementary Therapies March 2012;17(1):73-74	Wrong intervention
56.	Bilezikian	2005	Bilezikian, J. P.. Anabolic therapy for osteoporosis. International Journal of Fertility and Women's Medicine 2005 2005;50(2):53-60	Systematic review and/or meta-analysis
57.	Billington	2020	Billington, Emma O.; Reid, Ian R. Benefits of Bisphosphonate Therapy: Beyond the Skeleton. Current osteoporosis reports 2020;18(5):587-596	Systematic review and/or meta-analysis
58.	Black	1999	Black, D. M.; Thompson, D. E.. The effect of alendronate therapy on osteoporotic fracture in the vertebral fracture arm of the Fracture Intervention Trial. International Journal of Clinical Practice, Supplement 1999;(101):46-50.	Conference abstract
59.	Black	2009	Black, D. M.; Eastell, R.; Cosman, F.; Man, Z.; Bucci-Rechtweg, C.; Mesenbrink, P. Effect of once-yearly zoledronic acid 5 mg on 'Super Six' non-vertebral fractures. Bone June 2009;2)():S429	Conference abstract
60.	Black	2006	Black, D. M.. Building new bone: A new paradigm in osteoporosis. Clinical Cases in Mineral and Bone Metabolism September/December 2006;3(3):243-244	Conference abstract
61.	Black	2010	Black, D. M.; Eastell, R.; Cosman, F.; Man, Z.; Bucci-Rechtweg, C.; Mesenbrink, P.. Effect of once-yearly zoledronic acid = MG on a sub-set of six non-vertebral fractures. Journal of Clinical Densitometry 2010;13 (1):132.	Conference abstract
62.	Black	2010 b	Black, D. M.; Seeman, E.; Bucci-Rechtweg, C.; Eastell, R.; Boonen, S.; Mesenbrink, P. Zoledronic acid reduces the increased risk conferred by further fractures. Internal Medicine Journal May 2010;3)():27	Conference abstract
63.	Black	2010 a	Black, D.; Reid, I.; Lyles, K.; Bucci-Rechtweg, C.; Su, G.; Hue, T.; Eastell, R.. Reduction in the risk of clinical fractures after a single dose of zoledronic acid 5mg. Journal of Bone and Mineral Research 2010;1):S10.	Wrong patient population
64.	Black	2017	Black, D.; Eastell, R.; Bauer, D.; Lui, L. Y.; McCulloch, C.; De Papp, A.; Khosla, S.; Hoffmann, S.; Bouxsein, M.. Change in BMD over 12 to 24 months is strongly associated with fracture reductions in randomized trials: A study-level meta-regression using the FNIH Bone quality study project database. Journal of Bone and Mineral Research December 2017;32 (Supplement 1):S400	Conference abstract
65.	Black	2017 a	Black, D. M.; Mitlak, B. H.; Wang, Y.; Hu, M. Y.; Fitzpatrick, L. A.; Eastell, R.. Early change in serum	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			PINP During treatment with abaloparatide is correlated with lumbar spine BMD: Results from the ACTIVE Trial. Journal of Bone and Mineral Research December 2017;32 (Supplement 1):S377-S378	
66.	Black	2020	Black, Dennis M.; Bauer, Douglas C.; Vittinghoff, Eric; Lui, Li-Yung; Grauer, Andreas; Marin, Fernando; Khosla, Sundeep; de Papp, Anne; Mitlak, Bruce; Cauley, Jane A.; McCulloch, Charles E.; Eastell, Richard; Bouxsein, Mary L.; Foundation for the National Institutes of Health Bone Quality, Project. Treatment-related changes in bone mineral density as a surrogate biomarker for fracture risk reduction: meta-regression analyses of individual patient data from multiple randomised controlled trials. The lancet. Diabetes & endocrinology 2020;8(8):672-682	Systematic review and/or meta-analysis
67.	Blouin	2009	Blouin, S.; Misof, B. M.; Fratzl-Zelman, N.; Phipps, R.; Klaushofer, K.; Paschalis, E. P.; Roschger, P. Normal bone mineralization density distribution in postmenopausal osteoporosis with low bone turnover before and after 3 years risedronate treatment. Bone June 2009;2)():S445-S446	Conference abstract
68.	Boivin	2003	Boivin, G.; Lips, P.; Ott, S. M.; Harper, K. D.; Sarkar, S.; Pinette, K. V.; Meunier, P. J.. Contribution of raloxifene and calcium and vitamin D3 supplementation to the increase of the degree of mineralization of bone in postmenopausal women. Journal of Clinical Endocrinology & Metabolism 2003;88(9):4199-205.	Wrong outcomes
69.	Bolland	2010	Bolland, M. J.; Grey, A. B.; Gamble, G. D.; Reid, I. R.. Effect of osteoporosis treatment on mortality: A meta-analysis. Journal of Clinical Endocrinology and Metabolism 2010;95(3):1174-1181.	Systematic review and/or meta-analysis
70.	Bolognese	2011	Bolognese, M. A.; Bone, H. G.; Kendler, D. L.; Brandi, M. L.; Hodsman, A.; Orcel, P.; Radcliffe, H. S.. Transitioning to denosumab leads to further increases in BMD throughout the skeleton in postmenopausal women who received 5 or more years of continuous alendronate therapy. Arthritis and Rheumatism. Conference: Annual Scientific Meeting of the American College of Rheumatology and Association of Rheumatology Health Professionals 2011;63(10 SUPPL. 1).	Conference abstract
71.	Bone	2004	Bone, H. G.; Hosking, D.; Devogelaer, J. P.; Tucci, J. R.; Emkey, R. D.; Tonino, R. P.; Rodriguez-Portales, J. A.; Downs, R. W.; Gupta, J.; Santora, A. C.; Liberman, U. A.. Ten Years' Experience with Alendronate for Osteoporosis in Postmenopausal Women. New England Journal of Medicine 2004;350(12):1189-1199.	Extension study
72.	Bone	2011	Bone, H. G.; Kendler, D. L.; Bolognese, M. A.; Brandi, M. L.; Hodsman, A.; Orcel, P.; Austin, M.;	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			Grauer, A.; Libanati, C.. Transitioning to denosumab further improves BMD in postmenopausal women who received 5 or more years of continuous alendronate therapy. Endocrine Reviews. Conference: 93rd Annual Meeting and Expo of the Endocrine Society, ENDO 2011;32(3 Meeting Abstracts)	
73.	Bonnick	2009	Bonnick, S. L.; Silverman, S.; Tanner, S. B.; Martens, M.; Bachmann, G.; Kohles, J. D.; Civitelli, R.. Patient satisfaction in postmenopausal women treated with a weekly bisphosphonate transitioned to once-monthly ibandronate. Journal of Women's Health 01 Jul 2009;18(7):935-943	Wrong study design
74.	Boonen	2010	Boonen, S.; Lippuner, K.; Adachi, J. D.; Cummings, S.; Man, Z.; Farrerons, J.; Torring, O.; Gallagher, J. C.; Franchimont, N.; San Martin, J.; Wang, A.; McClung, M. Denosumab reduced the incidence of hip and new vertebral fractures in postmenopausal women with higher fracture risk: A subanalysis of the FREEDOM study. Osteoporosis International December 2010;5)():S746-S747	Conference abstract
75.	Boonen	2008	Boonen, S.; Marin, F.; Obermayer-Pietsch, B.; Simoes, M. E.; Barker, C.; Glass, E. V.; Hadji, P.; Lyritis, G.; Oertel, H.; Nickelsen, T.; McCloskey, E. V.. Effects of previous antiresorptive therapy on the bone mineral density response to two years of teriparatide treatment in postmenopausal women with osteoporosis. Journal of Clinical Endocrinology and Metabolism 2008;93(3):852-860.	Wrong outcomes
76.	Boonen	2010	Boonen, S.; McClung, M.; Minisola, S.; Lippuner, K.; Torring, O.; Rizzoli, R.; Man, Z.; Bone, H.; Farrerons, J.; Adachi, J.; Christiansen, C.; Eastell, R.; Reid, I.; Siris, E.; Cummings, S.; Wang, A.; Franchimont, N.; San Martin, J. Antifracture effects of denosumab in postmenopausal women at higher fracture risk: A subgroup analysis from the freedom trial. Osteoporosis International May 2010;1)():S376-S377	Conference abstract
77.	Boonen	2008 a	Boonen, S.; Vanderschueren, D.; Venken, K.; Milisen, K.; Delforge, M.; Haentjens, P.. Recent developments in the management of postmenopausal osteoporosis with bisphosphonates: Enhanced efficacy by enhanced compliance. Journal of Internal Medicine October 2008;264(4):315-332	Systematic review and/or meta-analysis
78.	Boonen	2011	Boonen, S.; Orwoll, E.; Magaziner, J.; Colon-Emeric, C. S.; Adachi, J. D.; Bucci-Rechtweg, C.; Haentjens, P.; Kaufman, J. M.; Rizzoli, R.; Vanderschueren, D.; Claessens, F.; Sermon, A.; Witvrouw, R.; Milisen, K.; Su, G.; Lyles, K. W.. Once-yearly zoledronic acid in older men compared with women with recent hip fracture. Journal of the American Geriatrics Society 2011;59(11):2084-2090.	Wrong patient population

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
79.	Borah	2004	Borah, B.; Dufresne, T. E.; Chmielewski, P. A.; Johnson, T. D.; Chines, A.; Manhart, M. D.. Risedronate preserves bone architecture in postmenopausal women with osteoporosis as measured by three-dimensional microcomputed tomography. Bone 2004;34(4):736-46	Wrong outcomes
80.	Borah	2005	Borah, B.; Ritman, E. L.; Dufresne, T. E.; Jorgensen, S. M.; Liu, S.; Sacha, J.; Phipps, R. J.; Turner, R. T.. The effect of risedronate on bone mineralization as measured by micro-computed tomography with synchrotron radiation: correlation to histomorphometric indices of turnover. Bone 2005;37(1):1-9	Wrong outcomes
81.	Borah	2006	Borah, B.; Dufresne, T. E.; Ritman, E. L.; Jorgensen, S. M.; Liu, S.; Chmielewski, P. A.; Phipps, R. J.; Zhou, X.; Sibonga, J. D.; Turner, R. T.. Long-term risedronate treatment normalizes mineralization and continues to preserve trabecular architecture: sequential triple biopsy studies with micro-computed tomography. Bone 2006;39(2):345-52	Wrong outcomes
82.	Borah	2010	Borah, B.; Dufresne, T.; Nurre, J.; Phipps, R.; Chmielewski, P.; Wagner, L.; Lundy, M.; Bouxsein, M.; Zebaze, R.; Seeman, E.. Risedronate reduces intracortical porosity in women with osteoporosis. Journal of Bone & Mineral Research 2010;25(1):41-7	Wrong outcomes
83.	Borgstrom	2004	Borgstrom, F.; Johnell, O.; Kanis, J. A.; Oden, A.; Sykes, D.; Jonsson, B.. Cost effectiveness of raloxifene in the treatment of osteoporosis in Sweden: An economic evaluation based on the MORE study. PharmacoEconomics 2004;22(17):1153-1165	Wrong outcomes
84.	Borst	2010	Borst, H.; Bock, O.; Beller, G.; Kratzsch, M.; Degner, C.; Profittlich, H.; Kalbow, M.; Armbrecht, G.; Martus, P.; Glaab, J.; Felsenberg, D.. Monthly oral ibandronate 150 mg improves significantly bone density and structure measured in Vivo by Micro-CT at distal tibia in postmenopausal women with mild osteoporosis. Bone 2010;1:S195.	Conference abstract
85.	Borst	2010	Borst, H.; Bock, O.; Beller, G.; Kratzsch, M.; Degner, C.; Profittlich, H.; Kalbow, M.; Armbrecht, G.; Martus, P.; Glaab, J.; Felsenberg, D. Effects of monthly oral ibandronate 150 MG on BV/TV and trabecular separation measured in vivo by micro-CT at the distal tibia in postmenopausal women with osteoporosis or osteopenia. Osteoporosis International May 2010;1)():S164-S165	Wrong outcomes
86.	Bouxsein	2017	Bouxsein, M. L.; Keaveny, T. M.; Lee, D. C.; Khosla, S.; De Papp, A.; Eastell, R.; Lui, L. Y.; Bauer, D. C.; Black, D. M.. Relationship between femoral strength from QCT-based finite element analysis and femoral BMD before and after treatment: An Analysis from the FNIH Bone Quality Project.	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			Journal of Bone and Mineral Research December 2017;32 (Supplement 1):S53	
87.	Bovbjerg	2021	Bovbjerg, Pernille; Froberg, Lonnie; Hogh, Ditte; Schmal, Hagen; Kassem, Moustapha. Effect of PTH treatment on bone healing in insufficiency fractures of the pelvis: a systematic review. EFORT Open Reviews 2021;6(1):9-14	Wrong outcomes
88.	Bovijn	2020	Bovijn, Jonas; Krebs, Kristi; Chen, Chia-Yen; Boxall, Ruth; Censin, Jenny C.; Ferreira, Teresa; Pulit, Sara L.; Glastonbury, Craig A.; Laber, Samantha; Millwood, Iona Y.; Lin, Kuang; Li, Liming; Chen, Zhengming; Milani, Lili; Smith, George Davey; Walters, Robin G.; Magi, Reedik; Neale, Benjamin M.; Lindgren, Cecilia M.; Holmes, Michael V. Evaluating the cardiovascular safety of sclerostin inhibition using evidence from meta-analysis of clinical trials and human genetics. Science translational medicine 2020;12(549):	Systematic review and/or meta-analysis
89.	Brandao	2008	Brandao, C. M.; Lima, M. G.; Silva, A. L.; Silva, G. D.; Guerra, A. A., Jr.; Acurcio Fde, A.. Treatment of postmenopausal osteoporosis in women: a systematic review. Cadernos de Saude Publica 2008;24 Suppl 4:s592-606	Systematic review and/or meta-analysis
90.	Brandi	2000	Brandi, M. L.. Raloxifene reduces vertebral fracture risk in postmenopausal women with osteoporosis. Clinical & Experimental Rheumatology 2000;18(3):309-10	Commentary
91.	Brandi	2008	Brandi, M. L.. Is yearly intravenous zoledronic acid comparable to weekly oral alendronate for postmenopausal osteoporosis? Nature Clinical Practice Endocrinology and Metabolism January 2008;4(1):20-21	Commentary
92.	Brown	2002	Brown, J. P.; Kendler, D. L.; McClung, M. R.; Emkey, R. D.; Adachi, J. D.; Bolognese, M. A.; Li, Z.; Balske, A.; Lindsay, R. The efficacy and tolerability of risedronate once a week for the treatment of postmenopausal osteoporosis. Calcified Tissue International 2002;71(2):103-11	Wrong outcomes
93.	Brown	2013	Brown, J. P.; Bolognese, M. A.; Ho, P. R.; Hall, J.; Roux, C.; Bone, H. G.; Bonnick, S.; Van Den Bergh, J.; Ferreira, I.; Ghelani, P.; Dakin, P.; Wagman, R. B.; Recknor, C.. Denosumab significantly increases bone mineral density compared with ibandronate and risedronate in postmenopausal women previously treated with an oral bisphosphonate who are at higher risk for fracture. Journal of Bone and Mineral Research. Conference 2013;28(SUPPL. 1).	Conference abstract
94.	Brown	2013 a	Brown, J. P.; Bolognese, M. A.; Ho, P. R.; Hall, J.; Roux, C.; Bone, H. G.; Bonnick, S.; Van Den Bergh, J.; Ferreira, I.; Ghelani, P.; Dakin, P.; Wagman, R. B.; Recknor, C.. Denosumab leads to significantly greater increases in bone mineral density than	Wrong outcomes

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			ibandronate and risedronate in postmenopausal women at high risk for fracture who were previously treated with an oral bisphosphonate. Arthritis and Rheumatism 2013;10):S522-S523.	
95.	Brown	2009	Brown, J. P.; Kendler, D. L.; Silverman, S. L.; Christiansen, C.; Genant, H. K.; Zanchetta, J. R.; Vukicevic, S.; Valter, I.; De Villiers, T. J.; Ciesielska, M.; Chines, A. A. Efficacy of bazedoxifene in reducing the incidence of nonvertebral fractures in postmenopausal osteoporotic women at higher fracture risk. Journal of Rheumatology 2009;36 (11)():2566	Conference abstract
96.	Brown	2014	Brown, J. P.; Roux, C.; Ho, P. R.; Bolognese, M. A.; Hall, J.; Bone, H. G.; Bonnick, S.; Van Den Bergh, J. P.; Ferreira, I.; Dakin, P.; Wagman, R. B.; Recknor, C. Denosumab significantly increases bone mineral density and reduces bone turnover compared with monthly oral ibandronate and risedronate in postmenopausal women who remained at higher risk for fracture despite previous suboptimal treatment with an oral bisphosphonate. Osteoporosis International July 2014;25(7):1953-1961	Systematic review and/or meta-analysis and/or pooled data
97.	Brown	2015	Brown, J. P.; Yue, S.; Farlay, D.; Rizzo, S.; Song, J.; Wang, A.; Wagman, R. B.; Boivin, G.. Effects of denosumab on bone matrix mineralization: Results from the phase 3 FREEDOM trial. Journal of Bone and Mineral Research. Conference 2015;30(Supplement 1).	Conference abstract
98.	Brown	2019	Brown, Jacques; Chines, Arkadi; Yang, Wenjing; Chapurlat, Roland; Foldes, Joseph; Nogues, Xavier; Civitelli, Roberto; De Villiers, Tobias; Massari, Fabio; Zerbini, Cristiano A.; Recknor, Chris; Libanati, Cesar. Romosozumab improves lumbar spine bone mineral density and bone strength greater than alendronate as assessed by quantitative computed Tomography and Finite Element Analysis in the ARCH Trial. Arthritis and Rheumatology 2019;71(Supplement 10):3347-3349	Conference abstract, with no new data
99.	Brown	2019 a	Brown, Jacques P.; Chines, Arkadi; Yang, Wenjing; Chapurlat, Roland; Foldes, Joseph; Nogues, Xavier; Civitelli, Roberto; De Villiers, Tobias; Massari, Fabio; Zerbini, Cristiano; Recknor, Chris; Libanati, Cesar. Romosozumab improves lumbar spine bone mineral density and bone strength greater than alendronate as assessed by quantitative computed tomography and finite element analysis in the ARCH trial. Journal of Bone and Mineral Research 2019;34(Supplement 1):16	Conference abstract, with no new data
100.	Burge	2013	Burge, R.; Shen, W.; Naegeli, A. N.; Alam, J.; Silverman, S.; Gold, D. T.; Shih, T.. Use of health-related quality of life measures to predict health utility in postmenopausal osteoporotic women:	Wrong outcomes

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			results from the Multiple Outcomes of Raloxifene Evaluation study. Health & Quality of Life Outcomes 2013;11:189	
101.	Byun	2017	Byun, J. H.; Jang, S.; Lee, S.; Park, S.; Yoon, H. K.; Yoon, B. H.; Ha, Y. C.. The efficacy of bisphosphonates for prevention of osteoporotic fracture: An update meta-analysis. Journal of Bone Metabolism 2017;24(1):37-49.	Systematic review and/or meta-analysis
102.	Caffarelli	2010	Caffarelli, C.; Gonnelli, S.; Tanzilli, L.; Martini, G.; Nuti, R. Apparent bone mineral density at femoral neck in the monitoring the early effects of teriparatide. Bone June 2010;1)():S203-S204	Wrong outcomes
103.	Calitro	2010	Calitro, M.; Pietrapertosa, D.; Pietrapertosa, G.; Novelli, D.; Forcignano, T.; Giannelli, P.; Lagrasta, F. Severe postmenopausal osteoporosis: Effycacy of parathyroid hormone therapy. Osteoporosis International May 2010;1)():S171	Wrong study design
104.	Carlino	2011	Carlino, G.; Cozzolongo, A. Effects of intravenous zoledronic acid following subcutaneous teriparatide [(1-34)PTH] in postmenopausal osteoporosis. Bone 07 May 2011;2)():S220	Conference abstract
105.	Carlos	2011	Carlos, F.; Clark, P.; Jasqui-Romano, S.. Economic evaluation of teripatide in the management of women with postmenopausal osteoporosis and high risk of fragility fractures in Mexico. Value in Health 2011;14 (7):A548.	Conference abstract
106.	Catton	2021	Catton, Brett; Towheed, Tanveer; Surangiwala, Salman. Is denosumab associated with an increased risk for infection in patients with low bone mineral density? A systematic review and meta-analysis of randomized controlled trials. International Journal of Rheumatic Diseases 2021;24(7):869-879	Systematic review and/or meta-analysis
107.	Cauley	2011	Cauley, J. A.; Cummings, S.; Palermo, L.; Cosman, F.; Eastell, R.; Boonen, S.; Hue, T.; Bucci-Rechtweg, C.; Black, D. M. Fracture risk reduction with zoledronic acid by predicted fracture risk score. Bone 07 May 2011;2)():S93	Conference abstract
108.	Cauley	2010	Cauley, J.; Cummings, S.; Palermo, L.; Cosman, F.; Eastell, R.; Boonen, S.; Hue, T.; Bucci- Rechtweg, C.; Black, D. Fracture risk reduction with zoledronic acid by predicted fracture risk score. Journal of Bone and Mineral Research 2010;1)():S32	Conference abstract
109.	Cauza	2004	Cauza, E.; Etemad, M.; Winkler, F.; Hanusch-Enserer, H.; Partsch, G.; Noske, H.; Dunky, A.. Pamidronate increases bone mineral density in women with postmenopausal or steroid-induced osteoporosis. Journal of Clinical Pharmacy and Therapeutics 2004;29(5):431-436.	Wrong patient population
110.	Cecilia	2009	Cecilia, D.; Jodar, E.; Fernandez, C.; Resines, C.; Hawkins, F.. Effect of alendronate in elderly patients after low trauma hip fracture repair. Osteoporosis International 2009;20(6):903-910.	Wrong patient population

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
111.	Cecelja	2015	Cecelja, M.; Edwards, S.; Moore, A.; Fogelman, I.; Chowienczyk, P.; Frost, M.. A pilot study to assess effects of alendronic acid on aortic calcification and stiffness in postmenopausal women. Journal of Hypertension 2015;1):e347.	Wrong outcomes
112.	Cedeno-Veloz	2020	Cedeno-Veloz, B. A.; Sanchez Latorre, M.; Garcia Martinez, J.; Rodriguez Garcia, A. M.; Martinez-Velilla, N.; Erviti Lopez, J.; Gutierrez-Valencia, M.; Leache Alegria, L.; Saiz, L. C.; Ramirez Velez, R.; Izquierdo, M. Efficacy of antiresorptive treatment in osteoporotic older adults: A systematic review and meta-analysis of randomised clinical trials. Osteoporosis International 2020;31(SUPPL 1):S255-S256	Conference abstract, with no new data
113.	Center	2020	Center, Jacqueline R.; Bliuc, Dana; Lyles, Kenneth W. Bisphosphonates and lifespan. Bone 2020;141():115566	Systematic review and/or meta-analysis
114.	Chandran	2019	Chandran, Thulasi; Venkatachalam, Indumathi. Efficacy and safety of denosumab compared to bisphosphonates in improving bone strength in postmenopausal osteoporosis: a systematic review. Singapore medical journal 2019;60(7):364-378	Systematic review and/or meta-analysis
115.	Chang	2020	Chang, Yin-Fan; Wu, Chih-Hsing; Hung, Wei-Chieh; Chang, Ing-Lin; Tsai, Tsung-Ting; McCloskey, Eugene V.; Watts, Nelson B.; McClung, Michael R.; Huang, Chun-Feng; Chen, Chung-Hwan; Wu, Kun-Ling; Tsai, Keh-Sung; Chan, Ding-Cheng; Chen, Jung-Fu; Tu, Shih-Te; Hwang, Jawl-Shan; Xia, Weibo; Matsumoto, Toshio; Chung, Yoon-Sok; Cooper, Cyrus; Kanis, John A.; Yang, Rong-Sen; Chan, Wing P. Pharmacologic intervention for prevention of fractures in osteopenic and osteoporotic postmenopausal women: Systemic review and meta-analysis. Bone Reports 2020;13():100729	Systematic review and/or meta-analysis
116.	Chao	2013	Chao, M.; Hua, Q.; Yingfeng, Z.; Guang, W.; Shufeng, S.; Yuzhen, D.; Wei, W.; Haifeng, T.. Study on the role of zoledronic acid in treatment of postmenopausal osteoporosis women. Pakistan Journal of Medical Sciences 2013;29(6):1381-4.	Wrong patient population
117.	Chaplin	2020	Chaplin, Steve. Romosozumab for the treatment of severe osteoporosis. Prescriber 2020;31(6):27-29	Systematic review and/or meta-analysis
118.	Chavassieux	2017	Chavassieux, P.; Chapurlat, R.; Portero-Muzy, N.; Garcia, P.; Brown, J. P.; Horlait, S.; Libanati, C.; Boyce, R.; Wang, A.; Grauer, A.. Effects of romosozumab in postmenopausal women with osteoporosis after 2 and 12 months: Bone histomorphometry substudy. Journal of Bone and Mineral Research December 2017;32 (Supplement 1):S25	Wrong outcomes
119.	Chavassieux	2019	Chavassieux, P.; Chapurlat, R.; Portero-Muzy, N.; Roux, J. P.; Garcia, P.; Brown, J. P.; Libanati, C.; Boyce, R. W.; Wang, A.; Grauer, A.. Bone-Forming and Antiresorptive Effects of Romosozumab in	Wrong outcomes

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			Postmenopausal Women With Osteoporosis: Bone Histomorphometry and Microcomputed Tomography Analysis After 2 and 12 Months of Treatment. Journal of Bone and Mineral Research 01 Sep 2019;34(9):1597-1608	
120.	Chavassieux	2019 b	Chavassieux, Pascale; Portero-Muzy, Nathalie; Roux, Jean Paul; Horlait, Stephane; Dempster, David W.; Wang, Andrea; Wagman, Rachel B.; Chapurlat, Roland. Reduction of Cortical Bone Turnover and Erosion Depth After 2 and 3 Years of Denosumab: Iliac Bone Histomorphometry in the FREEDOM Trial. Journal of bone and mineral research : the official journal of the American Society for Bone and Mineral Research 2019;34(4):626-631	Wrong outcomes
121.	Chawla	2020	Chawla, L. Comparative study of weekly alendronate vs. yearly zoledronic acid injection in treatment of postmenopausal osteoporosis in terms of efficacy, compliance and bone markers estimation. Osteoporosis International 2020;31(SUPPL 1):S196-S197	Wrong comparator
122.	Chen	2019	Chen, J.; Peng, X.; Hu, F.. Effect of co-administration of alendronate and allan sodium phosphate for the management of osteoporosis. Tropical Journal of Pharmaceutical Research 2019;18(1):49-54.	Wrong patient population
123.	Chen	2021	Chen, Yi; Zhu, Jun; Zhou, Yiqin; Peng, Jinhui; Wang, Bo. Efficacy and Safety of Denosumab in Osteoporosis or Low Bone Mineral Density Postmenopausal Women. Frontiers in Pharmacology 2021;12():588095	Systematic review and/or meta-analysis
124.	Chotiyarnwong	2020	Chotiyarnwong, Pojchong; McCloskey, Eugene; Eastell, Richard; Gostage, John; McClung, Michael R.; Gielen, Evelien; McDermott, Michele; Chines, Arkadi; Huang, Shuang; Cummings, Steven R. A Pooled Analysis of Fall Incidence From Placebo-Controlled Trials of Denosumab. Journal of Bone and Mineral Research 2020;35(6):1014-1021	Systematic review and/or meta-analysis and/or pooled analysis
125.	Christiansen	2010	Christiansen, C.; Chesnut, C. H., 3rd; Adachi, J. D.; Brown, J. P.; Fernandes, C. E.; Kung, A. W.; Palacios, S.; Levine, A. B.; Chines, A. A.; Constantine, G. D.. Safety of bazedoxifene in a randomized, double-blind, placebo- and active-controlled Phase 3 study of postmenopausal women with osteoporosis. BMC Musculoskeletal Disorders 2010;11:130	Wrong outcomes
126.	Churilla	2021	Churilla, B. M.; Resnick, N. M.; Kotlarczyk, M. P.; Perera, S.; Greenspan, S. L. Zoledronic acid and bone health in older adults with cognitive impairment. Osteoporosis International 2021;():	Wrong outcomes
127.	Cipriani	2021	Cipriani, Cristiana; Colangelo, Luciano; De Martino, Viviana; Ferrone, Federica; Piazzolla, Valentina; Minisola, Salvatore; Pepe, Jessica; Piemonte, Sara; Diacinti, Daniele; Fassino, Valeria; Nieddu, Luciano.	Wrong outcomes

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			Inhibition of the RANKL with denosumab has no effect on circulating markers of atherosclerosis in women with postmenopausal osteoporosis: a pilot study. Endocrine 2021;71(1):199-207	
128.	Civitelli	2007	Civitelli, R.; Napoli, N.; Armamento-Villareal, R.. Use of intravenous bisphosphonates in osteoporosis. Current Osteoporosis Reports March 2007;5(1):8-13	Systematic review and/or meta-analysis
129.	Clifton-Bligh	2002	Clifton-Bligh, R.; Sambrook, P.. An update on osteoporosis. Medicine Today 2002;3(1):16-22	Systematic review and/or meta-analysis
130.	Colon-Emeric	2006	Colon-Emeric, C. S.. Ten vs five years of bisphosphonate treatment for postmenopausal osteoporosis: Enough of a good thing. Journal of the American Medical Association 27 Dec 2006;296(24):2968-2969	Systematic review and/or meta-analysis
131.	Compston	2000	Compston, J. E.. Pharmacological interventions for post-menopausal osteoporosis: An evidence-based approach. Rheumatology 2000;39(12):1309-1312	Systematic review and/or meta-analysis
132.	Compston	2017	Compston, J.; Cooper, A.; Cooper, C.; Gittoes, N.; Gregson, C.; Harvey, N.; Hope, S.; Kanis, J. A.; McCloskey, E. V.; Poole, K. E. S.; Reid, D. M.; Selby, P.; Thompson, F.; Thurston, A.; Vine, N.; National Osteoporosis Guideline, Group. UK clinical guideline for the prevention and treatment of osteoporosis. Archives of Osteoporosis 2017;12(1):43	Systematic review and/or meta-analysis
133.	Cooper	2019	Cooper, Cyrus. Why are bisphosphonates not being used more to prevent fractures (The 'Treatment Gap'). JBMR Plus 2019;3(Supplement 3):21-22	Conference abstract, with no new data
134.	Cosman	1998	Cosman, F.. The effect of raloxifene on bone. Obstetrical and Gynecological Survey 1998;53(10 SUPPL.):S74-S76	Commentary
135.	Cosman	1998 a	Cosman, F.; Lindsay, R.. Is parathyroid hormone a therapeutic option for osteoporosis? A review of the clinical evidence. Calcified Tissue International 1998;62(6):475-480	Systematic review and/or meta-analysis
136.	Cosman	2003	Cosman, F.. Selective estrogen-receptor modulators. Clinics in Geriatric Medicine May 2003;19(2):371-379	Systematic review and/or meta-analysis
137.	Cosman	2004	Cosman, F.; Lindsay, R.. Therapeutic potential of parathyroid hormone. Current Osteoporosis Reports Mar 2004;2(1):5-11	Systematic review and/or meta-analysis
138.	Cosman	2013	Cosman, F.; Keaveny, T. M.; Kopperdahl, D.; Wermers, R. A.; Wan, X.; Krohn, K. D.; Krege, J. H.. Hip and spine strength effects of adding versus switching to teriparatide in postmenopausal women with osteoporosis treated with prior alendronate or raloxifene. Journal of Bone and Mineral Research 2013;28(6):1328-1336.	Wrong outcomes
139.	Cosman	2016	Cosman, F.; Hattersley, G.; Miller, P. D.; Hu, M. Y.; Russo, L. A. T.; Riis, B.; Williams, G.; Fitzpatrick, L.. Abaloparatide-sc significantly reduces vertebral and nonvertebral fractures and increases bone	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			mineral density (BMD) regardless of age, BMD T-score, or prior fracture at baseline. Arthritis and Rheumatology 2016;68 (Supplement 10):431-432.	
140.	Cosman	2016 a	Cosman, F.; Crittenden, D. B.; Adachi, J. D.; Binkley, N.; Czerwinski, E.; Ferrari, S.; Hofbauer, L. C.; Lau, E.; Lewiecki, E. M.; Miyauchi, A.; Zerbini, C. A. F.; Milmont, C. E.; Chen, L.; Maddox, J.; Meisner, P. D.; Libanati, C.; Grauer, A.. Fracture risk reduction with romosozumab: Results of a phase 3 study in postmenopausal women with osteoporosis. Arthritis and Rheumatology 2016;68 (Supplement 10):1347-1348.	Conference abstract
141.	Cosman	2017	Cosman, F.; Crittenden, D. B.; Adachi, J. D.; Binkley, N.; Czerwinski, E.; Ferrari, S.; Hofbauer, L. C.; Lau, E.; Lewiecki, E. M.; Miyauchi, A.; Zerbini, C. A. F.; Milmont, C. E.; Chen, L.; Maddox, J.; Meisner, P. D.; Libanati, C.; Grauer, A.. Fracture risk reduction with romosozumab: Results of a phase 3 study in postmeno-pausal women with osteoporosis. Osteoporosis International 2017;28 (1 Supplement 1):S50-S51.	Conference abstract
142.	Cosman	2017 a	Cosman, F.; Crittenden, D. B.; Adachi, J. D.; Binkley, N.; Czerwinski, E.; Ferrari, S.; Hofbauer, L. C.; Lau, E.; Lewiecki, E. M.; Miyauchi, A.; et al.,. Fracture risk reduction with romosozumab: results of the phase 3 frame study (fracture study in postmenopausal women with osteoporosis). Journal of Bone and Mineral Research 2017;31. [DOI: 10.1002/jbmr.3107]	Conference abstract
143.	Cosman	2018	Cosman, F.; Lewiecki, E. M.; Ebeling, P. R.; Hesse, E.; Napoli, N.; Crittenden, D. B.; Rojeski, M.; Yang, W.; Libanati, C.; Ferrari, S.. T-score as an indicator of fracture risk on therapy: Evidence from romosozumab vs alendronate treatment in the active-controlled fracture study in postmenopausal women with osteoporosis at high risk trial. Arthritis and Rheumatology 2018;70 (Supplement 9):3156-3157.	Conference abstract
144.	Cosman	2018 a	Cosman, F.; Crittenden, D. B.; Ferrari, S.; Khan, A.; Lane, N. E.; Lippuner, K.; Matsumoto, T.; Milmont, C. E.; Libanati, C.; Grauer, A.. Frame study: the foundation effect of rebuilding bone with one year of romosozumab leads to continued lower fracture risk after transition to denosumab. Osteoporosis International 2018;29 (1 Supplement 1):S268	Conference abstract
145.	Cosman	2018 b	Cosman, F.; Crittenden, D. B.; Ferrari, S.; Khan, A.; Lane, N. E.; Lippuner, K.; Matsumoto, T.; Milmont, C. E.; Libanati, C.; Grauer, A.. Frame study: The foundation effect of rebuilding bone with one year of romosozumab leads to continued lower fracture risk after transition to denosumab. Annals of the Rheumatic Diseases 2018;77 (Supplement 2):217-218.	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
146.	Cosman	2018 d	Cosman, F.; Lewiecki, E. M.; Ebeling, P. R.; Hesse, E.; Napoli, N.; Crittenden, D. B.; Rojeski, M.; Yang, W.; Libanati, C.; Ferrari, S. T-score as an indicator of fracture risk on therapy: Evidence from romosozumab vs alendronate treatment in the active-controlled fracture study in postmenopausal women with osteoporosis at high risk trial. Arthritis and Rheumatology September 2018;70 (Supplement 9)():3156-3157	Conference abstract
147.	Cosman	2019	Cosman, F.; McMahon, D.; Dempster, D.; Nieves, J. W.. Standard vs Cyclic Teriparatide and Denosumab Treatment for Osteoporosis: A Randomized Trial. Journal of bone and mineral research: the official journal of the American Society for Bone and Mineral Research. 2019;16.	Wrong comparator
148.	Cosman	2019 a	Cosman, F.; Lewiecki, E. M.; Ebeling, P. R.; Hesse, E.; Napoli, N.; Crittenden, D. B.; Rojeski, M.; Yang, W.; Libanati, C.; Ferrari, S. L. T-score as an indicator of fracture risk on therapy: Evidence from romosozumab vs. alendronate treatment in the activecontrolled fracture study in postmen opausal women with osteoporosis at high risk trial. Osteoporosis International 2019;30(SUPPL 2):S168	Conference abstract, with no new data
149.	Cosman	2019 b	Cosman, F.; Lewiecki, E. M.; Ebeling, P. R.; Hesse, E.; Napoli, N.; Matsumoto, T.; Rojeski, M.; Yang, W.; Libanati, C.; Ferrari, S. L. Levels of improvements in bone mineral density in postmenopausal women with osteoporosis treated with romosozumab: A post hoc analysis of the arch phase 3 trial. Osteoporosis International 2019;30(SUPPL 2):S732-S733	Conference abstract, with no new data
150.	Cosman	2020	Cosman, F.; Lewiecki, E. Michael; Ebeling, Peter R.; Hesse, E.; Napoli, N.; Crittenden, Daria B.; Rojeski, M.; Yang, W.; Libanati, C.; Ferrari, S. T-score as an indicator of fracture risk on therapy: evidence from romosozumab vs alendronate treatment in the ARCH trial. Osteologie 2020;29(1):72-73	Conference abstract, with no new data
151.	Cosman	2020 a	Cosman, Felicia. Anabolic Therapy and Optimal Treatment Sequences for Patients With Osteoporosis at High Risk for Fracture. Endocrine practice : official journal of the American College of Endocrinology and the American Association of Clinical Endocrinologists 2020;26(7):777-786	Systematic review and/or meta-analysis
152.	Cosman	2020 b	Cosman, Felicia; McMahon, Donald; Dempster, David; Nieves, Jeri W. Standard Versus Cyclic Teriparatide and Denosumab Treatment for Osteoporosis: A Randomized Trial. Journal of bone and mineral research : the official journal of the American Society for Bone and Mineral Research 2020;35(2):219-225	Wrong comparator
153.	Cosman	2021	Cosman, Felicia; Libanati, Cesar; Deignan, Cynthia; Yu, Zhigang; Wang, Zhenxun; Ferrari, Serge; Beck Jensen, Jens-Erik; Peris, Pilar; Bertoldo, Francesco;	Wrong outcomes

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			Lespessailles, Eric; Hesse, Eric; Cummings, Steven R. Romosozumab Followed by Antiresorptive Treatment Increases the Probability of Achieving Bone Mineral Density Treatment Goals. JBMR Plus 2021;5(11):e10546	
154.	Cranney	1999	Cranney, A.; Welch, V.; Tugwell, P.; Wells, G.; Adachi, J. D.; McGowan, J.; Shea, B.. Responsiveness of endpoints in osteoporosis clinical trials - An update. Journal of Rheumatology 1999;26(1):222-228	Systematic review and/or meta-analysis
155.	Cranney	2002	Cranney, A.; Guyatt, G.; Griffith, L.; Wells, G.; Tugwell, P.; Rosen, C.. IX: Summary of meta-analyses of therapies for postmenopausal osteoporosis. Endocrine Reviews August 2002;23(4):570-578	Systematic review and/or meta-analysis
156.	Cranney	2002 a	Cranney, A.; Tugwell, P.; Adachi, J.; Weaver, B.; Zytaruk, N.; Papaioannou, A.; Robinson, V.; Shea, B.; Wells, G.; Guyatt, G.. III. Meta-analysis of risedronate for the treatment of postmenopausal osteoporosis. Endocrine Reviews August 2002;23(4):517-523	Systematic review and/or meta-analysis
157.	Cummings	2010	Cummings, S. R.; Ensrud, K.; Delmas, P. D.; LaCroix, A. Z.; Vukicevic, S.; Reid, D. M.; Goldstein, S.; Sriram, U.; Lee, A.; Thompson, J.; Armstrong, R. A.; Thompson, D. D.; Powles, T.; Zanchetta, J.; Kendler, D.; Neven, P.; Eastell, R.; Pearl Study Investigators. Lasofoxifene in postmenopausal women with osteoporosis. New England Journal of Medicine 2010;362(8):686-96.	Wrong intervention
158.	Cummings	2019	Cummings, S. R.; Lui, L. Y.; Eastell, R.; Allen, I. E.. Association between Drug Treatments for Patients with Osteoporosis and Overall Mortality Rates: A Meta-analysis. JAMA Internal Medicine. 2019;:	Systematic review and/or meta-analysis
159.	Dane	2008	Dane, C.; Dane, B.; Cetin, A.; Erginbas, M.. Effect of risedronate on biochemical marker of bone resorption in postmenopausal women with osteoporosis or osteopenia. Gynecological Endocrinology 2008;24(4):207-13	Wrong outcomes
160.	David	2021	David, Natalie L.; Bruce, Michael; Leder, Benjamin Z.; Tsai, Joy N.; Ramchand, Sabashini K.; Lee, Hang; Bouxsein, Mary L. Effects of Combination Denosumab and High-Dose Teriparatide Administration on Bone Microarchitecture and Estimated Strength: The DATA-HD HR-pQCT Study. Journal of Bone and Mineral Research 2021;36(1):41-51	Wrong outcomes
161.	Dawson Hughes	2007	Dawson-Hughes, B.; Chen, P.; Krege, J. H.. Response to teriparatide in patients with baseline 25-hydroxyvitamin D insufficiency or sufficiency. Journal of Clinical Endocrinology and Metabolism 2007;92(12):4630-4636.	Wrong patient population (sub group analysis)
162.	Davis	2020	Davis, Sarah; Simpson, Emma; Hamilton, Jean; James, Marrissa Martyn-St; Rawdin, Andrew;	Systematic review and/or meta-analysis

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			Wong, Ruth; Goka, Edward; Gittoes, Neil; Selby, Peter. Denosumab, raloxifene, romosozumab and teriparatide to prevent osteoporotic fragility fractures: a systematic review and economic evaluation. Health technology assessment (Winchester, England) 2020;24(29):1-314	
163.	Deardorff	2021	Deardorff, W. J.; Stijacic Cenzer, I.; Lee, S. Time to benefit of bisphosphonates for the prevention of fractures in postmenopausal women with osteoporosis: A meta-analysis. Journal of the American Geriatrics Society 2021;69(SUPPL 1):S145	Conference abstract, with no new data
164.	Delmas	2002	Delmas, P. D.; Ensrud, K. E.; Adachi, J. D.; Harper, K. D.; Sarkar, S.; Gennari, C.; Reginster, J. Y.; Pols, H. A. P.; Recker, R. R.; Harris, S. T.; Wu, W.; Genant, H. K.; Black, D. M.; Eastell, R.. Efficacy of raloxifene on vertebral fracture risk reduction in postmenopausal women with osteoporosis: Four-year results from a randomized clinical trial. Journal of Clinical Endocrinology and Metabolism 2002;87(8):3609-3617.	Extension study
165.	Delmas	2006	Delmas, P. D.; Adami, S.; Strugala, C.; Stakkestad, J. A.; Reginster, J. Y.; Felsenberg, D.; Christiansen, C.; Civitelli, R.; Drezner, M. K.; Recker, R. R.; Bolognese, M.; Hughes, C.; Masanauskaite, D.; Ward, P.; Sambrook, P.; Reid, D. M.. Intravenous ibandronate injections in postmenopausal women with osteoporosis: One-year results from the dosing intravenous administration study. Arthritis and Rheumatism 2006;54(6):1838-1846.	Wrong outcomes
166.	Delmas	2007	Delmas, P. D.. Use of alendronate after 5 years of treatment [3]. Journal of the American Medical Association 09 May 2007;297(18):1979-1980	Commentary
167.	Delmas	2008	Delmas, P. D.; Benhamou, C. L.; Man, Z.; Tlustochowicz, W.; Matzkin, E.; Eusebio, R.; Zanchetta, J.; Olszynski, W. P.; Recker, R. R.; McClung, M. R.. Monthly dosing of 75 mg risedronate on 2 consecutive days a month: Efficacy and safety results. Osteoporosis International 2008;19(7):1039-1045.	Wrong intervention
168.	Delmas	2008 a	Delmas, P. D.; McClung, M. R.; Zanchetta, J. R.; Racewicz, A.; Roux, C.; Benhamou, C. L.; Man, Z.; Eusebio, R. A.; Beary, J. F.; Burgio, D. E.; Matzkin, E.; Boonen, S.. Efficacy and safety of risedronate 150 mg once a month in the treatment of postmenopausal osteoporosis. Bone 2008;42(1):36-42	Wrong comparator
169.	Dempster	2016	Dempster, D. W.; Roschger, P.; Misof, B. M.; Zhou, H.; Paschalis, E. P.; Alam, J.; Ruff, V. A.; Klaushofer, K.; Taylor, K. A.. Differential Effects of Teriparatide and Zoledronic Acid on Bone Mineralization Density Distribution at 6 and 24 Months in the SHOTZ Study. Journal of Bone and Mineral Research. 2016.	Extension study

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
170.	Dempster	2016 a	Dempster, D. W.; Zhou, H.; Recker, R. R.; Brown, J. P.; Recknor, C. P.; Lewiecki, E. M.; Miller, P. D.; Rao, S. D.; Kendler, D. L.; Lindsay, R.; Krege, J. H.; Alam, J.; Taylor, K. A.; Janos, B.; Ruff, V. A.. Differential effects of teriparatide and denosumab on intact PTH and bone formation indices: AVA osteoporosis study. Journal of Clinical Endocrinology and Metabolism 2016;101(4):1353-1363.	Wrong outcomes
171.	DeSantis	2002	DeSantis, A.; Buchman, A.. Current and emerging therapies in osteoporosis. Expert Opinion on Pharmacotherapy 2002;3(7):835-843	Systematic review and/or meta-analysis
172.	Dhesi	2006	Dhesi, J. K.; Allain, T. J.; Mangoni, A. A.; Jackson, S. H. D.. The implications of a growing evidence base for drug use in elderly patients. Part 4. Vitamin D and bisphosphonates for fractures and osteoporosis. British Journal of Clinical Pharmacology May 2006;61(5):521-528	Systematic review and/or meta-analysis
173.	Dhillon	2016	Dhesi, J. K.; Allain, T. J.; Mangoni, A. A.; Jackson, S. H. D. The implications of a growing evidence base for drug use in elderly patients. Part 4. Vitamin D and bisphosphonates for fractures and osteoporosis. British Journal of Clinical Pharmacology May 2006;61(5):521-528	Systematic review and/or meta-analysis
174.	Diez-Perez	2019	Diez-Perez, A.; Marin, F.; Eriksen, E. F.; Kendler, D. L.; Krege, J. H.; Delgado-Rodriguez, M.. Effects of teriparatide on hip and upper limb fractures in patients with osteoporosis: A systematic review and meta-analysis. Bone 2019;120:1-8.	Systematic review and/or meta-analysis
175.	Diez-Perez	2019 a	Diez-Perez, A.; Marin, F.; Eriksen, E. F.; Kendler, D. L.; Krege, J. H.; Delgado-Rodriguez, M.; Hassanzai, M.. Effects of teriparatide on hip and upper limb fractures in patients with osteoporosis: A systematic reviewand meta-analysis. Osteoporosis International May 2019;30 (Supplement 1):S51-S52	Conference abstract
176.	Diez-Perez	2019 b	Diez-Perez, A. New results of teriparatide in the treatment of severe osteoporosis. Osteoporosis International 2019;30(SUPPL 2):S781-S782	Conference abstract, with no new data
177.	Diez-Perez	2019c	Diez-Perez, A.; Marin, F.; Eriksen, E. F.; Kendler, D. L.; Krege, J. H.; Delgado-Rodriguez, M.; Hassanzai, M. Effects of teriparatide on hip and upper limb fractures in patients with osteoporosis: A systematic reviewand meta-analysis. Osteoporosis International 2019;30(Supplement 1):S51-S52	Conference abstract, with no new data
178.	Diez-Perez	2019 d	Diez-Perez, Adolfo; Marin, Fernando; Eriksen, Erik F.; Kendler, David L.; Krege, John H.; Delgado-Rodriguez, Miguel. Effects of teriparatide on hip and upper limb fractures in patients with osteoporosis: A systematic review and meta-analysis. Bone 2019;120():1-8	Systematic review and/or meta-analysis
179.	Diker-Cohen	2020	Diker-Cohen, Talia; Rosenberg, Dana; Avni, Tomer; Shepshelovich, Daniel; Tsvetov, Gloria; Gafter-Gvili, Anat. Risk for Infections During Treatment With Denosumab for Osteoporosis: A Systematic Review	Systematic review and/or meta-analysis

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			and Meta-analysis. The Journal of clinical endocrinology and metabolism 2020;105(5):	
180.	Dimai	2017	Dimai, H. P.; Ljuhar, R.; Ljuhar, D.; Norman, B.; Haftner, T.; Nehrer, S.; Fahrleitner-Pammer, A.. Fractal-based assessment of bone-antiresorptive treatment effects at the lumbar spine using conventional radiographs; Results from a pilot study in a sub-cohort of postmenopausal women who participated in the FREEDOM pivotal trial and its extension Phase*. Journal of Bone and Mineral Research December 2017;32 (Supplement 1):S356	Wrong study design
181.	Dimai	2019	Dimai, H. P.; Ljuhar, R.; Ljuhar, D.; Norman, B.; Nehrer, S.; Kurth, A.; Fahrleitner-Pammer, A.. Assessing the effects of long-term osteoporosis treatment by using conventional spine radiographs: results from a pilot study in a sub-cohort of a large randomized controlled trial. Skeletal Radiology 2019;48(7):1023-1032	Wrong outcomes
182.	Doggrell	2002	Doggrell, S. A.. Zoledronate once-yearly increases bone mineral density - Implications for osteoporosis. Expert Opinion on Pharmacotherapy 2002;3(7):1007-1009	Commentary
183.	Domotor	2020	Domotor, Zsuzsa Reka; Vorhendi, Nora; Hanak, Lilla; Hegyi, Peter; Csiki, Endre; Szako, Lajos; Parniczky, Andrea; Eross, Balint; Kiss, Szabolcs. Oral Treatment With Bisphosphonates of Osteoporosis Does Not Increase the Risk of Severe Gastrointestinal Side Effects: A Meta-Analysis of Randomized Controlled Trials. Frontiers in endocrinology 2020;11():573976	Systematic review and/or meta-analysis
184.	Dong	2021	Dong, Su-Li; Jiao, Yongqiang; Yang, Hai-Liang. Effectiveness of bisphosphonates on bone mineral density in osteopenic postmenopausal women: A systematic review and network meta-analysis of randomized controlled trials. Medicine 2021;100(31):e26715	Systematic review and/or meta-analysis
185.	Dreyfuss	1997	Dreyfuss, B. J.; Rai, D. S.. Bisphosphonates in the treatment of osteoporosis. Western Journal of Medicine 1997;167(3):177-178	Commentary
186.	Duckworth	2018	Duckworth, A.; Tuck, C.; Murray, G.; Rodriguez, A.; Ralston, S.; Tobias, J.; Wilkinson, M.; McQueen, M.; Biant, L.; Roberts, C.. Effect of early bisphosphonate treatment on fracture healing: The fracture and bisphosphonate (FAB) study. Journal of Musculoskeletal Neuronal Interactions March 2018;18 (1):114-115	Conference abstract
187.	Duckworth	2019	Duckworth, A. D.; McQueen, M. M.; Tuck, C. E.; Tobias, J. H.; Wilkinson, J. M.; Biant, L. C.; Pulford, E. C.; Aldridge, S.; Edwards, C.; Roberts, C. P.; Ramachandran, M.; McAndrew, A. R.; Cheng, K. C. K.; Johnston, P.; Shah, N. H.; Mathew, P.; Harvie, J.; Hanusch, B. C.; Harkess, R.; Rodriguez, A.; Murray, G. D.; Ralston, S. H.. Effect of Alendronic Acid on	Wrong patient population

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			Fracture Healing: A Multicenter Randomized Placebo-Controlled Trial. Journal of Bone and Mineral Research June 2019;34(6):1025-1032	
188.	Dufresne	2003	Dufresne, T. E.; Chmielewski, P. A.; Manhart, M. D.; Johnson, T. D.; Borah, B.. Risedronate preserves bone architecture in early postmenopausal women in 1 year as measured by three-dimensional microcomputed tomography. Calcified Tissue International 2003;73(5):423-32	Wrong outcomes
189.	Eastell	2003	Eastell, R.; Barton, I.; Hannon, R. A.; Chines, A.; Garnero, P.; Delmas, P. D.. Relationship of early changes in bone resorption to the reduction in fracture risk with risedronate. Journal of Bone & Mineral Research 2003;18(6):1051-6	Wrong study design
190.	Eastell	2010	Eastell, R.; Lang, T.; Boonen, S.; Cummings, S.; Delmas, P. D.; Cauley, J. A.; Horowitz, Z.; Kerzberg, E.; Bianchi, G.; Kendler, D.; Leung, P.; Man, Z.; Mesenbrink, P.; Eriksen, E. F.; Black, D. M.. Effect of once-yearly zoledronic acid on the spine and hip as measured by quantitative computed tomography: Results of the HORIZON pivotal fracture trial. Osteoporosis International 2010;21(7):1277-1285.	Wrong outcomes
191.	Eastell	2010 a	Eastell, R.; Vrijens, B.; Cahall, D.; Roux, C.; Ringe, J.; Garnero, P.; Watts, N.. Relationships between osteoporosis medication adherence, surrogate marker outcomes and non-vertebral fracture incidence. Bone 2010;1):S200-S201.	Wrong study design
192.	Eastell	2011	Eastell, R.; Vrijens, B.; Cahall, D. L.; Ringe, J. D.; Garnero, P.; Watts, N. B.. Bone turnover markers and bone mineral density response with risedronate therapy: Relationship with fracture risk and patient adherence. Journal of Bone and Mineral Research 2011;26(7):1662-1669.	Wrong intervention
193.	Eastell	2019	Eastell, R.; Mitlak, B. H.; Wang, Y.; Hu, M.; Fitzpatrick, L. A.; Black, D. M. Bone turnover markers to explain changes in lumbar spine BMD with abaloparatide and teriparatide: results from ACTIVE. Osteoporosis international : a journal established as result of cooperation between the European Foundation for Osteoporosis and the National Osteoporosis Foundation of the USA 2019;30(3):667-673	Wrong outcomes
194.	Eastell	2021	Eastell, Richard; Black, Dennis M.; Lui, Li-Yung; Chines, Arkadi; Marin, Fernando; Khosla, Sundeep; de Papp, Anne E.; Cauley, Jane A.; Mitlak, Bruce; McCulloch, Charles E.; Vittinghoff, Eric; Bauer, Douglas C.; Foundation for the National Institutes of Health Bone Quality, Project. Treatment-Related Changes in Bone Turnover and Fracture Risk Reduction in Clinical Trials of Antiresorptive Drugs: Proportion of Treatment Effect Explained. Journal of bone and mineral research : the official journal	Systematic review and/or meta-analysis

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			of the American Society for Bone and Mineral Research 2021;36(2):236-243	
195.	Eastell	2017	Eastell, R.; Black, D.; Bouxsein, M.; Lui, L. Y.; Cauley, J.; Khosla, S.; McCulloch, C.; Bauer, D.. Treatment-related changes in bone turnover and fracture risk reduction in clinical trials of anti-resorptive drugs: The FNIH bone quality study. Journal of Bone and Mineral Research December 2017;32 (Supplement 1):S173	Conference abstract
196.	Eastell	2017 a	Eastell, R.; Mitlak, B. H.; Wang, Y.; Hu, M. Y.; Fitzpatrick, L. A.; Black, D. M.. Early change in PINP correlates with lumbar spine BMD more strongly with abaloparatide than with teriparatide: Results of the ACTIVE trial. Journal of Bone and Mineral Research December 2017;32 (Supplement 1):S378	Conference abstract
197.	Eastell	2009	Eastell, R.; Black, D. M.; Boonen, S.; McLellan, A. R.; Cummings, S. R.; Delmas, P. D.; Palermo, L.; Mesenbrink, P.; Cauley, J. A. Once-Yearly zoledronic acid 5 mg infusion for treatment of postmenopausal osteoporosis: Effects on fracture incidence in patient subgroups from the HORIZON-PFT study. Rheumatology April 2009;1)():i105	Conference abstract
198.	Eisman	2008	Eisman, J. A.; Civitelli, R.; Adami, S.; Czerwinski, E.; Recknor, C.; Prince, R.; Reginster, J. Y.; Zaidi, M.; Felsenberg, D.; Hughes, C.; Mairon, N.; Masanauskaite, D.; Reid, D. M.; Delmas, P. D.; Recker, R. R.. Efficacy and tolerability of intravenous ibandronate injections in postmenopausal osteoporosis: 2-Year results from the DIVA study. Journal of Rheumatology 2008;35(3):488-497.	Wrong intervention
199.	Ellis	2008	Ellis, G. K.; Bone, H. G.; Chlebowski, R.; Paul, D.; Spadafora, S.; Smith, J.; Fan, M.; Jun, S.. Randomized trial of denosumab in patients receiving adjuvant aromatase inhibitors for nonmetastatic breast cancer. Journal of Clinical Oncology 2008;26(30):4875-4882.	Wrong patient population
200.	Ellis	2014	Ellis, A. G.; Reginster, J. Y.; Luo, X.; Cappelleri, J. C.; Chines, A.; Sutradhar, S.; Jansen, J. P.. Bazedoxifene versus oral bisphosphonates for the prevention of nonvertebral fractures in postmenopausal women with osteoporosis at higher risk of fracture: A network meta-analysis. Value in Health 2014;17(4):424-432.	Systematic review and/or meta-analysis
201.	Ensrud	1997	Ensrud, K. E.; Black, D. M.; Palermo, L.; Bauer, D. C.; Barrett-Connor, E.; Quandt, S. A.; Thompson, D. E.; Karpf, D. B.. Treatment with alendronate prevents fractures in women at highest risk: Results from the fracture intervention trial. Archives of Internal Medicine 1997;157(22):2617-2624.	Conference abstract
202.	Ensrud	1998	Ensrud, K. E.; Black, D. M.; Palermo, L.. Alendronate reduced new fractures in postmenopausal women who had low bone-mineral density and existing	Commentary

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			vertebral fractures. Evidence-Based Medicine July/August 1998;3(4):119	
203.	Ensrud	2019	Ensrud, K. E.; Crandall, C. J.. In older postmenopausal women with osteopenia, zoledronate reduced fragility fractures at 6 years. Annals of Internal Medicine 2019;170(8):JC42	Commentary
204.	Eriksen	2009	Eriksen, E. F.; Lyles, K. W.; Colon-Emeric, C. S.; Pieper, C. F.; Magaziner, J. S.; Adachi, J. D.; Hyldstrup, L.; Recknor, C.; Nordsletten, L.; Lavecchia, C.; Hu, H.; Boonen, S.; Mesenbrink, P.. Antifracture efficacy and reduction of mortality in relation to timing of the first dose of zoledronic acid after hip fracture. Journal of Bone and Mineral Research 2009;24(7):1308-1313.	Wrong patient population
205.	Eriksen	2014	Eriksen, E. F.; Diez-Perez, A.; Boonen, S.. Update on long-term treatment with bisphosphonates for postmenopausal osteoporosis: a systematic review. Bone 2014;58:126-35	Systematic review and/or meta-analysis
206.	Eriksen	2019	Eriksen, Erik; Chapurlat, Roland; Chavassieux, Pascale; Boyce, Rogely; Shi, Yifei; Wagman, Rachel; Brown, Jacques; Horlait, Stephane; Libanati, Cesar. Extensive modeling-based bone formation after 2 months of romosozumab treatment: Results from the frame clinical trial. Arthritis and Rheumatology 2019;71(Supplement 10):3342-3344	Conference abstract, with no new data
207.	Eriksen	2019 a	Eriksen, Erik F.; Chapurlat, Roland; Chavassieux, Pascale; Horlait, Stephane; Shi, Yifei; Wagman, Rachel B.; Brown, Jacques P.; Boyce, Rogely; Libanati, Cesar. Extensive modeling-based bone formation after 2 months of romosozumab treatment: Results from the FRAME clinical trial. Journal of Bone and Mineral Research 2019;34(Supplement 1):16	Conference abstract, with no new data
208.	Eriksen	2020	Eriksen, Erik F.; Chapurlat, Roland; Chavassieux, Pascale; Boyce, Rogely; Shi, Yifei; Wagman, Rachel B.; Brown, Jacques P.; Horlait, Stephane; Libanati, Cesar. Extensive modeling-based bone formation after 2 months of romosozumab treatment: Results from the FRAME clinical trial. Bone Reports 2020;13(Supplement):100440	Conference abstract, with no new data
209.	Eriksen	2021	Eriksen, Erik F.; Chapurlat, Roland; Chavassieux, Pascale; Boyce, Rogely Waite; Shi, Yifei; Betah, Donald; Brown, Jacques P.; Horlait, Stephane; Libanati, Cesar. Modeling-Based Bone Formation After 2 Months of Romosozumab Treatment: Results From the FRAME Clinical Trial. Journal of bone and mineral research : the official journal of the American Society for Bone and Mineral Research 2021;():	Wrong outcomes
210.	Eriksen	2021	Eriksen, Erik F.; Chapurlat, Roland; Chavassieux, Pascale; Boyce, Rogely Waite; Shi, Yifei; Betah, Donald; Brown, Jacques P.; Horlait, Stephane; Libanati, Cesar. Based Bone Formation After 2	Wrong outcomes

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			Months of Romosozumab Treatment: Results From the FRAME Clinical Trial. Journal of Bone and Mineral Research 2021;():	
211.	Ettinger	2000	Ettinger, B.; Black, D. M.; Mitlak, B. H.; Rosenfeld, J. A.. Can the prophylactic use of raloxifene, a selective estrogen-receptor modulator, prevent bone mineral loss and fractures in women with diagnosed osteoporosis or vertebral fractures? Western Journal of Medicine 2000;173(3):186-188	Commentary
212.	Fan	2020	Fan, Guiyong; Chen, Hao; Tan, Wei; Guo, Weixiao; Liu, Chaoqun; Liu, Jinlian; Zhao, Qun; Lu, Pei. Comparison between teriparatide and bisphosphonates for improving bone mineral density in postmenopausal osteoporosis patients: A meta-analysis. Medicine 2020;99(15):e18964	Systematic review and/or meta-analysis
213.	Fan	2020 a	Fan, Qin; Wang, Junjie. The Efficacy and Safety of Bisphosphonates for Osteoporosis in Women Older Than 65 Years: A Meta-Analysis. Current pharmaceutical design 2020;26(32):4022-4030	Full-text not available
214.	Favus	2006	Favus, M. J.. Does denosumab improve low BMD in postmenopausal women? Nature Clinical Practice Endocrinology and Metabolism November 2006;2(11):600-601	Commentary
215.	Feldman	2020	Feldman, Robert; Geusens, Piet; Oates, Mary; Yang, Wenjing; Rojeski, Maria; Thomas, Thierry; Makras, Polyzois; Jakob, Franz; Langdahl, Bente; Libanati, Cesar. Romosozumab Treatment Lowers the Incidence of New Vertebral Fractures Across All Fracture Severity Grades among Postmenopausal Women with Osteoporosis. Journal of Bone and Mineral Research 2020;35(SUPPL 1):253	Conference abstract, with no new data
216.	Felsenberg	1998	Felsenberg, D.; Alenfeld, F.; Bock, O.; Hammermeister, C.; Gowan, W.. Placebo-controlled multicenter study of oral alendronate in postmenopausal osteoporotic women. FOSIT-Study-Group. Fosamax International Trial. Maturitas 1998;31(1):35-44.	Wrong outcomes
217.	Felsenberg	2010	Felsenberg, D.; Charpulat, R.; Cheung, A. M.; LaRoche, M.; Morris, E.; Seeman, E.; Thomas, T. P.; Zanchetta, J. R.; Borah, B.; D'Alo, G.; Darbie, L.; Rizzolli, R.. Longitudinal in vivo micro-CT assessment in osteopenic women demonstrated that risedronate reduced the deterioration of cortical bone. Bone June 2010;1):S35	Wrong outcomes
218.	Ferrari	2017	Ferrari, S.; Butler, P.; Kendler, D. L.; Miller, P. D.; Roux, C.; Wang, A. T.; Wagman, R. B.; Lewiecki, E. M.. Ten-year continued nonvertebral fracture reduction in postmenopausal osteoporosis with denosumab treatment. Journal of Bone and Mineral Research December 2017;32 (Supplement 1):S25	Conference abstract
219.	Ferrari	2019	Ferrari, S.; Butler, P. W.; Kendler, D. L.; Miller, P. D.; Roux, C.; Wang, A. T.; Huang, S.; Wagman, R. B.;	Extension study

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			Lewiecki, E. M.. Further Nonvertebral Fracture Reduction beyond 3 Years for Up to 10 Years of Denosumab Treatment. Journal of Clinical Endocrinology and Metabolism 19 Jun 2019;104(8):3450-3461	
220.	Ferrari	2019 a	Ferrari, S. F.; Michael, E. M.; Butler, P. B.; Kendler, D. K.; Napoli, N. N.; Huang, S. H.; Crittenden, B. C.; Pannacciulli, N. P.; Siris, E. S.; Binkley, N. B.. Skeletal benefit/risk of long-term denosumab therapy: A virtual twin analysis of fractures preventedto skeletal safety events observed. Osteoporosis International May 2019;30 (Supplement 1):S64-S65	Conference abstract
221.	Ferrari	2019 b	Ferrari, S. F.; Michael, E. M.; Butler, P. B.; Huang, S. H.; Crittenden, B. C.; Pannacciulli, N. P.; Kendler, D. K.; Napoli, N. N.; Siris, E. S.; Binkley, N. B. Skeletal benefit/risk of long-term denosumab therapy: A virtual twin analysis of fractures preventedto skeletal safety events observed. Osteoporosis International 2019;30(Supplement 1):S64-S65	Conference abstract, with no new data
222.	Ferrari	2019c	Ferrari, S.; Libanati, C.; Lin, Celia Jow Fang; Brown, J. P.; Cosman, F.; Czerwinski, E.; de Gregorio, L. H.; Malouf-Sierra, J.; Reginster, J. Y.; Wang, A.; Wagman, R. B.; Lewiecki, E. M. Relationship Between Bone Mineral Density T-Score and Nonvertebral Fracture Risk Over 10 Years of Denosumab Treatment. Journal of bone and mineral research : the official journal of the American Society for Bone and Mineral Research 2019;34(6):1033-1040	Extension study
223.	Ferrari	2020	Ferrari, Serge; Lewiecki, E. Michael; Butler, Peter W.; Kendler, David L.; Napoli, Nicola; Huang, Shuang; Crittenden, Daria B.; Pannacciulli, Nicola; Siris, Ethel; Binkley, Neil. Favorable skeletal benefit/risk of long-term denosumab therapy: A virtual-twin analysis of fractures prevented relative to skeletal safety events observed. Bone 2020;134():115287	Extension study
224.	Ferreira	2019	Ferreira, T.; Glastonbury, C. A.; Bovijn, J.; Censin, J. C.; Laber, S.; Krebs, K.; Milani, L.; Magi, R.; Chen, C.; Neale, B. M.; Lin, K.; Chen, Z.; Boxall, R.; Millwood, I. Y.; Walters, R. G.; Pulit, S. L.; Li, L.; Lindgren, C. M.; Holmes, M. V. Lifelong genetically lowered sclerostin and risk of cardiovascular disease. European Journal of Human Genetics 2019;27(Supplement 2):1120-1121	Conference abstract, with no new data
225.	Finkelstein	2010	Finkelstein, J. S.; Wyland, J. J.; Lee, H.; Neer, R. M.. Effects of teriparatide, alendronate, or both in women with postmenopausal osteoporosis. Journal of Clinical Endocrinology and Metabolism 2010;95(4):1838-1845.	Wrong outcomes
226.	Fitzpatrick	2017	Fitzpatrick, L. A.; Hattersley, G.; Miller, P. D.; Hu, M.; Russo, L. A.; Riis, B. J.; Williams, G. C.; Cosman, F.. Abaloparatide-SC significantly reduces vertebral	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			and nonvertebral fractures and increases bone mineral density regardless of baseline risk: Results from the active phase 3 clinicaltrial. Osteoporosis International 2017;28 (1 Supplement 1):S50.	
227.	Fitzpatrick	2016	Fitzpatrick, L. A.; Miller, P.; Cosman, F.; Black, D.; Lau, E.; Zerbini, C. A. F.; Riis, B. J.; Christiansen, C.; Williams, G.; Hu, M. Y.; Hattersley, G. Effects of abaloparatide on vertebral, nonvertebral, major osteoporotic and clinical fracture incidence in postmenopausal women with osteoporosis: Results of the phase 3 active trial. Osteoporosis International April 2016;1)():S39	Conference abstract
228.	Fixen	2021	Fixen, Cy; Tunoa, Jennifer. Romosozumab: a Review of Efficacy, Safety, and Cardiovascular Risk. Current osteoporosis reports 2021;19(1):15-22	Systematic review and/or meta-analysis
229.	Fogelman	2008	Fogelman, I.; Fordham, J. N.; Fraser, W. D.; Spector, T. D.; Christiansen, C.; Morris, S. A.; Fox, J.. Parathyroid hormone(1-84) treatment of postmenopausal women with low bone mass receiving hormone replacement therapy. Calcified Tissue International 2008;83(2):85-92.	Wrong intervention
230.	Fontalis	2018	Fontalis, A.; Kenanidis, E.; Prousali, E.; Potoupnis, M.; Tsiridis, E.. Safety and efficacy of denosumab in osteoporotic patients previously treated with other medications: a systematic review and meta-analysis. Expert Opinion on Drug Safety 2018;17(4):413-428.	Systematic review and/or meta-analysis
231.	Frampton	2009	Frampton, J. E.. Risedronate on two consecutive days per month. Drugs and Aging 2009;26(4):355-362.	Wrong study design
232.	Fuggle	2020	Fuggle, N. R.; Cooper, C.; Harvey, N. C.; Al-Daghri, N.; Brandi, M. L.; Bruyere, O.; Cano, A.; Dennison, E. M.; Diez-Perez, A.; Kaufman, J. M.; Palacios, S.; Prieto-Alhambra, D.; Rozenberg, S.; Thomas, T.; Tremollieres, F.; Rizzoli, R.; Kanis, J. A.; Reginster, J. Y. Assessment of Cardiovascular Safety of Anti-Osteoporosis Drugs. Drugs 2020;80(15):1537-1552	Systematic review and/or meta-analysis
233.	Fraser	2011	Fraser, L. A.; Vogt, K. N.; Adachi, J. D.; Thabane, L. Fracture risk associated with continuation versus discontinuation of bisphosphonates after 5 years of therapy in patients with primary osteoporosis: a systematic review and meta-analysis. Therapeutics & Clinical Risk Management 2011;7():157-66	Systematic review and/or meta-analysis
234.	Fujita	2014 a	Fujita, T.; Fukunaga, M.; Itabashi, A.; Tsutani, K.; Nakamura, T.. Once-Weekly Injection of Low-Dose Teriparatide (28.2 μg) Reduced the Risk of Vertebral Fracture in Patients with Primary Osteoporosis. Calcified Tissue International 2014;94(2):170-175. [DOI: 10.1007/s00223-013-9777-8]	Wrong patient population
235.	Galesanu	2012	Galesanu, C.; Florescu, A.; Iulia Loghin, A.; Grozavu, I.; Ancute, P.; Zaharia, V.; Mocanu, V.. Effects of combined treatment with alendronate and	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			alfacalcidol comparing with other bisphosphonates and alfacalcidol in BMD changes at postmenopausal osteoporotic women. Journal of Bone and Mineral Research. Conference 2012;27(SUPPL. 1).	
236.	Galesanu	2013	Galesanu, C.; Ancute, P.; Zaharia, V.; Mocanu, V.; Galesanu, M. R.. Combined treatment with alendronate and alfacalcidol comparing with other bisphosphonates and alfacalcidol in BMD changes. Osteoporosis International 2013;1):S129-S130.	Conference abstract
237.	Galesanu	2017	Galesanu, C.; Gheorghe, L.; Lisnic, N.; Zaharia, V.. Denosumab vs. zoledronic acid in treatment of osteoporosis in postmeno-pausal women. Osteoporosis International 2017;28 (Supplement 1):S295.	Conference abstract
238.	Galesanu	2011	Galesanu, C.; Lisnic, N.; Mocanu, V.; Florescu, A.; Loghin, A. I.; Galesanu, M. R. Efficacy of bisphosphonates in the treatment of postmenopausal osteoporosis. Osteoporosis International October 2011;5)():S739	Conference abstract
239.	Galesanu	2020	Galesanu, C.; Gheorghe, L.; Lisnic, N.; Aancute, P. Bisphosphonates or biological therapy in postmenopausal women with osteoporosis? What is the best? Osteoporosis International 2020;31(SUPPL 1):S394	Conference abstract, with no new data
240.	Gallagher	2013	Gallagher, J. C.; Palacios, S.; Ryan, K. A.; Messig, M.; Pan, K.; Kendler, D.; Komm, B. S.; Mirkin, S.. A pooled analysis of the effects of bazedoxifene/conjugated estrogens on bone loss from the selective estrogens, menopause, and response to therapy trials. Endocrine Reviews. Conference: 95th Annual Meeting and Expo of the Endocrine Society, ENDO 2013;34(3 SUPPL. 1):	Conference abstract
241.	Gambacciani	2001	Gambacciani, M.; Ciaponi, M.; Cappagli, B.; Genazzani, A. R.. Effects of low-dose continuous combined conjugated estrogens and medroxyprogesterone acetate on menopausal symptoms, body weight, bone density, and metabolism in postmenopausal women. American Journal of Obstetrics & Gynecology 2001;185(5):1180-5	Wrong intervention
242.	Genant	2010	Genant, H. K.; Bucci-Rechtweg, C.; Bauer, D. C.; Mesenbrink, P. G.; Palermo, L.; Nusgarten, L.; Eastell, R.; Black, D. M. Does zoledronic acid increase risk of atypical femoral shaft fractures? results from the HORIZON-PFT. Osteoporosis International May 2010;1)():S161-S162	Wrong study design
243.	Genant	2011	Genant, H.; Radcliffe, H.; Libanati, C.; Engelke, K.; Zanchetta, J.; Hoiseth, A.; Yuen, C.; Stonkus, S.; Bolognese, M.; Franek, E.; Fuerst, T. BMD and BMC improvements in hip total, trabecular, and cortical bone following denosumab treatment: QCT results	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			from the freedom trial. Osteoporosis International March 2011;1)():S116-S117	
244.	Genant	2005	Genant, H. K.; Siris, E.; Crans, G. G.; Desaiah, D.; Krege, J. H.. Reduction in vertebral fracture risk in teriparatide-treated postmenopausal women as assessed by spinal deformity index. Bone 2005;37(2):170-174.	Wrong outcomes
245.	Genant	2005 a	Genant, H. K.; Halse, J.; Briney, W. G.; Xie, L.; Glass, E. V.; Krege, J. H.. The effects of teriparatide on the incidence of back pain in postmenopausal women with osteoporosis. Current Medical Research and Opinion 2005;21(7):1027-1034.	Wrong outcomes
246.	Genant	2010	Genant, H. K.; Bucci-Rechtweg, C.; Bauer, D. C.; Mesenbrink, P. G.; Palermo, L.; Nusgarten, L.; Eastell, R.; Black, D. M.. Does zoledronic acid increase risk of atypical femoral shaft fractures? results from the HORIZON-PFT. Osteoporosis International May 2010;1):S161-S162	Conference abstract
247.	Genant	2013	Genant, H. K.; Keaveny, T. M.; Zapalowski, C.; Engelke, K.; Fuerst, T.; Kendler, D. L.; Recknor, C.; Boonen, S.; Wang, A.; Dakin, P.; et al.,. Cortical bone parameters at the hip in response to denosumab vs placebo and the clinical relevance of these changes in postmenopausal women with osteoporosis <75 and >75 years old. Journal of Bone and Mineral Research 2013;28.	Wrong outcomes
248.	Genant	2014	Genant, H. K.; Keaveny, T. M.; Zapalowski, C.; Engelke, K.; Fuerst, T.; Kendler, D. L.; Recknor, C.; Boonen, S.; Wang, A.; Dakin, P.; Libanati, C.; McClung, M. R.. Clinical relevance of changes in hip cortical bone parameters in response to denosumab (DMAB) vs. Placebo (PBO) in postmenopausalwomen with osteoporosis <75 and >=75 years old. Osteoporosis International April 2014;2):S175	Conference abstract
249.	Generali	2003	Generali, J.; Cada, D. J.. Zoledronic acid: Postmenopausal osteoporosis. Hospital Pharmacy 01 Sep 2003;38(9):828-832	Commentary
250.	Gennari	1998	Gennari, C.; Reginster, J. Y.. Bisphosphonates and osteoporosis treatment in Italy. Aging-Clinical & Experimental Research 1998;10(4):284-94	Systematic review and/or meta-analysis
251.	Geusens	2017	Geusens, P.; Marin, F.; L. Kendler D; Russo, L.; Zerbini, C. A. F.; Greenspan, S.; Minisola, S.; Bagur, A.; Lakatos, P.; Casado, E.; Fahrleitner-Pammer, A.; Stepan, J.; Lespessailles, E.; Moericke, R.; Body, J. J.; Lopez-Romero, P.. Teriparatide compared with risedronate and the risk of fractures in subgroups of postmenopausal women with severe osteoporosis: The VERO Trial. Journal of Bone and Mineral Research December 2017;32 (Supplement 1):S22	Conference abstract
252.	Geusens	2017 b	Geusens, P.; Oates, M.; Miyauchi, A.; Adachi, J. D.; Lazaretti-Castro, M.; Ebeling, P. R.; Perez Nino, C.	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			A.; Milmont, C. J.; Grauer, A.; Libanati, C. Romosozumab rapidly reduces clinical vertebral fracture incidence: Results from the frame study. Osteoporosis International July 2017;28 (1 Supplement 1)():S51-S52	
253.	Geusens	2019	Geusens, P.; Kendler, D.; Fahrleitner-Pammer, A.; Lopez-Romero, P.; Marin, F.. The distribution of prevalent and incident vertebral fractures in the teriparatide versus risedronate "vero" clinical trial. Annals of the Rheumatic Diseases June 2019;78 (Supplement 2):929-930	Conference abstract, with no new data
254.	Ghadimi	2020	Ghadimi, Nashmil; Aryankhesal, Aidin; Kaveh, Sara; Hosseinifard, Hossein; Vojdanian, Mahdi. Efficacy and safety of Romosozumab in treatment for low bone mineral density: a systematic review and meta-analysis. Clinical rheumatology 2020;39(11):3261-3276	Systematic review and/or meta-analysis
255.	Glasser	2002	Glasser, S. P.. SERMs revisited. Cardiology Review 2002;19(9):42	Systematic review and/or meta-analysis
256.	Gnant	2016	Gnant, M.; Pfeiler, G.; Dubsky, P. C.; Hubalek, M.; Greil, R.; Jakesz, R.; Wette, V.; Balic, M.; Haslbauer, F.; Melbinger-Zeinitzer, E.; Bjelic-Radisic, V.; Artner-Matuschek, S.; Fitzal, F.; Marth, C.; Sevelda, P.; Mlineritsch, B.; Steger, G. G.; Manfreda, D.; Exner, R.; Egle, D.; Bergh, J.; Kainberger, F.; Talbot, S.; Warner, D.; Fesl, C.; Singer, C. F.. The impact of adjuvant denosumab on disease-free survival: Results from 3,425 postmenopausal patients of the ABCSG-18 trial. Cancer Research. Conference: 38th Annual CTRC AACR San Antonio Breast Cancer Symposium. San Antonio, TX United States. Conference Publication: 2016;76(4 SUPPL. 1):	Conference abstract
257.	Goel	2021	Goel, Heenam; Libber, Jessie; Borchardt, Gretta; Krueger, Diane; Binkley, Neil. A pilot study comparing daily teriparatide with monthly cycles of teriparatide and raloxifene. Archives of osteoporosis 2021;16(1):70	Wrong outcomes
258.	Goldstein	2000	Goldstein, S. R.; Siddhanti, S.; Ciaccia, A. V.; Plouffe Jr, L.. A pharmacological review of selective oestrogen receptor modulators. Human Reproduction Update May/June 2000;6(3):212-224	Systematic review and/or meta-analysis
259.	Gonnelli	1999	Gonnelli, S.; Cepollaro, C.; Pondrelli, C.; Martini, S.; Montagnani, A.; Monaco, R.; Gennari, C.. Bone turnover and the response to alendronate treatment in postmenopausal osteoporosis. Calcified Tissue International 1999;65(5):359-364.	Wrong outcomes
260.	Gonnelli	2006	Gonnelli, S.; Martini, G.; Caffarelli, C.; Salvadori, S.; Cadirni, A.; Montagnani, A.; Nuti, R.. Teriparatide's effects on quantitative ultrasound parameters and bone density in women with established osteoporosis. Osteoporosis International 2006;17(10):1524-1531.	Wrong outcomes

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
261.	Gossiel	2017	Gossiel, F.; Flintham, L.; Naylor, K.; Walsh, J.; Peel, N.; McCloskey, E.; Eastell, R. Offset of effect of oral bisphosphonates on tartrate-resistant acid phosphatase in postmenopausal osteoporosis: the TRIO Study. Journal of Bone and Mineral Research December 2017;32 (Supplement 1):S379	Conference abstract
262.	Gossiel	2019	Gossiel, F.; Jacques, R. M.; Naylor, K. E.; McCloskey, E. V.; Walsh, J. S.; Eastell, R.; Peel, N. The effect of bisphosphonates on bone turnover and bone balance in postmenopausal women with osteoporosis: The T-score bone marker approach in the TRIO study. JBMR Plus 2019;3(Supplement 3):54	Wrong comparator
263.	Gossiel	2020	Gossiel, F.; Paggiosi, M. A.; Naylor, K. E.; McCloskey, E. V.; Walsh, J.; Eastell, R.; Peel, N. The effect of bisphosphosphonates on bone turnover and bone balance in postmenopausal women with osteoporosis: The T-score bone marker approach in the TRIO study. Bone 2020;131():115158	Wrong comparator
264.	Greenspan	2002	Greenspan, S.; Field-Munves, E.; Tonino, R.; Smith, M.; Petruschke, R.; Wang, L.; Yates, J.; De Papp, A. E.; Palmisano, J. Tolerability of once-weekly alendronate in patients with osteoporosis: A randomized, double-blind, placebo-controlled study. Mayo Clinic Proceedings 01 Oct 2002;77(10):1044-1052 2002 01 Oct	Wrong patient population
265.	Greenspan	2007	Greenspan, S. L.; Bone, H. G.; Ettinger, M. P.; Hanley, D. A.; Lindsay, R.; Zanchetta, J. R.; Blosch, C. M.; Mathisen, A. L.; Morris, S. A.; Marriott, T. B.. Effect of recombinant human parathyroid hormone (1-84) on vertebral fracture and bone mineral density in postmenopausal women with osteoporosis. A randomized trial. Annals of Internal Medicine 2007;146(5):326-339.	Wrong intervention
266.	Greenspan	2012	Greenspan, S. L.; Nace, D.; Perera, S.; Ferchak, M.; Fiorito, G.; Medich, D.; Zukowski, K.; Adams, D.; Lee, C.; Saul, M.; Resnick, N. M.. Lessons learned from an osteoporosis clinical trial in frail long-term care residents. Clinical Trials April 2012;9(2):247-256	Systematic review and/or meta-analysis
267.	Greenspan	2018	Greenspan, S. L.; Fitzpatrick, L. A.; Mitlak, B.; Wang, Y.; Harvey, N. C.; Deal, C.; Cosman, F.; McClung, M. Abaloparatide effect on bone mineral density and fracture incidence in postmenopausal women with osteoporosis aged 80 years or older. Arthritis and Rheumatology September 2018;70 (Supplement 9)():3159-3160	Wrong study design
268.	Grey	2012	Grey, A.; Bolland, M.; Horne, A.; Wattie, D.; Gamble, G.; Reid, I. R.. Five years of anti-resorptive effects after 1 or 2 doses of zoledronate-Data from 2 randomized controlled trials. Bone May 2012;1):S46-S47	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
269.	Gu	2015	Gu, H. F.; Gu, L. J.; Wu, Y.; Zhao, X. H.; Zhang, Q.; Xu, Z. R.; Yang, Y. M. Efficacy and Safety of Denosumab in Postmenopausal Women With Osteoporosis: A Meta-Analysis. Medicine 2015;94(44):e1674	Systematic review and/or meta-analysis
270.	Gupta	2007	Gupta, G.; Aronow, W. S.. Treatment of postmenopausal osteoporosis. Comprehensive Therapy September 2007;33(3):114-119	Systematic review and/or meta-analysis
271.	Hadji	2012	Hadji, P.; Gamerdinger, D.; Spieler, W.; Kann, P. H.; Loeffler, H.; Articus, K.; Moricke, R.; Ziller, V.. Rapid Onset and Sustained Efficacy (ROSE) study: results of a randomised, multicentre trial comparing the effect of zoledronic acid or alendronate on bone metabolism in postmenopausal women with low bone mass. Osteoporosis International 2012;23(2):625-33	Wrong outcomes
272.	Hadji	2011 b	Hadji, P.; Zanchetta, J. R.; Russo, L. A.; Recknor, C. P.; Saag, K. G.; McKiernan, F. E.; Silverman, S. L.; Alam, J.; Burge, R. T.; Krege, J. H.; Lakshmanan, M. L.; Masica, D. N.; Mitlak, B. H.; Stock, J. L. Effect of teriparatide compared with risedronate on back pain and incident vertebral fractures in postmenopausal women with osteoporotic vertebral fractures. Bone 07 May 2011;2)():S82-S83	Wrong outcomes
273.	Hagino	2013	Hagino, H.; Nakamura, T.; Ito, M.; Nakano, T.; Hashimoto, J.; Tobinai, M.; Mizunuma, H.. Bone mineral density increases with monthly I.V. ibandronate injections contribute to its fracture risk reduction in primary osteoporosis: 3-year analysis of the phase III mover study. Osteoporosis International December 2013;4):S592-S593	Conference abstract
274.	Hagino	2013 a	Hagino, H.; Nakamura, T.; Ito, M.; Nakano, T.; Hashimoto, J.; Tobinai, M.; Mizunuma, H.. Bone mineral density increases with monthly i.v. ibandronate injections contribute to its fracture risk reduction in primary osteoporosis: 3-year analysis of the phase III mover study. Journal of Bone and Mineral Research. Conference 2013;28(SUPPL. 1).	Conference abstract
275.	Hagino	2017	Hagino, H.; Nakamura, T.; Ito, M.; Tobinai, M.; Hashimoto, J.; Yoshida, S.. Association between total Hip bone mineral density at baseline and vertebral fracture incidence in the MOVER study. Journal of Bone and Mineral Research December 2017;32 (Supplement 1):S269	Conference abstract
276.	Hagino	2019	Hagino, H.; Narita, R.; Yokoyama, Y.; Watanabe, M.; Tomomitsu, M.. A multicenter, randomized, rater-blinded, parallel-group, phase 3 study to compare the efficacy, safety, and immunogenicity of biosimilar RGB-10 and reference once-daily teriparatide in patients with osteoporosis. Osteoporosis International 01 Oct 2019;30(10):2027-2037	Wrong patient population

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
277.	Han	2012	Han, S. L.; Wan, S. L.. Effect of teriparatide on bone mineral density and fracture in postmenopausal osteoporosis: Meta-analysis of randomised controlled trials. International Journal of Clinical Practice 2012;66(2):199-209.	Systematic review and/or meta-analysis
278.	Han	2021	Han, Hee Soo; Park, Moon Seok; Sung, Ki Hyuk; Lee, Kyoung Min; Cho, Sung Hee. Comparison of bone mineral density and markers of bone turnover in osteoporotic women after 6-month treatment with alendronate or bazedoxifene: A randomized controlled trial. Journal of Bone Metabolism 2021;28(2):131-137	Wrong patient population
279.	Handel	2020	Handel, M. N.; Cardoso, I.; VonBulow, C.; Rohde, J. F.; Ussing, A.; Nielsen, S. M.; Christensen, R.; Langdahl, B.; Thomas, T.; Body, J. J.; Brandi, M. L.; Diez-Perez, A.; Nogues, X.; Hadji, P.; Javaid, M. K.; Prieto-Alhambra, D.; Lems, W. F.; Roux, C.; Minisola, S.; Kurth, A.; Ferrari, S. L.; Abrahamsen, B. Fracture risk reduction by anti-osteoporosis pharmacotherapy according to baseline risk factors among postmenopausal women: Metaregression analyses of randomised trials. Osteoporosis International 2020;31(SUPPL 1):S43-S44.	Conference abstract, with no new data
280.	Harris	2004	Harris, S. T.; Watts, N. B.; Li, Z.; Chines, A. A.; Hanley, D. A.; Brown, J. P.. Two-year efficacy and tolerability of risedronate once a week for the treatment of women with postmenopausal osteoporosis. Current Medical Research and Opinion May 2004;20(5):757-764	Wrong comparator
281.	Harrod	2020	Harrod, Wendy; Inderjeeth, Charles. Morbidity and all-cause mortality associated with osteoporosis treatments. Internal Medicine Journal 2020;50(SUPPL 2):44	Conference abstract, with no new data
282.	Harvey	2015	Harvey, N. C.; Kanis, J. A.; Odén, A.; Nakamura, T.; Shiraki, M.; Sugimoto, T.; Kuroda, T.; Johansson, H.; McCloskey, E. V.. Efficacy of weekly teriparatide does not vary by baseline fracture probability calculated using FRAX. Osteoporosis International 2015;26(9):2347-2353. [DOI: 10.1007/s00198-015-3129-7]	Wrong patient population
283.	He	2021	He, B.; Zhang, M. Z.; Quan, Z. X.; Zhao, J. Q. Zoledronic acid and fracture risk: A meta-analysis of 12 randomized controlled trials. European review for medical and pharmacological sciences 2021;25(3):1564-1573	Systematic review and/or meta-analysis
284.	Heaney	2002	Heaney, R. P.; Zizic, T. M.; Fogelman, I.; Olszynski, W. P.; Geusens, P.; Kasibhatla, C.; Alsayed, N.; Isaia, G.; Davie, M. W.; Chesnut, C. H., 3rd. Risedronate reduces the risk of first vertebral fracture in osteoporotic women. Osteoporosis International 2002;13(6):501-5	Systematic review and/or meta-analysis
285.	Hernandez	2019	Hernandez, A. V.; Perez-Lopez, F. R.; Piscoya, A.; Pasupuleti, V.; Roman, Y. M.; Thota, P.; Herrera, A..	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			Comparative efficacy of bone anabolic therapies in women with postmenopausal osteoporosis: A systematic review and network meta-analysis of randomized controlled trials. Maturitas November 2019;129:12-22	
286.	Hernandez	2019	Hernandez, Adrian V.; Perez-Lopez, Faustino R.; Piscoya, Alejandro; Pasupuleti, Vinay; Roman, Yuani M.; Thota, Priyaleela; Herrera, Antonio. Comparative efficacy of bone anabolic therapies in women with postmenopausal osteoporosis: A systematic review and network meta-analysis of randomized controlled trials. Maturitas 2019;129():12-22	Systematic review and/or meta-analysis
287.	Hirsch	2018	Hirsch, C.. In postmenopausal women with osteoporosis, romosozumab followed by alendronate reduced fractures vs alendronate alone. Annals of Internal Medicine 2018;168(2):JC3. [DOI: 10.7326/ACPJC-2018-168-2-003]	Commentary
288.	Hong	2019	Hong, H.; Song, T.; Liu, Y.; Li, J.; Jiang, Q.; Song, Q.; Deng, Z.. The effectiveness and safety of parathyroid hormone in fracture healing: A meta-analysis. Clinics (Sao Paulo, Brazil) 2019;74:e800	Systematic review and/or meta-analysis
289.	Horikawa	2019	Horikawa, A.; Miyakoshi, N.; Hongo, M.; Kasukawa, Y.; Kodama, H.; Shimada, Y.; Roever, L.. A prospective comparative study of intravenous alendronate and ibandronate for the treatment of osteoporosis. Medicine (United States) 01 Feb 2019;98 (6) (no pagination)(e14340):	Wrong study design
290.	Horne	2020	Horne, Anne M.; Mihov, Borislav; Stewart, Angela; Gamble, Gregory D.; Reid, Ian R.; Bastin, Sonja. Zoledronate Slows Weight Loss and Maintains Fat Mass in Osteopenic Older Women: Secondary Analysis of a Randomized Controlled Trial. Calcified tissue international 2020;106(4):386-391	Wrong outcomes
291.	Horne	2021	Horne, Anne M.; Mihov, Borislav; Stewart, Angela; Gamble, Gregory D.; Reid, Ian R.; Bastin, Sonja. Effect of Zoledronate on Lower Respiratory Infections in Older Women: Secondary Analysis of a Randomized Controlled Trial. Calcified tissue international 2021;109(1):12-16	Wrong patient population
292.	Horne	2021 a	Horne, Anne M.; Mihov, Borislav; Stewart, Angela; Gamble, Gregory D.; Reid, Ian R.; Bolland, Mark J.; Bastin, Sonja. Predictors of Fracture in Older Women With Osteopenic Hip Bone Mineral Density Treated With Zoledronate. Journal of Bone and Mineral Research 2021;36(1):61-66	Wrong outcomes
293.	Hosoi	2013	Hosoi, T.; Matsumoto, T.; Sugimoto, T.; Miki, T.; Gorai, I.; Yoshikawa, H.; Tanaka, Y.; Tanaka, S.; Fukunaga, M.; Sone, T.; Nakano, T.; Ito, M.; Matsui, S.; Yoneda, T.; Takami, H.; Nakamura, T.. Results of 2-year data from denosumab fracture intervention randomized placebo controlled trial (direct). Osteoporosis International 2013;1):S177.	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
294.	Hou	2015	Hou, Y.; Gu, K.; Xu, C.; Ding, H.; Liu, C.; Tuoheti, Y.. Dose-effectiveness relationships determining the efficacy of ibandronate for management of osteoporosis: A meta-analysis. Medicine (United States) 2015;94 (26) (no pagination)(e1007).	Systematic review and/or meta-analysis
295.	Hou	2015 a	Hou, Y.; Gu, K.; Xu, C.; Ding, H.; Liu, C.; Tuoheti, Y.. Dose-Effectiveness Relationships Determining the Efficacy of Ibandronate for Management of Osteoporosis: A Meta-Analysis. Medicine 2015;94(26):e1007	Systematic review and/or meta-analysis
296.	Hoy	2020	Hoy, Jennifer; Kerr, Stephen J.; Hans, Didier; Pocock, Nicholas; Carr, Andrew. Change in trabecular bone score (TBS) after zoledronic acid infusion or TDF switch. Topics in Antiviral Medicine 2020;28(1):254	Conference abstract, with no new data
297.	Ikeda	2017	Ikeda, S.. The effect of once-weekly teriparatide administration on prevention of vertebral collapse in new thoracolumbar vertebral fractures-T-WRAP prospective randomized controlled study. Journal of Bone and Mineral Research December 2017;32 (Supplement 1):S162	Conference abstract
298.	Ikeda	2017	Ikeda, S.; Nakamura, E.; Narusawa, K.; Fukuda, F.; Matsumoto, H.; Nakai, K.; Sakata, T.; Yoshioka, T.; Fujino, Y.; Sakai, A. Comparison of once-weekly teriparatide and alendronate against new osteoporotic vertebral fractures at week 12. Journal of Bone and Mineral Metabolism. 2019;:	Wrong patient population
299.	Ikeda	2019	Ikeda, Terumasa; Akagi, Masao; Kaji, Hiroshi; Tamura, Yukinori. Once-weekly teriparatide reduces serum sclerostin levels in postmenopausal women with osteoporosis. Journal of Orthopaedic Science 2019;24(3):532-538	Wrong patient population
300.	Ikeda	2020	Ikeda, Satoshi; Nakamura, Eiichiro; Narusawa, Kenichiro; Fukuda, Fumio; Matsumoto, Hidehiro; Nakai, Kenichiro; Sakata, Takeshi; Yoshioka, Toru; Fujino, Yoshihisa; Sakai, Akinori; Kotu T. Wrap Study Investigators. Comparison of once-weekly teriparatide and alendronate against new osteoporotic vertebral fractures at week 12. Journal of bone and mineral metabolism 2020;38(1):44-53	Wrong patient population
301.	Ilter	2006	Ilter, E.; Karalok, H.; Tufekci, E. C.; Batur, O.. Efficacy and acceptability of risedronate 5 mg daily compared with 35 mg once weekly for the treatment of postmenopausal osteoporosis. Climacteric 2006;9(2):129-134.	Wrong comparator
302.	Imai	2009	Imai, K.; Ohnishi, I.; Matsumoto, T.; Yamamoto, S.; Nakamura, K. Assessment of vertebral fracture risk and therapeutic effects of alendronate in postmenopausal women using a quantitative computed tomography-based nonlinear finite element method. Osteoporosis International May 2009;20(5):801-810	Wrong patient population

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
303.32 3	Iseri	2019	Iseri, K.; Watanabe, M.; Yoshikawa, H.; Mitsui, H.; Endo, T.; Yamamoto, Y.; Iyoda, M.; Ryu, K.; Inaba, T.; Shibata, T.. Effects of Denosumab and Alendronate on Bone Health and Vascular Function in Hemodialysis Patients: A Randomized, Controlled Trial. Journal of Bone & Mineral Research 2019;28:28.	Wrong patient population
304.	Ito	2017	Ito, M.; Nakamura, T.; Hagino, H.; Hashimoto, J.; Asao, Y.; Yamamoto, M.; Endo, K.; Katsumata, K.; Matsumoto, R.; Nakano, T.; et al.,. Monthly oral ibandronate 100mg is as effective as monthly intravenous ibandronate 1mg in patient subgroups of the movest study. Journal of Bone and Mineral Research 2017;31. [DOI: 10.1002/jbmr.3107]	Conference abstract
305.	Iwamoto	2007	Iwamoto, J.; Takeda, T.; Sato, Y.; Uzawa, M.. Comparison of the effect of alendronate on lumbar bone mineral density and bone turnover in men and postmenopausal women with osteoporosis. Clinical Rheumatology 2007;26(2):161-167.	Wrong study design
306.	Iwamoto	2008	Iwamoto, J.; Sato, Y.; Uzawa, M.; Takeda, T.; Matsumoto, H.. Comparison of effects of alendronate and raloxifene on lumbar bone mineral density, bone turnover, and lipid metabolism in elderly women with osteoporosis. Yonsei Medical Journal 2008;49(1):119-128.	Wrong patient population
307.	Jacobsen	2012	Jacobsen, D. E.; Melis, R. J.; Verhaar, H. J.; Olde Rikkert, M. G.. Raloxifene and tibolone in elderly women: a randomized, double-blind, double-dummy, placebo-controlled trial. Journal of the American Medical Directors Association 2012;13(2):189.e1-7	Wrong outcomes
308.	Jacques	2010	Jacques, R. M.; Reid, D.; Zanchetta, J.; Vukicevic, S.; Thompson, D.; Thompson, J.; Cummings, S.; Eastell, R.. The percentage reduction in vertebral fracture risk with lasofox-ifene explained by change in spine bone mineral density. Bone 2010;1):S207.	Conference abstract
309.	Jamal	2007	Jamal, S. A.; Bauer, D. C.; Ensrud, K. E.; Cauley, J. A.; Hochberg, M.; Ishani, A.; Cummings, S. R.. Alendronate treatment in women with normal to severely impaired renal function: An analysis of the fracture intervention trial. Journal of Bone and Mineral Research 2007;22(4):503-508.	Wrong patient population (sub group analysis)
310.	Jansen	2011	Jansen, J. P.; Bergman, G. J. D.; Huels, J.; Olson, M.. The Efficacy of Bisphosphonates in the Prevention of Vertebral, Hip, and Nonvertebral-Nonhip Fractures in Osteoporosis: A Network Meta-Analysis. Seminars in Arthritis and Rheumatism 2011;40(4):275-284.e2.	Systematic review and/or meta-analysis
311.	Jean	2015	Jean, S.; Bessette, L.; Ste-Marie, L. G.; Brown, J. P.. Denosumab compared to other treatments to prevent or treat osteoporosis: A systematic review and meta-analysis. Journal of Bone and Mineral Research. Conference 2015;30(Supplement 1).	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
312.	Jin	2018	Jin, Y. Z.; Lee, J. H.. Effect of medications on secondary prevention of Osteoporotic Vertebral Compression Fracture: A meta-analysis of randomized controlled trials. Calcified Tissue International 2018;102 (1 Supplement 1):S137-S138.	Conference abstract
313.	Jin	2019	Jin, Y. Z.; Lee, J. H.; Xu, B.; Cho, M.. Effect of medications on prevention of secondary osteoporotic vertebral compression fracture, non-vertebral fracture, and discontinuation due to adverse events: A meta-analysis of randomized controlled trials. BMC Musculoskeletal Disorders 31 Aug 2019;20 (1) (no pagination)(399)	Systematic review and/or meta-analysis
314.	Jin	2019	Jin, Yuan-Zhe; Cho, Minjoon; Lee, Jae Hyup; Xu, Bin. Effect of medications on prevention of secondary osteoporotic vertebral compression fracture, non-vertebral fracture, and discontinuation due to adverse events: A meta-analysis of randomized controlled trials. BMC musculoskeletal disorders 2019;20(1):399	Systematic review and/or meta-analysis
315.	Johansson	2017	Johansson, H.; McCloskey, E.; Oden, A.; Harvey, N. C.; Jiang, H.; Modin, S.; Fitzpatrick, L. A.; Kanis, J. A.. The efficacy of abaloparatide-SC is independent of baseline BMD. Osteoporosis International 2017;28 (Supplement 1):S519	Conference abstract
316.	Johansson	2017 a	Johansson, H.; McCloskey, E.; Oden, A.; Harvey, N. C.; Black, D. M.; Cauley, J.; Kanis, J. A.. The effect of alendronate on vertebral fracture risk is independent of baseline frax fracture probability: A post HOC analysis of the fit study. Osteoporosis International 2017;28 (Supplement 1):S619.	Conference abstract
317.	Johansson	2010	Johansson, H.; Oden, A.; Chines, A.; Kanis, J.; McCloskey, E. Non-vertebral fracture risk reduction by bazedoxifene. Bone June 2010;1)():S211	Conference abstract
318.	Johnell	2002	Johnell, O.; Scheele, W. H.; Lu, Y.; Reginster, J. Y.; Need, A. G.; Seeman, E.. Additive effects of raloxifene and alendronate on bone density and biochemical markers of bone remodeling in postmenopausal women with osteoporosis. Journal of Clinical Endocrinology and Metabolism 2002;87(3):985-992.	Wrong outcomes
319.	Johnson	2007	Johnson, B. E.. A once yearly IV infusion of zoledronic acid prevented fractures in postmenopausal women with osteoporosis. Evidence-Based Medicine October 2007;12(5):145	Commentary
320.	Jundi	2019	Jundi, Bakr; Lyu, Houchen; Xu, Chang; Tedeschi, Sara K.; Yoshida, Kazuki; Zhao, Sizheng; Nigwekar, Sagar U.; Leder, Benjamin Z.; Solomon, Daniel H. Comparison of Denosumab and Bisphosphonates in Patients with Osteoporosis: A Meta-Analysis of Randomized Controlled Trials. Journal of Clinical Endocrinology and Metabolism 2019;104(5):1753-1765	Systematic review and/or meta-analysis

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
321.	Kanis	2010	Kanis, J.; Johansson, H.; Oden, A.; McCloskey, E.. The effect of raloxifene on vertebral and non-vertebral fracture risk is independent of baseline FRAXH probability. Journal of Bone and Mineral Research 2010;1):S126.	Conference abstract
322.	Kataoka	2020	Kataoka, Yuki; Luo, Yan; Chaimani, Anna; Onishi, Akira; Kimachi, Miho; Tsujimoto, Yasushi; Murad, Mohammad Hassan; Li, Tianjing; Cipriani, Andrea; Furukawa, Toshi A. Cumulative network meta-analyses, practice guidelines, and actual prescriptions for postmenopausal osteoporosis: a meta-epidemiological study. Archives of osteoporosis 2020;15(1):21	Systematic review and/or meta-analysis
323.	Kaufman	2012	Kaufman, J. M.; Palacios, S.; Silverman, S.; Sutradhar, S.; Chines, A. A. The effects of bazedoxifene and raloxifene on vertebral, nonvertebral, and all clinical fractures as a function of baseline fracture risk assessed by FRAX. Osteoporosis International March 2012;2)():S278-S279	Conference abstract
324.	Keaveny	2017	Keaveny, T. M.; Crittenden, D. B.; Bolognese, M. A.; Genant, H. K.; Engelke, K.; Oliveri, B.; Brown, J. P.; Langdahl, B. L.; Yan, C.; Grauer, A.; Libanati, C.. Greater Gains in Spine and Hip Strength for Romosozumab Compared With Teriparatide in Postmenopausal Women With Low Bone Mass. Journal of Bone and Mineral Research 2017;32(9):1956-1962.	Wrong outcomes
325.	Keaveny	2010	Keaveny, T.; McClung, M.; Genant, H.; Zanchetta, J. R.; Kendler, D. L.; Brown, J.; Goemaere, S.; Recknor, C.; Brandi, M. L.; Eastell, R.; Engelke, K.; Fuerst, T.; Radcliffe, H. S.; Libanati, C. Denosumab improves both femoral and vertebral strength in women with osteoporosis: Results from the freedom trial. Journal of Bone and Mineral Research 2010;1)():S31	Conference abstract
326.	Kendler	2011	Kendler, D. L.; McClung, M. R.; Freemantle, N.; Lillestol, M.; Moffett, A. H.; Borenstein, J.; Satram-Hoang, S.; Yang, Y. C.; Kaur, P.; Macarios, D.; Siddhanti, S.. Adherence, preference, and satisfaction of postmenopausal women taking denosumab or alendronate. Osteoporosis International 2011;22(6):1725-1735.	Wrong outcomes
327.	Kendler	2012	Kendler, D.; Lillestol, M. J.; Moffett, A. H.; Satram-Hoang, S.; Huang, J.; Tang, E. T.; Kaur, P.. Influence of patient perceptions and preferences about osteoporosis medication on adherence in the denosumab adherence, preference, and satisfaction (DAPS) study. Menopause 2012;19 (12):1390.	Conference abstract
328.	Kendler	2013	Kendler, D.. Sustainability of anti-fracture efficacy and safety of denosumab in postmenopausal	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			osteoporosis. Osteoporosis International 2013;4):S653-S654.	
329.	Kendler	2017	Kendler, D. L.; Zerbini, C.; Russo, L.; Greenspan, S.; Zikan, V.; Bagur, A.; Malouf, J.; Lakatos, P.; Fahrleitner-Pammer, A.; Lespessailles, E.; Minisola, S.; Body, J. J.; Geusens, P.; Moericke, R.; Lopez-Romero, P.; Marin, F.. Effects of 24 months treatment of teriparatide compared with risedronate on new fractures in postmenopausal women with severe osteoporosis: A randomized, double-dummy, clinicaltrial. Osteoporosis International 2017;28 (1 Supplement 1):S69-S70.	Conference abstract
330.	Kendler	2017 a	Kendler, D. L.; Bone, H. G.; Massari, F.; Gielen, E.; Palacios, S.; Maddox, J.; Yan, C.; Libanati, C.; Yue, S.; Grauer, A.. Retreatment with romosozumab after 12 months of placebo demonstrates similar BMD efficacy compared with initial romosozumab treatment. Endocrine Reviews. Conference: 99th Annual Meeting of the Endocrine Society, ENDO 2017;38(3 Supplement 1)	Conference abstract
331.	Kendler	2017 b	Kendler, D. L.; Chines, A.; Brandi, M. L.; Papapoulos, S.; Lewiecki, E. M.; Reginster, J. Y.; Roux, C.; Munoz Torres, M.; Wang, A.; Bone, H. G.. The risk of subsequent osteoporotic fractures is decreased in patients experiencing fracture while on denosumab: Results from the freedom and freedom extension studies. Endocrine Reviews. Conference: 99th Annual Meeting of the Endocrine Society, ENDO 2017;38(3 Supplement 1)	Conference abstract
332.	Kendler	2019	Kendler, D.; Chines, A.; Clark, P.; Ebeling, P. R.; McClung, M.; Rhee, Y.; Huang, S.; Stad, R. K.. Bone Mineral Density After Transitioning From Denosumab to Alendronate. The Journal of clinical endocrinology and metabolism. 2019;26	Wrong study design
333.	Kendler	2019 a	Kendler, D. L.; Bone, H. G.; Massari, F.; Gielen, E.; Palacios, S.; Maddox, J.; Yan, C.; Yue, S.; Dinavahi, R. V.; Libanati, C.; Grauer, A.. Bone mineral density gains with a second 12-month course of romosozumab therapy following placebo or denosumab. Osteoporosis International: a journal established as result of cooperation between the European Foundation for Osteoporosis and the National Osteoporosis Foundation of the USA. 2019;18	Wrong outcomes
334.	Kendler	2019 d	Kendler, D. L.; Marin, F.; Lopez-Romero, P.; Geusens, P.; Lespessailles, E.; Body, J. J.; Minisola, S. Psychotropic medications and proton pump inhibitors and the risk of fractures in the teriparatide vs. risedronate 'vero' clinical trial. Osteoporosis International 2019;30(SUPPL 2):S286	Conference abstract, with no new data
335.	Kendler	2019 e	Kendler, David; Chines, Arkadi; Huang, Shuang; Clark, Patricia; Ebeling, Peter R.; McClung, Michael; Rhee, Yumie; Kees Stad, Robert; Freemantle, Nick.	Conference abstract, with no new data

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			Subject characteristics and changes in bone mineral density after transitioning from denosumab to alendronate in the denosumab Adherence Preference Satisfaction (DAPS) Study. Arthritis and Rheumatology 2019;71(Supplement 10):3344-3345	
336.	Kendler	2019f	Kendler, David; Clark, Patricia; Ebeling, Peter R.; McClung, Michael; Rhee, Yumie; Chines, Arkadi; Huang, Shuang; Stad, Robert Kees; Freemantle, Nick. Subject characteristics and changes in bone mineral density after transitioning from denosumab to alendronate in the denosumab adherence preference satisfaction (DAPS) study. Journal of Bone and Mineral Research 2019;34(Supplement 1):15-16	Conference abstract, with no new data
337.	Kendler	2020	Kendler, D. L.; Marin, F.; Geusens, P.; Lopez-Romero, P.; Lespessailles, E.; Body, J. J.; Minisola, S.. Psychotropic medications and proton pump inhibitors and the risk of fractures in the teriparatide versus risedronate VERO clinical trial. Bone January 2020;130 (no pagination)(115113)	Wrong study design
338.	Khalilli	2018	Khalili, M.; Hosseinzadeh, A.; Kiavandani, H. M.; Khanjani, N.. Effects of Bazedoxifene on Bone Mineral Density and Fracture in Post-Menopausal Osteoporotic Women: a Systematic Review and Meta-Analysis. Clinical Reviews in Bone and Mineral Metabolism 2018;16(1):22-32.	Systematic review and/or meta-analysis
339.	Kirazli	2019	Kirazli, Y. Osteoporotic hip fractures: Are we able to prevent? Osteoporosis International 2019;30(SUPPL 2):S239	Conference abstract, with no new data
340.	Kmietowicz	2015	Kmietowicz, Z.. Zoledronic acid increases bone density but does not reduce fractures in frail elderly people, study finds. BMJ (Online) 2015;350. [DOI: 10.1136/bmj.h1949]	Commentary
341.	Kotlarczyk	2020	Kotlarczyk, Mary P.; Perera, Subashan; Resnick, Neil M.; Nace, David A.; Greenspan, Susan L. Early changes in bone turnover predict longer-term changes in bone mineral density but not trabecular bone score in frail older women. Archives of osteoporosis 2020;15(1):79	Wrong outcomes
342.	Kravvariti	2020	Kravvariti, Evrydiki; Mouratidou, Pelagia; Sfikakis, Petros P. Nocebo effects increase with advancing age in clinical trials of bisphosphonate therapy for osteoporotic vertebral compression fracture prevention. European Geriatric Medicine 2020;11(SUPPL 1):S208	Conference abstract, with no new data
343.	Kurth	2019	Kurth, A. A. Is there a role for local bone treatment in osteoporosis? Osteoporosis International 2019;30(SUPPL 2):S206-S207	Conference abstract, with no new data
344.	Kurth	2019	Kurth, A.; Marin, F.; Eriksen, E. F.; Kendler, D. L.; Krege, J. H.; Delgado-Rodriguez, M. Effects of teriparatide on hip and upper limb fractures in	Conference abstract, with no new data

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			patients with osteoporosis: A systematic review and meta-analysis. Osteologie 2019;28(1):52	
345.	Kurth	2020	Kurth, A. A. Local bone enhancement treatment in high risk osteoporotic patients. Osteoporosis International 2020;31(SUPPL 1):S79-S80	Conference abstract, with no new data
346.	Lan	2019	Lan, X.; Ma, H.; Zhang, Z.; Ye, D.; Min, J.; Cai, F.; Luo, J. Denosumab versus bisphosphonates for treatment of postmenopausal osteoporosis: A meta-analysis. International Journal of Clinical and Experimental Medicine 2019;12(9):11037-11048	Systematic review and/or meta-analysis
347.	Lan	2019	Lan, Xiaoyong; Luo, Jun; Ma, Haiping; Zhang, Zhiping; Ye, Dong; Cai, Feng; Min, Jun. Denosumab versus bisphosphonates for treatment of postmenopausal osteoporosis: A meta-analysis. International Journal of Clinical and Experimental Medicine 2019;12(9):11037-11048	Systematic review and/or meta-analysis
348.	Lane	2012	Lane, N.; Fuerst, T.; Levine, A. B.; Hines, T.; Williams, R.; Sutradhar, S.; Chines, A. Effects of bazedoxifene on intervertebral disc height and association with incident vertebral fractures in postmenopausal women. Journal of Bone and Mineral Research. Conference 2012;27(SUPPL. 1):	Conference abstract
349.	Langdahl	2016	Langdahl, B.; Libanati, C.; Crittenden, D.; Bolognese, M.; Brown, J.; Daizadeh, N.; Dokoupilova, E.; Engelke, K.; Finkelstein, J.; Genant, H.; Goemaere, S.; Hyldstrup, L.; Jodar-Gimeno, E.; Keaveny, T.; Kendler, D.; Lakatos, P.; Maddox, J.; Malouf, J.; Massari, F.; Molina, J.; Ulla, M.; Grauer, A.. Superior gains in bone mineral density and estimated strength at the hip for romosozumab compared with teriparatide in women with postmenopausal osteoporosis transitioning from bisphosphonate therapy: Results of the phase 3 open-label structure study. Annals of the Rheumatic Diseases June 2016;75 (Supplement 2):92-93	Conference abstract
350.	Lecart	2004	Lecart, M. P.; Bruyere, O.; Reginster, J. Y.. Combination/sequential therapy in osteoporosis. Current Osteoporosis Reports Dec 2004;2(4):123-130	Systematic review and/or meta-analysis
351.	Leder	2007	Leder, B. Z.. Is parathyroid hormone (1-84) a safe and effective treatment for postmenopausal osteoporosis?. Nature Clinical Practice Endocrinology and Metabolism November 2007;3(11):746-747	Commentary
352.	Leder	2018	Leder, B.; Zapalowski, C.; Hu, M. Y.; Hattersley, G. Fracture and bone mineral density response by baseline risk in patients treated with abaloparatide followed by alendronate. Arthritis and Rheumatology September 2018;70 (Supplement 9)():3158-3159	Extension study
353.	Leder	2019	Leder, B. Z.; Zapalowski, C.; Hu, M. Y.; Hattersley, G.; Lane, N. E.; Singer, A. J.; Dore, R. K.. Fracture	Extension study

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			and Bone Mineral Density Response by Baseline Risk in Patients Treated With Abaloparatide Followed by Alendronate: Results From the Phase 3 ACTIVExtend Trial. Journal of Bone and Mineral Research. 2019	
354.	Lee	2001	Lee, V. K.. Management of osteoporosis in the nursing home setting. Annals of Long-Term Care 2001;9(9):32-42	Systematic review and/or meta-analysis
355.	Lee	2018	Lee, S. Y.; Jung, S. H.; Lee, S. U.; Ha, Y. C.; Lim, J. Y.. Can Bisphosphonates Prevent Recurrent Fragility Fractures? A Systematic Review and Meta-Analysis of Randomized Controlled Trials. Journal of the American Medical Directors Association 2018;19(5):384-390.e1.	Systematic review and/or meta-analysis
356.	Levine	2010	Levine, A. B.; Ciesielska, M.; Chines, A.. Efficacy and safety of bazedoxifene in postmenopausal African American women. Journal of Bone and Mineral Research 2010;1):S125-S126.	Conference abstract
357.	Levis	2002	Levis, S.; Quandt, S. A.; Thompson, D.; Scott, J.; Schneider, D. L.; Ross, P. D.; Black, D.; Suryawanshi, S.; Hochberg, M.; Yates, J.. Alendronate reduces the risk of multiple symptomatic fractures: Results from the Fracture Intervention Trial. Journal of the American Geriatrics Society 2002;50(3):409-415.	Wrong outcomes
358.	Lewiecki	2008	Lewiecki, E. M.; Babbitt, A. M.; Piziak, V. K.; Ozturk, Z. E.; Bone, H. G.. Adherence to and Gastrointestinal Tolerability of Monthly Oral or Quarterly Intravenous Ibandronate Therapy in Women with Previous Intolerance to Oral Bisphosphonates: A 12-Month, Open-Label, Prospective Evaluation. Clinical Therapeutics April 2008;30(4):605-621	Wrong study design
359.	Lewiecki	2017	Lewiecki, E. M.; Dinavahi, R. V.; Lazaretti-Castro, M.; Ebeling, P. R.; Adachi, J. D.; Miyauchi, A.; Gielen, E.; Milmont, C. E.; Libanati, C.; Grauer, A.. Continued fracture risk reduction after 12 months of romosozumab followed by denosumab through 36 months in the phase 3 FRAME (FRActure study in postmenopausal woMen with ostEoporosis) Extension. Journal of Bone and Mineral Research 2017;32 (Supplement 1):S24	Extension study
360.	Li	2005	Li, Y.; Zhang, Z.; Deng, X.; Chen, L.. Efficacy and safety of risedronate sodium in treatment of postmenopausal osteoporosis. Journal of Huazhong University of Science and Technology. Medical Sciences 2005;25(5):527-9	Wrong outcomes
361.	Li	2015	Li, W.; Chen, W.; Lin, Y.. The efficacy of parathyroid hormone analogues in combination with bisphosphonates for the treatment of osteoporosis: A meta-analysis of randomized controlled trials. Medicine (United States) 2015;94 (38) (no pagination)(e1156).	Systematic review and/or meta-analysis

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
362.	Li	2015	Li, W.; Chen, W.; Lin, Y.. The Efficacy of Parathyroid Hormone Analogues in Combination With Bisphosphonates for the Treatment of Osteoporosis: A Meta-Analysis of Randomized Controlled Trials. Medicine 2015;94(38):e1156	Systematic review and/or meta-analysis
363.	Li	2016	Li, M.; Gurbuz, S.; Zhang, B.; Li, Y. J.; Chen, Y.. Effect of teriparatide in chinese and caucasian postmenopausal women with osteoporosis: Bridging findings on efficacy. Osteoporosis International 2016;1):S216.	Conference abstract
364.	Li	2016 a	Li, Y.; Zhao, W. B.; Wang, D. L.; He, Q.; Li, Q.; Pei, F. X.; Liu, L.. Treatment of osteoporotic intertrochanteric fractures by zoledronic acid injection combined with proximal femoral nail anti-rotation. Chinese Journal of Traumatology - English Edition 2016;19(5):259-263.	Wrong patient population
365.	Libanati	2010	Libanati, C.; Seeman, E.; Thomas, T.; Boyd, S.; Boutroy, S.; Shane, E.; Hanley, D.; Bogado, C.; Cheung, A.; Majumdar, S.; Sellmayer, D.; Kearns, A.; Delmas, P.; Fan, M.; Zanchetta, J.. Denosumab and alendronate have different effects at the ultradistal radius in postmenopausalwomen with low bone mass. Bone March 2010;1):S28-S29	Conference abstract
366.	Liedholm	1996	Liedholm, H.; Linne, A. B.; McGrath Jr, H.; Liberman, U.; Karpf, D. B.; Capizzi, T.. Alendronate in postmenopausal osteoporosis [2]. New England Journal of Medicine 1996;334(11):733-735	Commentary
367.	Lim	2017	Lim, S. J.; Kim, K.; Park, Y. S.. Effect of osteoporosis medications on refracture and mortality following hip fracture surgery in postmenopausal women: A prospective randomized trial. Osteoporosis International 2017;28 (Supplement 1):S250.	Conference abstract
368.	Lin	2014	Lin, T.; Yan, S. G.; Cai, X. Z.; Ying, Z. M.; Yuan, F. Z.; Zuo, X.. Alendronate versus raloxifene for postmenopausal women: A meta-analysis of seven head-to-head randomized controlled trials. International Journal of Endocrinology 2014;2014 (no pagination)(796510):	Systematic review and/or meta-analysis
369.	Lin	2021	Lin, Shih-Yin; Hung, Min-Chih; Chang, Shih-Fu; Chang, Jenny Zwei-Chieng; Tsuang, Fon-Yih; Sun, Jui-Sheng. Efficacy and safety of postmenopausal osteoporosis treatments: A systematic review and network meta-analysis of randomized controlled trials. Journal of Clinical Medicine 2021;10(14):3043	Systematic review and/or meta-analysis
370.		2009	Lindsay, R.; Gallagher, J. C.; Kagan, R.; Pickar, J. H.; Constantine, G.. Efficacy of tissue-selective estrogen complex of bazedoxifene/conjugated estrogens for osteoporosis prevention in at-risk postmenopausal women. Fertility and Sterility 2009;92(3):1045-1052.	Wrong outcomes
371.	Lippuner	2010	Lippuner, K.; Adachi, J.; Cummings, S.; Man, Z.; Farrerons, J.; Torring, O.; Gallagher, J.; McClung,	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			M.; Franchimont, N.; Martin, J. S.; Wang, A.; Boonen, S. Effect of denosumab on the incidence of hip and new vertebral fractures in postmenopausal women with high fracture risk: A subanalysis of the FREEDOM study. Bone March 2010;1)():S27-S28	
372.	Liu	2015	Liu, M.; Guo, L.; Pei, Y.; Li, N.; Jin, M.; Ma, L.; Liu, Y.; Sun, B.; Li, C.. Efficacy of zoledronic acid in treatment of osteoporosis in men and women-a meta-analysis. International Journal of Clinical and Experimental Medicine 2015;8(3):3855-3861.	Systematic review and/or meta-analysis
373.	Liu	2017	Liu, C. L.; Lee, H. C.; Chen, C. C.; Cho, D. Y.. Head-to-head comparisons of bisphosphonates and teriparatide in osteoporosis: a meta-analysis. Clinical and investigative medicine 2017;Medecine clinique et experimentale. 40(3):E146-E157.	Systematic review and/or meta-analysis
374.	Liu	2018	Liu, G. F.; Wang, Z. Q.; Liu, L.; Zhang, B. T.; Miao, Y. Y.; Yu, S. N.. A network meta-analysis on the short-term efficacy and adverse events of different anti-osteoporosis drugs for the treatment of postmenopausal osteoporosis. Journal of Cellular Biochemistry 2018;119(6):4469-4481.	Systematic review and/or meta-analysis
375.	Liu	2018 a	Liu, Y.; Cao, Y.; Zhang, S.; Zhang, W.; Zhang, B.; Tang, Q.; Li, Z.; Wu, J.. Romosozumab treatment in postmenopausal women with osteoporosis: a meta-analysis of randomized controlled trials. Climacteric 2018;21(2):189-195.	Systematic review and/or meta-analysis
376.	Lou	2016	Lou, S.; Lv, H.; Wang, G.; Zhang, L.; Li, M.; Li, Z.; Zhang, L.; Tang, P.. The Effect of Teriparatide on Fracture Healing of Osteoporotic Patients: A Meta-Analysis of Randomized Controlled Trials. BioMed Research International 2016;2016:6040379	Systematic review and/or meta-analysis
377.	Lou	2019	Lou, S.; Lv, H.; Yin, P.; Li, Z.; Tang, P.; Wang, Y.. Combination therapy with parathyroid hormone analogs and antiresorptive agents for osteoporosis: a systematic review and meta-analysis of randomized controlled trials. Osteoporosis International 2019;30(1):59-70.	Systematic review and/or meta-analysis
378.	Lou	2019 a	Lou, S.; Lv, H.; Yin, P.; Li, Z.; Tang, P.; Wang, Y. Combination therapy with parathyroid hormone analogs and antiresorptive agents for osteoporosis: a systematic review and meta-analysis of randomized controlled trials. Osteoporosis international : a journal established as result of cooperation between the European Foundation for Osteoporosis and the National Osteoporosis Foundation of the USA 2019;30(1):59-70	Systematic review and/or meta-analysis
379.	Lu	2019	Lu, L.; Zhang, J.; Li, J.. Potential risks of rare serious adverse effects related to long-term use of bisphosphonates: An overview of systematic reviews. Journal of Clinical Pharmacy and Therapeutics. 2019	Systematic review and/or meta-analysis

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
380.	Lui	2019	Lui, Li-Yung; Eastell, Richard; Cummings, Steven R.; Allen, Isabel E. Association between Drug Treatments for Patients with Osteoporosis and Overall Mortality Rates: A Meta-analysis. JAMA Internal Medicine 2019;179(11):1491-1500	Systematic review and/or meta-analysis
381.	Lundstam	2015	Lundstam, K.; Heck, A.; Mollerup, C.; Godang, K.; Baranowski, M.; Pernow, Y.; Varhaug, J. E.; Hessman, O.; Rosen, T.; Nordenstrom, J.; Jansson, S.; Hellstrom, M.; Bollerslev, J.; Siph Study Group. Effects of parathyroidectomy versus observation on the development of vertebral fractures in mild primary hyperparathyroidism. Journal of Clinical Endocrinology & Metabolism 2015;100(4):1359-67.	Wrong intervention
382.	Lundstam	2014	Lundstam, K.; Hellstrom, M.; Heck, A.; Godang, K.; Baranowski, M.; Varhaug, J. E.; Mollerup, C. L.; Rosen, T. P.; Nordenstrom, J.; Jansson, S.; et al., Increased risk for vertebral fractures with long-term observation in mild primary hyperparathyroidism: five year data from the scandinavian investigation of primary hyperparathyroidism (SIPH). Endocrine reviews. Conference: 96th annual meeting and expo of the endocrine society, ENDO 2014. Chicago, IL united states. Conference start: 20140621. Conference end: 20140624. Conference publication: (var.pagings) 2014;35(no pagination):	Conference abstract
383.	Lv	2020	Lv, Fang; Cai, Xiaoling; Yang, Wenjia; Gao, Leili; Chen, Ling; Wu, Jing; Ji, Linong. Denosumab or romosozumab therapy and risk of cardiovascular events in patients with primary osteoporosis: Systematic review and meta- analysis. Bone 2020;130():115121	Systematic review and/or meta-analysis
384.	Lyles	2007	Lyles, K. W.; Colon-Emeric, C. S.; Magaziner, J. S.; Adachi, J. D.; Pieper, C. F.; Mautalen, C.; Hyldstrup, L.; Recknor, C.; Nordsletten, L.; Moore, K. A.; Lavecchia, C.; Zhang, J.; Mesenbrink, P.; Hodgson, P. K.; Abrams, K.; Orloff, J. J.; Horowitz, Z.; Eriksen, E. F.; Boonen, S.. Zoledronic acid and clinical fractures and mortality after hip fracture. New England Journal of Medicine 2007;357(18):1799-1809.	Wrong patient population
385.	Lyu	2018	Lyu, H.; Jundi, B.; Xu, C.; Tedeschi, S. K.; Yoshida, K.; Zhao, S.; Nigwekar, S. U.; Leder, B. Z.; Solomon, D. H.. Comparison of denosumab vs. bisphosphonates in osteoporosis patients: A meta-analysis of randomized controlled trials. Journal of Clinical Endocrinology & Metabolism 2018;10:10.	Systematic review and/or meta-analysis
386.	Magaziner	2014	Magaziner, J. S.; Orwig, D. L.; Lyles, K. W.; Nordsletten, L.; Boonen, S.; Adachi, J. D.; Recknor, C.; Colon-Emeric, C. S.; Mesenbrink, P.; Bucci-Rechtweg, C.; Su, G.; Johnson, R.; Pieper, C. F.. Subgroup variations in bone mineral density response to zoledronic acid after hip fracture.	Wrong patient population

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			Journal of Bone and Mineral Research 2014;29(12):2545-2551.	
387.	Malhotra	2019	Malhotra, R.; Chawla, L. Comparative study of weekly alendronate vs. yearly zoledronic acid injectionint reatment of postmenopausal osteoporosis in terms of efficacy, compliance and bone markers estimation. Osteoporosis International 2019;30(SUPPL 2):S724	Wrong outcomes
388.	Malouf	2017	Malouf, J.; Tarantino, U.; Aspenberg, P.; Overgaard, S.; Corradini, C.; Pini, G.; Stepan, J.; Borris, L.; Garcia-Hernandez, P.; Lespessailles, E.; et al.,. Effect of teriparatide or risedronate in bmd and fracture recovery in elderly patients with a recent pertrochanteric hip fracture: final results of a 78-week randomized clinical trial. Journal of Bone and Mineral Research 2017;31. [DOI: 10.1002/jbmr.3107]	Wrong patient population
389.	Mariscal	2020	Mariscal, Gonzalo; Barrios, Carlos; Nunez, Jorge H.; Bhatia, Sanjay; Domenech-Fernandez, Pedro. Safety of Romosozumab in Osteoporotic Men and Postmenopausal Women: A Meta-Analysis and Systematic Review. Monoclonal antibodies in immunodiagnosis and immunotherapy 2020;39(2):29-36	Systematic review and/or meta-analysis
390.	Maughan	1997	Maughan, K. L.. Preventing osteoporotic fractures with alendronate. The Journal of family practice Apr 1997;44(4):336	Systematic review and/or meta-analysis
391.	McCloskey	2010	McCloskey, E.; Johansson, H.; Chines, A.; Oden, A.; Kanis, J. Bazedoxifene reduces non-vertebral fractures in patients at high probability of fracture. Bone March 2010;1)():S26	Conference abstract
392.	McCloskey	2010	McCloskey, E.; Kanis, J.; Johansson, H.; Oden, A. FRAX and the effect of raloxifene on vertebral and non-vertebral fracture. Osteoporosis International May 2010;1)():S22	Conference abstract
393.	McCloskey	2016	McCloskey, E. V.; Johansson, H.; Harvey, N. C.; Oden, A.; Jiang, H.; Modin, S.; Fitzpatrick, L.; Kanis, J. A.. Effect of investigational treatment abaloparatide-SC for prevention of major osteoporotic fracture or any fracture is independent of baseline fracture probability. Journal of Bone and Mineral Research. Conference 2016;31(Supplement 1)	Conference abstract
394.	McCloskey	2017	McCloskey, E.; Fitzpatrick, L. A.; Hu, M.; Kanis, J. A.. Abaloparatide-sc decreases vertebral, nonvertebral, major osteoporotic, and wrist fractures in a subset of postmeno-pausal women at high risk of fracture by frax score. Osteoporosis International 2017;28 (1 Supplement 1):S49-S50.	Conference abstract
395.	McCloskey	2019	McCloskey, E. When and why use a bone-forming agent? Osteoporosis International 2019;30(SUPPL 2):S157	Conference abstract, with no new data

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
396.	McCloskey	2019 a	McCloskey, E. V.; Eastell, R.; McClung, M.; Pannacciulli, N.; Wang, C.; Yue, S.; Cummings, S. R. A pooled analysis of fall incidence from placebo-controlled trials of denosumab. Osteoporosis International 2019;30(SUPPL 2):S179-S180	Conference abstract, with no new data
397.	McCloskey	2019 b	McCloskey, E. V.; Lorentzon, M.; Johansson, H.; Harvey, N. C.; Kanis, J. A. Romosozumab efficacy on fracture outcomes is greater in patients at high baseline fracture risk: A post hoc analysis of the frame study. Osteoporosis International 2019;30(SUPPL 2):S163-S164	Conference abstract, with no new data
398.	McCloskey	2019 d	McCloskey, E. V.; Fitzpatrick, L. A.; Hu, M. Y.; Williams, G.; Kanis, J. A. Effect of abaloparatide on vertebral, nonvertebral, major osteoporotic, and clinical fractures in a subset of postmenopausal women at increased risk of fracture by FRAX probability. Archives of osteoporosis 2019;14(1):15	Conference abstract
399.	McClung	2003	McClung, M.. Use of highly potent bisphosphonates in the treatment of osteoporosis. Current Osteoporosis Reports Dec 2003;1(3):116-122	Systematic review and/or meta-analysis
400.	McClung	2009	McClung, M.; Bauer, D.; Christiansen, C.; Ebeling, P.; Grauer, A.; Lakatos, P.; Lems, W. The effects of denosumab on fracture risk reduction related to baseline bone resorption. Arthritis and Rheumatism 2009;10)():593	Conference abstract
401.	McClung	2009	McClung, M.; Bone, H. G.; Adachi, J. D.; Boonen, S.; Christiansen, C.; Eastell, R.; Farrerons, J. Denosumab and risk of fractures in subgroups of women with osteoporosis. Arthritis and Rheumatism 2009;10)():869	Conference abstract
402.	McClung	2009	McClung, M.; Cummings, S.; Yang, Y. C.; Vittinghoff, E.; Adami, S.; Bianchi, G.; Bolognese, M. Relationship between increases in BMD on denosumab and reduction in fracture risk. Arthritis and Rheumatism 2009;10)():883	Conference abstract
403.	McClung	2012	McClung, M. R.; Miller, P. D.; Brown, J. P.; Zanchetta, J.; Bolognese, M. A.; Benhamou, C. L.; Balske, A.; Burgio, D. E.; Sarley, J.; McCullough, L. K.; Recker, R. R.. Efficacy and safety of a novel delayed-release risedronate 35 mg once-a-week tablet. Osteoporosis International 2012;23(1):267-76.	Wrong intervention
404.	McClung	2013	McClung, M. R.; Balske, A.; Burgio, D. E.; Wenderoth, D.; Recker, R. R.. Treatment of postmenopausal osteoporosis with delayed-release risedronate 35 mg weekly for 2 years. Osteoporosis International 2013;24(1):301-310.	Wrong intervention
405.	McClung	2013 a	McClung, M. R.; Benhamou, C. L.; Man, Z.; Tlustochowicz, W.; Zanchetta, J. R.; Eusebio, R.; Balske, A. M.; Matzkin, E.; Olszynski, W. P.; Recker, R.; Delmas, P. D.. A novel monthly dosing regimen of risedronate for the treatment of	Wrong comparator

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			postmenopausal osteoporosis: 2-year data. Calcified Tissue International 2013;92(1):59-67	
406.	McClung	2013 b	McClung, M. R.; Zanchetta, J. R.; Racewicz, A.; Roux, C.; Benhamou, C. L.; Man, Z.; Eusebio, R. A.; Beary, J. F.; Burgio, D. E.; Matzkin, E.; Boonen, S.; Delmas, P.. Efficacy and safety of risedronate 150-mg once a month in the treatment of postmenopausal osteoporosis: 2-year data. Osteoporosis International 2013;24(1):293-9	Wrong comparator
407.	McClung	2013	McClung, M. R.; Zanchetta, J. R.; Hoiseth, A.; Kendler, D. L.; Yuen, C. K.; Brown, J. P.; Stonkus, S.; Goemaere, S.; Recknor, C.; Woodson, G. C.; Bolognese, M. A.; Franek, E.; Brandi, M. L.; Wang, A.; Libanati, C. Denosumab densitometric changes assessed by quantitative computed tomography at the spine and hip in postmenopausal women with osteoporosis. Journal of Clinical Densitometry April 2013;16(2):250-256	Wrong outcomes
408.	McClung	2017	McClung, M. R.; Williams, G. C.; Hattersley, G.; Fitzpatrick, L. A.; Wang, Y.; Miller, P. D.. Comparison of the geography of fracture incidence in postmenopausal women with osteoporosis treated with abaloparatide-SC versus placebo during the ACTIVE trial. Endocrine Reviews. Conference: 99th Annual Meeting of the Endocrine Society, ENDO 2017;38(3 Supplement 1).	Conference abstract
409.	McClung	2017 a	McClung, M. R.; Bolognese, M. A.; Brown, J. P.; Reginster, J. Y.; Langdahl, B. L.; Maddox, J.; Yan, C.; Yue, S.; Meisner, P. D.; Grauer, A.. Transition to zoledronic acid after romosozumab treatment maintains bone mineral density gains. Endocrine Reviews. Conference: 99th Annual Meeting of the Endocrine Society, ENDO 2017;38(3 Supplement 1).	Conference abstract
410.	McClung	2017 b	McClung, M.; Harvey, N. C.; Fitzpatrick, L. A.; Miller, P.; Hattersley, G.; Wang, Y.; Cosman, F.. Effects of abaloparatide-sc on bone mineral density and risk of fracture in postmenopausal women aged 80 years or older with osteoporosis. Osteoporosis International 2017;28 (Supplement 1):S407.	Conference abstract
411.	McClung	2020	McClung, M. R.; Bolognese, M. A.; Brown, J. P.; Reginster, J. Y.; Langdahl, B. L.; Ruiz-Santiago, N.; Shi, Y.; Rojeski, M.; Kassahun, H.; Oates, M.; Timoshanko, J.; Libanati, C. Romosozumab after Denosumab Improves Lumbar Spine and Maintains Total Hip Bone Mineral Density in Postmenopausal Women with Low Bone Mass. Journal of Bone and Mineral Research 2020;35(SUPPL 1):246-247	Conference abstract, with no new data
412.	McClung	2020 a	McClung, M. R.; Bolognese, M. A.; Brown, J. P.; Reginster, J. Y.; Langdahl, B. L.; Ruiz-Santiago, N.; Shi, Y.; Rojeski, M.; Oates, M.; Timoshanko, J.; Libanati, C.; Kassahun, H. Romosozumab after denosumab improves lumbar spine and maintains total hip bone mineral density in postmenopausal	Conference abstract, with no new data

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			womenwith low bone mass. Osteoporosis International 2020;31(SUPPL 1):S41-S42	
413.	McClung	2020 b	McClung, Michael R.; Bolognese, Michael A.; Brown, Jacques P.; Reginster, Jean-Yves; Langdahl, Bente; Ruiz-Santiago, Norma; Shi, Yifei; Rojeski, Maria; Kassahun, Helina; Oates, Mary; Timoshanko, Jen; Libanati, Cesar. Romosozumab after Denosumab Improves Lumbar Spine and Maintains Total Hip Bone Mineral Density in Postmenopausal Women with Low Bone Mass. Arthritis and Rheumatology 2020;72(SUPPL 10):192-193	Conference abstract, with no new data
414.	Messalli	2009	Messalli, E. M.; Scaffa, C.. Long-term safety and efficacy of raloxifene in the prevention and treatment of postmenopausal osteoporosis: An update. International Journal of Women's Health 2009;1(1):11-20	Systematic review and/or meta-analysis
415.	MichaelLewiecki	2017	Michael Lewiecki, E.; Dinavahi, R. V.; Lazaretti-Castro, M.; Ebeling, P. R.; Adachi, J. D.; Miyauchi, A.; Gielen, E.; Milmont, C. E.; Libanati, C.; Grauer, A. Continued fracture risk reduction after 12 months of romosozumab followed by denosumab through 36 months in the phase 3 FRAME (FRActure study in postmenopausal woMen with ostEoporosis) Extension. Journal of Bone and Mineral Research December 2017;32 (Supplement 1)():S24	Extension study
416.	Migliore	2013	Migliore, A.; Broccoli, S.; Massafra, U.; Cassol, M.; Frediani, B.. Ranking antireabsorptive agents to prevent vertebral fractures in postmenopausal osteoporosis by mixed treatment comparison meta-analysis. European Review for Medical and Pharmacological Sciences 2013;17(5):658-667.	Systematic review and/or meta-analysis
417.	Miller	2008	Miller, P. D.; Bolognese, M. A.; Lewiecki, E. M.; McClung, M. R.; Ding, B.; Austin, M.; Liu, Y.; San Martin, J.. Effect of denosumab on bone density and turnover in postmenopausal women with low bone mass after long-term continued, discontinued, and restarting of therapy: A randomized blinded phase 2 clinical trial. Bone 2008;43(2):222-229.	Extension study
418.	Miller	2010	Miller, P. D.; Delmas, P. D.; Huss, H.; Patel, K. M.; Schimmer, R. C.; Adami, S.; Recker, R. R.. Increases in hip and spine bone mineral density are predictive for vertebral antifracture efficacy with ibandronate. Calcified Tissue International 2010;87(4):305-13	Wrong study design
419.	Miller	2015	Miller, P. D.; Leder, B. Z.; Hattersley, G.; Lau, E.; Alexandersen, P.; Hala, T.; Mustatea, S.; Nedergaard, B. S.; Krogsaa, A.; Slesinger, J.; Zerbini, C. A. F.; Valter, I.; Visockiene, Z.; Jendrych, B.; Kulak, C. A.; Marquez, F.; Harris, A. G.; Williams, G. C.; Hu, M. Y.; Riis, B. J.; Russo, L. A.; Christiansen, C.. Effects of abaloparatide on vertebral and non-vertebral fracture incidence in postmenopausal	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			women with osteoporosis-results of the phase 3 active trial. Endocrine Reviews. Conference: 97th Annual Meeting and Expo of the Endocrine Society, ENDO 2015;36(Supplement 2).	
420.	Miller	2015 a	Miller, P. D.; Pannacciulli, N.; Brown, J. P.; Czerwinski, E.; Nedergaard, B. S.; Bolognese, M. A.; Malouf, J.; Bone, H. G.; Reginster, J. Y.; Singer, A.; Wang, C.; Wagman, R. B.; Cummings, S. R.. A randomized double-blind study of denosumab compared with zoledronic acid in postmenopausal women with osteoporosis previously treated with oral bisphosphonate. Arthritis and Rheumatology. Conference: American College of Rheumatology/Association of Rheumatology Health Professionals Annual Scientific Meeting, ACR/ARHP 2015;67(SUPPL. 10).	Conference abstract
421.	Miller	2016	Miller, P.; Pannacciulli, N.; Brown, J. P.; Czerwinski, E.; Nedergaard, B. S.; Bolognese, M. A.; Malouf, J.; Bone, H. G.; Reginster, J. Y.; Singer, A.; Wang, C.; Wagman, R. B.; Cummings, S. R.. A randomized double-blind study of denosumab (DMAB) compared with zoledronic acid (ZOL) in postmenopausal women with osteoporosis previously treated with oral bisphosphonates. Osteoporosis International 2016;1):S41.	Conference abstract
422.	Miller	2017	Miller, P. D.; Pannacciulli, N.; Malouf, J.; Singer, A.; Czerwinski, E.; Bone, H. G.; Wang, C.; Wagman, R. B.; Brown, J. P.. A meta-analysis of 4 clinical trials of denosumab compared with bisphosphonates in postmenopausal women previously treated with oral bisphosphonates. Arthritis and Rheumatology. Conference: American College of Rheumatology/Association of Rheumatology Health Professionals Annual Scientific Meeting, ACR/ARHP 2017;69(Supplement 10).	Conference abstract
423.	Miller	2017 a	Miller, P.; Pannacciulli, N.; Malouf-Sierra, J.; Singer, A.; Czerwinski, E.; Bone, H. G.; Wang, C.; Wagman, R. B.; Brown, J. P.. A meta-analysis of 4 clinical trials of denosumab compared with bisphosphonates in postmenopausal women previously treated with oral bisphosphonates. Journal of Bone and Mineral Research December 2017;32 (Supplement 1):S271	Conference abstract
424.	Miller	2018	Miller, P. D.; Pannacciulli, N.; Malouf, J.; Singer, A.; Czerwinski, E.; Bone, H. G.; Wang, C.; Wagman, R. B.; Brown, J. P.. A meta-analysis of 4 clinical trials of denosumab (DMAB) compared with bisphosphonates (BPS) in postmenopausal women previously treated with oral bisphosphonates (OBPS). Osteoporosis International 2018;29 (1 Supplement 1):S55-S56.	Conference abstract
425.	Miller	2019	Miller, P. D.; Hattersley, G.; Fitzpatrick, L. A.; Williams, G. C.; Hu, M. Y.; Lau, E.; Harris, A. G.; Riis, B. J.; Christiansen, C.; Russo, L. Bone mineral	Wrong outcomes

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			density response rates are greater in patients treated with abaloparatide compared with those treated with placebo or teriparatide: Results from the ACTIVE phase 3 trial. Bone 2019;120():137-140	
426.	Miller	2020	Miller, P. D.; Pannacciulli, N.; Malouf-Sierra, J.; Singer, A.; Czerwinski, E.; Bone, H. G.; Wang, C.; Huang, S.; Chines, A.; Lems, W.; Brown, J. P. Efficacy and safety of denosumab vs. bisphosphonates in postmenopausal women previously treated with oral bisphosphonates. Osteoporosis international : a journal established as result of cooperation between the European Foundation for Osteoporosis and the National Osteoporosis Foundation of the USA 2020;31(1):181-191	Wrong outcomes
427.	Mirkin	2013	Mirkin, S.; Komm, B. S.; Pan, K.; Chines, A. A.. Effects of bazedoxifene/conjugated estrogens on endometrial safety and bone in postmenopausal women. Climacteric 2013;16(3):338-346.	Wrong outcomes
428.	Mockel	2020	Mockel, Luis; Bartneck, Matthias; Mockel, Christina. Risk of falls in postmenopausal women treated with romosozumab: Preliminary indices from a meta-analysis of randomized, controlled trials. Osteoporosis and Sarcopenia 2020;6(1):20-26	Wrong outcomes
429.	Morales	2018	Morales, C. C.; Canizares, H. G.. Teriparatide use among postmenopausal women: A meta-analysis. Osteoporosis International 2018;29 (1 Supplement 1):S436.	Systematic review and/or meta-analysis
430.	Murad	2012	Murad, M. H.; Drake, M. T.; Mullan, R. J.; Mauck, K. F.; Stuart, L. M.; Lane, M. A.; Abu Elnour, N. O.; Erwin, P. J.; Hazem, A.; Puhan, M. A.; Li, T.; Montori, V. M.. Clinical review. Comparative effectiveness of drug treatments to prevent fragility fractures: a systematic review and network meta-analysis. The Journal of clinical endocrinology and metabolism 2012;97(6):1871-1880.	Systematic review and/or meta-analysis
431.	Murphy	2001	Murphy, M. G.; Weiss, S.; McClung, M.; Schnitzer, T.; Cerchio, K.; Connor, J.; Krupa, D.; Gertz, B. J.. Effect of alendronate and MK-677 (a growth hormone secretagogue), individually and in combination, on markers of bone turnover and bone mineral density in postmenopausal osteoporotic women. Journal of Clinical Endocrinology and Metabolism 2001;86(3):1116-1125.	Wrong intervention
432.	Muschitz	2012	Muschitz, C.; Fahrleitner-Pammer, A.; Kocijan, R.; Bittighofer, C.; Trubrich, A.; Kuehne, F.; Waneck, R.; Resch, H. Teriparatide and antiresorptive combination treatment subsequent to 9 months of teriparatide monotherapy. Osteoporosis International March 2012;2)():S106-S107	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
433.	Muschitz	2013	Muschitz, C.; Kocijan, R.; Fahrleitner-Pammer, A.; Lung, S.; Resch, H.. Antiresorptives overlapping ongoing teriparatide treatment result in additional increases in bone mineral density. Journal of Bone and Mineral Research January 2013;28(1):196-205	Wrong study design
434.	Muschitz	2013	Muschitz, C.; Kocijan, R.; Schima, W.; Haschka, J.; Zendeli, A.; Fahrleitner-Pammer, A.; Resch, H. Overlapping and follow-up of alendronate to teriparatide results in continuing volumetric bone mass increase measured by quantitative computed tomography. Journal of Bone and Mineral Research. Conference 2013;28(SUPPL. 1):	Conference abstract
435.	Nagahama	2011	Nagahama, K.; Kanayama, M.; Togawa, D.; Hashimoto, T.; Minami, A.. Does alendronate disturb the healing process of posterior lumbar interbody fusion? A prospective randomized trial. Journal of Neurosurgery: Spine 2011;14(4):500-507.	Wrong patient population
436.	Nakamura	2012	Nakamura, T.; Tsujimoto, M.; Hamaya, E.; Sowa, H.; Chen, P.. Consistency of fracture risk reduction in Japanese and Caucasian osteoporosis patients treated with teriparatide: A meta-analysis. Journal of Bone and Mineral Metabolism 2012;30(3):321-325.	Systematic review and/or meta-analysis
437.	Narula	2012	Narula, R.; Mujtaba, T.; Iraqi, A. A.; Singh, S.. Effect of risedronate and strontium therapy on bone mineral density in postmenopausal osteoporosis. International Journal of Research in Ayurveda and Pharmacy July/August 2012;3(4):543-547	Wrong outcomes
438.	Nevitt	2010	Nevitt, M. C.; Silverman, S. L.; Viswanathan, H.; Yang, Y. C.; Wang, A.; Boonen, S.; Ragi-Eis, S. Impact of incident clinical vertebral fractures on back pain outcomes in postmenopausal women who participated in the FREEDOM trial. Arthritis and Rheumatism 2010;10)():971	Conference abstract
439.	Nuti	2014	Nuti, R.. Updates on mechanism of action and clinical efficacy of risedronate in osteoporosis. Clinical Cases in Mineral and Bone Metabolism 01 Sep 2014;11(3):208-214	Systematic review and/or meta-analysis
440.	Oglesby	2003	Oglesby, A. K.; Minshall, M. E.; Shen, W.; Xie, S.; Silverman, S. L.. The impact of incident vertebral and non-vertebral fragility fractures on health-related quality of life in established postmenopausal osteoporosis: Results from the teriparatide randomized, placebo-controlled trial in postmenopausal women. Journal of Rheumatology 2003;30(7):1579-1583.	Wrong study design
441.	Oswald	2019	Oswald, A. J.; Berg, K.; Ralston, S. H.; Riches, P. L.. Long-Term Effects of Teriparatide Followed by Antiresorptive Therapy on Clinical Outcomes in Patients with Severe Spinal Osteoporosis. Calcified Tissue International 15 Aug 2019;105(2):148-155	Wrong study design

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
442.	Paggiosi	2019	Paggiosi, M. A.; McCloskey, E. V.; Walsh, J. S.; Eastell, R.; Peel, N. F. A. Comparison of treatment responder rates for three oral bisphosphonates: The TRIO study. JBMR Plus 2019;3(Supplement 3):54-55	Conference abstract, with no new data
443.	Paggiosi	2020	Paggiosi, Margaret A.; McCloskey, Eugene; Walsh, Jennifer S.; Eastell, Richard; Peel, Nicola. Comparison of treatment responder rates for three oral bisphosphonates: The TRIO study. Bone Reports 2020;13(Supplement):100677	Conference abstract, with no new data
444.	Palacios	2013	Palacios, S.; Rizzoli, R.; Zapalowski, C.; Resch, H.; Adami, S.; Adachi, J. D.; Gallagher, J. C.; Feldman, R. G.; Kendler, D. L.; El-Haschimi, K.; Wang, A.; Wagman, R. B.; Boonen, S. Denosumab reduced osteoporotic fractures in postmenopausal women with osteoporosis with prior fracture: Results from freedom. Osteoporosis International April 2013;1)():S299-S300	Conference abstract
445.	Palacios	2015	Palacios, S.; Silverman, S. L.; De Villiers, T. J.; Levine, A. B.; Goemaere, S.; Brown, J. P.; De Cicco Nardone, F.; Williams, R.; Hines, T. L.; Mirkin, S.; Chines, A. A.. A 7-year randomized, placebo-controlled trial assessing the long-term efficacy and safety of bazedoxifene in postmenopausal women with osteoporosis: Effects on bone density and fracture. Menopause 2015;22(8):806-813.	Extension study
446.	Palacios	2020	Palacios, S. An assessment of cardiovascular safety with HRT and SERMS. Osteoporosis International 2020;31(SUPPL 1):S63-S64	Wrong outcomes
447.	Pannecciulli	2015	Pannacciulli, N.; Czerwinski, E.; Nedergaard, B. S.; Malouf, J.; Bone, H. G.; Reginster, J. Y.; Wang, C.; Wagman, R. B.; Cummings, S. R.. Denosumab compared with zoledronic acid in postmenopausal women with osteoporosis previously treated with oral bisphosphonates: Efficacy and safety results from a randomized double-blind study. Journal of Bone and Mineral Research. Conference 2015;30(Supplement 1).	Conference abstract
448.	Papaioannou	2010	Papaioannou, A.; Marr, S.; Ioannidis, G.; Kennedy, C.; Giangregorio, L.; Pickard, L.; Johnson, J.; Campbell, G.; Stroud, J.; Morin, S.; Josse, R.; Sawka, A.; Crilly, R.; Thabane, L.; Dolovich, L.; Van Der Horst, M. L.; Flett, N.; Nash, L.; Adachi, J.. Bisphosphonate use in women and men who are at high risk for new fractures and living in long-term care homes: The vitamin D osteoporosis study (ViDOS). Journal of Bone and Mineral Research 2010;1):S206.	Conference abstract
449.	Papapoulous	2010	Papapoulos, S. E. New evidence in the treatment of osteoporosis with Denosumab. Osteoporosis International May 2010;1)():S396	Conference abstract
450.	Papapoulos	2005	Papapoulos, S. E.; Quandt, S. A.; Liberman, U. A.; Hochberg, M. C.; Thompson, D. E.. Meta-analysis of	Systematic review and/or meta-analysis

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			the efficacy of alendronate for the prevention of hip fractures in postmenopausal women. Osteoporosis international : a journal established as result of cooperation between the European Foundation for Osteoporosis and the National Osteoporosis Foundation of the USA 2005;16(5):468-474.	
451.	Papapoulos	2011	Papapoulos, S. E.. Use of bisphosphonates in the management of postmenopausal osteoporosis. Annals of the New York Academy of Sciences 2011;1218:15-32	Systematic review and/or meta-analysis
452.	Park	2021	Park, C. W.; Lim, S. J.; Moon, Y. W.; Park, Y. S.; Choi, S. H.; Shin, M. H.; Min, Y. K.; Yoon, B. K. Fracture recurrence in hip fracture with menopausal hormone therapy versus risedronate: a clinical trial. Climacteric 2021;24(4):408-414	Wrong comparator
453.	Pazan	2021	Pazan, Farhad; Wehling, Martin; Petrovic, Mirko; Cherubini, Antonio; Onder, Graziano; Cruz-Jentoft, Alfonso J.; Denkinger, Michael; van der Cammen, Tischa J. M.; Stevenson, Jennifer M.; Ibrahim, Kinda; Rajkumar, Chakravarthi; Bakken, Marit Stordal; Baeyens, Jean-Pierre; Crome, Peter; Fruhwald, Thomas; Gallaghar, Paul; Gumundsson, Adalsteinn; Knol, Wilma; O'Mahony, Denis; Pilotto, Alberto; Ronnemaa, Elina; Serra-Rexach, Jose Antonio; Soulis, George; van Marum, Rob J.; Ziere, Gijsbertus; Mair, Alpana; Burkhardt, Heinrich; Neumann-Podczaska, Agnieszka; Wieczorowska-Tobis, Katarzyna; Fernandes, Marilia Andreia; Gruner, Heidi; Dallmeier, Dhayana; Beuscart, Jean-Baptiste; van der Velde, Nathalie. Current evidence on the impact of medication optimization or pharmacological interventions on frailty or aspects of frailty: a systematic review of randomized controlled trials. European Journal of Clinical Pharmacology 2021;77(1):	Wrong outcomes
454.	Peng	2016	Peng, J.; Liu, Y.; Chen, L.; Peng, K.; Xu, Z.; Zhang, D.; Xiang, Z.. Bisphosphonates can prevent recurrent hip fracture and reduce the mortality in osteoporotic patient with hip fracture: A meta-analysis. Pakistan Journal of Medical Sciences 2016;32(2):499-504.	Systematic review and/or meta-analysis
455.	Peng	2017	Peng, L.; Luo, Q.; Lu, H.. Efficacy and safety of bazedoxifene in postmenopausal women with osteoporosis: A systematic review and meta-analysis. Medicine (United States) 2017;96 (49) (no pagination)(e8659).	Systematic review and/or meta-analysis
456.	Peng	2017 a	Peng, L.; Luo, Q.; Lu, H.. Efficacy and safety of bazedoxifene in postmenopausal women with osteoporosis: A systematic review and meta-analysis. Medicine 2017;96(49):e8659	Systematic review and/or meta-analysis
457.	Pilipovic	2006	Pilipovic, N.; Brankovic, S.; Vujasinovic-Stupar, N.. Effects of Alendronate on bone mass in women	Systematic review and/or meta-analysis

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			with osteoporosis. Medicinski Pregled 2006;59(9-10):427-35	
458.	Pinkerton	2014	Pinkerton, J. V.; Harvey, J. A.; Lindsay, R.; Pan, K.; Chines, A. A.; Mirkin, S.; Archer, D. F.. Effects of bazedoxifene/conjugated estrogens on the endometrium and bone: A randomized trial. Journal of Clinical Endocrinology and Metabolism 2014;99(2):E189-E198.	Wrong outcomes
459.	Poole	2006	Poole, K. E. S.; Compston, J. E.. Osteoporosis and its management. British Medical Journal 16 Dec 2006;333(7581):1251-1256	Systematic review and/or meta-analysis
460.	Poole	2019	Poole, K. E. S.; Treece, G. M.; Gee, A. H.; Whitmarsh, T.; Pearson, R. A.; Bolognese, M. A.; Brown, J. P.; Goemaere, S.; Grauer, A.; Yang, Y. C.; Hanley, D. A.; Mautalen, C.; Recknor, C.; Libanati, C. Romosozumab enhances 3d vertebral structure in women with low bone density: mapping bone gains at one year compared with teriparatide or placebo. Osteoporosis International 2019;30(SUPPL 2):S164	Conference abstract, with no new data
461.	Popp	2013	Popp, A. W.; Guler, S.; Lamy, O.; Senn, C.; Buffat, H.; Perrelet, R.; Hans, D.; Lippuner, K.. Effects of zoledronate versus placebo on spine bone mineral density and microarchitecture assessed by the trabecular bone score in postmenopausal women with osteoporosis: A three-year study. Journal of Bone and Mineral Research 2013;28(3):449-454.	Wrong outcomes
462.	Prestwood	2000	Prestwood, K. M.; Raisz, L. G.. Prevention and treatment of osteoporosis. Clinical cornerstone 2000;2(6):34-44	Systematic review and/or meta-analysis
463.	Prieto-Alhambra	2014	Prieto-Alhambra, D.; Judge, A.; Arden, N. K.; Cooper, C.; Lyles, K. W.; Javaid, M. K.. Fracture prevention in patients with cognitive impairment presenting with a hip fracture: Secondary analysis of data from the HORIZON Recurrent Fracture Trial. Osteoporosis International 2014;25(1):77-83.	Wrong patient population (sub group analysis)
464.	Purdie	2003	Purdie, D. W.; Rees, M.. Parathyroid hormone in osteoporosis. Journal of the British Menopause Society 2003;9(4):175	Commentary
465.	Qureshi	2020	Qureshi, Abdul Rehman; El-Khechen, Hussein Ali; Akhter, Shakib; Bozzo, Anthony; Khan, Moin; Bhandari, Mohit; Patel, Rakesh; Aleem, Ilyas. The efficacy of teriparatide on lumbar spine bone mineral density, vertebral fracture incidence and pain in post-menopausal osteoporotic patients: A systematic review and meta-analysis. Bone Reports 2020;13():100728	Systematic review and/or meta-analysis
466.	Rackoff	2009	Rackoff, P.. Efficacy and safety of risedronate 150 mg once a month in the treatment of postmenopausal osteoporosis. Clinical Interventions In Aging 2009;4:207-214	Systematic review and/or meta-analysis
467.	Ralston	2011	Ralston, S. H.; Binkley, N.; Boonen, S.; Kiel, D. P.; Reginster, J. Y.; Roux, C.; Chen, L.; Rosenberg, E.; Santora, A.; Coughlan, T.; Arabi, A.; Kucukdeveci,	Wrong patient population

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			A.; Savani, N.; Kausiene, R.; Pornel, B.; Price, T.; Benhamou, C. L.; Aguilar, M.; Abello, M.; Tobias, E.; Rais, N.; Ershova, O.; Martz, R.; Linjawi, S.; Kramer, S.; Walliser, J.; Hepguler, S.; Gimble, J.; Lesnyak, O.; Chalem, P.; Aramburu, J.; Foldes, J.; Yaghi, Y.; Abud, C.; Munoz Torres, M.; Gonzalez, G.; Weryha, G.; Mola, E. M.; Shargordsky, M.; Lippuner, K.; Moericke, R.; Masri, B.; Stura, I.; Theiler, R.; Dursun, N.; Thompson, V.; Andersone, D.; Arya, M.; Anderberg, C. P.; Pfeifer, M.; Goldstraj, H.; Alekna, V.; Wieskopf, B.; De Villiers, T.; Minisola, S.; Heil, K.; Herkt, V.; Rohlf, J.; De Weerd, A.; Ish-Shalom, S.; Bukauskiene, L.; Benevolenskaya, L.; Mantilla, R.; Woolf, A.; Otero, W.; Nayiager, S.; Walsh, B.; Newman, S.; Bagul, N.; Abdulhakim, E.; Govindraj, S.; Sarmiento, R.; Ellahbadi, R.; Shaw, H.; Thomas, H.; Lipschitz, S.; Gutierrez, S.; Ralston, S.; Davey, M.; Lauro, R.; Rodriguez, H.; Al-Ramahi, M.. Randomized trial of alendronate plus vitamin D<inf>3</inf> versus standard care in osteoporotic postmenopausal women with vitamin D insufficiency. Calcified Tissue International 2011;88(6):485-494.	
468.	Ramchand	2019	Ramchand, S. K.; David, N. L.; Leder, B. Z.; Tsai, J. N.. Bone mineral density response with denosumab in combination with standard or high-dose teriparatide: the DATA-HD RCT. The Journal of clinical endocrinology and metabolism. 2019;01	Wrong outcomes
469.	Ramchand	2019	Ramchand, Sabashini K.; Tsai, Joy N.; David, Natalie L.; Leder, Benjamin Z.; Lee, Hang; Eastell, Richard. Bone balance in postmenopausal women treated with combined high-dose teriparatide and denosumab: The DATA-HD randomized controlled trial. Journal of Bone and Mineral Research 2019;34(Supplement 1):103	Conference abstract, with no new data
470.	Reginster	2001	Reginster, J. Y.. Risedronate increases bone mineral density and reduces the vertebral fracture incidence in postmenopausal women. Clinical and Experimental Rheumatology 2001 2001;19(2):121-122	Commentary
471.	Reginster	2004	Reginster, J. Y.; Sarkar, S.; Zegels, B.; Henrotin, Y.; Bruyere, O.; Agnusdei, D.; Collette, J.. Reduction in PINP, a marker of bone metabolism, with raloxifene treatment and its relationship with vertebral fracture risk. Bone 2004;34(2):344-351.	Wrong study design
472.	Reginster	2005	Reginster, J. Y.. Treatment of postmenopausal osteoporosis. British Medical Journal 16 Apr 2005;330(7496):859-860	Commentary
473.	Reginster	2010	Reginster, J. Y.; McClung, M.; Cox, D.; Mitlak, B.; Stock, J.; Amewou-Atisso, M.; Miller, P.; Christiansen, C.; Cummings, S. Effects of arzoxifene on fracture incidence in postmenopausal women	Wrong intervention

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			with osteoporosis or with low bone mass. Osteoporosis International May 2010;1)():S23-S24	
474.	Reginster	2017	Reginster, J.; Bianic, F.; Campbell, R.; Martin, M.; Williams, S.; Fitzpatrick, L.. Abaloparatide for risk reduction of nonvertebral and vertebral fractures in postmenopausal women with osteoporosis: A network meta-analysis. Value in Health 2017;20 (9):A527.	Systematic review and/or meta-analysis
475.	Reginster	2018	Reginster, J. Y.; Bianic, F.; Campbell, R.; Martin, M.; Williams, S. A.; Fitzpatrick, L. A.. Abaloparatide for risk reduction of nonvertebral and vertebral fractures in postmenopausal women with osteoporosis: A network meta-analysis. Arthritis and Rheumatology 2018;70 (Supplement 9):2552-2553.	Systematic review and/or meta-analysis
476.	Reginster	2018 b	Reginster, J.; Bianic, F.; Campbell, R.; Martin, M.; Williams, S.; Fitzpatrick, L.. Abaloparatide for risk reduction of nonvertebral and vertebral fractures in postmenopausal women with osteoporosis: A network meta-analysis. Journal of Managed Care and Specialty Pharmacy October 2018;24 (10 A):S84-S85	Conference abstract
477.	Reginster	2018c	Reginster, J. Y.; Al Daghri, N.; Kaufman, J. M.; Bruyere, O.. Effect of a sequential treatment combining abaloparatide and alendronate for the management of postmenopausal osteoporosis. Expert Opinion on Pharmacotherapy 2018;19(2):159-161.	Commentary
478.	Reginster	2019	Reginster, J. Y.; Bianic, F.; Campbell, R.; Martin, M.; Williams, S. A.; Fitzpatrick, L. A.. Abaloparatide for risk reduction of nonvertebral and vertebral fractures in postmenopausal women with osteoporosis: a network meta-analysis. Osteoporosis International 01 Jul 2019;30(7):1465-1473	Systematic review and/or meta-analysis
479.	Reginster	2019 a	Reginster, J. Y.; Bianic, F.; Campbell, R.; Martin, M.; Williams, S. A.; Fitzpatrick, L. A. Abaloparatide for risk reduction of nonvertebral and vertebral fractures in postmenopausal women with osteoporosis: a network meta-analysis. Osteoporosis international : a journal established as result of cooperation between the European Foundation for Osteoporosis and the National Osteoporosis Foundation of the USA 2019;30(7):1465-1473	Systematic review and/or meta-analysis
480.	Reid	2002	Reid, I. R.. Osteoporosis: Non-HRT treatments. Reviews in Gynaecological Practice 2002;2(1-2):48-53	Systematic review and/or meta-analysis
481.	Reid	2009	Reid, I. Rank ligand inhibition in patients with postmenopausal bone loss. Bone May 2009;1)():S41	Wrong outcomes
482.	Reid	2009	Reid, I.; Boonen, S.; Black, D. M.; Colon-Emeric, C.; Eastell, R.; Magaziner, J.; Mesenbrink, P.; Eriksen, E.	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			F.; Lyles, K. W. Once-yearly treatment with zoledronic acid continues to be effective in old age. Bone May 2009;1)():S94	
483.	Reid	2010	Reid, I.; Miller, P.; Brown, J. P.; Kendler, D.; Fahrleitner-Pammer, A.; Valter, I.; Maasalu, K.; Bolognese, M.; Woodson, G.; Bone, H. G.; Ding, B.; Wagman, R. B.; San Martin, J.; Ominsky, M. S.; Dempster, D. W. Effect of denosumab treatment on bone histology and histomorphometry: The freedom and stand studies. Osteoporosis International May 2010;1)():S134	Wrong patient population
484.	Reid	2013	Reid, I. R.; Black, D. M.; Eastell, R.; Bucci-Rechtweg, C.; Su, G.; Hue, T. F.; Mesenbrink, P.; Lyles, K. W.; Boonen, S.. Reduction in the risk of clinical fractures after a single dose of zoledronic Acid 5 milligrams. Journal of Clinical Endocrinology and Metabolism 2013;98(2):557-563. [DOI: 10.1210/jc.2012-2868]	Systematic review and/or meta-analysis
485.	Reid	2013	Reid, I. R.; Black, D. M.; Eastell, R.; Bucci-Rechtweg, C.; Su, G.; Hue, T. F.; Mesenbrink, P.; Lyles, K. W.; Boonen, S. Reduction in the risk of clinical fractures after a single dose of zoledronic Acid 5 milligrams. Journal of Clinical Endocrinology and Metabolism 2013;98(2):557-563	Systematic review and/or meta-analysis and/or pooled data
486.	Reid	2018	Reid, I.; Horne, A.; Mihov, B.; Stewart, A.; Garratt, L.; Bolland, M.; Bastin, S.; Gamble, G.. Zoledronate every 18 months for 6 years in osteopenic postmenopausal women: Effects on fractures and non-skeletal endpoints. JBMR Plus 2018;2 (Supplement 1):S14.	Conference abstract
487.	Reid	2018 a	Reid, I.; Horne, A.; Mihov, B.; Stewart, A.; Garratt, L.; Bolland, M.; Bastin, S.; Gamble, G.. Zoledronate every 18 months for 6 years in osteopenic postmenopausal women reduces non-vertebral fractures and height loss. Calcified Tissue International 2018;102 (1 Supplement 1):S22-S23.	Conference abstract
488.	Reid	2019	Reid, I. R.; Horne, A. M.; Mihov, B.; Stewart, A.; Garratt, E.; Bastin, S.; Gamble, G. D.. Effects of Zoledronate on Cancer, Cardiac Events, and Mortality in Osteopenic Older Women. Journal of Bone and Mineral Research. 2019	Commentary
489.	Ringe	2007	Ringe, J. D.; Farahmand, P.; Schacht, E.; Rozehnal, A.. Superiority of a combined treatment of Alendronate and Alfacalcidol compared to the combination of Alendronate and plain vitamin D or Alfacalcidol alone in established postmenopausal or male osteoporosis (AAC-Trial). Rheumatology International 2007;27(5):425-434.	Wrong patient population
490.	Rizzolli	2002	Rizzoli, R.; Greenspan, S. L.; Bone, G.; Schnitzer, T. J.; Watts, N. B.; Adami, S.; Foldes, A. J.; Roux, C.; Levine, M. A.; Uebelhart, B.; et al.,. Two-year results of once-weekly administration of alendronate 70 mg for the treatment of	Extension study

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			postmenopausal osteoporosis. Journal of Bone and Mineral Research 2002;17(11):1988-1996. [DOI: 10.1359/jbmr.2002.17.11.1988]	
491.	Rizzolli	2010	Rizzoli, R. Zoledronic Acid for the treatment and prevention of primary and secondary osteoporosis. Therapeutic Advances in Musculoskeletal Disease 2010;2(1):3-16	Wrong study design
492.	Rizzolli	2010	Rizzoli, R.; Boonen, S.; Bone, H. G.; Minisola, S.; Wang, A.; Benhamou, C. L.; Halse, J.; Hoeck, H.; Siddhanti, S.; McClung, M.; Franchimont, N. The effect of denosumab on vertebral fracture risk by type and subgroup: Results from the FREEDOM trial. Osteoporosis International May 2010;1)():S357-S358	Conference abstract
493.	Rodriguez	2021	Rodriguez, Alexander J.; Abrahamsen, Bo. Cardiovascular Safety of Antifracture Medications in Patients With Osteoporosis: A Narrative Review of Evidence From Randomized Studies. JBMR Plus 2021;5(7):e10522	Systematic review and/or meta-analysis
494.	Rooney	2020	Rooney, Amanda M.; Bostrom, Mathias P. G.; Dempster, David W.; Nieves, Jeri W.; Zhou, Hua; Cosman, Felicia. Loading modality and age influence teriparatide-induced bone formation in the human femoral neck. Bone 2020;136():115373	Wrong patient population
495.	Rosenberg	2021	Rosenberg, D.; Avni, T.; Gafter-Gvili, A.; Tsvetov, G.; Diker-Cohen, T. Denosumab is not associated with risk of malignancy: systematic review and meta-analysis of randomized controlled trials. Osteoporosis International 2021;32(3):413-424	Systematic review and/or meta-analysis
496.	Robles-Carranza	2012	Robles-Carranza, L. P.; Chavez-Valencia, V.; Arce-Salinas, C. A. Comparison of the efficacy of annual zoledronic acid or weekly alendronate. A 3-yr analysis of postmenopausal women with low bone mineral density. Annals of the Rheumatic Disease. Conference: Annual European Congress of Rheumatology of the European League Against Rheumatism, EULAR 2012;71(SUPPL. 3):	Conference abstract
497.	Rossini	2000	Rossini, M.; Gatti, D.; Girardello, S.; Braga, V.; James, G.; Adami, S.. Effects of two intermittent alendronate regimens in the prevention or treatment of postmenopausal osteoporosis. Bone 2000;27(1):119-122.	Wrong outcomes
498.	Roux	2004	Roux, C.; Seeman, E.; Eastell, R.; Adachi, J.; Jackson, R. D.; Felsenberg, D.; Songcharoen, S.; Rizzoli, R.; Di Munno, O.; Horlait, S.; Valent, D.; Watts, N. B.. Efficacy of risedronate on clinical vertebral fractures within six months. Current Medical Research and Opinion April 2004;20(4):433-439	Systematic review and/or meta-analysis
499.	Roux	2010	Roux, C.; Cummings, S.; Bone, H. G.; Rizzoli, R.; Minisola, S.; Wang, A.; Franchimont, N.; Benhamou, C. L.; Halse, J.; Hoeck, H.; Boonen, S.; Siddhanti, S.; McClung, M.. Effect of denosumab on the incidence of nonvertebral fractures in	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			postmenopausal women at increased risk of fracture: A freedom study subanalysis (study sponsored by Amgen Inc) (formore informationvisit theAmgen/GlaxoSmithKline scientific booth). Bone 2010;1):S213.	
500.	Roux	2011	Roux, C. Fracture reduction throughout the skeleton: Implications for patient care. Osteoporosis International March 2011;1)():S411	Conference abstract
501.	Roux	2013	Roux, C.; Fahrleitner-Pammer, A.; Ho, P. R.; Hawkins, F.; Hofbauer, L. C.; Micaelo, M.; Minisola, S.; Papaioannou, N.; Stone, M.; Wark, J.; Zillikens, M. C.; Ferreira, I.; Siddhanti, S.; Wagman, R. B.; Brown, J. P.. Denosumab versus risedronate: Efficacy and safety in postmenopausal women suboptimally adherent to alendronate therapy in a randomized open-label study. Annals of the Rheumatic Diseases. Conference: Annual European Congress of Rheumatology of the European League Against Rheumatism, EULAR 2013;72(SUPPL. 3)	Conference abstract
502.	Rubin	1997	Rubin, B. R.. Alendronate useful in treating osteoporosis. The Journal of the American Osteopathic Association Feb 1997;97(2):77	Commentary
503.	Rubin	2017	Rubin, C.; Pouns, K.. Efficacy of treatment with slow-release sodium fluoride versus alendronate on bone mineral density and fractures in postmenopausal women. Journal of the American Geriatrics Society May 2017;65 (Supplement 1):S111-S112	Conference abstract
504.	Saag	2017	Saag, K. G.; Petersen, J.; Brandi, M. L.; Karaplis, A.; Lorentzon, M.; Thomas, T.; Maddox, J.; Fan, M.; Meisner, P.; Grauer, A.. A randomized alendronate-controlled trial of romosozumab: Results of the phase 3 ARCH Study (Active-contRolled fraCture study in postmenopausal women with osteoporosis at High risk). Journal of Bone and Mineral Research December 2017;32 (Supplement 1):S54-S55	Conference abstract
505.	Saag	2017 a	Saag, K.; Petersen, J.; Brandi, M. L.; Karaplis, A.; Lorentzon, M.; Thomas, T.; Maddox, J.; Fan, M.; Meisner, P. D.; Grauer, A.. A randomized alendronate-controlled trial of romosozumab: Results of the phase 3 active-controlled fracture study in postmenopausal women with osteoporosis at high risk. Arthritis and Rheumatology. Conference: American College of Rheumatology/Association of Rheumatology Health Professionals Annual Scientific Meeting, ACR/ARHP 2017;69(Supplement 10).	Conference abstract
506.	Saag	2017 b	Saag, K. G.; Petersen, J.; Brandi, M. L.; Karaplis, A.; Lorentzon, M.; Thomas, T.; Maddox, J.; Fan, M.; Meisner, P.; Grauer, A.. A randomized alendronate-controlled trial of romosozumab: Results of the phase 3 arch study (active-controlled fracture study in postmenopausal women with osteoporosis at	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			high risk). Indian Journal of Rheumatology 2017;12 (5 Supplement 1):S11-S12.	
507.	Saag	2017	Saag, K.; Miller, P. D.; Cosman, F.; Fitzpatrick, L. A.; Hattersley, G.; Gut, R.; Mitlak, B.; Bilezikian, J. P.; Dore, R. K. Persistent fracture reduction with abaloparatide-sc (tymlosTM) followed by 24 months of alendronate. Arthritis and Rheumatology. Conference: American College of Rheumatology/Association of Rheumatology Health Professionals Annual Scientific Meeting, ACR/ARHP 2017;69(Supplement 10):	Conference abstract
508.	Saag	2018	Saag, K. G.; Wagman, R. B.; Geusens, P.; Adachi, J. D.; Messina, O. D.; Emkey, R.; Chapurlat, R.; Wang, A.; Pannacciulli, N.; Lems, W. F.. Denosumab versus risedronate in glucocorticoid-induced osteoporosis: a multicentre, randomised, double-blind, active-controlled, double-dummy, non-inferiority study. The Lancet Diabetes and Endocrinology 2018;6(6):445-454.	Wrong patient population
509.	Saag	2018 a	Saag, K.; Pannacciulli, N.; Geusens, P.; Adachi, J. D.; Messina, O. D.; Morales-Torres, J.; Emkey, R.; Butler, P. W.; Yin, X.; Lems, W. F.. Greater bmd gains with denosumab vs risedronate in glucocorticoid-treated subjects: Results from the final 24-month analysis of a randomized, double-blind, double-dummy study. Arthritis and Rheumatology 2018;70 (Supplement 9):2022-2023.	Wrong patient population
510.	Saag	2018 b	Saag, K. G.; Miller, P. D.; Cosman, F.; Fitzpatrick, L. A.; Hattersley, G.; Mitlak, B.; Bilezikian, J. P.; Dore, R. K.. Persistent Fracture Reduction with Abaloparatide-SC (TYMLOSTM) Followed by 24 Months of Alendronate. Journal of Clinical Densitometry 2018;21 (4):1.	Extension study
511.	Saito	2017	Saito, T.; Sterbenz, J. M.; Malay, S.; Zhong, L.; MacEachern, M. P.; Chung, K. C.. Effectiveness of anti-osteoporotic drugs to prevent secondary fragility fractures: systematic review and meta-analysis. Osteoporosis International 2017;28(12):3289-3300.	Systematic review and/or meta-analysis
512.	Sambrook	2010	Sambrook, P.; Cranney, A.; Adachi, J. D.. Risk reduction of non-vertebral fractures with intravenous ibandronate: Post-hoc analysis from DIVA. Current Medical Research and Opinion 2010;26(3):599-604.	Wrong study design
513.	Sambrook	2011	Sambrook, P. N.; Silverman, S. L.; Cauley, J. A.; Recknor, C.; Olson, M.; Su, G.; Boonen, S.; Black, D.; Adachi, J. D.. Health-related quality of life and treatment of postmenopausal osteoporosis: Results from the HORIZON-PFT. Bone 2011;48(6):1298-1304.	Wrong outcomes

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
514.	Sanad	2011	Sanad, Z.; Ellakwa, H.; Desouky, B.. Comparison of alendronate and raloxifene in postmenopausal women with osteoporosis. Climacteric 2011;14(3):369-377.	Wrong outcomes
515.	Sanderson	2015	Sanderson, J.. Clinical effectiveness of bisphosphonates for prevention of fragility fractures: A systematic review and network meta-analysis. Value in Health 2015;18 (7):A634.	Systematic review and/or meta-analysis
516.	Sanderson	2016	Sanderson, J.; Martyn-St James, M.; Stevens, J.; Goka, E.; Wong, R.; Campbell, F.; Selby, P.; Gittoes, N.; Davis, S.. Clinical effectiveness of bisphosphonates for the prevention of fragility fractures: A systematic review and network meta-analysis. Bone 2016;89:52-58.	Systematic review and/or meta-analysis
517.	Sanford	2012	Sanford, M.; McCormack, P. L.. Spotlight on eldecalcitol in osteoporosis. Drugs and Aging 2012;29(1):69-71.	Wrong intervention
518.	Santiago	2014	Santiago, P.; Williams, R.; Komm, B.; Pan, K.; Arias, L.; Mirkin, S.. Evaluation of efficacy and safety of bazedoxifene in a mexican population of women with osteoporosis. Climacteric 2014;1):81.	Wrong outcomes
519.	Santora	2020	Santora, Arthur C.; Sharma, Anupa. Bisphosphonates: Mechanisms of Action and Role in Osteoporosis Therapy. Contemporary Endocrinology 2020;():277-307	Wrong study design
520.	Sato	2005	Sato, Y.; Kanoko, T.; Satoh, K.; Iwamoto, J.. The prevention of hip fracture with risedronate and ergocalciferol plus calcium supplementation in elderly women with alzheimer disease: A randomized controlled trial. Archives of Internal Medicine 2005;165(15):1737-1742.	Retracted
521.	Sato	2005 a	Sato, Y.; Iwamoto, J.; Kanoko, T.; Satoh, K.. Risedronate therapy for prevention of hip fracture after stroke in elderly women. Neurology 2005;64(5):811-816.	Retracted
522.	Sato	2010	Sato, Y.; Honda, Y.; Umeno, K.; Hayashida, N.; Iwamoto, J.; Takeda, T.; Matsumoto, H.. The prevention of hip fracture with menatetrenone and risedronate plus calcium supplementation in elderly patients with Alzheimer disease: A randomized controlled trial. Kurume Medical Journal 2010;57(4):117-124.	Retracted
523.	Schemitsch	2020	Schemitsch, Emil H.; Miclau, Theodore; Karachalios, Theofilos; Nowak, Lauren L.; Sancheti, Parag; Poolman, Rudolf W.; Caminis, John; Daizadeh, Nadia; Dent-Acosta, Ricardo E.; Egbuna, Ogo; Chines, Arkadi; Maddox, Judy; Grauer, Andreas; Bhandari, Mohit. A Randomized, Placebo-Controlled Study of Romosozumab for the Treatment of Hip Fractures. The Journal of bone and joint surgery. American volume 2020;102(8):693-702	Wrong patient population

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
524.	Schnitzer	2000	Schnitzer, T.; Bone, H. G.; Crepaldi, G.; Adami, S.; McClung, M.; Kiel, D.; Felsenberg, D.; Recker, R. R.; Tonino, R. P.; Roux, C.; et al., Therapeutic equivalence of alendronate 70 mg once-weekly and alendronate 10 mg daily in the treatment of osteoporosis. Aging Clinical and Experimental Research 2000;12(1):1-12	Wrong intervention
525.	Sebba	2009	Sebba, A. I.; Emkey, R. D.; Kohles, J. D.; Sambrook, P. N. Ibandronate dose response is associated with increases in bone mineral density and reductions in clinical fractures: Results of a meta-analysis. Bone March 2009;44(3):423-427	Systematic review and/or meta-analysis
526.	Seeman	1999	Seeman, E.. The antifracture efficacy of alendronate. International Journal of Clinical Practice 1999;Supplement. 101:40-45.	Systematic review and/or meta-analysis
527.	Seeman	2006	Seeman, E.; Crans, G. G.; Diez-Perez, A.; Pinette, K. V.; Delmas, P. D.. Anti-vertebral fracture efficacy of raloxifene: A meta-analysis. Osteoporosis International February 2006;17(2):313-316	Systematic review and/or meta-analysis
528.	Seeman	2009	Seeman, E.; Black, D.; Bucci-Rechtweg, C.; Eastell, R.; Boonen, S.; Mesenbrink, P. Zoledronic acid substantially reduces the risk of morphometric vertebral and clinical fractures. Arthritis and Rheumatism 2009;10)():892	Conference abstract
529.	Seeman	2012	Seeman, E.; Libanati, C.; Austin, M.; Chapurlat, R.; Boyd, S. K.; Zebaze, R.; Hanley, D. A.; Zanchetta, J.; Grauer, A.; Bilezikian, J. P.. The transitory PTH increase following denosumab administration is associated with reduced intracortical porosity: A distinctive characteristic of denosumab therapy. Osteoporosis International 2012;2):S76-S77.	Wrong outcomes
530.	Seeman	2019	Seeman, E.; Ferrari, S. The importance of bone forming agents in the treatmentof severe osteoporosis. Osteoporosis International 2019;30(Supplement 1):S47-S48	Conference abstract, with no new data
531.	Seeto	2021	Seeto, Alexander H.; Abrahamsen, Bo; Ebeling, Peter R.; Rodriguez, Alexander J. Cardiovascular Safety of Denosumab Across Multiple Indications: A Systematic Review and Meta-Analysis of Randomized Trials. Journal of bone and mineral research : the official journal of the American Society for Bone and Mineral Research 2021;36(1):24-40	Systematic review and/or meta-analysis
532.	Selim	2016	Selim, A.; Ghoname, S.; Karabelas, P.. The efficacy of parathyroid hormone analogues in combination with bisphosphonates for the prevention of osteoporotic fractures. A simulation meta-analysis of randomized controlled trials. Journal of Bone and Mineral Research. Conference 2016;31(Supplement 1).	Systematic review and/or meta-analysis
533.	Selim	2020	Selim, Abdulhafez; Selim, Omar; Karabelas, Paula. Cardiovascular Risk in Patients Treated with Romosozumab: Disproportional Meta-Analysis.	Conference abstract, with no new data

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			Journal of Bone and Mineral Research 2020;35(SUPPL 1):246	
534.	Serrano	2013	Serrano, A. J.; Begona, L.; Anitua, E.; Cobos, R.; Orive, G.. Systematic review and meta-analysis of the efficacy and safety of alendronate and zoledronate for the treatment of postmenopausal osteoporosis. Gynecological Endocrinology 2013;29(12):1005-1014.	Systematic review and/or meta-analysis
535.	Sestak	2014	Sestak, I.; Singh, S.; Cuzick, J.; Blake, G. M.; Patel, R.; Gossiel, F.; Coleman, R.; Dowsett, M.; Forbes, J. F.; Howell, A.; Eastell, R.. Changes in bone mineral density at 3 years in postmenopausal women receiving anastrozole and risedronate in the IBIS-II bone substudy: an international, double-blind, randomised, placebo-controlled trial. Lancet Oncology 2014;15(13):1460-1468	Wrong outcomes
536.	Shakeri	2020	Shakeri, Ahmad; Adanty, Christopher. Romosozumab (sclerostin monoclonal antibody) for the treatment of osteoporosis in postmenopausal women: A review. Journal of population therapeutics and clinical pharmacology = Journal de la therapeutique des populations et de la pharmacologie clinique 2020;27(1):e25-e31	Systematic review and/or meta-analysis
537.	Shao	2015	Shao, H. B.; Yao, Y. M.; Wang, Z. Y.; Zhang, Q. F.; Wei, W.. Effects of combined alendronate and alfacalcidol on prevention of fractures in osteoporosis patients: A network meta-analysis. International Journal of Clinical and Experimental Medicine 2015;8(8):12935-12941.	Systematic review and/or meta-analysis
538.	Shapses	2011	Shapses, S. A.; Kendler, D. L.; Robson, R.; Hansen, K. E.; Sherrell, R. M.; Field, M. P.; Woolf, E.; Berd, Y.; Mantz, A. M.; Santora, A. C., 2nd. Effect of alendronate and vitamin D3 on fractional calcium absorption in a double-blind, randomized, placebo-controlled trial in postmenopausal osteoporotic women. Journal of Bone & Mineral Research 2011;26(8):1836-44.	Wrong outcomes
539.	Shen	2011	Shen, L.; Xie, X.; Su, Y.; Luo, C.; Zhang, C.; Zeng, B.. Parathyroid hormone versus bisphosphonate treatment on bone mineral density in osteoporosis therapy: a meta-analysis of randomized controlled trials. PLoS ONE [Electronic Resource] 2011;6(10):e26267	Systematic review and/or meta-analysis
540.	Sherman	2001	Sherman, S.. Preventing and treating osteoporosis: Strategies at the millennium. Annals of the New York Academy of Sciences 2001;949:188-197	Systematic review and/or meta-analysis
541.	Shi	2016	Shi, Z.; Zhou, H.; Pan, B.; Lu, L.; Liu, J.; Kang, Y.; Yao, X.; Feng, S.. Effectiveness of Teriparatide on Fracture Healing: A Systematic Review and Meta-Analysis. PLoS ONE [Electronic Resource] 2016;11(12):e0168691	Systematic review and/or meta-analysis
542.	Shi	2019	Shi, Lei; Min, Nan; Wang, Fei; Xue, Qing-Yun. Bisphosphonates for Secondary Prevention of	Systematic review and/or meta-analysis

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			Osteoporotic Fractures: A Bayesian Network Meta-Analysis of Randomized Controlled Trials. BioMed research international 2019;2019():2594149	
543.	Shi	2021	Shi, Hong; Santos, Heitor O.; de Souza, Ivan G. O.; Hoilat, Gilles Jadd; Martins, Carlos E. C.; Varkaneh, Hamed Kord; Alkhwildi, Joud Amer; Hejji, Aljawhara Talal; Almuqayyid, Faisal; Abu-Zaid, Ahmed. The Effect of Raloxifene Treatment on Lipid Profile in Elderly Individuals: A Systematic Review and Meta-analysis of Randomized Clinical Trials. Clinical therapeutics 2021;():	Systematic review and/or meta-analysis
544.	Shigenobu	2019	Shigenobu, Keiichi; Hashimoto, Tomoyuki; Kanayama, Masahiro; Ohha, Humihiro; Yamane, Shigeru. The efficacy of osteoporotic treatment in patients with new spinal vertebral compression fracture pain, ADL, QOL, bone metabolism and fracture-healing - In comparison with weekly teriparatide with bisphosphonate. Bone Reports 2019;11():100217	Wrong patient population
545.	Shiraki	2013	Shiraki, M.; Sugimoto, T.; Nakamura, T.. Effects of a single injection of teriparatide on bone turnover markers in postmenopausal women. Osteoporosis International 2013;24(1):219-226.	Wrong outcomes
546.	Sieber	2013	Sieber, P.; Lardelli, P.; Kraenzlin, C. A.; Kraenzlin, M. E.; Meier, C. Intravenous bisphosphonates for postmenopausal osteoporosis: Safety profiles of zoledronic acid and ibandronate in clinical practice. Clinical Drug Investigation February 2013;33(2):117-122	Wrong study design
547.	Silverman	2009	Silverman, S.; Viswanathan, H.; Yang, Y.; Eis, S. R.; Fardellone, P.; Gilchrist, N.; Lips, P. Relationships between presence, severity, and location of prevalent vertebral fractures and health related quality of life (HRQoL). Arthritis and Rheumatism 2009;10)():867	Conference abstract
548.	Silverman	2010	Silverman, S.; Viswanathan, H.; Wang, A.; Ragi-Eis, S.; Fardellone, P.; Gilchrist, N.; Lips, P.; Nevitt, M.; Palacios, S.; Pavelka, K.; Revicki, D.; Simon, J.; Macarios, D.; Siris, E. Evaluation of health-related quality of life in postmenopausal women with osteoporosis who participated in the freedom trial. Osteoporosis International May 2010;1)():S14-S15	Conference abstract
549.	Silverman	2011	Silverman, S. L.; Kriegman, A.; Goncalves, J.; Kianifard, F.; Carlson, T.; Leary, E.. Effect of acetaminophen and fluvastatin on post-dose symptoms following infusion of zoledronic acid. Osteoporosis International 2011;22(8):2337-2345.	Wrong outcomes
550.	Silverman	2012	Silverman, S.; Viswanathan, H. N.; Yang, Y. C.; Wang, A.; Boonen, S.; Ragi-Eis, S.; Fardellone, P.; Gilchrist, N.; Lips, P.; Nevitt, M.; Gil-Antunano, S. P.; Pavelka, K.; Revicki, D.; Simon, J.; MacArios, D.; Siris, E. S.. Impact of clinical fractures on health-related quality of life is dependent on time of	Wrong outcomes

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			assessment since fracture: Results from the FREEDOM trial. Osteoporosis International 2012;23(4):1361-1369.	
551.	Simpson	2020	Simpson, E. L.; Martyn-St James, M.; Hamilton, J.; Wong, R.; Gittoes, N.; Selby, P.; Davis, S.. Clinical effectiveness of denosumab, raloxifene, romosozumab, and teriparatide for the prevention of osteoporotic fragility fractures: A systematic review and network meta-analysis. Bone January 2020;130 (no pagination)(115081)	Systematic review and/or meta-analysis
552.	Singh	2019	Singh, R.; Ibrahim, A.; Carey, J. J. Long-term safety of zoledronic acid treatment for osteoporosis in men and women: A systematic review and meta-analysis of clinical trials. JBMR Plus 2019;3(Supplement 3):55-56	Conference abstract, with no new data
553.	Singh	2021	Singh, Inderjeet; Jose, Vinu; Patel, Ronak; Arora, Sumit. Denosumab biosimilar in postmenopausal osteoporotic women: A randomized, assessor-blind, active-controlled clinical trial. Indian Journal of Pharmacology 2021;53(1):6-12	Wrong patient population
554.	Singh	2021	Singh, S.; Dutta, S.; Kumar, T.; Sachin, J.; Sharma, J.; Varthya, S. B.; Khasbage, S. A systematic review and meta-analysis of efficacy and safety of Romosozumab in postmenopausal osteoporosis. Osteoporosis International 2021;():	Systematic review and/or meta-analysis
555.	Siris	2016	Siris, E.; Pannacciulli, N.; Miller, P. D.; Lewiecki, E. M.; Chapurlat, R.; Jodar-Gimeno, E.; Daizadeh, N. S.; Wagman, R. B.; Kanis, J. A.. Denosumab treatment for 10 years in postmenopausal women with osteoporosis was associated with substantially lower fracture incidence relative to their baseline FRAX-predicted probability. Arthritis and Rheumatology October 2016;68 (Supplement 10):430-431	Conference abstract
556.	Siris	2017	Siris, E.; Pannacciulli, N.; Miller, P. D.; Lewiecki, E. M.; Chapurlat, R.; Gimeno, E. J.; Daizadeh, N. S.; Wagman, R. B.; Kanis, J. A. Denosumab treatment for 10 years in postmenopausal women with osteoporosis was associated with substantially lower fracture incidence relative to their baseline frax-predicted probability. Osteoporosis International 2017;28 (Supplement 1)():S179-S180	Extension study
557.	Slaton	2020	Slaton, Rachel M.; Boyd, Katie; Iranikhah, Maryam. Romosozumab and Sequential Therapy in Postmenopausal Osteoporosis. The Senior care pharmacist 2020;35(7):297-308	Full-text not available
558.	Solling	2019	Solling, Anne Sophie; Harslof, Torben; Langdahl, Bente Lomholt. Treatment with zoledronic acid subsequent to treatment with denosumab. Journal of Bone and Mineral Research 2019;34(Supplement 1):53	Conference abstract, with no new data
559.	Solling	2020	Solling, Anne Sophie; Harslof, Torben; Langdahl, Bente. Treatment with Zoledronate Subsequent to	Wrong patient population

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			Denosumab in Osteoporosis: a Randomized Trial. Journal of bone and mineral research : the official journal of the American Society for Bone and Mineral Research 2020;35(10):1858-1870	
560.	Solling	2021	Solling, Anne Sophie; Harslof, Torben; Langdahl, Bente. Treatment With Zoledronate Subsequent to Denosumab in Osteoporosis: A 2-Year Randomized Study. Journal of bone and mineral research : the official journal of the American Society for Bone and Mineral Research 2021;36(7):1245-1254	Wrong patient population
561.	Sorbera	2000	Sorbera, L. A.; Leeson, P. A.. Treatment of osteoporosis. Drugs of the Future 2000;25(10):1007-1010	Systematic review and/or meta-analysis
562.	Ste-Marie	2009	Ste-Marie, L. G.; Brown, J. P.; Beary, J. F.; Matzkin, E.; Darbie, L. M.; Burgio, D. E.; Racewicz, A. J.. Comparison of the effects of once-monthly versus once-daily risedronate in postmenopausal osteoporosis: a phase II, 6-month, multicenter, randomized, double-blind, active-controlled, dose-ranging study. Clinical Therapeutics 2009;31(2):272-85	Wrong intervention
563.	Stepan	1999	Stepan, J. J.; Vokrouhlicka, J.. Comparison of biochemical markers of bone remodelling in the assessment of the effects of alendronate on bone in postmenopausal osteoporosis. Clinica Chimica Acta 1999;288(1-2):121-135.	Wrong outcomes
564.	Strukov	2019	Strukov, V. I.; Kislov, A. I.; Eremina, N. V.; Deriabina, G. P.; Sergeeva-Kondrachenko, M. Y.; Antropov, A. Y.; Kuzmina, Y. V.; Tayrova, K. R.; Petrova, E. V.; Elistratov, D. G.; Strukova-Jones, O. V.. The use of bone tissue non-steroid anabolizators in treatment of osteoporosis. Research Journal of Pharmacy and Technology May 2019;12(5):2195-2199	Wrong intervention
565.	Sugimoto	2020	Sugimoto, Toshitsugu; Matsumoto, Toshio; Hosoi, Takayuki; Shiraki, Masataka; Kobayashi, Makiko; Okubo, Naoki; Takami, Hideo; Nakamura, Toshitaka. Efficacy of denosumab co-administered with vitamin D and Ca by baseline vitamin D status. Journal of bone and mineral metabolism 2020;38(6):848-858	Wrong patient population
566.	Sunyecz	2009	Sunyecz, J. A.. Once-a-month risedronate in postmenopausal osteoporosis. Postgraduate Medicine July 2009;121(4):42-44	Commentary
567.	Taguchi	2019	Taguchi, Akira; Shiraki, Masataka; Tanaka, Satoshi; Ohshige, Hideyo; Nakamura, Toshitaka. Improved periodontal disease and prevention of tooth loss in osteoporosis patients receiving once-yearly zoledronic acid: a randomized clinical trial. Menopause (New York, N.Y.) 2019;26(11):1277-1283	Wrong patient population
568.	Takacs	2019	Takacs, I.; Jokai, E.; Kovats, D. E.; Aradi, I. The first biosimilar approved for the treatment of osteoporosis: results of a comparative	Wrong patient population

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			pharmacokinetic/pharmacodynamic study. Osteoporosis international : a journal established as result of cooperation between the European Foundation for Osteoporosis and the National Osteoporosis Foundation of the USA 2019;30(3):675-683	
569.	Takada	2020	Takada, Junichi; Dinavahi, Rajani; Milmont, Cassandra E.; Grauer, Andreas; Miyauchi, Akimitsu; Hamaya, Etsuro; Hirama, Toshiyasu; Nakamura, Yoichi; Libanati, Cesar. Relationship between P1NP, a biochemical marker of bone turnover, and bone mineral density in patients transitioned from alendronate to romosozumab or teriparatide: a post hoc analysis of the STRUCTURE trial. Journal of bone and mineral metabolism 2020;38(3):310-315	Wrong outcomes
570.	Takada	2021	Takada, Junichi; Yoshimura, Takeshi; Uzawa, Toyonobu. Twice-weekly teriparatide improves lumbar spine BMD independent of pre-treatment BMD and bone turnover marker levels. Journal of bone and mineral metabolism 2021;39(3):484-493	Wrong patient population
571.	Tan	2019	Tan, X.; Wen, F.; Yang, W.; Xie, J. Y.; Ding, L. L.; Mo, Y. X.. Comparative efficacy and safety of pharmacological interventions for osteoporosis in postmenopausal women: a network meta-analysis (Chongqing, China). Menopause (New York, N.Y.) 01 Aug 2019;26(8):929-939	Systematic review and/or meta-analysis
572.	Tan	2019	Tan, Xiang; Wen, Fei; Yang, Wei; Xie, Ji-Yong; Ding, Liang-Liang; Mo, Yu-Xia. Comparative efficacy and safety of pharmacological interventions for osteoporosis in postmenopausal women: a network meta-analysis (Chongqing, China). Menopause (New York, N.Y.) 2019;26(8):929-939	Systematic review and/or meta-analysis
573.	Tanko	2003	Tanko, L. B.; Mouritzen, U.; Lehmann, H. J.; Warming, L.; Moelgaard, A.; Christgau, S.; Qvist, P.; Baumann, M.; Wieczorek, L.; Hoyle, N.; Christiansen, C.. Oral ibandronate: changes in markers of bone turnover during adequately dosed continuous and weekly therapy and during different suboptimally dosed treatment regimens. Bone 2003;32(6):687-93.	Wrong outcomes
574.	Tanko	2003 a	Tanko, L. B.; Felsenberg, D.; Czerwinski, E.; Burdeska, A.; Jonkanski, I.; Hughes, C.; Christiansen, C.. Oral weekly ibandronate prevents bone loss in postmenopausal women. Journal of Internal Medicine 2003;254(2):159-167.	Wrong outcomes
575.	Taylor	2001	Taylor, A. L.. Risedronate: A new bisphosphonate on the block. Medicine Today 2001;2(6):109-110	Commentary
576.	Tian	2021	Tian, Aixian; Lu, Bin; Li, Yan; Ma, Jianxiong; Jia, Haobo; Ma, Xinlong; Zhu, Shan. Romosozumab versus Teriparatide for the Treatment of Postmenopausal Osteoporosis: A Systematic Review and Meta-analysis through a Grade Analysis	Systematic review and/or meta-analysis

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			of Evidence. Orthopaedic surgery 2021;13(7):1941-1950	
577.	Tile	2020	Tile, Lianne; Bleakney, Robert; Tomlinson, George; Ridout, Rowena; Cheung, Angela M.; Khan, Aliya; Lau, Adrian N. C.; Chang, Jessica; Lakhesar, Jasmine; Scher, Judy; Hu, Hanxian; Adachi, Jonathan D. Teriparatide for the healing of incomplete Atypical Femur Fractures: The TAFF Trial. Journal of Bone and Mineral Research 2020;35(SUPPL 1):23	Wrong patient population
578.	Torring	2012	Torring, O.; Simon, J.; Recknor, C.; Moffet, A.; Adachi, J.; Franek, E.; Lewiecki, E.; Mautalen, C.; Ragi Eis, S.; Nicholson, G.; Muschitz, C.; Nuti, R.; Wang, A.; Libanati, C. Denosumab effects on radius BMD, estimated strength, and wrist fractures: 3-year results from the FREEDOM study. Bone May 2012;1)():S54-S55	Conference abstract
579.	Trimpou	2016	Trimpou, P.; Kontogeorgos, G.; Laine, C.; Landin-Wilhelmsen, K. Comparison between teriparatide (PTH) and growth hormone (GH) treatment during 3 years in established osteoporosis Endocrine Reviews. Conference: 98th Annual Meeting and Expo of the Endocrine Society, ENDO 2016;37(2 Supplement 1):	Conference abstract
580.	Tsai	2013	Tsai, J. N.; Uihlein, A. V.; Lee, H.; Kumbhani, R.; Siwila-Sackman, E.; McKay, E. A.; Burnett-Bowie, S. A. M.; Neer, R. M.; Leder, B. Z.. Teriparatide and denosumab, alone or combined, in women with postmenopausal osteoporosis: The DATA study randomised trial. The Lancet 2013;382(9886):50-56.	Wrong outcomes
581.	Tsai	2016	Tsai, J. N.; Uihlein, A. V.; Burnett-Bowie, S. M.; Neer, R. M.; Derrico, N. P.; Lee, H.; Bouxsein, M. L.; Leder, B. Z.. Effects of two years of teriparatide, denosumab, or both on bone microarchitecture and strength (DATA-HRpQCT study). Journal of Clinical Endocrinology and Metabolism 2016;101(5):2023-2030.	Wrong outcomes
582.	Tsai	2017	Tsai, J. N.; Jiang, L. A.; Lee, H.; Hans, D.; Leder, B. Z.. Effects of Teriparatide, Denosumab, or Both on Spine Trabecular Microarchitecture in DATA-Switch: a Randomized Controlled Trial. Journal of Clinical Densitometry 2017;20(4):507-512	Wrong outcomes
583.	Tsai	2017 a	Tsai, J. N.; Burnett-Bowie, S. M.; Lee, H.; Leder, B. Z.. Relationship between bone turnover and density with teriparatide, denosumab or both in women in the DATA study. Bone 2017;95:20-25	Wrong outcomes
584.	Tsai	2019	Tsai, J. N.; Lee, H.; David, N. L.; Eastell, R.; Leder, B. Z.. Combination denosumab and high dose teriparatide for postmenopausal osteoporosis (DATA-HD): a randomised, controlled phase 4 trial.	Wrong outcomes

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			The Lancet Diabetes and Endocrinology October 2019;7(10):767-775	
585.	Tsuda	2020	Tsuda, Takayuki; Hashimoto, Yoshichika; Okamoto, Yasunori; Ando, Wataru; Ebina, Kosuke. Meta-analysis for the efficacy of bisphosphonates on hip fracture prevention. Journal of bone and mineral metabolism 2020;38(5):678-686	Systematic review and/or meta-analysis
586.	Tuck	2008	Tuck, S. P.. (iii) Antifracture efficacy of osteoporosis treatments. Current Orthopaedics October 2008;22(5):328-335	Systematic review and/or meta-analysis
587.	Uihlein	2015	Uihlein, A.; Burnett-Bowie, S. A.; Neer, R.; Tuck, P.; Wallace, P.; Bouxsein, M.; Leder, B.. Effect of denosumab (DMAB) and teriparatide (TPTD) transitions on peripheral bone mineral density (BMD) and microarchitecture: The DATA-Switch HR-pQCT study. Journal of Bone and Mineral Research. Conference 2015;30(Supplement 1)	Conference abstract
588.	Utian	2004	Utian, W. H.; Gass, M. L.; Pickar, J. H.. Body mass index does not influence response to treatment, nor does body weight change with lower doses of conjugated estrogens and medroxyprogesterone acetate in early postmenopausal women. Menopause 2004;11(3):306-14	Wrong outcomes
589.	van Schoor	2008	van Schoor, N. M.; Ewing, S. K.; O'Neill, T. W.; Lunt, M.; Smit, J. H.; Lips, P.. Impact of prevalent and incident vertebral fractures on utility: results from a patient-based and a population-based sample. Quality of Life Research 2008;17(1):159-67	Wrong study design
590.	Vastag	2006	Vastag, B.. Raloxifene prevails in STAR trial, may face easier road to acceptance than previous drugs. Journal of the National Cancer Institute 7 Jun 2006;98(11):733-735	Commentary
591.	Von keyserlingk	2011	von Keyserlingk, C.; Hopkins, R.; Anastasilakis, A.; Toulis, K.; Goeree, R.; Tarride, J. E.; Xie, F.. Clinical Efficacy and Safety of Denosumab in Postmenopausal Women with Low Bone Mineral Density and Osteoporosis: A Meta-Analysis. Seminars in Arthritis and Rheumatism 2011;41(2):178-186.	Systematic review and/or meta-analysis
592.	vonTirpitz	2003	Von Tirpitz, C.; Klaus, J.; Steinkamp, M.; Hofbauer, L. C.; Kratzer, W.; Mason, R.; Boehm, B. O.; Adler, G.; Reinshagen, M.. Therapy of osteoporosis in patients with Crohn's disease: A randomized study comparing sodium fluoride and ibandronate. Alimentary Pharmacology and Therapeutics 2003;17(6):807-816.	Wrong patient population
593.	Vorhendi	2020	Vorhendi, N.; Hanak, L.; Hegyi, P.; Szako, L.; Csiki, E.; Parniczky, A.; Eross, B.; Domotor, Z. R.; Kiss, S. Bisphosphonate treatment of osteoporosis does not increase the risk of severe gastrointestinal side effects: A meta-analysis of randomized controlled trials. United European Gastroenterology Journal 2020;8(8 SUPPL):217	Conference abstract, with no new data

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
594.	Vukicevic	2011	Vukicevic, S.; Grgurevi, L.. The PEARL trial: Lasofoxifene and incidence of fractures, breast cancer and cardiovascular events in postmenopausal osteoporotic women. International Journal of Clinical Rheumatology 2011;6(4):387-391.	Wrong intervention
595.	Wagner	2019	Wagner, Frithjof; Augat, Peter; Varady, Patrick A.; Keiser, Silke; Panzer, Stephanie; Vach, Werner; Eckardt, Henrik. Daily subcutaneous Teriparatide injection increased bone mineral density of newly formed bone after tibia distraction osteogenesis, a randomized study. Injury 2019;50(8):1478-1482	Wrong outcomes
596.	Walling	1997	Walling, A. D. Effect of alendronate in postmenopausal fractures. American Family Physician 1997;55(4):1420-1421	Conference abstract
597.	Wan	2010	Wan, X.; Krege, J.. Teriparatide and risk of nonvertebral fractures in women with postmenopausal osteoporosis. Journal of Bone and Mineral Research 2010;1):S310.	Conference abstract
598.	Wang	2007	Wang, Q.; Chen, D. C.. Ibandronate sodium for osteoporosis in postmenopausal women. Cochrane Database of Systematic Reviews 2007;(2) (no pagination)(CD006514)	Systematic review and/or meta-analysis
599.	Wang	2010	Wang, Q.; Lu, C.; Zhang, L.; Deng, Q.; Wei, S.; Chen, D. Alendronate use prevents new vertebral compression fractures in osteoporotic patients after percutaneous vertebral augmentation. Osteoporosis International May 2010;1)():S382	Conference abstract
600.	Wang	2015	Wang, C.; Gu, M.; Fan, J.; Chen, J.; Zhang, G.; Li, B.. Parathyroid hormone plus alendronate in osteoporosis: A meta-analysis of randomized controlled trials. Journal of Investigative Surgery 02 Nov 2015;28(6):309-316	Systematic review and/or meta-analysis
601.	Wang	2017	Wang, Y. K.; Qin, S. Q.; Ma, T.; Song, W.; Jiang, R. Q.; Guo, J. B.; Li, K.; Zhang, Y. M.. Effects of teriparatide versus alendronate for treatment of postmenopausal osteoporosis: A meta-analysis of randomized controlled trials. Medicine 2017;96(21):e6970.	Systematic review and/or meta-analysis
602.	Wang	2017 a	Wang, C.. Efficacy and Safety of Zoledronic Acid for Treatment of Postmenopausal Osteoporosis: A Meta-Analysis of Randomized Controlled Trials. American Journal of Therapeutics 2017;24(5):e544-e552.	Systematic review and/or meta-analysis
603.	Wang	2017 b	Wang, T.; Xuan, Z.; Li, R.; Song, L.; Dou, Y.; Ren, J.; Jia, X.; Lu, L.. Efficacy and safety of denosumab and teriparatide treatment for osteoporosis: A systematic review and meta-analysis. International Journal of Clinical and Experimental Medicine 2017;10(4):5949-5956.	Systematic review and/or meta-analysis
604.	Wang	2017c	Wang, G.; Sui, L.; Gai, P.; Li, G.; Qi, X.; Jiang, X. The efficacy and safety of vertebral fracture prevention	Systematic review and/or meta-analysis

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			therapies in postmenopausal osteoporosis treatment: Which therapies work best? A network meta-analysis. Bone and Joint Research July 2017;6(7):452-463	
605.	Watts	2003	Watts, N. B.; Lindsay, R.; Li, Z.; Kasibhatla, C.; Brown, J.. Use of matched historical controls to evaluate the anti-fracture efficacy of once-a-week risedronate. Osteoporosis International 2003;14(5):437-41	Wrong comparator
606.	Watts	2004	Watts, N. B.; Cooper, C.; Lindsay, R.; Eastell, R.; Manhart, M. D.; Barton, I. P.; van Staa, T. P.; Adachi, J. D.. Relationship between changes in bone mineral density and vertebral fracture risk associated with risedronate: greater increases in bone mineral density do not relate to greater decreases in fracture risk. Journal of Clinical Densitometry 2004;7(3):255-61	Systematic review and/or meta-analysis
607.	Watts	2010	Watts, N. B.; Brown, J. P.; Cline, G.. Risedronate on 2 consecutive days a month reduced vertebral fracture risk at 1year compared with historical placebo. Journal of Clinical Densitometry 2010;13(1):56-62	Wrong study design
608.	Watts	2017	Watts, N. B.; Fitzpatrick, L. A.; Williams, G. C.; Hattersley, G.; Wang, Y.; Miller, P. D.; Cosman, F.. Forearm bone mineral density and fracture incidence in postmenopausal women with osteoporosis: Results from the abaloparatide-SC phase 3 trial (ACTIVE). Endocrine Reviews. Conference: 99th Annual Meeting of the Endocrine Society, ENDO 2017;38(3 Supplement 1).	Conference abstract
609.	Watts	2018	Watts, N. B.; Dore, R. K.; Baim, S.; Hattersley, G.; Williams, G.; Wang, Y.; Rozental, T. D.; LeBoff, M. S. Forearm bone mineral density and fracture incidence in postmenopausal women with osteoporosis. Arthritis and Rheumatology September 2018;70 (Supplement 9)():2546-2547	Conference abstract
610.	Wei	2021	Wei, Kang; Qu, Yuxing; Gao, Yi; Ma, Yong. Comparison of Efficacy of Teriparatide (Parathyroid Hormone 1-34) Alone and in Combination with Zoledronic Acid for Osteoporosis in Postmenopausal Women. Journal of the College of Physicians and Surgeons--Pakistan : JCPSP 2021;31(2):240-242	Wrong patient population
611.	Weivoda	2019	Weivoda, Megan; Chew, Chee Kian; Monroe, David; Atkinson, Elizabeth; Farr, Josh; Thicke, Brianne; Ruan, Ming; Tweed, Amanda; Eckhardt, Brittany; McCready, Louise; Geske, Jennifer; Rizza, Robert; Vella, Adrian; Matveyenko, Aleksey; Drake, Matthew; Clarke, Bart; Oursler, Merry Jo; Khosla, Sundeep; Kassem, Moustapha; Andersen, Thomas. Identification of novel factors involved in the coupling of bone resorption and bone formation in humans reveals RANKL/DPP4 as a new link	Conference abstract, with no new data

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			between bone remodeling and energy metabolism. Journal of Bone and Mineral Research 2019;34(Supplement 1):17	
612.	Wen	2020	Wen, Fei; Ding, Liangliang; Du, Hongheng; Hu, Jinxi; Huang, Zifeng; Huang, Hua; Li, Kaikai; Mo, Yuxia; Kuang, Anyin. Clinical efficacy and safety of drug interventions for primary and secondary prevention of osteoporotic fractures in postmenopausal women: Network metaanalysis followed by factor and cluster analysis. PloS one 2020;15(6):e0234123	Systematic review and/or meta-analysis
613.	Wimalawansa	2000	Wimalawansa, S. J.. Prevention and treatment of osteoporosis: efficacy of combination of hormone replacement therapy with other antiresorptive agents. Journal of Clinical Densitometry 2000;3(2):187-201	Wrong intervention
614.	Wu	2018	Wu, J.; Zhang, Q.; Yan, G.; Jin, X.. Denosumab compared to bisphosphonates to treat postmenopausal osteoporosis: a meta-analysis. Journal of orthopaedic surgery and research 2018;13(1):194.	Systematic review and/or meta-analysis
615.	Wustack	2010	Wustrack, R.; Seeman, E.; Bucci-Rechtweg, C.; Palermo, L.; Black, D.. Impact of zoledronic acid on severe vertebral fractures: Results from horizon-pivotal fracture trial. Bone 2010;1):S194-S195.	Wrong outcomes
616.	Wustack	2012	Wustrack, R.; Seeman, E.; Bucci-Rechtweg, C.; Burch, S.; Palermo, L.; Black, D. M.. Predictors of new and severe vertebral fractures: results from the HORIZON Pivotal Fracture Trial. Osteoporosis International 2012;23(1):53-8.	Wrong study design
617.	Xie	2019	Xie, Zhongjian; Chen, Yun; Gurbuz, Sirel; Zhang, Bin; Li, Yujie; Bai, Fan; Chen, Yu. Effects of teriparatide in Chinese and Caucasian women with osteoporosis: bridging study on efficacy. Clinical interventions in aging 2019;14():959-968	Systematic review and/or meta-analysis and/ or pooled analysis
618.	Xu	2016	Xu, X. J.; Ma, D. D.; Lv, F.; Wang, J. Y.; Liu, Y.; Xia, W. B.; Jiang, Y.; Wang, O.; Xing, X. P.; Yu, W.; et al.,. THE CLINICAL CHARACTERISTICS AND EFFICACY OF BISPHOSPHONATES IN AUDLT PATIENTS WITH OSTEOGENESIS IMPERGECTA. Endocrine Practice 2016;22(11):1267-1276. [DOI: 10.4158/EP151184.OR]	Wrong patient population
619.	Xuan	2015	Xuan, S.; Ma, J.; Liu, G. G.. Meta-analysis of efficacy and safety of denosumab in postmenopausal osteoporosis. Value in Health 2015;18 (3):A153.	Systematic review and/or meta-analysis
620.	Yang	2016	Yang, X. C.; Deng, Z. H.; Wen, T.; Luo, W.; Xiao, W. F.; Zhao, R. B.; Li, Y. S. Network Meta-Analysis of Pharmacological Agents for Osteoporosis Treatment and Fracture Prevention. Cellular Physiology and Biochemistry 01 Dec 2016;40(3-4):781-795	Systematic review and/or meta-analysis
621.	Yang	2019	Yang, L.; Kang, N.; Yang, J. C.; Su, Q. J.; Liu, Y. Z.; Guan, L.; Liu, T.; Meng, X. L.; Wang, Y.; Hai, Y.. Drug	Systematic review and/or meta-analysis

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			efficacies on bone mineral density and fracture rate for the treatment of postmenopausal osteoporosis: A network meta-analysis. European Review for Medical and Pharmacological Sciences 2019;23(6):2640-2668	
622.	Yang	2019	Yang, L.; Kang, N.; Yang, J. C.; Su, Q. J.; Liu, Y. Z.; Guan, L.; Liu, T.; Meng, X. L.; Wang, Y.; Hai, Y. Drug efficacies on bone mineral density and fracture rate for the treatment of postmenopausal osteoporosis: a network meta-analysis. European review for medical and pharmacological sciences 2019;23(6):2640-2668	Systematic review and/or meta-analysis
623.	Yang	2020	Yang, Chengzhi; Le, Guoping; Lu, Changwei; Wei, Renjie; Lan, Wanjie; Tang, Jingli; Zhan, Xinli. Effects of teriparatide compared with risedronate in the treatment of osteoporosis: A meta-analysis of randomized controlled trials. Medicine 2020;99(7):e19042	Systematic review and/or meta-analysis
624.	Yildirim	2005	Yildirim, K.; Gureser, G.; Karatay, S.; Melikoglu, M. A.; Ugur, M.; Erdal, A.; Senel, K.; Billen, H.. Comparison of the effects of alendronate, risedronate and calcitonin treatment in postmenopausal osteoporosis. Journal of Back and Musculoskeletal Rehabilitation 2005;18(3-4):85-89	Wrong outcomes
625.	Yu	2011	Yu, S.; Burge, R. T.; Foster, S. A.; Gelwicks, S.; Meadows, E. S. The impact of teriparatide adherence and persistence on fracture outcomes. Osteoporosis International 2011;():1-11	Wrong study design
626.	Yuan	2019	Yuan, F.; Peng, W.; Yang, C.; Zheng, J.. Teriparatide versus bisphosphonates for treatment of postmenopausal osteoporosis: A meta-analysis. International journal of surgery 2019;16.	Systematic review and/or meta-analysis
627.	Yuan	2019	Yuan, Fei; Peng, Wen; Yang, Caihong; Zheng, Jinping. Teriparatide versus bisphosphonates for treatment of postmenopausal osteoporosis: A meta-analysis. International journal of surgery (London, England) 2019;66():1-11	Systematic review and/or meta-analysis
628.	Yun	2021	Yun, Jae Nam; Hoe, Kwang Lae; Kan, Hye-Su; Yeun, Ji-Sun; Kwon, In Sun; Kim, Jae-Hoon; Lee, Minyu; Kim, Namsick; Oh, Tae-Young; Nam, Seung-Kwan; Choi, Yoon Seok; Hong, Jang Hee.Bioequivalence for a Fixed-Dose Combination Formulation of Bazedoxifene and Cholecalciferol Compared With the Corresponding Single Entities Given Together. Clinical pharmacology in drug development 2021;10(8):850-858	Wrong patient population
629.	Zerbini	2017	Zerbini, C. A. F.; Geusens, P.; Lespessailles, E.; Body, J. J.; Casado, E.; Stepan, J.; Kendler, D. L.; Russo, L.; Greenspan, S. L.; Minisola, S.; Bagur, A.; Lakatos, P.; Fahrleitner-Pammer, A.; Moricke, R.; Lopez-Romero, P.; Marin, F.. Teriparatide compared with risedronate and the risk of clinical vertebral fractures: 2-year results of a randomized, double-	Conference abstract

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
			dummy clinical trial. Arthritis and Rheumatology. Conference: American College of Rheumatology/Association of Rheumatology Health Professionals Annual Scientific Meeting, ACR/ARHP 2017;69(Supplement 10).	
630.	Zhang	2012	Zhang, J.; Wang, R.; Zhao, Y. L.; Sun, X. H.; Zhao, H. X.; Tan, L.; Chen, D. C.; Hai-Bin, X.. Efficacy of intravenous zoledronic acid in the prevention and treatment of osteoporosis: A meta-analysis. Asian Pacific Journal of Tropical Medicine 2012;5(9):743-748.	Systematic review and/or meta-analysis
631.	Zhang	2015	Zhang, Q.; Qian, J.; Zhu, Y.. Parathyroid hormone plus alendronate in osteoporosis: A meta-analysis of randomized controlled trials. International Journal of Clinical and Experimental Medicine 2015;8(3):3338-3348.	Retracted
632.	Zhang	2017	Zhang, Y.; Zhang, L.; Li, S.; Sun, F.; Li, J.; Ke, A.; Chen, X.; Zhang, X.; Xu, L.; Duan, J.; Zhang, G.; Li, D.; Ding, G.; Qin, L.; Wang, C.. Effect of denosumab, a fully human monoclonal antibody to RANKL, on bone mineral density and fractures: A meta-analysis. International Journal of Clinical and Experimental Medicine 2017;10(4):5931-5940.	Systematic review and/or meta-analysis
633.	Zhang	2019	Zhang, J.; Zhang, T.; Xu, X.; Cai, Q.; Zhao, D.. Zoledronic acid combined with percutaneous kyphoplasty in the treatment of osteoporotic compression fracture in a single T12 or L1 vertebral body in postmenopausal women. Osteoporosis International 01 Jul 2019;30(7):1475-1480	Systematic review and/or meta-analysis
634.	Zhou	2014	Zhou, Z.; Chen, C.; Zhang, J.; Ji, X.; Liu, L.; Zhang, G.; Cao, X.; Wang, P. Safety of denosumab in postmenopausal women with osteoporosis or low bone mineral density: a meta-analysis. International journal of clinical and experimental pathology 2014;7(5):2113-2122	Systematic review and/or meta-analysis
635.	Zhou	2016	Zhou, J.; Ma, X.; Wang, T.; Zhai, S.. Comparative efficacy of bisphosphonates in short-term fracture prevention for primary osteoporosis: a systematic review with network meta-analyses. Osteoporosis International 2016;27(11):3289-3300.	Systematic review and/or meta-analysis
636.	Zhou	2017	Zhou, B.; W ang, J.; Seeman, E.; Chines, A.; Shi, Y.; Wang, A. T.; Guo, X. E.. Denosumab treatment in women with osteoporosis rapidly prevents deterioration in trabecular microstructure at the distal tibia. Journal of Bone and Mineral Research December 2017;32 (Supplement 1):S10-S11	Conference abstract
637.	Zhou	2020	Zhou, Jian; Liu, Bo; Qin, Ming-Zhao; Liu, Jin-Ping. Fall Prevention and Anti-Osteoporosis in Osteopenia Patients of 80 Years of Age and Older: A Randomized Controlled Study. Orthopaedic surgery 2020;12(3):890-899	Wrong patient population

No.	Authors	Year	Reference (extracted from covidence)	Reasons for exclusion
638.	Zhu	2020	Zhu, Yilin; Huang, Zhonglian; Xu, Weicai; Chen, Hongjiang; Luo, Shaowei; Zhang, Yuantao; Zhao, Di; Hu, Jun; Wang, Yan; Xu, Jiankun. The efficacy and safety of denosumab in postmenopausal women with osteoporosis previously treated with bisphosphonates: A review. Journal of Orthopaedic Translation 2020;22():7-13	Systematic review and/or meta-analysis
639.	Not reported	2017	Efficacy of treatment with slow-release sodium fluoride versus alendronate on bone mineral density and fractures in postmenopausal women. Journal of the American Geriatrics Society 2017;Conference: 2017 Annual Scientific Meeting of the American Geriatrics Society. United States. 65(pp S111-S112):	Conference abstract

S4 Table. Characteristics of included studies

Note: [Ordered by trial (when applicable), alphabetically and year of publication] The information hereby presented has been copied from the original article or adapted.

General list

Adachi 2009

Methods	RCT, parallel group 34 centers in Canada and Columbia
Participants	438 women were randomized and 367 completed the study Inclusion criteria: postmenopausal women (at least 6 months after their last menstrual period) and at least 40 years of age (or ≥25 years if surgically menopausal). Patients were included if they had either a history of osteoporotic fracture or a bone mineral density <2.0 SDs below the mean for young adults, as assessed using dual-energy X-ray absorptiometry performed within 3 years before randomization. Patients were required to have an adequate intake of vitamin D and calcium through diet and/or supplements, as determined by the study investigator based on information obtained during the screening process.
Interventions	Intervention: alendronate 10 mg, once daily for 12 weeks (N=291) Control: placebo, once daily for 12 weeks (N=147)
Outcomes	Non-vertebral fractures

Adami 2008

Methods	RCT, parallel group 32 clinical centers in seven countries (the United States, France, Germany, Spain, Italy, Canada, and Australia)
Participants	Inclusion criteria: Ambulatory postmenopausal women 50 to 80 years of age who were at least 5 years postmenopausal that had a BMD T-score below −2.5 at the lumbar spine and/or the femoral neck. Exclusion criteria: Women were excluded from the study if they had diseases other than osteoporosis which affected bone metabolism or responses to therapy or if they reported use of any of the following treatments at baseline: calcitonin within 2 months; estrogens, SERMs or tibolone within 3 months; >0.3 mg conjugated estrogen or equivalent for more than three doses per week within 3 months; androgens or anabolic steroids within 6 months; fluorides within 2 years; oral bisphosphonates for more than 2 consecutive months within previous 6 months or intravenous bisphosphonates within 6 months; vitamin D >50,000 IU/week or any use of calcitriol or vitamin D analogs within 6 months; systemic corticosteroids within 1 month or more than 30 days within previous 12 months; any drugs known to affect bone metabolism within 6 months; or investigational drugs within 1 month.
Interventions	Intervention: A one-month run-in period was followed by three consecutive one-year treatment phases. Patients received open-label recombinant teriparatide 20 µg once-daily by subcutaneous self-injection in the first year. Then one year of raloxifene 60 mg/day as a tablet taken orally followed by one year of open label raloxifene 60 mg/day (N=157)

	Control: A one-month run-in period was followed by three consecutive one-year treatment phases. Patients received open-label recombinant teriparatide 20 µg once-daily by subcutaneous self-injection in the first year. Then one year of oral placebo as a tablet taken orally followed by one year of open-label raloxifene 60 mg/day (N=172)
Outcomes	Clinical and non-vertebral fractures

Anastasilakis 2015

Methods	RCT, parallel group Outpatient clinics in Greece
Participants	N=64, from which 58 completed the study Inclusion criteria: Postmenopausal Caucasian women with low bone mass (bone mineral density [BMD] T-score of ≤−2.0 at the lumbar spine [LS] and/or the non-dominant femoral neck [FN]) who had been subjected to a single zoledronic acid infusion for the first time 1 year ago were included in the study. Exclusion criteria: Exclusion criteria for both groups were as follows: (i) age <40 years; (ii) any bone and mineral disorder other than osteoporosis, including primary or secondary hyperparathyroidism, Paget's disease of bone, osteogenesis imperfecta, rheumatologic diseases, paraplegia, and chronic immobilization; (iii) severe liver or kidney disease (creatinine clearance <60 ml/min/1.73 m2) or liver or kidney transplantation; (iv) premature ovarian failure; (v) uncontrolled thyroid disease; (vi) any malignancy; (vii) any musculoskeletal injury or surgical procedure 6 months prior to baseline; (viii) dental surgery or tooth removal 3 months prior to baseline or plan to dental surgery; (ix) history or concomitant medications that could affect bone metabolism, including immunosuppressive, anticonvulsant, antiviral and anti-tuberculosis agents, addictive drugs, corticosteroids, non-steroidal anti-inflammatory drugs, amiodarone, thiazolidinediones, interferon, metronidazole, and tamoxifen.
Interventions	Intervention 1: denosumab 60 mg, subcutaneous injections every 6 months (N=32) Intervention 2: zoledronic acid 5 mg, intravenous infusion (N=26)
Outcomes	Clinical fractures

Ascott Evans 2003

Methods	RCT, parallel group 18 centers in 9 countries
Participants	N=144, from which 119 women completed the study Intervention: 92.6% Caucasian Control: 89.8% Caucasian Inclusion criteria: Women were eligible for enrollment if they were younger than 80 years, had been postmenopausal for at least 3 years, had used HRT for at least 1 year, and had discontinued HRT within the3 months preceding their joining the study. In addition, patients had to have a low bone density defined as a lumbar spine T score between −3.5 and −1.5 (approximately 1.5 to 3.5 SDs below the mean BMD for healthy young women). Exclusion criteria: Patients were excluded from participation if they had a history of other metabolic bone disease or osteoporotic fracture, or if they had recently received

	bisphosphonate or other treatments (such as glucocorticoid therapy) known to affect bone metabolism.
Interventions	Treatment duration: 12 months Intervention: alendronate sodium 10 mg per day (N=95) Control: placebo, daily (N=49)
Outcomes	Vertebral, non-vertebral and hip fractures

Barrett-Connor 2006

Methods	RUTH (the Raloxifene Use for The Heart trial): a RCT, parallel group 177 sites in 26 countries (ClinicalTrials.gov number, NCT00190593.)
Participants	10101 women underwent randomization Inclusion criteria: Eligible women were 55 years of age or older, were one year or more postmenopausal, and had established CHD or were at increased risk for CHD. Participants were required to have a cardiovascular risk score of 4 or more, according to a point system that takes into account the presence of the following14: established CHD (4 points), arterial disease of the leg (4 points), an age of at least 70 years (2 points), diabetes mellitus (3 points), cigarette smoking (1 point), hypertension (1 point), and hyperlipidemia (1 point). Exclusion criteria: Exclusion criteria were a myocardial infarction, coronary-artery bypass grafting, or percutaneous coronary intervention within three months before randomization; a history of cancer or venous thromboembolism; a life expectancy of less than five years; unexplained uterine bleeding within six months before randomization; New York Heart Association class III or IV heart failure; chronic liver or renal disease; use of oral or transdermal estrogens within six months before randomization; or current use of other sex hormones or SERMs.
Interventions	Intervention: raloxifene 60 mg/d (N=5044) Control: placebo, daily (N=5057)
Outcomes	Vertebral and non-vertebral

Bell 2002

Methods	RCT, parallel group 8 institutions geographically distributed across the United States
Participants	N=65 Inclusion criteria: African-American postmenopausal women aged 45–88 yr, otherwise healthy, and a BMD 0.86 g/cm2 or less (T score range -1.75 or less) at the lumbar spine as measured by model QDR 1000, QDR 1000W, or QDR 2000 bone densitometers (Hologic, Inc., Waltham, MA). Exclusion criteria: women with any disease or drug therapy potentially affecting bone metabolism or who had had more than one fracture of a lumbar spine vertebra were excluded. Other exclusion criteria included abnormal renal function or a history of cancer or major upper gastrointestinal mucosal erosive disease.
Interventions	Treatment duration: 2 years Intervention: alendronate 10 mg/day (N=33)

	Control: placebo, daily (N=32)
Outcomes	Clinical fractures

Bock 2012

Methods	RCT, parallel group with 1-year follow-up period (clinical trial registration number NCT00271713; www.clinicaltrials.gov)
Participants	Inclusion criteria: y women aged between 60 and 75 years, with menopause more than 5 years ago, measurable spine and hip BMD (e.g. no severe degenerative changes) by dual X-ray absorptiometry (DXA), spine (L1–L4) or total hip BMD ≤−2.0 and >−3.5 SD T-score measured on DXA. Exclusion criteria: Exclusion criteria included spine or hip BMD ≤−3.5 SD T-score as measured by DXA, vertebral fractures or multiple (>2) low trauma peripheral fractures (as measured on lateral radiographs of thoracic and lumbar spine), diseases or disorders known to influence bone metabolism, a history of major upper gastro-intestinal disease, diagnosed malignant disease within the previous 10 years, previous treatment with a bisphosphonate at any time, treatment with fluoride for osteoporosis (dose greater than 10 mg/day) within the last 12 months or for more than 2 years (total duration), treatment with parathyroid hormone and similar agents or strontium ranelate at any time, treatment with other drugs affecting bone metabolism within the last 6 months, chronic systemic corticosteroid treatment, prior or current treatment with estrogens, progestins, SERMs, anabolic steroids, active vitamin D analogs/metabolites, calcitonin, calcineurin inhibitors or methotrexate, total serum calcium <2.2 mmol/l or >2.6 mmol/l, vitamin D deficiency (serum 25-hydroxyvitamin D <12 ng/ml), ALT above triple upper limit of normal range, renal impairment (serum creatinine >210 µmol/l) or any of the contraindications for ibandronate, calcium or vitamin D
Interventions	Intervention: 150 mg ibandronate oral monthly (N=36) Control: placebo oral monthly (N=34) All subjects received 500 mg calcium and 400 I.U. vitamin D daily.
Outcomes	Vertebral and non-vertebral fractures

Body 2002

Methods	RCT, parallel group 12 sites in the United States, Austria, Belgium, Canada, Israel and Mexico
Participants	Inclusion criteria: Ambulatory postmenopausal women at least 5 yr past menopause were eligible to participate if they were aged 30 – 85 yr, free of severe or chronically disabling conditions other than osteoporosis, and had LS or femoral neck bone mineral density at least 2.5 SD below the mean for young adult women. Exclusion criteria: Women were excluded for metabolic bone disorders; diseases affecting bone and mineral metabolism; carcinomas within the previous 5 yr.; nephrolithiasis or urolithiasis within the previous 2 yr.; malabsorption; significantly impaired renal [serum creatinine concentrations, 177 mol/liter (2.0 mg/dl)] or hepatic function; abnormalities of the LS prohibiting assessment of bone mineral density at L2-L4; medications or drugs known to affect bone or mineral metabolism in the prior 2 – 24 months depending on the drug (e.g. androgens, anabolic steroids, bisphosphonates, calcitonin, glucocorticoids, estrogens, fluoride); alcohol abuse; or allergy or previous exposure to teriparatide, exogenous PTH, or PTH analogs.

Interventions	Treatment duration: 24 months Intervention: once-daily subcutaneous injection teriparatide 40 µg plus oral placebo (N=73) Control: once-daily placebo injection plus oral 10 mg alendronate sodium (N=73)
Outcomes	Non-vertebral fractures

Bone 1997

Methods	RCT, parallel group 15 clinical sited in the United States
Participants	Inclusion criteria: Subjects were required to be in generally good health apart from osteoporosis. Patients were accepted for entry if lumbar spine BMD was 0.824 g/cm2 or less by Hologic DXA or 0.944 g/cm2 or less by Lunar DXA. These densities correspond to 2.0 SD below mean peak levels. Exclusion criteria: Potential subjects were excluded if they had more than 1 lumbar crush fracture or spinal anatomy was otherwise unsuitable for DXA analysis. They were also excluded if they had a history of recent major gastrointestinal disease, such as peptic ulcer, esophageal disorder, or malabsorption, or had recently used a drug to inhibit gastric acid secretion for more than 2 weeks. In addition, patients receiving chronic nonsteroidal anti-inflammatory therapy or agents known to affect bone metabolism (such as etidronate, estrogen, glucocorticoids, fluoride, or calcitonin) were excluded. Subjects receiving thyroid hormone replacement were required to have been on a stable dosage for at least 6 months before entry into the study and euthyroid by ultrasensitive TSH assay. Clinically significant vitamin D deficiency was similarly excluded or corrected.
Interventions	Treatment duration: 2 years Intervention 1: alendronate 1.0 mg/day (N=86) Intervention 2: alendronate 2.5 mg/day (N=89) Intervention 3: alendronate 5.0 mg/day (N=93) Control: placebo, daily (N=91)
Outcomes	Vertebral and non-vertebral fractures

Bone 2000

Methods	2 year RCT, parallel group Multicenter
Participants	N=425, 92% Caucasians Inclusion criteria: Entry criteria included prior hysterectomy and a lumbar spine BMD below 0.862 g/cm2 for at least three evaluable vertebrae in the L1—L4 region, as measured by Hologic, Inc., densitometry equipment (Waltham, MA). Compared with the current reference range, the mean BMD (0.77 6 0.07 g/cm2) observed in the patients enrolled corresponds to a mean t score of 22.5 6 0.2. The study was limited to women who had undergone hysterectomy to avoid any possible confounding effects of progestin therapy or withdrawal bleeding. Exclusion criteria: Exclusion criteria included evidence of metabolic bone disease (other than postmenopausal osteoporosis), a low serum 25-hydroxyvitamin D concentration [,10 ng/mL (25 nmol/L)], concomitant therapy with drugs that affect

	bone turnover (including bisphosphonates, calcitonin, or fluoride), renal insufficiency, severe cardiac disease, or history of recent major upper gastrointestinal mucosal erosive disease (including significant upper gastrointestinal bleeding, recurrent peptic ulcer disease, and esophageal or gastric varices). However, a history of other gastrointestinal diseases or chronic use of nonsteroidal anti-inflammatory agents were not considered reasons for exclusion. Women were not eligible for entry into the study if they had an underlying condition that would contraindicate randomization to estrogen, including active thrombophlebitis or history of prior thromboembolic disease, history of unexplained genital bleeding within the preceding year, increased risk for breast cancer, or fasting serum triglycerides more than 400 mg/dL. Women were also excluded from entering the study if within 6 months before entry into the study they had taken any form of systemic HRT.
Interventions	Intervention 1: alendronate (alendronate (10 mg/day) and placebo CEE) (N=92) Intervention 2: CEE (CEE (0.625 mg/day) and placebo alendronate) (N=143) Intervention 3: ALN + CEE (alendronate (10 mg/day) and CEE (0.625 mg/day)) (N=140) Control: placebo (placebo alendronate/placebo conjugated equine estrogen) (N=50)
Outcomes	Clinical fractures

Bone 2008

Methods	2-year RCT, phase 3 study 21 centers in Canada and United States
Participants	332 women enrolled in the study and 83% were white 286 completed the 24 months of treatment (86%) Inclusion criteria: postmenopausal women with lumbar spine BMD Tscores between -1.0 and -2.5 who were: 1) ambulatory, 2) not receiving medication that affected bone metabolism (other than calcium and vitamin D supplements), 3) free from any underlying condition (other than low BMD) that might have resulted in abnormal bone metabolism, and 4) had no history of a fracture after the age of 25 years. Women who had taken oral bisphosphonates for less than 3 months were eligible. Those who had taken oral bisphosphonates for longer than 3 months but less than 3 yr cumulatively were eligible after a 12-month washout period. Exclusion criteria: Women were excluded if they had received oral bisphosphonates for 3 or more yr, cumulatively; fluoride, or strontium ranelate within 5 yr. of study enrollment; or PTH or PTH derivatives, steroids, hormone replacement therapy, selective estrogen receptor modulators, tibolone, calcitonin, or calcitriol within 6 wk of study enrollment.
Interventions	Treatment duration: 2 years Intervention: Denosumab 60 mg, subcutaneous injection every 6 months (N=142) Control: placebo, subcutaneous injection every 6 months (N=144)
Outcomes	Vertebral and non-vertebral fractures

Brown 2009

Methods	DECIDE (Determining Efficacy: Comparison of Initiating Denosumab versus Alendronate) trial: a phase-3 RCT, parallel group Multicenter; Western Europe, North and South America, and Australia

Participants	1189 included in the study; 94% of them completed 12 months of study Inclusion criteria: Ambulatory postmenopausal women in general good health and with a T-score − 2.0 at the proximal femur ("total hip") or lumbar spine by DXA were eligible. Subjects were required to have at least one hip and at least two vertebrae (L 1 –L4) that were evaluable by DXA. Exclusion criteria: exclusion criteria included prior administration of intravenous bisphosphonates, fluoride (except for dental treatment) or strontium; use of drugs with known bone activity within 3 mo of randomization; current enrollment in or <1 mo since completion of other drug trials; evidence of an active disease known to affect bone metabolism; malignancy within the past 5 yr (except basal or squamous cell carcinoma or cervical or breast cancer in situ); impaired renal function; or contraindications for alendronate therapy. Subjects with screening serum 25-hydroxyvitamin D [25(OH)D] concentrations <12 ng/ml were ineligible but could undergo vitamin D repletion with ergocalciferol for 2 wk. and be rescreened.
Interventions	Treatment duration: 12 months Intervention: 1 ml subcutaneous injection of denosumab 60 mg every 6 months plus an oral placebo tablet once weekly Control: 1 ml subcutaneous injection of placebo every 6 months plus oral branded alendronate 70 mg weekly
Outcomes	Clinical and major osteoporotic fractures

Brown 2021

Methods	The Active-Controlled Fracture Study in Postmenopausal Women With Osteoporosis at High Risk (ARCH) trial (NCT01631214; https://clinicaltrials.gov/ct2/show/NCT01631214): a phase 3, multi-center, international, randomized, active-controlled, double-blind study.
Participants	ARCH enrolled 4093 patients (2046 romosozumab, 2047 alendronate); 167 of these patients were enrolled in the ARCH imaging substudy (Supplemental Figure S4). Of the patients in the imaging substudy, 90 (49 romosozumab, 41 alendronate) participated. Inclusion criteria: postmenopausal women with low BMD (T-score≤2.5) and a prior fragility fracture. Exclusion criteria: Patients were ineligible for the ARCH imaging substudy if they experienced a nonvertebral fracture or clinical vertebral fracture within 6 months before enrollment or had non-evaluable vertebrae in the region of interest for spine QCT scans as assessed by the central imaging vendor at the time of screening, based on lateral spine x-rays.
Interventions	Double-blind treatment period: 12 months Intervention 1: monthly s.c. romosozumab 210 mg (N=49) Intervention 2: weekly oral alendronate 70 mg (N=41) After completion of the double-blind study period, all patients received open-label weekly oral alendronate 70 mg.
Outcomes	Vertebral fractures

Clemmesen 1997

Methods	RCT, parallel group

	2 sites: Copenhagen County, Denmark and Liège, Belgium
Participants	N=132 Inclusion criteria: otherwise healthy postmenopausal women, 53–81 years of age (mean age 68 years) and at least 1 year past the menopause, with established postmenopausal osteoporosis defined as at least one, but no more than four vertebral fractures, and at least three intact lumbar vertebrae. Exclusion criteria: None of the women had received estrogen or calcitonin treatment within the 6–12 months prior to entrance in the study or had ever received any kind of bisphosphonate or fluoride. All women were otherwise healthy with no secondary causes of osteoporosis. None of the women received medications with known influence on bone metabolism.
Interventions	Treatment duration: 2 year Intervention 1: risedronate 2.5 mg daily (N=44) Intervention 2: risedronate 2.5 mg daily for 2 weeks followed by 10 weeks on placebo (N=44) Control: placebo, daily (N=44)
Outcomes	Vertebral and non-vertebral fractures

Cosman 2001

Methods	RCT, parallel group Osteoporosis clinic and osteoporosis screening program in the USA
Participants	N=52 Inclusion criteria: the presence of primary postmenopausal osteoporosis, defined as a T score of 2.5 below the normal premenopausal mean in either the spine or hip region and/or X-ray–documented osteoporotic vertebral fracture. Furthermore, all women had been on HRT for at least 1 year before study entry and were followed prospectively for 1 year to assure that bone density was stable. No patients were excluded because of bone loss. Consequently, all patients were on HRT for at least 2 years before randomization. Exclusion criteria: secondary causes of osteoporosis or medications (other than HRT) known to affect bone metabolism. Active renal calculus disease with a renal stone within the last 10 years or multiple prior renal stones.
Interventions	All patients were on HRT for at least 2 years before randomization. Treatment duration: 3 years Intervention: hormone-replacement therapy in addition to 400 IU/day (25 µg) of PTH(1–34) by subcutaneous daily injection. (N=27) Control: hormone-replacement therapy (N=5)
Outcomes	Clinical and vertebral fractures

Cosman 2005

Methods	RCT, parallel group Osteoporosis clinic and osteoporosis screening program in the USA
Participants	N=126 women with osteoporosis who had been taking alendronate for at least 1 year were randomized.

	Inclusion criteria: Normal levels of serum creatinine, total calcium (upper limit, 10.6 mg per deciliter [2.65 mmol per liter]), parathyroid hormone, and thyrotropin; normal liver function and complete blood count; and a ratio of urinary calcium to creatinine of less than 0.35 mg per milligram (1.0 mmol per millimole) after an overnight fast were prerequisites Exclusion criteria: Exclusion criteria included rheumatoid arthritis, multiple prior renal stones or a kidney stone within the preceding five years, or current use of glucocorticoids, antiepileptic medications, or estrogen. Subjects were required to have a bone mineral density T score of –2.5 or less at the lumbar spine (two or more vertebrae could be evaluated), femoral neck, or total hip or a T score of –2 or less at any of these sites plus a history of fracture in adulthood (defined as an age of at least 40 years) or vertebral fracture (identified by radiography), but excluding fractures caused by trauma (motor vehicle accidents) and finger, toe, and skull fractures.
Interventions	Treatment duration: 15 months Intervention 1: daily subcutaneous parathyroid hormone 25 µg plus alendronate 70 mg weekly (N=43) Intervention 2: cyclic subcutaneous parathyroid hormone 25 µg (each treatment cycle lasted three months and was followed by three months without parathyroid hormone) plus alendronate70 mg weekly (N=40) Intervention 3: alendronate 70 mg weekly (N=43)
Outcomes	Vertebral, non-vertebral and hip fractures

Cosman 2009

Methods	Randomized open-label trial (ClinicalTrials.gov Identifier: NCT00079924) 11 centers in the USA
Participants	N=198, 84% completed the study Inclusion criteria: Women were required to be postmenopausal and at least 50 yr old and to have had a previous diagnosis of osteoporosis based on fracture history and/or BMD. Women had to be on alendronate (70 total mg/wk.) or raloxifene (60 mg/d) for at least 18 months and be willing to continue or discontinue the alendronate or raloxifene, based on randomization, during the 18-month teriparatide treatment phase of the trial. Participants had to be on at least 1 month of stable calcium supplementation (at least 500 mg/d elemental calcium).At least two vertebrae in the lumbar region (L-1 through L-4) were required to be evaluable by DXA. A posterior-anterior lumbar spine BMD and/or hip BMD measurement via Hologic (Ho-logic Inc., Bedford, MA) or Lunar (GE Medical Systems, Madison, WI) densitometers equal to or lower than 2.0 SD values below the average bone mass for young women (BMD T-score <= -2.0) was required. Serum calcium values had to be within the normal range (8.9–10.1 mg/dl). Laboratory assessments including 25-hydroxyvitamin D, intact PTH, alkaline phosphatase, and TSH had to be normal or assessed as clinically insignificant. Exclusion criteria: Women were excluded if they had a history of hypercalcemia (with the exception of surgically corrected hyperparathyroidism), metabolic bone diseases other than osteoporosis, secondary causes of osteoporosis, or malignant neoplasms within the past 5 yr. Women were also excluded if they had active urolithiasis within the past 2 yr or high risk for urolithiasis in the opinion of the investigator; prior radiation therapy involving the skeleton; active liver disease (liver enzymes more than three times upper limit of normal) or jaundice; substantially impaired renal function (serum creatinine > 1.8 mg/dl); history of excessive alcohol consumption; or were treated with other bone-active drugs.

Interventions	All postmenopausal women were treated with alendronate or raloxifene for at least 18 months before study entry. Treatment duration: 18 months Alendronate pretreated stratum Intervention 1: switch group – discontinue alendronate 10 mg/day or 70 mg/week and initiated teriparatide 20 µg by daily subcutaneous injection (N=50) Intervention 2: add group – continue alendronate 10 mg/day or 70 mg/week and initiated teriparatide 20 µg by daily subcutaneous injection (N=52) Raloxifene pretreated stratum Control 1: switch group – discontinue raloxifene 60 mg/day and initiated teriparatide 20 µg by daily subcutaneous injection (N=49) Control 2: add group – continue raloxifene 60 mg/day and initiated teriparatide 20 µg by daily subcutaneous injection (N=47)
Outcomes	Clinical fractures

Cosman 2011

Methods	1-year RCT, parallel group (ClinicalTrials.gov number, NCT00439244). Multicenter
Participants	N=412, the majority was white (96-98%). Inclusion criteria: Eligible participants were postmenopausal women aged 45 to 89 years with BMD T-scores of 2.5 or less at the femoral neck, total hip, or lumbar spine or a BMD T-score of 2.0 or less at any site plus one or more documented vertebral or nonvertebral fractures (not due to excessive trauma, as determined by individual investigators). Exclusion criteria: Women were excluded for any prior use of PTH or bisphosphonates for more than 3 consecutive months; shorter-term use was acceptable if followed by a 1-year washout. Other ineligibility criteria included prior strontium treatment; chronic use of systemic corticosteroids within the prior year; raloxifene, calcitonin, or hormone therapy within the prior 3 months; creatinine clearance < 30 mL/min (assessed by estimated glomerular filtration rate [Cockcroft-Gault equation]); urine dipstick 2þ protein; serum calcium 2.75 mmol/L or <2.0 mmol/L; or 25-hydroxyvitamin D levels < 15 ng/mL.
Interventions	Intervention 1: single intravenous infusion of zoledronic acid 5mg plus daily teriparatide 20 µg via subcutaneous injection (N=137) Intervention 2: single intravenous infusion of zoledronic acid 5mg (N=137) Control: placebo infusion plus daily teriparatide 20 µg. (N=138)
Outcomes	Clinical fractures

Cosman 2020

Methods	Post hoc analysis was based on the Active-Controlled Fracture Study in Postmenopausal Women With Osteoporosis at High Risk (ARCH) (Clinical TrialNCT01631214), a phase 3, multicenter, international, randomized, active-controlled, double-blind study.
Participants	Inclusion criteria and Exclusion criteria: not provided. (Please see Brown 2021)

Interventions	Double-blind treatment period: 12 months Intervention 1: monthly s.c. romosozumab 210 mg (N=1739) Intervention 2: weekly oral alendronate 70 mg (N=1726) After completion of the double-blind study period, all patients received open-label weekly oral alendronate 70 mg.
Outcomes	Clinical, vertebral, non-vertebral and hip fractures

Downs Jr. 2000

Methods	Prospective, randomized study Conducted at 24 centers across the United States
Participants	97% women were Caucasian Inclusion criteria: ambulatory women at least 5 yr. post menopause with osteoporosis. Patients were required to have a BMD by dual-energy x-ray absorptiometry (DXA) at least 2 SD below the mean for a reference population of young women [based on the reference database provided by Hologic, Inc. (Waltham, MA)] at either the PA lumbar spine or femoral neck and, in addition, a BMD measurement at least 1 SD below the young normal mean at the other site. These criteria identify women who would be among the appropriate candidates for therapeutic intervention according to the National Osteoporosis Foundation guidelines. A history of a gastrointestinal disorder (other than an esophageal motility disorder) or use of a nonsteroidal anti-inflammatory agent was not a reason for exclusion. Exclusion criteria: Patients with a BMD more than 4 SD below the young normal mean at either the PA lumbar spine or femoral neck, a prevalent vertebral fracture on lateral thoracic or lumbar spine radiographs, or a history of minimal trauma hip fracture were excluded due to the use of a placebo in this study. Patients were also excluded for any of the following: active rheumatoid arthritis, disorders of bone mineralization, untreated hyperthyroidism, recent systemic estrogen therapy, hypercortisolism, or use of drugs known to alter bone or calcium metabolism.
Interventions	Half as many patients were randomized to the placebo group as were randomized to the alendronate and calcitonin groups (2:2:1, alendronate:calcitonin:placebo) Intervention 1: oral alendronate sodium (N=118) Intervention 2: open-label intranasal calcitonin-salmon (N=123) Control: matching alendronate placebo (N=58)
Outcomes	Clinical fractures

Dursun 2001

Methods	RCT, parallel group Turkey
Participants	151 participants included in the study Inclusion criteria: Postmenopausal women. Required to have a BMD of 2 SD or more below the young adult mean at either the posteroanterior lumbar spine or the femoral neck. Exclusion criteria: Women with a documented history of drug or alcohol abuse or with evidence from physical examinations, laboratory test or radiography of any bone metabolism disorder; active gastrointestinal or liver disease, renal failure, renal calculi,

	treatment with specific therapy for osteoporosis, treatment with systemic corticosteroid therapy, malignancy, disorder of calcium metabolism and lumbar vertebrae abnormalities preventing evaluation of BMD.
Interventions	Participants were randomized to receive daily for 1 year one of this 3 treatments: Intervention 1: oral alendronate 10 mg and calcium 1000 mg (N=51) Intervention 2: intranasal salmon calcitonin 100 IU and oral calcium 1000 mg (N=50) Control: oral calcium 1000 mg (N=50)
Outcomes	Vertebral fractures

Ensrud 2008

Methods	RUTH (the Raloxifene Use for The Heart trial): a RCT, parallel group Follow up: median of 5.6 years 177 sites in 26 countries
Participants	Inclusion criteria: eligible women were ≥55 yr of age, ≥1 yr postmenopausal, and had established CHD or were at high risk for CHD. Exclusion criteria: myocardial infarction, coronary-artery bypass grafting, or percutaneous coronary intervention within three months before randomization; a history of cancer or venous thromboembolism; a life expectancy of less than five years; unexplained uterine bleeding within six months before randomization; New York Heart Association class III or IV heart failure; chronic liver or renal disease; use of oral or transdermal estrogens within six months before randomization; or current use of other sex hormones or SERMs.
Interventions	Intervention: raloxifene 60 mg/d (N=5044) Control: placebo, daily (N=5057)
Outcomes	Vertebral and non-vertebral fractures

Fogelman 2000

Methods	RCT, parallel group 13 centers in France, UK, Netherlands, Belgium and Germany.
Participants	543 women were enrolled; 355 completed 24 months of treatment Inclusion criteria: Women up to 80 yr of age were eligible to participate in the study if they had been postmenopausal for at least 1 yr, based on the date of their last menstrual period, and had a mean lumbar spine (L1–L4) T-score of -2 or less. Prior or concomitant use of non-steroidal anti-inflammatory drugs (NSAIDs) or aspirin was permitted. Patients with previous or ongoing upper gastrointestinal disease were not excluded. Exclusion criteria: Patients were excluded from the study if they had hyperparathyroidism, hyperthyroidism, or osteomalacia within a year before the study; a history of cancer; or abnormalities that would interfere with the measurement of lumbar spine BMD by dual-energy x-ray absorptiometry (DXA). Patients were also excluded if they had taken (within 6–12 months, depending on the medication) or were still taking treatment known to affect bone metabolism, including an injection of vitamin D ≥ 10,000 IU.
Interventions	Treatment duration: 24 months; 2.5 mg group was discontinued by protocol amendment at 9 of the 13 centers

	Intervention 1: risedronate 2.5 mg per day (N=184) Intervention 2: risedronate 5 mg per day (N=177) Control: placebo, daily (N=180)
Outcomes	Vertebral and non-vertebral fractures

Freemantle 2012

Methods	DAPS (the Denosumab Adherence Preference Satisfaction Trial): a RCT, crossover (registered in ClinicalTrials.gov under the identifier NCT00518531) 20 centers in the USA and 5 centers in Canada
Participants	250 women were enrolled in the study; 221 entered the 2nd year Inclusion criteria: Subjects enrolled were ambulatory, postmenopausal women, aged 55 years or older, with baseline BMD T-scores between −4.0 and −2.0 at the lumbar spine, total hip, or femoral neck as measured by dual energy X-ray absorptiometry. Exclusion criteria: Key exclusion criteria were prior bisphosphonate or denosumab treatment, use of bone-active drugs, vitamin D deficiency (<20 ng/mL [49.9 nmol/L]), or contraindications to alendronate treatment.
Interventions	Treatment sequence 1: denosumab/alendronate - denosumab 60 mg every 6 months for 1 year during the 1st year of the study, followed by alendronate 70 mg once a week for 1 year during the 2nd year of the study (N=118) Treatment sequence 2: alendronate/denosumab - alendronate 70 mg once a week for 1 year during the 1st year of the study, followed by denosumab 60 mg every 6 months for 1 year during the 2nd year of the study (N=125)
Outcomes	Clinical fractures

Galesanu 2018

Methods	RCT, parallel group
Participants	Inclusion criteria: Postmenopausal women with osteoporosis. Exclusion criteria:
Interventions	Treatment duration: 2 years Intervention: denosumab 60 mg, subcutaneously every 6 months (N=32) Intervention 2: zoledronic acid 5 mg, intravenously once yearly (N=30)
Outcomes	Clinical fractures

Greenspan 1998

Methods	RCT, parallel group United States, Greater Boston areas
Participants	N=120 Inclusion criteria: unselected healthy, ambulatory, community-dwelling women age 65 years of age and older from the Greater Boston area via advertisement. Entry criteria were not based on BMD. The inclusion criteria for the present study were more relaxed, allowing for characteristic medical problems closer to those that exist in the general population of community-dwelling elderly women.

	Exclusion criteria: Potential subjects were excluded if they had a history of any illness affecting bone and mineral metabolism (e.g., renal failure, hepatic failure, active malignancy, current hyperthyroidism or hyperparathyroidism, or malabsorption), were currently taking medications known to affect bone metabolism (e.g., glucocorticoids, anticonvulsants), or had been treated for osteoporosis with bisphosphonates, hormone replacement therapy, or calcitonin within 1 year of screening.
Interventions	Treatment duration: 2,5 years Intervention: alendronate 5mg/day; in the last year of the study the dose was increased to 10 mg/day (N=60) Control: placebo, daily (N=60)
Outcomes	Non-vertebral and hip fractures

Greenspan 2003

Methods	RCT, follow up: 3 years United States, Greater Boston area (single-center)
Participants	N=373 Inclusion criteria: community-dwelling women aged 65 or older. Exclusion criteria: Participants were excluded if they had a history of illnesses that could affect bone mineral metabolism (e.g., current hyperthyroidism or hyperparathyroid ism, renal failure, hepatic failure, and active malignancy) or if they were currently taking medications known to alter bone mineral metabolism (e.g., glucocorticoids, anticonvulsants, excess thyroid hormone). Participants were also excluded if they had been treated with osteoporosis medications (e.g., bisphosphonates, hormone replacement, or calcitonin) within a year of screening. In addition, women were excluded if they had any contraindications for hormone replacement or alendronate or had a baseline femoral neck BMD of 0.9 g/cm2 or greater (i.e., zero SD of mean peak BMD using Hologic database prior to the Third National Health and Nutrition Examination Survey database10).
Interventions	Intervention 1: alendronate + hormone replacement treatment placebo (N=93) Intervention 2: alendronate + hormone replacement treatment (N=94) Control 1: placebo (hormone replacement treatment placebo + alendronate placebo) (N=93) Control 2: hormone replacement treatment + alendronate placebo (N=93) Women received alendronate sodium, 10 mg/d, or matching placebo. For hormone replacement, women who had had a hysterectomy were given 0.625 mg/d of conjugated equine estrogen or matching placebo, and women with an intact uterus received conjugated equine estrogen, 0.625 mg/d, with medroxyprogesterone, 2.5 mg/d, or matching placebo.
Outcomes	Clinical fractures

Grey 2009

Methods	2 year RCT, parallel group New Zealand, conducted at an academic research center in a volunteer sample
Participants	N=50

	Inclusion criteria: Participants were women more than 5 yr postmenopausal, with bone mineral density (BMD) T score between 1 and 2 at either lumbar spine or total hip. Exclusion criteria: Women who had illnesses or were receiving therapies that were known to affect the skeleton were ineligible, as were those with low bone mass (BMD T score at lumbar spine or total hip 2) or a previous hip or vertebral fracture, those who had ever used bisphosphonates, and those with any other major systemic disease.
Interventions	Intervention: zoledronate 5 mg, given as a 15-min iv infusion in 100ml 0.9% NaCl (N=25) Control: placebo (100 ml 0.9% NaCl, administered in anidentical fashion) (N=25)
Outcomes	Clinical fractures

Grey 2012

Methods	RCT, parallel group New Zealand, clinical research facility in a tertiary medical center (https://www.anzctr.org.au/Trial/Registration/TrialReview.aspx?id=82391)
Participants	180 women were randomized Data from 172 women were included in the analysis Inclusion criteria: Participants were women more than 5 yr postmenopausal, with BMD T-score between 1 and 2.5 at either lumbar spine or total hip. Exclusion criteria: Women receiving antiresorptive therapies were ineligible, as were those with osteoporosis (BMD T-score at lumbar spine or total hip 2.5), a previous hip fracture, clinical vertebral fracture, or postmenopausal wrist fracture, those who had ever used an aminobisphosphonate or had used etidronate within the past 3 yr, those with any major systemic illness, and those with serum 25(OH)D below 25 nmol/liter.
Interventions	Intervention 1: zoledronate 1 mg, 15-min iv infusion in 100ml 0.9% NaCl, followed for 12 months (N=43) Intervention 2: zoledronate 2.5 mg, 15-min iv infusion in 100ml 0.9% NaCl, followed for 12 months (N=43) Intervention 3: zoledronate 5 mg, 15-min iv infusion in 100ml 0.9% NaCl, followed for 12 months (N=43) Control: placebo, 100 ml 0.9% NaCl administered in an identical fashion (N=43)
Outcomes	Clinical and non-vertebral fractures

Hadji 2012

Methods	RCT, parallel group 78 clinical sites in 12 countries
Participants	710 women started the treatment Inclusion criteria: Women ≥ 45 years of age and at least 2 years postmenopausal were eligible if they had a history of back pain for ≥ 2 months before screening that was likely, in the opinion of the investigator, to be caused by osteoporotic vertebral fracture, despite conservative analgesic treatment; a baseline mean pain score of at least 4.0 on the numeric rating scale during the week before randomization; lumbar

	spine, femoral neck, or total hip bone mineral density (BMD) T-score of ≤− 2; and a minimum of one moderate vertebral fracture. Exclusion criteria: Exclusion criteria included diseases affecting bone metabolism other than osteoporosis; elevated serum calcium values, abnormal serum thyroid-stimulating hormone, parathyroid hormone, or 25-hydroxyvitamin D levels; imminent need for kyphoplasty or vertebroplasty; and evidence of significant pathology related to back pain which would make the interpretation of the back pain related to an osteoporotic vertebral fracture difficult, based on investigator assessment
Interventions	Treatment duration: 18 months Intervention: daily teriparatide 20 µg subcutaneous (SQ) injections plus placebo tablet orally once weekly (N=360) Control: placebo SQ injections plus risedronate 35 mg orally once weekly (N=350)
Outcomes	Vertebral, non-vertebral and hip fractures

Hooper 2005

Methods	RCT, parallel group 11 centers in Australia
Participants	383 women were randomized Inclusion criteria: The protocol specified that all were to have been postmenopausal (as determined from their medical histories) for 6 to 36 months, with a serum follicle stimulating hormone concentration of at least 50 mIU/ml and a serum estradiol concentration of no more than 20 pg/ml. Menopause could be natural or surgical. Patients who had undergone hysterectomy without bilateral oophorectomy could be enrolled if they were 51–60 years of age. All patients were required to have a lumbar spine BMD T-score greater than - 2.5 (BMD greater than 0.76 g/cm2 when measured with a Hologic densitometer (Waltham, Massachusetts, USA) or greater than 0.87 g/cm2 when measured with a Lunar densitometer (Madison, Wisconsin, USA)). All patients were in good health and had no history of hyperparathyroidism, hyperthyroidism, or osteomalacia, or of treatment with agents that were likely to affect bone metabolism. Patients were not excluded because of previous or active gastrointestinal disease (including dysphagia, esophagitis, and esophageal, gastric, and duodenal ulceration), need for antisecretory therapy, or concomitant use of medications with potential to irritate the gastrointestinal tract.
Interventions	Treatment duration: 2 years Intervention 1: risedronate 2.5 mg/day (N=127) Intervention 2: risedronate 5 mg/day (N=129) Control: placebo (N=125)
Outcomes	Vertebral and non-vertebral fractures

Hosking 1998

Methods	2 year data from a RCT Multicentre in Europe and the United States
Participants	Inclusion criteria: To be eligible for the study they had to have been postmenopausal for at least six months (as confirmed by a high serum follicle-stimulating hormone

	concentration) and in good health, with no clinical or laboratory evidence of systemic disease. To ensure that few women who entered the study had osteoporosis, only 10 percent of the women enrolled at each center were allowed to have a lumbar-spine bone mineral density be-low 0.8 g per square centimeter, as measured by dual-energy x-ray absorptiometry. Exclusion criteria: The following were exclusion criteria: abnormal renal function (serum creatinine, >1.5 mg per deciliter [130 µmol per liter]), a history of cancer, peptic ulcer or esophageal disease requiring prescription medication within the previous five years, previous treatment with a bisphosphonate or fluoride, regular therapy with a phosphate-binding antacid, estrogen-replacement therapy within the previous three months, and therapy with any other drug that affects the skeleton.
Interventions	There were two treatment strata. In the first, the women were randomly assigned to receive placebo or 2.5 mg or 5 mg of alendronate daily, with both the women and the investigator being unaware of treatment-group assignment, or open-label estrogen-progestin. Women who had undergone hysterectomy or for whom estrogen–progestin was contraindicated (because of thromboembolic disease or a family history of estrogen-dependent cancer) or unacceptable were enrolled in the second stratum, which was identical to the first except that it did not include estrogen-progestin. In the United States the estrogen and progestin were given as conjugated estrogens (Premarin, Wyeth–Ayerst, Philadelphia, 0.625mg daily), and medroxyprogesterone acetate (Provera, Upjohn, Kalamazoo, Mich., 5 mg daily), respectively. In Europe the estrogen and progestin were given in a cyclical regimen (Trisequens, Novo Nordisk, Copenhagen, Denmark) of 2 mg of micronized estradiol per day for 22 days, 1 mg of norethindrone acetate per day on days 13 to 22, and 1 mg of estradiol per day on days 23 to 28.Dietary calcium intake was estimated at base line and annually during the study with a food-frequency questionnaire. Women with a calcium intake of less than 500 mg per day were advised to increase their intake. Supplements were not provided, because of the limited evidence of benefit in women soon after menopause.
Outcomes	Non-vertebral fractures

Hosking 2003

Methods	3 month RCT, parallel group Multicentre in Brazil and Europe
Participants	549 women were randomized; 99.5% Caucasian Inclusion criteria: Postmenopausal (at least 2 years) women ≥ 60 and ≤ 90 years of age with osteoporosis as defined by low BMD (lumbar spine or total hip BMD Tscore ≤ –2.5, or both lumbar spine and total hip BMD Tscore ≤ –2.0) were eligible. Patients with an oesophageal stricture, achalasia, or severe oesophageal motor dysfunction were excluded, while patients with other recent but controlled gastrointestinal mucosal erosive disease were eligible. Use of non-steroidal anti-inflammatory drugs and proton pump inhibitors was allowed. Exclusion criteria: Patients were excluded from the study if they had a history of any illness or if significant abnormalities were discovered during the prestudy clinical or laboratory evaluation that, in the opinion of the investigator, might compromise the patient's safety or the evaluation of the study results. Patients with osteoporosis, so severe that (in the judgment of the investigator) participation in a placebo-controlled trial was unethical, were excluded. Also excluded were patients with a baseline 25-hydroxyvitamin D level below 9 ng/ml, or below 15 ng/ml with biochemical evidence of osteomalacia: elevated parathyroid hormone or alkaline phosphatase or decreased

	24-h urine calcium. Patients with an oesophageal stricture, achalasia, or severe oesophageal motor dysfunction were excluded. Metabolic and other bone diseases were also reasons for exclusion. Prior concomitant medications excluded were: oestrogen preparations (> 2 weeks within 6 months), thyroid hormone (for less than 6 weeks before the study or with abnormal thyroid stimulating hormone), fluoride (>1 mg/day), glucocorticoids (>1 month within 6 months), bisphosphonate (> 2 weeks), and supplemental calcium (except if ongoing for >4 weeks).
Interventions	Intervention: risedronate 5 mg/day (N=222) Intervention: alendronate 70 mg once a week (N=219) Control: placebo (N=108)
Outcomes	Clinical fractures

Kendler 2010

Methods	The STAND (Study of Transitioning from Alendronate to Denosumab) trial: a 1-year phase 3 RCT, parallel group Multicenter, international
Participants	504 women were enrolled; 481 (95.4%) completed the 12 months follow-up Inclusion criteria: Ambulatory postmenopausal women at least 55 years of age with a lumbar spine or total hip BMD measurements corresponding to a T-score of -2.0 or less and -4.0 or greater and who had been receiving alendronate treatment equivalent to 70 mg/week for at least 6 months. Exclusion criteria: Women were excluded if they had current hyper- or hypothyroidism, current hyper- or hypoparathyroidism, elevated transaminases, significantly impaired renal function (creatinine clearance ≤35mL/min as estimated by the Cockcroft and Gault method), hyper- or hypocalcemia, serum 25-hydroxyvitamin D levels < 20ng/mL (< 50nmol/L) or any other condition that could result in impaired calcium metabolism, or any metabolic bone disease that could interfere with interpretation of the findings. Women who were intolerant of alendronate therapy or for whom it was contraindicated or who had taken any bisphosphonate other than alendronate within 1 year of screening also were excluded. Women were excluded if they had ever received intravenous bisphosphonates, fluoride (except for dental treatment), or strontium ranelate; had received parathyroid hormone (PTH) or PTH derivatives within 1 year; had received any Selective Estrogen Receptor Modulator (SERM), anabolic steroids, systemic hormone replacement, calcitonin, calcitriol, or other vitamin D derivatives within 3 months; or had height, weight, or girth measurements that precluded accurate dual- energy x-ray absorptiometry (DXA) assessments.
Interventions	Intervention: denosumab 60 mg, subcutaneous injections once every 6 months + placebo tablets once a week (N=253) Control: alendronate 70 mg once a week + placebo subcutaneous injections every 6 months (N=251)
Outcomes	Clinical fractures

Kendler 2020

Methods	Post hoc analysis focused on denosumab/alendronate sequence

	Randomized, open-label, 2-year crossover Denosumab Adherence Preference Satisfaction (DAPS) study (NCT00518531). 25 study centers in the US and Canada
Participants	Inclusion criteria: ambulatory postmenopausal women aged 55 years or older with baseline BMD T-scores from −4.0 to −2.0 at the lumbar spine (LS), total hip (TH), or femoral neck (FN), as measured using dual-energy x-ray absorptiometry (DXA). Exclusion criteria: had received prior bisphosphonate or denosumab treatment or bone-acting drugs, including glucocorticoids. Additional exclusion criteria included hyper/hypocalcemia, vitamin D deficiency (< 20 ng/mL [49.9 nmol/L]), or contraindications to alendronate treatment.
Interventions	Treatment 1: Denosumab 60 mg every 6 months in the 1st year and then crossed over to oral alendronate 70 mg once weekly in the 2nd year (N=) All participants received daily supplementation of calcium (1000 mg) and vitamin D (at least 400 IU).
Outcomes	Osteoporotic and non-vertebral fractures

Langdahl 2017

Methods	STRUCTURE: a phase 3b, randomised, open-label, active-controlled, parallel-group trial. 46 sites (clinical practices, hospitals, and research centres) in North America, Latin America, and Europe
Participants	436 patients were randomized Inclusion criteria: Patients were ambulatory, postmenopausal women (aged ≥55 to ≤90 years at randomisation) who had received oral bisphosphonate therapy at a dose approved for postmenopausal osteoporosis for at least 3 years before screening, and alendronate (70 mg weekly or equivalent) the year immediately before screening. Patients had a history of non-vertebral fracture after age50 years or vertebral fracture; osteoporosis as documented by an areal BMD T score of –2·5 or lower at the total hip, femoral neck, or lumbar spine on dual energy x-ray absorptiometry (DXA) scans; and at least one hip and at least two vertebrae in the L1–L4 region evaluable by DXA Exclusion criteria: Patients were excluded from the study if they had recently used other agents affecting bone metabolism, had a serum 25hydroxyvitamin D concentration of less than 50 nmol/L, or had a history of metabolic or bone disease, or other disease or condition known to affect bone mass.
Interventions	Treatment duration: 12 months Intervention: romosozumab 210 mg, 3 subcutaneous injections of 70 mg each (N=218) Control: teriparatide 20 µg, self-administered, subcutaneously with a pen daily (N=218)
Outcomes	Clinical and non-vertebral fractures

Lewiecki 2007

Methods	RCT, parallel group 29 centers in the USA
Participants	412 women were randomized; 406 received at least one dose of study drug

	Inclusion criteria: Postmenopausal women up to 80 yr of age were eligible if they had a BMD T-score of –1.8 to –4.0 at the lumbar spine or –1.8 to –3.5 at the femoral neck or total hip. An upper limit of –1.8 was selected to include both osteopenic and osteoporotic populations. Exclusion criteria: Exclusion criteria included the use of bisphosphonates within 12 mo or fluoride within 24 mo; tibolone, PTH or any derivative, systemic glucocorticoids (>5 mg prednisone-equivalent daily for >10 days), inhaled glucocorticoids (>2000 g daily for >10 days), anabolic steroids, or testosterone within 6 mo; and estrogens, selective estrogen receptor modulators, calcitonin, or calcitriol within 3 mo of enrollment. Women with hyper- or hypoparathyroidism, hyper- or hypothyroidism, hypocalcemia, rheumatoid arthritis, Paget's disease of bone, osteomalacia, creatinine clearance 35 ml/min as determined using the Cockcroft-Gault equation, malabsorption syndrome, recent long-bone fracture (within 6 mo), more than one grade 1 vertebral fracture, or an osteoporosis-related fracture within the last 2 yr were excluded. Potential subjects were also excluded if BMD could not be measured accurately by DXA.
Interventions	Intervention 1: open-label alendronate 70 mg, orally once weekly (N=47) Intervention 2: denosumab 6, 14 or 30 mg, subcutaneously every 3 months or denosumab 14, 60,100 or 210 mg, subcutaneously every 6 mo, alternating with placebo (N=319) Control: placebo, subcutaneously every 3 months (N=46)
Outcomes	Clinical and major fractures

Lindsay 1997

Methods	3 year RCT, parallel group United States
Participants	34 patients were randomized Inclusion criteria: The principal inclusion criterion was postmenopausal osteoporosis, defined as low bone mass (>2·5 SD below mean young normal values) or atraumatic fractures, or both. Patients were also required to have taken hormone-replacement therapy for more than 1 year and were followed up for 1 year prospectively to ensure that bone mass was stable. Exclusion criteria: Patients were excluded from the study if they had secondary osteoporosis or abnormal thyroid function (patients on thyroxine were included if thyroid-stimulating hormone was normal), renal and hepatic dysfunction, or a history of renal stones within the previous 10 years.
Interventions	Participants completed an observation period of 1 year on oestrogens before randomization. Intervention: aminoterminal fragment of human PTH (1-34) plus oestrogens (N=17) Control: oestrogens (N=17) We used conjugated equine oestrogen (0·625 mg/day, Premarin, Wyeth-Ayerst, Philadelphia, PA, USA, n=30) or transdermal oestrogen (50 µg/day, Estraderm, Ciba-Geigg, Summit, NJ, USA, n=4). Patients who had had a hysterectomy (n=6, of whom two were in the PTH group) were not given a progestin. The remainder of the patients were prescribed medroxyprogesterone acetate 5–10 mg a day for at least 10 days per calendar month, or 2·5 mg a day continuously. hPTH (1–34) was given as a lyophilised powder, reconstituted with 1 mL 5% dextrose immediately before self-injection.
Outcomes	Clinical fractures

Luckey 2004

Methods	EFFECT (Efficacy of Fosamax versus Evista Comparison Trial) study was a double-blind, randomized, active-controlled, multicenter study 52 sites within the United States
Participants	456 postmenopausal were enrolled Inclusion criteria: Postmenopausal women (18 months since last menstrual period), women older than 40 years (> 25 years if surgically postmenopausal) with osteoporosis as defined by a low BMD (> 2.0 SD below young normal mean bone mass for either PA lumbar spine (L1 to L4) or total hip). This corresponded to an absolute BMD of ≤0.835 g/cm2 at the spine and ≤0.705 g/cm2 at the total hip (Hologic) and ≤0.947 g/cm2 at the spine and ≤0.747 g/cm2 at the total hip (Lunar). This operational definition of osteoporosis is consistent with the U.S. Food and Drug Administration-approved product labeling of ALN and conforms to the current osteoporosis treatment guidelines set forth by the National Osteoporosis Foundation.2,12 Participants were required to be in good general health, with spinal anatomy suitable for DXA of the lumbar spine. Exclusion criteria: Women were excluded from the study if they had a history of an illness or were found to have an abnormality during the prestudy, clinical, or laboratory evaluation that, in the opinion of the investigator, might compromise the person's safety or the evaluation of the study results. Specifically, women with any history of breast or uterine cancer, active or past history of venous thromboembolic events, including deep vein thrombosis, pulmonary embolism, or retinal vein thrombosis, were excluded from the study. Consistent with the respective product labels, women with a history of significant hepatic dysfunction (ALT ≥2 times the upper limit of normal) or women with abnormalities of the esophagus that delay esophageal emptying, such as esophageal stricture or achalasia, were also excluded. Hypocalcemia or metabolic bone diseases other than postmenopausal osteoporosis were also a reason for exclusion. Women were excluded if they had taken estrogen, estrogen analogues, selective estrogen receptor modulators (SERMs), anabolic steroids, bisphosphonates, or parathyroid hormone within 1 year of study entry. Exceptions to this rule included women who received estrogen therapy more than 3 months before study entry for less than 1 week or more than 6 months before study entry for less than 1 month. Topical (vaginal) estrogen cream (< 2 g) used up to two times weekly was also permitted. Fluoride (> 1 mg/day) at any time, and treatment with glucocorticoids for more than 1 month with more than 7.5 mg of oral prednisone (or equivalent) daily within 6 months before randomization were not allowed. Women treated with immunosuppressants or other medications that might alter bone or calcium metabolism were also excluded.
Interventions	Women were randomized to one of the two treatment groups: 1) ALN70 mgOW(taken fasting with a full glass of water upon arising for the day, and while remaining in an upright position for 30 minutes before the first food or beverage of the day) and daily RLX-matching placebo, dosed as RLX below; or 2) 2) RLX 60 mg daily (dosed at any time, without regard to food, as long as the dosing occurs at least 30 minutes after taking the OW dose) and ALN-matching placebo, dosed as ALN above. Based on the investigators' clinical assessment of individual participants' dietary calcium and vitamin D intake at baseline, women were instructed to take one or two

	caplets of Os-Cal 500 + D daily (calcium 500 mg, vitamin D 200 IU) with the noon and/or evening meal.
Outcomes	Clinical fractures (all non-vertebral)

Lufkin 1998

Methods	RCT, parallel group United States - All of them were studied at the Mayo Clinic, Rochester, MN, or the Mayo Clinic, Scottsdale, AZ, including the women recruited at the Gundersen Clinic in La Crosse, WI, who were studied at the Mayo Clinic, Rochester.
Participants	143 women were randomized Inclusion criteria: Subjects were eligible if they were in good health except for osteoporosis, free of any serious acute or chronic medical condition that might affect bone or calcium metabolism, fully ambulatory, between the ages of 45 and 75 years, and postmenopausal (no menses for 5 years or levels of serum estradiol <73 pmol/land serum follicle-stimulating hormone [FSH] >30 IU/l) The criteria for the diagnosis of osteoporosis were a bone mineral density (BMD) value for either the lumbar spine or proximal femur of ≤10th percentile for normal premenopausal females and one or more non-traumatic vertebral fractures, defined as a decrease in vertical height of ≥15% compared with adjacent vertebrae. (Two women were inadvertently entered whose BMD values were slightly above the entry criteria.) Calcium supplements of ≤500 mg/day or vitamin D ≤800 IU/day were allowed. Patients with previous estrogen replacement therapy (ERT) or calcitonin therapy were accepted after a 6-month wash-out interval before enrollment, and, for larger dosages of calcium supplements or vitamin D supplements, after a 3-month washout interval. Exclusion criteria: Specific exclusion criteria included patients with a history of deep venous thrombosis, thromboembolic disorders, or cerebral vascular accident, also patients with a history of cancer within the previous 5 years, except for superficial skin cancer. Patients were ineligible if they had been previously treated with sodium fluoride or bisphosphonates.
Interventions	Treatment duration: 12 months Intervention 1: raloxifene HCL 60 mg/day (N=48) Intervention 2: raloxifene HCL 120 mg/day (N=47) Control: placebo, daily (N=48)
Outcomes	Vertebral, non-vertebral and hip fractures

Malouf-Sierra 2017

Methods	Multinational, multicenter, prospective, randomized, active-controlled study Conducted from April 2009 to August 2015 across 17 countries in North America, Mexico, and Europe Public clinical trial registration: http://clinicaltrials.gov/show/NCT00887354
Participants	Over 2400 patients were screened; 389 were enrolled. N (women) = missing Inclusion criteria: The study included men and postmenopausal women with low bone mass who had sustained a recent unilateral pertrochanteric fracture (Arbeitsgemeinschaft fur Osteosynthesefragen [AO]/ Orthopaedic Trauma Association [OTA] types 31-A1 and 31-A2) and were treated with osteosynthesis with a sliding

	compression hip screw or a trochanteric intramedullary nail. Low bone mass was defined by a BMD T-score ≤ –2.0 SDs at the total hip, femoral neck, or lumbar spine.
Interventions	Eligible patients were randomly assigned, within 2 weeks of osteosynthesis, in a 1:1 ratio to: Intervention 1: teriparatide 20mg subcutaneous injection once daily plus oral placebo once weekly for 26 weeks (n= missing) Intervention 2: placebo subcutaneous injection once daily plus oral risedronate 35 mg once weekly for 26 weeks (n= missing)
Outcomes	Clinical and hip fractures

Masud 2009

Methods	The Hip Intervention Program (HIP): 3-year, double-blind, placebo-controlled, randomized study Conducted between November 1993 and April 1998 at 183 study centers in Europe, North America, New Zealand, and Australia. analysis focused on a subgroup of the intention-to-treat (ITT) population from the HIP study
Participants	9331 women enrolled in the original study, 6876 had available and evaluable vertebral fracture status of which 4702 had low BMD. Eligible for this analysis: A total of 1656 women had low BMD and at least one prevalent vertebral fracture Inclusion criteria: women aged 70 to 100 years with National Health and Nutrition Examination Survey (NHANES) III defined baseline femoral neck T-score of ≤ −2.5 and at least one prior vertebral fracture consistent with the World Health Organization /International Osteoporosis Foundation criteria for established postmenopausal osteoporosis.
Interventions	Intervention: daily treatment with 2.5 mg or 5.0 mg risedronate (n=1090) Control: identical-appearing placebo (n=566)
Outcomes	Hip fracture

McClung 2001

Methods	RCT, parallel group; mean follow-up of 2.3 years 183 study centers in North America, Europe, New Zealand, and Australia
Participants	N=9331 Inclusion criteria: One group consisted of women 70 to 79 years old who had osteoporosis, indicated by either a bone mineral density at the femoral neck (T score) that was more than 4 SD below the mean peak value in young adults (-4) or a femoral-neck T score lower than ¡3 plus at least one risk factor for hip fracture. These risk factors (hereafter referred to as clinical risk factors) included difficulty standing from a sitting position, a poor tandem gait, a fall-related injury during the previous year, a psychomotor score of 5 or less on the Clifton Modified Gibson Spiral Maze test (a test of hand–eye coordination, with scores ranging from 1 to 12, where scores of 5 or less are considered to indicate an increased risk of falling),16 current smoking or smoking during the previous five years, a maternal history of hip fracture, a previous hip fracture, and a hip-axis length of 11.1 cm or greater. The other group consisted of women 80 years of age or older who had at least one nonskeletal risk factor for hip

	fracture, a femoral neck T score lower than -4, or a femoral-neck T score lower than -3 plus a hip-axis length of 11.1 cm or greater. Exclusion criteria: The exclusion criteria were any major medical illness, a recent history of cancer, another metabolic bone disease within the previous year, important abnormalities in the results of routine laboratory tests, recent use of drugs known to affect bone, allergy to any bisphosphonate, a history of bilateral hip fractures, and any physical or mental condition that would preclude participation in a clinical trial. There were no specific criteria for exclusion on the basis of previous or ongoing upper gastrointestinal tract disorders or concomitant use of non-steroidal anti-inflammatory drugs, aspirin, proton-pump inhibitors, or antacids.
Interventions	Treatment duration: a mean of 2.0 years Intervention: risedronate 2.5 mg or 5.0 mg, daily (N=6197) Control: placebo, daily (N=3134)
Outcomes	Hip fractures

McClung 2005

Methods	RCT, parallel group; 2-month screening phase and an 18-month treatment phase 19 clinical sites globally
Participants	N=203 Inclusion criteria: Postmenopausal women with osteoporosis, 45 to 84 years of age. Subjects were ambulatory, 5 years or more past menopause, had a BMD T score between –2.5 and –4.0 at the lumbar spine or femoral neck, and had normal or clinically insignificant abnormal laboratory values, including serum calcium, PTH 1-84, 25-hydroxyvitamin D, and alkaline phosphatase. Exclusion criteria: Women were excluded if they had prior treatment with PTH or a PTH analogue; treatment with bisphosphonates within 12 months, anabolic corticosteroids or calcitriol or vitamin D analogues or agonists within 6 months, estrogens or selective estrogen receptor modulators within 3 months, or calcitonin within 2 months; therapeutic doses of fluoride; systemic corticosteroid use within 1 month or for more than 30 days in the prior year; use of anticoagulants within 1 month; history of diseases other than postmenopausal osteoporosis that affect bone metabolism; malignant neoplasms within 5 years; carcinoma in situ of the uterine cervix within 1 year; nephrolithiasis or urolithiasis within 2 years; abnormal uncorrected thyroid function; liver disease or clinical jaundice; impaired renal function; alcohol or other drug abuse; or poor medical or psychiatric risk for treatment. Patients with an increased risk of osteosarcoma (i.e., patients with Paget disease of bone, previous skeletal exposure to external beam radiotherapy, or previous malignant neoplasm involving the skeleton) were also excluded.
Interventions	Intervention 1: alendronate 10 mg/day, orally + injectable placebo (N=101) Intervention 2: oral placebo + teriparatide 20 µg (N=102)
Outcomes	Clinical fractures

McClung 2006

Methods	Phase 2 RCT, parallel group 29 centers in the USA
Participants	412 subjects were enrolled; 85% were white

	369 (90%) completed 12 months of treatment Inclusion criteria: Postmenopausal women up to 80 years of age were eligible if they had a bone mineral density T score of –1.8 to –4.0 at the lumbar spine or –1.8 to –3.5 at either the femoral neck or total hip. An upper limit of –1.8 was selected to include subjects with both osteopenia and osteoporosis. Exclusion criteria: Exclusion criteria included the use of bisphosphonates within the previous 12 months or fluoride within the previous 24 months; tibolone, parathyroid hormone or any derivative, systemic glucocorticoids (more than 5 mg of prednisone equivalent daily for more than 10 days), inhaled glucocorticoids (more than 2000 µg daily for more than 10 days), anabolic steroids or testosterone within 6 months; and estrogens, selective estrogen receptor modulators, calcitonin, or calcitriol within 3 months before enrollment. Exclusion criteria included hyperparathyroidism or hypoparathyroidism, hyperthyroidism or hypothyroidism, hypocalcemia, rheumatoid arthritis, Paget's disease of bone, osteomalacia, a creatinine clearance of less than 35 ml per minute (as estimated by the Cockroft–Gault equation),11 malabsorption syndrome, a recent long-bone fracture (within the previous six months), more than one grade 1 vertebral fracture, an osteoporosis-related fracture within the previous two years, or a case in which bone mineral density could not be accurately measured.
Interventions	Intervention 1: denosumab, subcutaneously every three months (at a dose of 6, 14, or 30 mg) and subcutaneously every six months (at a dose of 14, 60, 100, or 210 mg) (N=319) Intervention 2: open-label alendronate 70 mg, orally once a week (N=47) Control: placebo (N=46)
Outcomes	Vertebral and non-vertebral fractures

McClung 2009

Methods	1-year RCT, parallel group 10 centers in the United States
Participants	N=160 Inclusion criteria: postmenopausal women aged 45 – 60 years with baseline mean lumbar spine (LS) BMD T -score between − 1.0 and − 2.5 (L2 – L4) and baseline T -score N − 2.5 in 3 regions of the proximal femur: the total hip (TH), trochanter (TR) and femoral neck (FN). Exclusion criteria: Women with prevalent vertebral fractures (as assessed by lateral X-ray of T4 – L4) or previous low-trauma osteoporotic fractures were excluded, as were patients receiving systemic hormones (including estrogens, progestins, selective estrogen receptor modulators [SERMs], anabolic steroids, active vitamin D analogs/metabolites, and calcitonin). Additional major exclusions included: severe renal failure (defined as a calculated glomerular filtration rate [GFR] b 30 mL/min), malignancy, diseases that impact bone metabolism, treatment with bisphosphonates within the previous 2 years, and history of major upper gastrointestinal disease.
Interventions	Intervention: 150 mg monthly oral ibandronete (N=77) Control: monthly oral placebo (N=83)
Outcomes	Clinical fractures

McClung 2014

Methods	Phase 2 RCT, parallel group 28 study centers in Argentina, Austria, Belgium, Canada, Denmark, Spain, and the United States
Participants	419 participants were randomized; 383 (91%) completed the 12 month visit; 86% were white Inclusion criteria: Ambulatory postmenopausal women, 55 to 85 years of age, were eligible if they had low bone mineral density (a T score of -2.0 or less at the lumbar spine, total hip, or femoral neck and −3.5 or more at each of the three sites). Exclusion criteria: A history of vertebral fracture or a fragility fracture of the wrist, humerus, hip, or pelvis after 50 years of age; a history of metabolic bone disease; a serum level of 25-hydroxyvitamin D of less than 20 ng per milliliter; untreated hyper thyroidism or hypothyroidism; current hyperparathyroidism or hypoparathyroidism; an elevated aminotransferase level; substantially impaired renal function (estimated creatinine clearance, ≤30 ml per minute, as assessed by means of the Modification of Diet in Renal Disease equation 14); current hypercalcemia or hypocalcemia; cancer; a positive test for the human immunodeficiency virus, hepatitis C virus, or hepatitis B surface antigen; and a history of spinal stenosis, facial-nerve paralysis, or solid-organ or one marrow transplantation. In addition, the use of any of the following agents affecting bone metabolism was an exclusion criterion: intravenous bisphosphonate or denosumab at any time; fluoride (for treatment of osteoporosis) within the previous 24 months; oral bisphosphonate, parathyroid hormone, or strontium within the previous 12 months; calcitonin, selective estrogen-receptor modulator, systemic oral or transdermal estrogen, or tibolone within the previous 3 months; or systemic glucocorticoid (≥5 mg of prednisone equivalent per day for >10 days) within the previous 3 months.
Interventions	Intervention 1: alendronate 70 mg, weekly (N=51) Intervention 2: teriparatide 20 µg, daily (N=55) Intervention 3: romosozumab 140 mg or 210 mg every 3 months or 70 mg, 140 mg or 210 mg monthly (N=261) Control: placebo, monthly or every 3 months (N=52)
Outcomes	Non-vertebral fractures

McClung 2020

Methods	Phase 2, international, multicenter, randomized, placebo-controlled, dose-finding, parallel-group study. The study was registered as a clinical trial with registration identification ClinicalTrials.gov NCT00896532.
Participants	Inclusion criteria: Postmenopausal women aged 55 to 85 years with a low BMD (T-score of ≤ − 2.0 and ≥ − 3.5 at the lumbar spine, total hip, or femoral neck). Exclusion criteria: Key exclusion criteria were a history of metabolic bone disease; a history of vertebral fracture or a fragility fracture of the wrist, humerus, hip, or pelvis at > 50 years of age; a serum level of 25-hydroxyvitamin D of less than 20 ng/mL; untreated hypothyroidism or hyperthyroidism; current hypoparathyroidism or hyperparathyroidism; current hypocalcemia or hypercalcemia; substantially impaired renal function (i.e., estimated creatinine clearance ≤ 30 mL/min as assessed by the Modification of Diet in Renal Disease equation [1]); an elevated aminotransferase level; a positive test for hepatitis C virus, hepatitis B surface antigen, or the human

	immunodeficiency virus; cancer; and a history of spinal stenosis, facial-nerve paralysis, or solid-organ or bone marrow transplantation. Additionally, the use of any of the following agents affecting bone metabolism led to exclusion from the study: intravenous denosumab or bisphosphonate at any time; fluoride (for treatment of osteoporosis) within the previous 24 months; oral bisphosphonate, parathyroid hormone, or strontium within the previous 12 months; selective estrogen-receptor modulator, systemic oral or transdermal estrogen, tibolone, or calcitonin, within the previous 3 months; or systemic glucocorticoid (≥ 5 mg of prednisone equivalent per day for > 10 days) within the previous 3 months.
Interventions	**For study period from baseline to 48 months:** Subjects who received various romosozumab doses or placebo from months 0–24 were rerandomized to denosumab (60 mg SC Q6M) or placebo for 12 months, followed by open-label romosozumab (210 mg QM) for 12 months. **The present paper presents data for the study period from 48 to 72 months - Zoledronate Follow-on period:** At month 48, subjects who had received active treatment for 48 months were assigned to no further active treatment (N=51) and all other subjects were assigned to zoledronate 5 mg IV (N=90).
Outcomes	Clinical vertebral fractures, adjudicated atypical femoral fractures and fragility fractures.

McClung 2021

Methods	International, multicenter, randomized, placebo-controlled, parallel-group study and its extensions (NCT00896532; https://www.clinicaltrials. gov/ct2/show/NCT00896532)
Participants	Inclusion criteria: postmenopausal women 55 to 85 years old with low bone mass (T-score of ≤ 2.0 and ≥ 3.5 at the lumbar spine, total hip, or femoral neck) Exclusion criteria: not reported in this paper.
Interventions	In this analysis, we report the results from a subset of women who were randomized to receive placebo for 24 months, re-randomized to receive denosumab or placebo for 12 months, and then received romosozumab for 12 months. This provides two treatment groups: one that received romosozumab after 3 years of placebo (Group 1; n = 12) and the second group that received placebo for 2 years, then denosumab for 12 months followed by 12 months of treatment with romosozumab (Group 2; n = 16) (Figure 1B). Only data from the 28 subjects who entered the month 36 to month 48 romosozumab treatment period are included in the analyses.
Outcomes	Atypical femoral fractures

Miller 2008

Methods	RCT, parallel group 101 sites in Canada, Europe and the United States
Participants	1583 women were randomized; 470 (29.7%) discontinued treatment Inclusion criteria: Enrolled subjects were generally healthy women 45 yr of age who were at least 1 yr postmenopausal (i.e., completed their last natural menstrual cycle or underwent bilateral oophorectomy, with or without hysterectomy, at least 1 yr before screening). Women were stratified into two strata based on time since menopause: (1)

	women who were 1–5 yr. postmenopause and (2) those who were >5 yr. postmenopause. Women who were postmenopausal between 1 and 5 yr had to have at least one of the following risk factors for osteoporosis to be enrolled: lumbar spine or femoral neck BMD T-scores between −1.0 and −2.5 as measured by DXA, a family history of fracture, bilateral oophorectomy, current history of smoking, small-boned and/or thin frame (weight < 58 kg), inadequate intake of calcium, and little or no weight-bearing exercise. Women in the latter stratum who previously received hormone replacement therapy but had discontinued treatment for 6 mo or women who were surgically postmenopausal for <5 yr were required to have accompanying serum follicle-stimulating hormone (FSH) levels 40 IU/liter and estradiol levels ≤73.4 pM (20 pg/ml). Women who were postmenopausal for >5 yr had to have the following inclusion criteria: lumbar spine or femoral neck BMD T-scores between −1.0 and −2.5 in addition to one of the following risk factors: a family history of fracture, bilateral oophorectomy, menopause occurring at ≤40 yr of age, current history of smoking, small-boned and/or thin frame (weight < 58 kg), inadequate intake of calcium, and little or no weight-bearing exercise. Exclusion criteria: Women were excluded at screening if they had other forms of bone disease, conditions that could invalidate BMD testing, at least one osteoporotic vertebral fracture shown on thoracolumbar radiographs, history of or active nontraumatic venous thromboembolic event, endometrial hyperplasia based on biopsy or endometrial thickness of >5 mm on transvaginal ultrasound, abnormal vaginal bleeding, history of malignancy within the previous 10 yr, abnormal laboratory tests including abnormal liver function tests or elevated fasting total cholesterol or triglyceride levels (310 or 300 mg/dl, respectively), and abnormal physical findings including body mass index (BMI) >32.2 kg/m2 or elevations in blood pressure. Subjects were also ineligible if they received treatment with any of the following medications: a bisphosphonate within 2 yr. of screening; PTH, a SERM, or an estrogen-, androgen-, or progestin-containing medication within 6 mo of screening; calcitonin or systemic fluoride for >1 mo within 6 mo of screening; a systemic corticosteroid (equivalent to 10 mg of prednisone for >10 days) within 6 mo of screening; and any investigational drug within 60 days of randomization.
Interventions	Intervention 1: bazedoxifene 10 mg (N=321) Intervention 2: bazedoxifene 20 mg (N=322) Intervention 3: bazedoxifene 40 mg (N=319) Intervention 4: raloxifene 60 mg (N=311) Control: placebo (N=310)
Outcomes	Clinical fractures

Miller 2016b

Methods	12 month RCT, parallel group 37 study centers in Belgium, Denmark, Poland, Spain, Canada, the United States, and Australia
Participants	643 were enrolled in the study; 625 (97.2%) completed 12 month of follow-up. Inclusion criteria: Ambulatory postmenopausal women aged 55 years or older who received oral bisphosphonate therapy for 2 years or longer immediately before screening were eligible if they had a T-scoreof-2.5 or less at the lumbar spine, total hip, or femoral neck, two or more lumbar vertebrae, and one hip evaluable by dual-energy x-ray absorptiometry (DXA) and baseline serum C-telopeptide of type 1 collagen (CTX) of 500 pg/mL or less.

	Exclusion criteria: Subjects were excluded if they had received denosumab or ZOL at any time; fluoride, strontium ranelate, or iv bisphosphonate other than ZOL within the previous 5 years; PTH or PTH derivatives within the year before enrollment; or other bone-active drugs in the 3 months before screening.
Interventions	Intervention: denosumab 60 mg, subcutaneously every 6 months + placebo intravenously on day 1 and denosumab 60 mg, subcutaneously at the month 6 visit (N=320) Control: zoledronic acid 5 mg, intravenously + denosumab placebo subcutaneously on day 1 and denosumab placebo subcutaneously at 6 months (N=320)
Outcomes	Non-vertebral fractures

Mortensen 1998

Methods	RCT, parallel group 3 year study (but was initially a 1 year study) Conducted at two study centers: Indiana University School of Medicine, Indianapolis, Indiana, and the Department of Endocrinology, Aarhus Amtssygehus, Aarhus, Denmark.
Participants	111 women were enrolled in the study; all Caucasian Inclusion criteria: Women with normal lumbar spine bone mass (within 2 sd of age matched mean bone mass) who were 6–60 months postmenopausal qualified for enrollment. Patients' estradiol levels had to be at least 40 pg/mL and FSH at least 20 U/L, and they had to be ambulatory and active, weigh at least 45 kg and no more than 90 kg, and be within 25% of normal weight and height values as determined by the investigator based on standard weight tables (i.e., 1983 Metropolitan Life Insurance tables). Patients also had to be willing and able to participate in the study and to provide written informed consent. Exclusion criteria: Ineligible patients included those who took any bisphosphonate, thyroid hormone therapy, glucocorticoids (>=5 mg prednisone per day), anabolic agents, calcitonin, vitamin D (>400 IU per day), high-dose calcium (>1,500 mg per day), diuretics, or anticonvulsants for more than 1 month within the previous 6 months, estrogens and/or progestogens for more than 1 month within the past year, or fluoride for more than 1 month ever in the past; had a history of any generalized bone disease, including hyperparathyroidism, Paget's disease of bone, renal osteodystrophy, or any other acquired or congenital bone disease, a documented history of alcohol or drug abuse, or evidence of significant organic or psychiatric disease; any evidence of established osteoporosis, such as an atraumatic vertebral deformity documented by spinal x-ray, or a history of osteoporosis related fracture of the hip or wrist; or who underwent bilateral oophorectomy or had any other type of artificially induced menopause.
Interventions	Intervention 1: oral risedronate cyclically - "cyclic group" (risedronate daily for the first 2 weeks of every calendar month and placebo daily for the rest of the month) (N=38) Intervention 2: oral risedronate daily, the "daily group" (N=37) Control: placebo, orally (N=36)
Outcomes	Vertebral and non-vertebral fractures

Muscoso 2004

Methods	RCT, parallel group
Participants	2000 women were enrolled in the study Inclusion criteria: osteoporotic female population submitted to a treatment with anti-resorption drugs
Interventions	Intervention 1: alendronate 10 mg, daily for 24 months (N=1000) Intervention 2: risedronate 5 mg, daily for 24 months (N=100) Control: raloxifene 60 mg, daily (N=100)
Outcomes	Clinical fractures

Panico 2011

Methods	18 month RCT, parallel group Department of Molecular and Clinical Endocrinology and Oncology, University of Naples Federico II, Naples, Italy
Participants	81 women were enrolled Inclusion criteria: Inclusion criteria for this study consisted of back pain, postmenopausal osteoporosis (T-score ≤–2.5 at lumbar spine or femoral neck), the presence of 2 osteoporotic vertebral fractures, previous treatment for osteoporosis. Exclusion criteria: The exclusion criteria were: an increased risk of osteosarcoma (i.e., patients with Paget disease bone, previous skeletal exposure to external beam radiotherapy, or previous malignant neoplasm involving the skeleton), hypercalcemia, malignant neoplasms, impaired renal function, liver disease, history of diseases other than postmenopausal osteoporosis that affect bone metabolism, nephrolithiasis, alcohol or drug abuse. Secondary osteoporosis was excluded in order to avoid the interference of the primitive disease with the patient's quality of life.
Interventions	Intervention: 20 µg s.c. of recombinant human parathyroid hormone (rhPTH 1–34), daily self-administered injections (group A) (N=42) Control: 70 mg per os of alendronate every week (group B) (N=39)
Outcomes	Vertebral fractures

Pols 1999

Methods	FOSIT study: RCT, parallel group 153 centers in 34 countries (Australia, Canada, South Africa, China and in Europe and Latin America)
Participants	N=1908 Inclusion criteria: Women eligible for study participation had been postmenopausal for at least 3 years, were not older than 85 years, and had BMD of the lumbar spine (L2–4) at least 2 standard deviations (SD) below the mean for mature, premenopausal women – a value that approximately corresponds to the median BMD of 65-year-old women. Lumbar spine BMD, as measured using dual-energy X-ray absorptiometry (DXA), was ≤0.86 g/cm^2 by Hologic QDR densitometry (Hologic, Waltham, MA) or ≤0.98 g/cm^2 by Lunar DPX densitometry (Lunar, Madison, WI). Eligible patients were otherwise in good health and were between 20% below and 50% above ideal body

	weight as defined in the Metropolitan Life Insurance Company Height and Weight Table. Levels of 25- hydroxyvitamin D were determined before study entry. Exclusion criteria: Excluded from participation were women with metabolic bone disease other than postmenopausal osteoporosis; disturbed parathyroid or thyroid function; major gastrointestinal disease (for example, peptic ulcer or malabsorption) within the year before enrollment or use of a drug to inhibit gastric acid secretion for >2 weeks within 3 months of study entry; myocardial infarction within the year prior to enrollment; uncontrolled hypertension or untreated angina; significantly impaired renal function (serum creatinine >150 mmol/l); or evidence of significant end organ disease. Also excluded were women who had received a bisphosphonate or fluoride (>8 mg/day) during the previous 6 months; estrogen (except vaginal ≤ 3 times/week), ipriflavone or calcitonin during the previous 4 months; or any anabolic steroid, glucocorticoid or progestin for >2 weeks within the previous 6 months. Participants could not be receiving any medications that might alter bone or mineral metabolism, including vitamin A in excess of 10.000 U/day, vitamin D in excess of 1000 U/day, anticonvulsants or phosphate-binding antacids. Finally, at least three vertebrae from L1 to L4 had to be evaluable by DXA to determine BMD in this region.
Interventions	Intervention: alendronate 10 mg, once daily for 12 months (N=958) Control: placebo, once daily for 12 months (N=950)
Outcomes	Non-vertebral and hip fracture

Recker 2004

Methods	RCT, parallel group
Participants	2862 women were randomized Inclusion criteria: All participants were postmenopausal women (aged 55–76 years, time since menopause >= 5 years) who, at enrolment, had a low BMD T score (-2.0 to -5.0) in at least one vertebra of the lumbar spine (L1 –L4) and one to four prevalent vertebral fractures. Exclusion criteria: Women were excluded if they had a disease or disorder known to influence bone metabolism (chronic GI or liver disease, malignant disease, chronic alcoholism, primary hyperparathyroidism, Paget's disease of bone, histologically documented osteomalacia, active thyroid disease) or had received a drug known to affect bone metabolism in the previous 6 months (corticosteroids, hormone-replacement therapy, calcitonin, cyclosporin, prior bisphosphonate treatment). Women were also excluded if they had received any investigational drug within 30 days of the first dose of the study drug or fluoride pretreatment within the previous 12 months or for a duration of >2 years. Additional exclusion criteria were renal impairment (serum creatinine >210 Amol/l), contraindications for calcium therapy and/or serum calcium concentrations of ≥ 2.6 or <2.0 mmol/l.
Interventions	Intervention 1: 0.5 mg iv ibandronate injections given once every 3months for 3 years (N=950) Intervention 2: 1 mg iv ibandronate injections given once every 3months for 3 years (N=961) Control: placebo, once every 3 months for 3 years (N=949)
Outcomes	Vertebral and hip fractures

Recker 2007

Methods	The EVA (Evista Alendronate Comparison) trial: RCT, parallel group 138 clinical study sites
Participants	1423 women were randomized Inclusion criteria: postmenopausal women between 50and 80 years of age inclusive, whose last menstrual period occurred at least2 years prior to study entry. The original study protocol[23]planned to treat3000 women with osteoporosis, defined by the WHO criteria, with femoral neck bone mineral density (BMD) at least 2.5 but no more than 4.0 standard deviations below the average bone mass for young women (T-score between−2.5 and−4.0, inclusive), according to the 1995 NHANES III reference database[26], and no prevalent vertebral fractures from the fourth thoracic to the fourth lumbar vertebrae, as determined using semi-quantitative analysis. Lateral thoracic and lumbar spinal radiographs were obtained after a patient's eligibility by femoral neck BMD was confirmed by a central coordinating center (Synarc, San Francisco, CA). Women were required to have baseline thoracic and lumbar radiographs evaluable for vertebral fractures, as determined by the coordinating center and at least two lumbar vertebrae evaluable by dual energy X-ray absorptiometry (DXA), prior to enrollment into the treatment phase. Exclusion criteria: Detailed exclusion criteria were previously published[23]and included a history of the following diseases: those which affect calcium or bone metabolism within 1 year of screening, other than low bone mass or osteoporosis; currently suspected of history of known breast or estrogen-dependent carcinoma; history of vaginal bleeding of unknown cause; venous thromboembolic events (VTE), or risk of developing VTE; esophageal abnormalities; and significant abnormal thyroid, hepatic or renal function. Women were also excluded if they took oral or intravenous bisphosphonates, fluorides, parathyroid hormone (PTH) or PTH analog within 1 year, or any other drugs known to significantly affect bone metabolism within 1 month prior to study entry, including calcitonin, estrogens, progestins, androgens, as well as antagonists or selective receptor modulators of these agents, tibolone, oraromatase inhibitors; anabolic steroids; vitamin D >50,000 IU/week orcalcitriol, or vitamin D analogs; or systemic corticosteroids. Concomitant use of other bone-active agents was prohibited during this study. However, use of estrogens for vaginal lubrication, or ophthalmic, otic, topical, inhaled, or intra-articular corticosteroid therapy was permitted in this study.
Interventions	Treatment duration: 5 years Intervention: alendronate 10 mg/day + raloxifene placebo (N=713) Control: raloxifene 60 mg/day + alendronate placebo (N=699)
Outcomes	Vertebral, non-vertebral and hip fractures

Recknor 2013

Methods	RCT, parallel group 74 centers in the United States and Europe.
Participants	417 women were randomized; 821 (98.6%) received one or more dose of treatment Inclusion criteria: Postmenopausal women with low bone density who had been treated previously with oral bisphosphonate therapy. Ambulatory, postmenopausal women aged 55years or older were eligible if they had received their first prescription of daily or weekly bisphosphonate therapy 1 month or more before screening but had either discontinued bisphosphonate treatment or remained on treatment but had

	insufficient adherence assessed by a score of less than 6 on the Osteoporosis Specific Morisky Medication Adherence Scale. Women with a bone mineral density (BMD) T-score of -2 or less and -4 or greater at the total hip or lumbar spine determined at the local site and had one or more proximal femur (hip) and two or more vertebrae between L1 and L4 evaluable by dual-energy x-ray absorptiometry were included. Exclusion criteria: Exclusion criteria included the current or prior use of osteoporosis medication, except daily or weekly oral bisphosphonate therapy, raloxifene, calcitonin, and hormone replacement therapy; use of medications affecting bone metabolism 3 or fewer months before screening; current enrollment in or less than 1 month since completion of other investigational drug trials; malignancy within the last 5 years, except fully resected basal or squamous cell carcinoma, cervical, or breast carcinoma in situ; impaired renal function (estimated glomerular filtration rate less than 30 mL/min/1.73 m2); or contraindications for ibandronate therapy. Study participants with screening 25-hydroxy vitamin D level less than 20 ng/mL were ineligible but could undergo vitamin D repletion and be rescreened. There was no exclusion based on fracture history.
Interventions	Treatment duration: 12 months Intervention: 60 mg denosumab subcutaneously every 6 months (N=411) Control: 150 mg oral ibandronate once monthly (N=410)
Outcomes	Clinical and non-vertebral fractures

Reginster 2003

Methods	RCT, parallel group 6 investigative sites in Austria, Belgium, the Czech Republic, Germany and Slovakia
Participants	Inclusion criteria: Eligible subjects included women aged up to 72 years who had been postmenopausal for at least 2 years. Participants were selected from patients, referred to osteoporosis centers for potential diagnosis and treatment of osteoporosis, and were required to have a BMD, as measured by dual X-ray absorptiometry at the femoral neck, of 2.0standard deviations (SD) or more below the normal peak bone mass for healthy, premenopausal women (T-score). Exclusion criteria: Subjects were excluded from the study for any of the following reasons: more than two fractured lumbar vertebrae or more than three fractured vertebrae of any kind, bone disorders other than primary osteoporosis, endocrine and malignant diseases, uterine and ovarian abnormalities, clinically severe postmenopausal symptoms that required estrogen therapy, a history of thromboembolic disorders, severe chronic diseases, or treatment with any agent that might influence bone turnover.
Interventions	Treatment duration: 18 months Intervention: raloxifene HCl 60 mg/day (N=291) Control: placebo, daily (N=290)
Outcomes	Clinical, vertebral, non-vertebral and hip fractures

Reid 2002

Methods	1 year RCT, parallel group 24 centers in 10 countries

Participants	351 women withdrew from the study, most commonly for personal reasons (in the case of 15 women) or because of adverse events (14 women). 316 women completed the study. All but two women were white. Inclusion criteria: In all the women, menopause had occurred at least five years previously, either naturally or as the result of bilateral oophorectomy. All women had a bone mineral density at the lumbar spine (L1 to L4) that was at least 2.0 SD below the mean value for young adults (a T score lower than -2) and had no more than one vertebral fracture at screening. Exclusion criteria: Major criteria for exclusion included systemic estrogen treatment within the previous three months, evidence of secondary osteoporosis, clinical or laboratory evidence of hepatic or renal disease, disorders of the parathyroid or thyroid glands, a serum 25-hydroxyvitamin D concentration of 15 ng per milliliter (37 nmol per liter) or less, a history of cancer, previous treatment with bisphosphonates or fluoride, and current therapy with any other drug known to affect the skeleton.
Interventions	Intervention: zoledronic acid by intravenous infusion every three months at different doses: 0.25 mg, 0.5 mg, or 1 mg at three month intervals; in addition, one group received a total annual dose of 4 mg as a single dose, and another received two doses of 2 mg each, six months apart. (N=292) Control: placebo (saline) (N=59)
Outcomes	Vertebral and non-vertebral fractures

Reid 2004

Methods	Phase 3 RCT, parallel group 38 centers in Europe, North America, Australasia, and South Africa.
Participants	619 subjects were randomized; 95.6% were white. Inclusion criteria: Women were eligible to participate if they were 40 to 60 years of age, postmenopausal (naturally or surgically), had undergone a hysterectomy no more than 15 years before beginning the study, had serum estradiol levels of 20 pg/mL (<73 pmol/L) and follicle-stimulating hormone levels of 40 mIU/mL or higher, and had a lumbar spine BMD measurement between 2.5 SDs below and 2.0 SDs above the mean value for normal premenopausal women. Exclusion criteria: Women were excluded from the study if they had a history of carcinoma of the breast or estrogen dependent tumors; had cancer within the last 5 years (except excised skin cancers); had taken estrogen (other than vaginal estrogens), progestin, androgen, calcitonin, or systemic corticosteroids within the previous 6 months; had ever taken bisphosphonate or fluoride (except for dental prophylaxis); were taking anti-seizure medications; were taking pharmacologic dosages of vitamin D or lipid-lowering drugs; had a history of thromboembolic disorders or of diabetes mellitus or other endocrine disorders requiring therapy (except thyroid hormone therapy); had abnormal renal function or hepatic function; had serious postmenopausal symptoms; or consumed more than 4 alcoholic drinks per day.
Interventions	Treatment duration: mean of 2.2 years (60% of subjects were still taking study medication at 3 years) Intervention 1: raloxifene 60mg/d (N=152) Intervention 2: raloxifene 150mg/d (N=157) Control 1: placebo, daily (N=158) Control 2: conjugated equine estrogen 0.625 mg/day (N=152)

Outcomes	Vertebral fractures

Reid 2018

Methods	RCT, placebo group New Zealand
Participants	N=2000 Inclusion criteria: Eligible participants were ambulatory postmenopausal women 65 years of age or older, with a T score of −1.0 to −2.5 at either the total hip or the femoral neck on either side; both hips were assessed in all patients. A T score of less than −2.5 at one hip site (total hip or femoral neck on either side) did not preclude participation in the trial, as long as another hip site met the criteria, so patients at the interface of osteopenia and osteoporosis were included. Exclusion criteria: The presence of spinal osteoporosis was not an exclusion criterion as long as the T score was above −3.0. Other exclusion criteria were an estimated glomerular filtration rate of less than 30 ml per minute per 1.73 m2 of body-surface area, major systemic disease, cancer in the previous 2 years, metabolic bone disease, or regular use of bone-active drugs in the previous year (including bisphosphonates, estrogen, antiestrogens, and prednisone at a dose of 2.5 mg or greater per day or equivalent).
Interventions	Intervention: zoledronate 5 mg, 4 infusions at 18 months intervals for 6 years (N=1000) Control: placebo (normal saline), 4 infusions at 18 months intervals for 6 years (N=1000)
Outcomes	Clinical, major osteoporotic, vertebral, non-vertebral and hip fractures

Reid 2019

Methods	RCT, parallel group 6 years of follow-up
Participants	Inclusion criteria: ambulant postmenopausal women aged > 65 years, with T-score at either the right or left total hip or femoral neck in the range -1.0 to -2.5, who were able to give informed consent. Exclusion criteria: lumbar spine T-score < -3.0, eGFR < 30 mL min^{-1}, major systemic disease, malignant disease in the last 2 years, metabolic bone disease or regular use of bone-active drugs in the previous year (including oestrogen, anti-oestrogens and systemic glucocorticoids in doses equivalent to prednisone ≥ 2.5 mg day^{-1}).
Interventions	Intervention: 4 infusions of Zoledronate 5 mg at 18-months intervals Control: 4 infusions of placebo (normal saline) at 18-months intervals
Outcomes	Major clinical fractures, analysis stratified by age, BMI at baseline, LS T score

Reid 2020

Methods	Prospective, randomized, placebo-controlled, double-blind trial The study was registered at the Australian New Zealand Clinical Trials Registry, numberACTRN12609000593235

Participants	Each participant was followed for 6 years. Inclusion criteria: Participants were ambulant postmenopausal women aged >65 years, with T-score at the total hip or femoral neck in the range −1.0 to −2.5, who were able to give informed consent. Exclusion criteria: lumbar spine T-score <−3.0, estimated glomerular filtration rate (eGFR) <30 mL/min, major systemic dis-ease, malignant disease in the last 2 years, metabolic bone dis-ease, or regular use of bone-active drugs in the previous year.
Interventions	Intervention 1: four infusions of either zoledronate5 mg at 18-month intervals (N=1000) Control: normal saline at 18-month intervals (N=1000)
Outcomes	Fragility fractures

Roux 2014

Methods	12 month RCT, parallel group 82 centers in Europe, Australia and Canada
Participants	870 participants were randomized; 824 (94.7%) completed the study 97.6% were Caucasian Inclusion criteria: Ambulatory, postmenopausal women aged ≥55years were eligible if they had been previously prescribed alendronate therapy, with first daily or weekly alendronate prescription≥1 month prior to screening, without limitation of alendronate treatment duration. To be eligible to participate in this study, the subject must have either stopped oral alendronate therapy before the screening visit, or was still taking oral alendronate therapy (no washout period) with low adherence, which was assessed by a score of <6 on the Osteoporosis Specific Morisky Medication Adherence Scale (OS-MMAS). Exclusion criteria: Key exclusion criteria included any prior or current treatment with osteoporosis medication other than daily or weekly oral alendronate therapy, hormone replacement therapy, and calcium and vitamin D (use of raloxifene or calcitonin prior to initiation of alendronate therapy was allowed); use of the following medications within3 months of screening: tibolone, anabolic steroids or testosterone, and glucocorticosteroids (≥5 mg prednisone equivalent per dayforN10 days or a total cumulative dose of≥50 mg); contra indicated or poorly tolerant of alendronate; significantly impaired renal function; previous participation in clinical trials with denosumab within the preceding 12 months regardless of treatment; reported malignancy within the last 5 years, except cervical carcinoma in situ or basal cell carcinoma; and any metabolic bone disease that had the potential to interfere with the interpretation of the findings. Vitamin D deficiency, defined as serum 25 (OH) vitamin D levelsb20ng/mL, was an exclusion criterion: repletion as confirmed by a serum vitamin D level≥20ng/mL was allowed and subjects were able to be re-screened only once
Interventions	Intervention: denosumab 60 mg, subcutaneously every 6 months (N=429) Control: risedronate orally 150 mg once monthly (QM, one 75 mg tablet on each of 2 consecutive days) (N=429)
Outcomes	Clinical fractures

Saag 2017

Methods	Phase 3 RCT, parallel group, with a duration of 12 months. After that, open-label Multicenter, international
Participants	4093 patients underwent randomization; 3654 patients (89.3%) completed 12 months of the trial Inclusion criteria: Ambulatory postmenopausal women 55 to 90 years of age who met at least one of the following criteria were eligible: a bone mineral density T score of –2.5 or less at the total hip or femoral neck and either one or more moderate or severe vertebral fractures or two or more mild vertebral fractures; or a bone mineral density T score of –2.0 or less at the total hip or femoral neck and either two or more moderate or severe vertebral fractures or a fracture of the proximal femur sustained 3 to 24 months before randomization. Exclusion criteria: Women were excluded as described previously5and for an inability to take alendronate oral tablets or contraindications to alendronate, including a glomerular filtration rate below 35 ml per minute per 1.73 m2 of body-surface area
Interventions	Intervention: monthly subcutaneous romosozumab 210 mg for 12 months of the trial and then weekly oral alendronate 70 mg for open-label period for 12 months (N=2046) Control: weekly oral alendronate 70 mg for 12 months of trial and then for the open-label period for 12 months (N=2047)
Outcomes	Clinical, vertebral, non-vertebral and hip fractures

Sambrook 2004

Methods	EFFECT (the EFficacy of FOSAMAX versus EVISTA Comparison Trial): a RCT, parallel group 50 clinical trial centers in 16 countries in Europe, South America and Asia-Pacific
Participants	487 women were randomized Inclusion criteria: patients were post-menopausal (defined as at least 6 months beyond the final menstrual period) with low bone density(defined as a BMD at least 2.0 SD below the young normal mean at either the total hip or lumbar spine using the normal range provided by the densitometry manufacturer). Patients were required to be in good general health, and able to accept either treatment. Exclusion criteria: reasons for exclusion included bilateral hip replacement, history of venous thromboembolism, marked hypertriglyceridaemia in response to oestrogen, oesophageal stricture or achalasia, bone-active therapy (including use of a bisphosphonate, oestrogen or oestrogen analogue, or parathyroid hormone) within 1 year of enrolment, and medical conditions or current medications which could affect bone metabolism. Use of oestrogen or other therapies to treat osteoporosis was not allowed during the course of the study.
Interventions	Intervention: alendronate 70 mg once weekly + daily placebo identical to raloxifene for 12 months (N=246) Control: raloxifene 60 mg daily + weekly placebo identical to alendronate for 12 months (N=241)
Outcomes	Clinical, vertebral and hip fractures

Valimaki 2007

Methods	24-month, randomized, double-blind, placebo-controlled, parallel-group, Phase III trial Conducted at 14 study centers across Finland, The Netherlands, Norway, Spain, and Sweden (Clinicaltrials.gov number NCT0035308)
Participants	171 women were enrolled and randomized The intended-to-treat population included 170 women All women were white. Inclusion criteria: Healthy, ambulatory, late-postmenopausal (≥5 years from menopause) women were enrolled in the study. The menopause could be either natural or surgical. *Natural menopause* was defined as 12 months without menses, based on medical history. Women who were postmenopausal secondary to surgery were required per protocol to have a follicle-stimulating hormone level of ≥30 IU/L and an estradiol level of ≤150 pmol/L. Patients were also required to have a baseline LS BMD T-score between −2.5 and −1 SD (ie, between 2.5 and 1 SD below the mean value for young white female adults [age, 30–40 years]). When measured with a Hologic densitometer (Hologic Inc., Waltham, Massachusetts), this equated to 0.772 g/cm^2 < LS BMD < 0.937 g/cm^2; using a Lunar densitometer (Lunar Corporation, Madison, Wisconsin), the values were 0.882 g/cm^2 < LS BMD < 1.062 g/cm.[2,3] Other inclusion criteria were the presence of ≥1 other risk factor for osteoporosis[19,20] (eg, premature menopause [age <42 years], late menarche [age >15 years], maternal history of osteoporosis-related fractures, body mass index ≤22 kg/m^2, or a smoking habit of ≥10 cigarettes/d) or the presence of hip osteopenia (proximal femur [Fem] T-score ≤−1 [ie, ≥1 SD below the mean value in healthy young women]). Women were required to discontinue hormone replacement therapy (HRT), calcitriol, or calcitonin treatment 12, 4, and 4 weeks, respectively, prior to enrollment. Exclusion criteria: Patients were excluded if they had a history of cancer within the 5 years before the study, any condition that might interfere with the evaluation of LS BMD (eg, confluent aortic calcifications, severe osteoarthritis, spinal fusion, or >2 fractured lumbar vertebrae [L1–L4]), or any disease requiring long-term treatment with systemic corticoids. Patients were also excluded if they had received bisphosphonate therapy (any dosage) within 6 months of starting the study treatment or for >14 days within 1 year before the start of the study.
Interventions	Treatment duration: 24 months

	Intervention: risedronate 5 mg (n=114) Control: placebo (n=57)
Outcomes	Clinical and non-vertebral fractures

The ACTIVE (The Abaloparatide Comparator Trial In Vertebral Endpoints) study

Bilezikian 2019

Methods	ACTIVE: phase 3, randomized, double-blind, active-comparator, placebo-controlled study
Participants	Included criteria: women with postmenopausal osteoporosis Exclusion criteria: Patients were excluded from the trial if their serum creatinine was >2.0 mg/dL (177 lmol/L), or was 1.5–2.0 mg/dL with an eGFR <37 mL/min.
Interventions	Treatment duration: 18 months Intervention: abaloparatide 80 µg, daily subcutaneous injection Intervention: open label teriparatide (20 mg) Control: placebo, daily subcutaneous injection
Outcomes	Vertebral fractures

Cosman 2017

Methods	ACTIVE trial (NCT01343004): RCT, parallel group 28 centers in 10 countries
Participants	Inclusion criteria: Postmenopausal women aged 49 to 86 years were enrolled in the ACTIVE trial if they had radiological evidence of at least 2 mild or at least 1 moderate lumbar or thoracic vertebral fractures or a history of nonvertebral fracture within the preceding 5 years, in addition to a BMD T-score –2.5 at the lumbar spine or hip or –2.0 for those older than 65 years. Women older than 65 years were also enrolled without prior fracture if they had a BMD T-score –3.0. Exclusion criteria: Women were excluded if they had more than 4 mild, moderate, or any severe vertebral fractures (consistent with definitions described by Genant et al16), fewer than 2 evaluable lumbar vertebrae, or if hip BMD was unevaluable. Participants were ineligible if they had evidence of metabolic bone disease or malabsorption or were taking any medications that would interfere with bone metabolism. Women were also excluded if they used bisphosphonates for more than 3 months in the past 5 years or denosumab within the past year. Women with a history of osteosarcoma were also excluded. (See the ACTIVE Trial Protocol in Supplement 1 for full inclusion and exclusion criteria.)
Interventions	Treatment duration: 18 months Intervention: abaloparatide 80 µg, daily subcutaneous injection Control: placebo, daily subcutaneous injection
Outcomes	Non-vertebral fractures

Cosman 2020

Methods	ACTIVE: a randomized, double-blind, placebo- and active-controlled, multicenter, phase 3 study (clinicaltrials.gov identifier NCT01343004) ACTIVExtend: 24-month, open-label extension of ACTIVE (clinicaltrials.gov identifier NCT01657162).
Participants	Inclusion criteria: postmenopausal women between the ages of 49 and 86 years with osteoporosis defined by bone mineral density and prior fracture history. Concomitant medications such as statins, aspirin, or antihypertensives were allowed if the dose was stable at entry. Exclusion criteria: not provided.
Interventions	ACTIVE treatment for 18 months: Intervention 1: daily subcutaneous abaloparatide 80 µg (N=822) Control: matching placebo (N=820) Intervention 2: open-label daily subcutaneous teriparatide 20 µg (N=818) After an approximately 1-month treatment-free period for reconsent, eligible participants who had been randomized to either abaloparatide or placebo in ACTIVE were enrolled in ACTIVExtend and transitioned to open-label alendronate 70 mg once-weekly for 24 months.
Outcomes	New vertebral and non-vertebral factures; major osteoporotic fractures, CVD

McClung 2018

Methods	The ACTIVE study: a randomized, multinational phase 3 trial Posthoc analysis using data from women enrolled in the ACTIVE Trial that were ≥ 80 years
Participants	94 women (5.7%) out of 1645 women in the treatment groups of the ACTIVE trial were aged 80 years or old. Inclusion criteria: postmenopausal women, aged 49 to 86 years, with osteoporosis as defined by prior radiographic vertebral fracture or recent (within 5 y of enrollment) nonvertebral fracture with a BMD T-score ≤ -2.5 and > -5.0 at the lumbar spine or femoral neck if aged 65 years or ≤ -2.0 and > -5.0 if aged >65 years. For those aged >65 years, no prior fracture was required if the lumbar spine or femoral neck BMD T-score was ≤ -3.0 and > -5.0.
Interventions	Intervention: daily injections of abaloparatide 80µg for 18 months (N=51) Control: matching placebo for 18 months (N=43)
Outcomes	Vertebral and non-vertebral fractures

McClung 2018a

Methods	ACTIVE study: multicenter, multinational (South America, Asia, North America and Europe)
Participants	Inclusion: postmenopausal women, ages 49–86 years, with osteoporosis as defined by prior radiographic vertebral fracture or recent (within 5 years of enrollment) non-vertebral fracture with a BMD T-score ≤−2.5 at the lumbar spine or femoral neck if age≤65 years or ≤ −2.0 if age>65 years. For those aged>65 years, no prior fracture was required if the lumbar spine or femoral neck BMD t score was ≤−3.0.

Interventions	This analysis included 1645 women that were randomized 1:1:1 to receive: Intervention: daily injections of abaloparatide-SC 80 µg for 18 months Control: matching placebo for 18 months
Outcomes	Vertebral and non-vertebral fractures

Miller 2016a

Methods	ACTIVE: a RCT, parallel group 28 study centers in 10 countries
Participants	2463 women were randomized Inclusion criteria: Postmenopausal women aged 49 to 86 years were eligible if they had bone mineral density (BMD) by dual energy x-ray absorptiometry T-score of less than or equal to −2.5 and greater than −5.0 at the lumbar spine or femoral neck together with radiologic evidence of at least 2 mild vertebral fractures or at least 1 moderate vertebral fracture16or history of a low-trauma fracture of the forearm, humerus, sacrum, pelvis, hip, femur, or tibia within the past 5 years. Women older than 65years who met fracture criteria but had a T score of less than or equal to −2.0 and greater than −5.0 were eligible. Women older than 65 years were eligible without fracture criteria if either BMD T score was less than or equal to −3.0 and greater than −5.0. Eligibility required normal serum values for calcium, intact parathyroid hormone, phosphorus, and alkaline phosphatase and a 25-hydroxyvitamin D level of greater than15 ng/mL (37.5 nmol/L [SI conversion, multiply by 2.496]). Exclusion criteria: Women were excluded if they had more than 4 mild, moderate, or any severe vertebral fractures (consistent with definitions described by Genant et al16), fewer than 2 evaluable lumbar vertebrae, or if hip BMD was unevaluable. Participants were ineligible if they had evidence of metabolic bone disease or malabsorption or were taking any medications that would interfere with bone metabolism. Women were also excluded if they used bisphosphonates for more than 3months in the past 5 years or denosumab within the past year. Women with a history of osteosarcoma were also excluded.
Interventions	Treatment duration: 18 months Intervention 1: daily subcutaneous injections of abaloparatide, 80 µg (N=824) Intervention 2: open-label teriparatide 20 µg (N=818) Control: placebo, daily (N=821)
Outcomes	Clinical, major osteoporotic, vertebral and non-vertebral fractures

Saag 2020

Methods	The Abaloparatide Comparator Trial in Vertebral Endpoints (ACTIVE) trial: randomized, multicenter study (NCT01343004). Subgroup analysis of women in the ACTIVE trial
Participants	**Inclusion criteria in the ACTIVE trial:** postmenopausal women aged 49-86 years with osteoporosis, has been previously described.19 Briefly, women with a prior radiographic vertebral fracture or recent (within 5 years) nonvertebral fracture and a BMD T score of ≤−2.5 and >−5.0 (if aged >65 years) or ≤−2.0 or >−5.0 (if aged >65

	years) were included in the study. Women >65 years of age with no prior fracture and a lumbar spine or femoral neck BMD T score of ≤−3.0 or >−5.0 were also eligible. **Inclusion criteria for this subgroup analysis:** women in the ACTIVE study who were <65 years of age and who met modified utilization management criteria (baseline T score at any site of ≤−2.5 and a prevalent vertebral and/or at least 1 prior clinical fracture within 5 years of randomization). The modified utilization management criteria were based on coverage criteria for abaloparatide from a large US health insurance company.
Interventions	Participants were randomly assigned 1:1:1 to receive for 18 months: double blind, daily abaloparatide 80 µg subcutaneously (N=94), matching placebo subcutaneously (N=103), or open-label teriparatide 20 µg subcutaneously (N=99). NOTE: In parentheses, it is given the number of women that met inclusion criteria by treatment for this subgroup analysis.
Outcomes	Vertebral fractures, non-vertebral fractures, clinical fractures and major osteoporotic fractures.

Watts 2019

Methods	The 18-month phase 3 Abaloparatide Comparator Trial in Vertebral Endpoints (ACTIVE): multicenter, multinational, randomized controlled study (clinicaltrials.gov identifier: NCT01343004). Explanatory analysis that used data from the ACTIVE study.
Participants	**Inclusion criteria:** postmenopausal women, ages 49 to 86 years, with osteoporosis as defined by prior radiographic vertebral fracture or recent (within 5 years of enrollment) nonvertebral fracture with a BMD T-score ≤ −2.5 at the lumbar spine or femoral neck if age ≤ 65 years or ≤ −2.0 if age > 65 years. For those aged > 65 years, no prior fracture was required if the lumbar spine or femoral neck BMD T-score was ≤ −3.0. Other inclusion/exclusion criteria have been previously described (REF: Miller 2016).
Interventions	Participants were randomly assigned 1:1:1 to double blind, daily abaloparatide 80 µg subcutaneously, matching placebo subcutaneously, or open-label teriparatide 20 µg subcutaneously for 18 months. All women received supplements of 500 to 1000 mg/day calcium and 400 to 800 IU vitamin D based on regional standard of care.
Outcomes	Wrist fractures

The BONE study (oral iBandronate Osteoporosis Vertebral Fracture Trial in North America and Europe, BONE)

Chesnut 2004

Methods	BONE trial: 3 year RCT, parallel group 73 centers in North America and Europe
Participants	2946 women were enrolled and randomized; 1938 women completed treatment

	Inclusion criteria: Eligible patients were 55–80years of age and≥ 5 years postmenopausal, with one to four prevalent vertebral fractures (T4–L4) and a BMD T score of-2.0 to-5.0 in at least one vertebra (L1–L4). Patients with upper GI disorders or taking medication with a potential for GI irritation were not specifically excluded. Exclusion criteria: The main exclusion criteria were a BMD T score of < -5.0 at the lumbar spine; more than two prevalent fractures of the lumbar spine; diseases, disorders, or therapy (within the last 6 months) known to affect bone metabolism; previous treatment with bisphosphonates; fluoride treatment within the last 12 months or for a total duration of > 2 years; renal impairment (serum creatinine >2.4 mg/dl [> 212 µM]);contraindications to calcium or vitamin D therapy; and hyper- or hypocalcemia.
Interventions	Intervention 1: ibandronate 2.5 mg, oral daily (N=977) Intervention 2: ibandronate 20 mg, oral every other day for 12 doses every 3 months; on the days when no active medication was given, patients received placebo (N=977) Control: placebo, oral daily (N=975)
Outcomes	Vertebral and non-vertebral fractures

Chesnut 2005

Methods	BONE: a double-blind, placebo-controlled, phase III, fracture-prevention study 73 centers in North America (United States and Canada) and Europe.
Participants	Inclusion criteria: postmenopausal women (aged 55years–80years; time since menopause: at least 5 years) with osteoporosis (one to four prevalent vertebral fractures [T4–L4] and BMD T-score –2 to –5 in at least one vertebra [L1–L4]). Participants with upper gastro intestinal (GI) disorders or receiving concomitant medications with a potential for GI irritation (e.g., nonsteroidal anti-inflammatory drugs [NSAIDs]) were not specifically excluded.
Interventions	3 years of treatment. Intervention 1: ibandronate 2.5 mg, oral daily (N=977) Intervention 2: ibandronate 20 mg, oral every other day for 12 doses every 3 months; on the days when no active medication was given, patients received placebo (N=977) Control: placebo, oral daily (N=975)
Outcomes	Clinical, vertebral and non-vertebral fractures

Delmas 2004

Methods	The BONE study: a multinational, randomized, double-blind, placebo-controlled, pivotal fracture-prevention study North America and Europe
Participants	ITT population: 2929 2946 patients, aged 55-80 years, ≥5 years postmenopause, with one to four prevalent vertebral fractures (T4-L4), and with a BMD T-score of -2.0 to -5.0 in at least one vertebra (L1-L4) were included.
Interventions	Intervention 1: ibandronate, 2.5 mg, oral daily (N=not stated/unclear) Intervention 2: ibandronate, 20 mg, oral every other day for 12 doses every 3 months. On days without active treatment, the participants in this group received placebo. (N= not stated/unclear)

	Control: placebo (N= not stated/unclear)
Outcomes	Vertebral fractures

Felsenberg 2005

Methods	Posthoc analysis using data from the BONE study: f a multinational, randomized, double-blind, placebo-controlled, phase III, fracture prevention study North America and Europe.
Participants	The BONE study enrolled 2946 patients aged 55 –80 years, ≥5 years postmenopause, with 1 – 4 prevalent vertebral fractures (T4 –L4), and with a BMD T score of -2.0 to -5.0 in ≥1 vertebra (L1 –L4). 1964 women were included in this analysis, 982 women in each treatment group (intervention vs control) 628 women in the placebo group and 648 women in the ibandronate group completed the treatement
Interventions	Treatment duration: 3 years Intervention: oral ibandronate 2.5 mg/day (N=977) Control: placebo, daily (N=975)
Outcomes	Vertebral fractures

FIT (The Fracture Intervention Trial)

Bauer 2006

Methods	Posthoc analysis using data from the FIT, a randomized, double-blind clinical trial 11 clinical centers in the United States
Participants	Included data from both the vertebral fracture arm, which enrolled women with one or more existing vertebral fractures (duration of 3 years), and the clinical fracture arm, which enrolled women without baseline vertebral fracture (duration 4 years). N=6186 - women who completed the trial and had complete baseline and follow-up measurements. Inclusion criteria: postmenopausal women between 55 and 80 years of age with femoral neck BMD (QDR-2000; Hologic, Waltham, MA, USA) 0.68 g/cm^2, equivalent to T score ≤−1.6 using NHANEs normative data.
Interventions	Intervention: Alendronate (ALN) 5 mg /day for 2 years and then increased to 10 mg/day at the second annual visit - Intervention 1: osteoporotic subjects (N= 1764) - Intervention 2: non-osteoporotic subjects(N=1341) Control: placebo (PBO), daily - Control 1: osteoporotic subjects (N=1731) - Control 2: non-osteoporotic subjects (N=1348)
Outcomes	Vertebral and non-vertebral fractures

Black 1996

Methods	FIT: RCT, parallel group 11 centers in the USA
Participants	N=2027 Inclusion criteria: A woman must be 55-80 years of age, in good health, postmenopausal for at least 2 years, and have a femoral neck bone mineral density ≤0.68 g/cm^2. Exclusion criteria: Women with peptic-ulcer disease (a single hospital admission for upper-gastrointestinal bleeding or two or more documented ulcers within the preceding 5 years), dyspepsia requiring daily treatment, abnormal renal function (serum creatinine >144 nmol/L), major medical problems that would be likely to preclude participation for 3 y, severe malabsorption syndrome, uncontrolled hypertension (blood pressure >210 mm Hg systolic or >105 mm Hg diastolic), myocardial infarction during the previous 6 mo, unstable angina, or evidence of disturbed thyroid or parathyroid function. Also excluded women who had taken oestrogen or calcitonin within the preceding 6 mo or biphosphonates or sodium fluoride (<1mg daily for 2 weeks or longer) at anytime.
Interventions	Treatment duration: 3 years Intervention: alendronate 5 mg/day in the 1st year and then increased to 10 mg/day at the 24 months clinic visit (N=1022) Control: placebo, daily (N=1005)
Outcomes	Clinical, vertebral, non-vertebral and hip fractures

Chapurlat 2005

Methods	FIT 11 clinical centers in the USA The FIT had two arms, which in this study were pooled: the vertebral fracture arm (FIT-I) with a duration of 3 years, and the clinical fracture arm (FIT-II) with a duration of 4 years.
Participants	N=5383 - patients who adhered to treatment by taking at least 70% of pills by pill count and 75% by diary. - FIT-I: included 2,027 women who had prevalent vertebral fractures and low femoral neck BMD (≤ 0.689 g/cm2). - FIT-II: enrolled 4,432 women who had low femoral neck BMD (≤ 0.68 g/cm2) but no vertebral fracture at baseline.
Interventions	Intervention: alendronate 5 mg /day for 2 years, which was then increased to 10 mg/day Control: placebo
Outcomes	Vertebral fracture

Cummings 1998

Methods	FIT - RCT, parallel group – had 2 arms: the vertebral fracture arm, which included women who had vertebral fractures, and the clinical fracture arm, which included women without vertebral fractures and is the subject of this article.

	11 community-based clinical research centers in the United States
Participants	N= 4432, 97% were white 4272 women (96%) completed the study; follow-up: average of 4.2 years Inclusion criteria: women aged 55 through 80 years who had been postmenopausal for at least 2 years and had femoral neck BMD of 0.68 g/cm2 (QDR2000, Hologic Inc, Waltham, Mass) or less, which corresponded to 1.6 SD or more below the normal young adult mean. Exclusion criteria: women who had recent peptic ulcers or ulcers that required hospitalization, dyspepsia requiring daily treatment, significant renal or hepatic dysfunction, medical problems that precluded 3 years of participation, severe malabsorption, blood pressure exceeding 210 mm Hg systolic or 105 mm Hg diastolic, myocardial infarction within 6 months, unstable angina, hypothyroidism, hyperthyroidism, or hyperparathyroidism. We also excluded women who had taken estrogen or calcitonin within the preceding 6 months or bisphosphonates or sodium fluoride (>1 mg/d) at any time. Although women taking estrogen were excluded from entry into the trial, 246 (11.1%) in the placebo group and 204 (9.2%) in the alendronate group took estrogen at some time during the study.
Interventions	Intervention: alendronate sodium 5 mg/day for 2 years, followed by 10 mg/day from the rest of the trial (N=2214) Control: placebo, daily (N=2218)
Outcomes	Clinical, vertebral, non-vertebral and hip fractures

Donaldson 2012

Methods	FIT: RCT, parallel group The FIT had 2 arms: the vertebral fracture arm, which included women who had vertebral fractures, and the clinical fracture arm, which included women without vertebral fractures. 11 community-based clinical research centers in the United States
Participants	Inclusion criteria: Women 55 to 81 years of age who had been postmenopausal for at least 2 years and had low FN BMD (BMD ≤0.68 g/cm2; T-score ≤ -1.6). Exclusion criteria: The primary exclusion criteria are the presence of major medical conditions or secondary causes of osteoporosis, the presence of significant upper gastrointestinal disease, therapy with drugs that affect bone metabolism or factors that might make full compliance with the protocol unlikely. A complete list of inclusion and exclusion criteria is shown in Table 2.
Interventions	Women who participated in FIT-VF were followed for a median of 3 years. Women who participated in FIT-CF were followed for a median of 4 years. Intervention: alendronate 5 mg/day (N=3236) Control: placebo, daily (N=3223)
Outcomes	Non-vertebral fractures

Hochberg 2005

Methods	FIT: a RCT, parallel group 11 centers in the United States

Participants	Inclusion criteria: Study participants were women 55–80 years of age who had been postmenopausal for at least 2 years and had a femoral neck BMD <= 0.68 g/cm2, measured using Hologic densitometer
Interventions	The average duration of treatment and follow-up according to the FIT protocol was 2.9 years in FIT I and 4.25 years in FIT II. Intervention: alendronate 5mg/day for the first 24 months, followed by 10 mg/day for the rest of the period (N=4408) Control: placebo, daily (N=4343)
Outcomes	Major, vertebral, non-vertebral and hip fractures

Nevitt 1999

Methods	FIT, a large randomized, placebo-controlled trial of alendronate, had two arms: - the Vertebral Fracture Arm (average of 2.9 years of follow-up) and - the Clinical Fracture Arm (average of 50 months of follow-up). 11 metropolitan areas in the United States of America using population-based listings
Participants	6082 women (94.2%) were included in this analysis, whom were randomized and had lateral spine radiographs at baseline and at least one additional visit. Inclusion criteria: Women between the ages of 55 and 81 years, that had femoral neck BMD of 0.68 g/cm or less (measured by Hologic Model QDR-2000, Waltham, MA), and had been postmenopausal for at least 2 years. The femoral neck BMD cutoff used corresponds to approximately 1.6 SD below the mean for young white women. Exclusion criteria: Women were excluded if they had active serious peptic ulcer disease during the past year, a recent history of abnormal renal function, uncontrolled hypertension, severe malabsorption, myocardial infarction during the previous 6 months, unstable angina, or medical problems that would interfere with participation for the 3–4 year study duration. Women who had used fluoride or bisphosphonates at any time in the past, or had used estrogen or calcitonin during the previous 6 months, were also excluded.
Interventions	Intervention: alendronate 5mg/day for the first 24 months, followed by 10 mg/day for the rest of the period (N=3040) Control: placebo (N=3042)
Outcomes	Vertebral fractures

Quandt 2005

Methods	FIT had 2 arms: FIT I – women with a vertebral fracture at baseline FIT II – women without a vertebral fracture 11 clinical centers in the USA Participants were followed up to 4.5 years (mean 3.8 years).
Participants	N=3737 Inclusion criteria: women from FIT I and FIT II who had a diagnosis consistent with the World Health Organization definition of osteopenia (a femoral neck BMD T score of -1.6 or less but greater than -2.5.

Interventions	Intervention: alendronate 5mg/day for the first 2 years and by 10 mg/day for the rest of the study (N=1878) Control: placebo (N=1859)
Outcomes	Vertebral fractures

Ryder 2008

Methods	Posthoc analysis using data from FIT II (the study arm that included women without prevalent vertebral deformity at baseline). 11 clinical sited in the USA
Participants	N=2785 Inclusion criteria: women enrolled in FIT II without vertebral deformity had a femoral neck T-score above −2.5.
Interventions	Intervention: alendronate for up 54 months (5 mg/day for the first 2 years, and then increased to 10 mg/day at the second annual visit) (N=1389) Control: placebo for up 54 months (N=1396)
Outcomes	Non-vertebral fractures

van de Glind 2016

Methods	FIT, a RCT, parallel group
Participants	N=3658 Inclusion criteria: all patients (n = 3658) with confirmed osteoporosis [either a femoral neck bone mineral density (BMD) T score B22.5 (n = 1631) or at least one morphometric vertebral fracture (n = 2027)].
Interventions	Intervention: alendronate (N=1841) Control: placebo (N=1817)
Outcomes	Clinical fractures

The FPT (The Fracture Prevention Trial)

Boonen 2006

Methods	FPT, a RCT, parallel group 99 centers in 17 countries
Participants	N=1085 Inclusion criteria: postmenopausal women aged 42 to 86 were enrolled in the study. Study protocol required that the patients be ambulatory, at least 5 years postmenopausal, and free of other major diseases and have had at least one moderate or two mild atraumatic vertebral fractures. Exclusion criteria: women with illnesses that affect bone or calcium metabolism, urolithiasis within the preceding 5 years, impaired hepatic function, a serum creatinine concentration exceeding 2 mg per deciliter (177 µmol per liter), or alcohol or drug

	abuse, as well as women who had taken drugs that alter bone metabolism within the previous 2 to 24 months (depending on the drug).
Interventions	Treatment duration: median of 19 months Intervention: teriparatide 20 µg, daily self-injection (N=541) Control: placebo, daily self-injection (N=544)
Outcomes	Vertebral and non-vertebral fractures

Chen 2006

Methods	Posthoc analysis using data from FPT 99 centers in 17 countries
Participants	1637 ambulatory, postmenopausal were included in the FPT In this analysis were included all subjects that had a spine BMD measurement at baseline and 18 months and lateral spine radiographs at baseline and study endpoint. Inclusion criteria: Women were ambulatory, if a period of at least five years had elapsed since menopause, and if they had at least one moderate or two mild atraumatic vertebral fractures on radiographs of the thoracic and lumbar spine, and an ambulatory status.6 For women with fewer than two moderate fractures, an additional criterion for enrollment was a value for bone mineral density of the hip or lumbar spine that was at least 1 SD below the mean value in normal premenopausal white women (age range, 20 to 35 years). Exclusion criteria: Women with illnesses that affect bone or calcium metabolism, urolithiasis within the preceding 5 years, impaired hepatic function, a serum creatinine concentration exceeding 2 mg per deciliter (177 µmol per liter), or alcohol or drug abuse, as well as women who had taken drugs that alter bone metabolism within the previous 2 to 24 months (depending on the drug).
Interventions	Treatment duration: 24 months Intervention: teriparatide 20µg or 40µg per day, self-administered subcutaneous injections (N=860) Control: placebo, daily self-administered subcutaneous injections (N= 439)
Outcomes	Vertebral fractures, stratified analysis on LS BMD

Delmas 2006

Methods	FPT 99 centers in 17 countries 1637 ambulatory, postmenopausal women ranging in age from 42 to 86 years were included in FPT
Participants	Two subsets of participants, partially overlapping, were included in this analysis: - Four BTM subset: 520 women had four bone turnover markers (BTM) assessed (Serum concentrations of two bone formation markers - bone-specific alkaline phosphatase [BSAP], and the carboxy-terminal extension peptide of procollagen type I [PICP]) and urinary concentrations of two bone resorption markers (free deoxypyridinoline [DPD], and N-terminal telopeptide [NTX]), and

	- The PINP subset: 771 participants who had serum collected at baseline, for which the concentration of amino-terminal extension peptide of procollagen type I [PINP] could be assessed. Inclusion criteria: ambulatory women, if a period of at least five years had elapsed since menopause, and if they had at least one moderate or two mild atraumatic vertebral fractures on radiographs of the thoracic and lumbar spine, and an ambulatory status. For women with fewer than two moderate fractures, an additional criterion for enrollment was a value for bone mineral density of the hip or lumbar spine that was at least 1 SD below the mean value in normal premenopausal white women (age range, 20 to 35 years). Exclusion criteria: women with illnesses that affect bone or calcium metabolism, urolithiasis within the preceding 5 years, impaired hepatic function, a serum creatinine concentration exceeding 2 mg per deciliter (177 µmol per liter), or alcohol or drug abuse, as well as women who had taken drugs that alter bone metabolism within the previous 2 to 24 months (depending on the drug).
Interventions	Median duration of exposure to teriparatide was 19 months. Intervention: teriparatide 20 mcg or 40 mcg per day, daily self-administered subcutaneous injections (Four BTM subset: N=345; the PINP subset N= 511) Control: placebo, daily self-administered subcutaneous injections (Four BTM subset: N=175; the PINP subset N=260)
Outcomes	Major osteoporotic fractures, vertebral and non-vertebral fractures

Gallagher 2005

Methods	Analysis with data from women that participated in the FPT study
Participants	N=931 - postmenopausal women with baseline radiographs were included in this analysis; of those 91 did not have a vertebral fracture. Inclusion criteria: ambulatory women at least 5 yr past menopause who had at least one moderate or two mild atraumatic vertebral fractures. For women who had fewer than two moderate vertebral fractures, an additional inclusion criterion included bone mineral density (BMD) of the lumbar spine or proximal femur at least 1 SD below the mean value in healthy young (20 –35 yr old) white women. Exclusion criteria: Women with diseases related to bone or calcium metabolism, urolithiasis within the preceding 2 yr, alcohol or drug abuse, impaired hepatic function, or a serum creatinine concentration of 177 µM or higher were excluded from the study. Women who had taken drugs affecting bone metabolism within the past 2–24 months, depending on the drug, were also excluded.
Interventions	Median of 19 months of treatment Intervention: teriparatide 20 µg, daily self-administered subcutaneous injections (N=467) Control: placebo, daily self-administered subcutaneous injections (N=464)
Outcomes	Vertebral and non-vertebral fractures

Harvey 2015

Methods	Analysis with data from the FPT study, a pivotal global, phase 3, multicentre, double-blind, calcium- and vitamin D-controlled, randomized study of teriparatide

Participants	Inclusion criteria: ambulatory postmenopausal women Exclusion criteria:
Interventions	Intervention: teriparatide 20 µg/day or 40 µg/ day, for a mean duration of 18±6 and 17±6 months, respectively (N=1093) Control: placebo daily, for a mean duration of 18±5 months (N=544)
Outcomes	Major osteoporotic fractures, vertebral and non-vertebral fractures

Krege 2012

Methods	Posthoc analysis using data from the FPT study, which was a randomized, double-blinded, placebo-controlled trial Median follow-up of 21 months
Participants	Inclusion criteria: postmenopausal women with osteoporosis and vertebral fractures
Interventions	Intervention: daily subcutaneous self-injections of teriparatide 20 µg for a median of 19 months (N=541) Control: daily subcutaneous self-injections of placebo for a median of 19 months (N=544)
Outcomes	Non-vertebral fractures

Lindsay 2009

Methods	Posthoc analysis of data from the FPT study
Participants	Inclusion criteria: Women were required to be at least 5 years postmenopausal with at least one moderate or two mild atraumatic vertebral fractures. Women with fewer than two moderate vertebral fractures were required to have lumbar spine or hip T score of −1 or below. Exclusion criteria: diagnosis with any disease known to affect bone or calcium metabolism, urolithiasis within 2 years, serum creatinine level greater than 2 mg/dl, alcohol or drug abuse, or medication use known to alter bone metabolism within the previous 2 to 24 months depending on the drug.
Interventions	Intervention 1: once-daily subcutaneous injections of teriparatide 20 µg (N=541) Intervention 2: once-daily subcutaneous injections of teriparatide 40 µg (N=552) Control: once-daily subcutaneous injections of placebo (N=544)
Outcomes	Vertebral and non-vertebral fractures

Marcus 2003

Methods	FPT study
Participants	1637 ambulatory postmenopausal women were enrolled in FPT study Inclusion criteria: postmenopausal women at least 5 years beyond menopause and had a minimum of either one moderate or two mild atraumatic vertebral fractures and a minimum of seven evaluable nonfractured vertebrae on baseline spinal radiographs. Women with fewer than two moderate fractures were also included if their hip or

	vertebral BMD values were less than 1 SD below the mean value for normal premenopausal white women (i.e., T score < –1.0). Exclusion criteria: Women with diseases related to bone or calcium metabolism, urolithiasis within the preceding 5 years, alcohol or drug abuse, impaired hepatic function, a serum creatinine concentration ≥ 177 µM, or had taken drugs affecting bone metabolism within the past 2–24 months.
Interventions	Treatment duration: Rather than achieving the planned 36 months of teriparatide administration for all subjects, the median duration of drug exposure was 19 months with no subject exposed to drug for more than 25 months. Intervention 1: Teriparatide 20 µg, daily, self-administered subcutaneous injections (N=541) Intervention 2: Teriparatide 40 µg, daily, self-administered subcutaneous injections (N=552) Control: placebo, daily, self-administered subcutaneous injections (N=544)
Outcomes	Vertebral fractures

Neer 2001

Methods	FPT study: RCT, parallel group 99 centers in 17 countries (United States, Australia, New Zealand, Canada, South America and in Europe)
Participants	1637 women were randomized Inclusion criteria: Women were eligible for enrollment if they were ambulatory, if a period of at least five years had elapsed since menopause, and if they had at least one moderate or two mild atraumatic vertebral fractures on radiographs of the thoracic and lumbar spine, and an ambulatory status.6 For women with fewer than two moderate fractures, an additional criterion for enrollment was a value for bone mineral density of the hip or lumbar spine that was at least 1 SD below the mean value in normal pre-menopausal white women (age range, 20 to 35 years). Exclusion criteria: We excluded women with illnesses that affect bone or calcium metabolism, urolithiasis within the preceding 5 years, impaired hepatic function, a serum creatinine concentration exceeding 2 mg per deciliter (177µmol per liter), or alcohol or drug abuse, as well as women who had taken drugs that alter bone metabolism within the previous 2 to24 months (depending on the drug).
Interventions	Intervention 1: self-administered injections of parathyroid hormone (1-34) 20 µg/day for a mean (±SD) duration of treatment of 18±6 months (N=541) Intervention 2: self-administered injections of parathyroid hormone (1-34) 40 µg/day for a mean (±SD) duration of treatment of 17±6 months (N=552) Control: self-administered injections of placebo, daily for a mean (±SD) duration of treatment of 18±5 months (N=544)
Outcomes	Major, vertebral, non-vertebral and hip fractures

Prevrhal 2009

Methods	FPT study Median observation of 21 months

Participants	Inclusion criteria: Postmenopausal women with osteoporosis, who were included in the FPT study, specifically included in the placebo and teriparatide 20g/day group and that had a baseline and endpoint spine radiograph.
Interventions	Treatment duration: median study drug exposure of 19 months Intervention: Teriparatide 20 µg, daily, self-injection (N=444) Control: placebo, daily, self-injection (N=448)
Outcomes	Vertebral fractures

Watts 2009

Methods	FPT study – RCT, parallel group
Participants	Inclusion criteria: Women were eligible for enrollment if they were ambulatory, if a period of at least five years had elapsed since menopause, and if they had at least one moderate or two mild atraumatic vertebral fractures on radiographs of the thoracic and lumbar spine, and an ambulatory status.6 For women with fewer than two moderate fractures, an additional criterion for enrollment was a value for bone mineral density of the hip or lumbar spine that was at least 1 SD below the mean value in normal pre-menopausal white women (age range, 20 to 35 years). Exclusion criteria: We excluded women with illnesses that affect bone or calcium metabolism, urolithiasis within the preceding 5 years, impaired hepatic function, a serum creatinine concentration exceeding 2 mg per deciliter (177µmol per liter), or alcohol or drug abuse, as well as women who had taken drugs that alter bone metabolism within the previous 2 to24 months (depending on the drug).
Interventions	Treatment duration: median duration of exposure of 19 mo Intervention 1: 20 µg of recombinant human parathyroid hormone (1-34) in a regimen of daily, self-administered injection (N=541) Intervention 2: 40 µg of recombinant human parathyroid hormone (1-34) in a regimen of daily, self-administered injection (N=552) Control: placebo (N=544)
Outcomes	Vertebral fractures

The Chinese osteoporosis study and the FPT

Xie 2019

Methods	Post-hoc analysis using data from 2 studies: - Chinese osteoporosis study (NCT00414973): Chinese, open-labeled, multicenter, active comparator, randomized phase III study, carried out at 10 study centers - FPT (NCT00670501): Global, phase III, multicenter, double-blind, placebo-controlled, randomized study, conducted in 99 centers in 17 countries
Participants	Inclusion criteria: Only those who met the selection criteria for both the FPT and the Chinese study were considered: patients who were female with osteoporosis at high risk of fracture, aged ≥55 years, and had no history of rheumatoid arthritis or use of corticosteroids. Inclusion criteria specific of each study:

	- Chinese osteoporosis study: Ambulatory men (aged 40–85 years) or women (aged 55–85 years and at least 3 years postmenopause). Established osteoporosis based on experiencing a fragility fracture prior to enrollment or T-score BMD <2.5 at LS or hip - FPT: Ambulatory women aged 35–80 years and at least 5 years postmenopause. Minimum of one moderate or two mild atraumatic vertebral fractures prior to enrollment. For those with <2 moderate fractures, or a T-score BMD of <1.0 at LS or hip. Exclusion criteria specific of each study: - Chinese osteoporosis study: Disease or medication (eg, corticosteroid) that affect bone metabolism. Impaired renal/hepatic function. Skeletal radiotherapy. Malignant neoplasm within 5 years. - FPT: Disease or medication (eg, corticosteroid) that affects bone metabolism. Impaired renal/hepatic function. Urolithiasis within 5 years. Drug or alcohol abuse.
Interventions	Duration: - Chinese osteoporosis study: 24 weeks of treatment - FPT: median of 19 months of treatment Chinese osteoporosis study (N=228): Intervention: Teriparatide 20 µg once daily administered via subcutaneous injection Control: Salmon calcitonin 200 IU once daily administered intranasally FPT (N=228): Intervention: Teriparatide 20 µg or 40 µg once daily administered subcutaneously Control: Placebo
Outcomes	Clinical fractures

The FRAME (The FRActure study in postmenopausal woMen with ostEoporosis) Trial

Cosman 2016

Methods	FRAME: RCT, parallel group
Participants	N=7180 6390 patients (89.0%) completed 12 months of the trial, and 6026 (83.9%) completed 24 months. Inclusion criteria: Ambulatory postmenopausal women, 55 to 90 years of age, with a T score of −2.5 to −3.5 at the total hip or femoral neck were eligible for participation. Exclusion criteria: Patients had to have at least two vertebrae in the L1 through L4 region and at least one hip that could be evaluated by means of dual-energy x-ray absorptiometry. Women who had a history of hip fracture, any severe or more than two moderate vertebral fractures, a history of metabolic bone disease or conditions affecting bone metabolism, osteonecrosis of the jaw, a 25-hydroxyvitamin D level of less than 20 ng per milliliter, current hypercalcemia or hypocalcemia, or recent use of drugs affecting bone metabolism (within defined washout periods; see the protocol) were excluded.

Interventions	Intervention: romosozumab 210 mg subcutaneous administration once monthly for 12 months followed by open-label denosumab 60 mg subcutaneous administration every 6 months for additional 12 months (N=3321) Control: placebo, subcutaneous administration once monthly for 12 months followed by open-label denosumab 60 mg subcutaneous administration every 6 months for additional 12 months (N=3322)
Outcomes	Clinical, vertebral and non-vertebral fractures

Cosman 2018

Methods	Secondary, posthoc analysis based on FRAME: (ClinicalTrials.gov, NCT01575834), a phase 3, international, randomized, double-blind, placebo-controlled, parallel-group trial. For fracture efficacy, the current analysis focused on the RRRs in FRAME in the second year alone, when all patients were treated with the same active therapy—denosumab.
Participants	7180 postmenopausal women with osteoporosis were included in the FRAME study. Inclusion criteria: Women were eligible for this study if they were between 55 and 90 years old, had a T-score of –2.5 to –3.5 at the total hip or femoral neck, and at least two vertebrae in the L1 through L4 region and at least one hip that could be evaluated by DXA. Exclusion criteria: Women who had a history of hip fracture, any severe or more than two moderate vertebral fractures, a history of metabolic bone disease or conditions affecting bone metabolism, osteonecrosis of the jaw, a 25-hydroxyvitamin D level of less than 20 ng per milliliter, current hypercalcemia or hypocalcemia, or recent use of drugs affecting bone metabolism (within defined washout periods; see the protocol) were excluded.
Interventions	Intervention: romosozumab 210 mg, s.c. once monthly for 12 months (N= unclear) Control: placebo, s.c. once monthly for 12 months (N= unclear) Both treatment groups transitioned to denosumab 60 mg s.c. once every 6 months for an additional 12 months.
Outcomes	Clinical, major osteoporotic, vertebral, non-vertebral and hip fractures

Cosman 2018

Methods	Posthoc analysis using the FRAME study: (ClinicalTrials.gov, NCT01575834), an international, randomized, double-blind, placebo-controlled, parallel-group, phase 3 study. Latin America, Central/Eastern Europe, Western Europe and Australia/New Zealand, Asia Pacific and North America
Participants	7180 women were included, from which 6390 (89%) completed 12 months of study The highest enrolling region was Latin America (43%) (vs. Rest-of-world (57%): non-Latin American population combined, which included Central/Eastern Europe, Western Europe and Australia/New Zealand and Asia Pacific) Inclusion criteria: ambulatory postmenopausal women, 55 to 90 years old, with a T-score of –2.5 to –3.5 at the total hip or femoral neck Exclusion criteria: history of hip fracture, any severe or more than two moderate vertebral fractures, a history of metabolic bone disease or conditions affecting bone

	metabolism, osteonecrosis of the jaw, a 25-hydroxyvitamin D level of less than 20 ng per milliliter, current hypercalcemia or hypocalcemia, or recent use of drugs affecting bone metabolism (within defined washout periods; see the protocol). Any severe or more than two moderate vertebral fractures, or history of hip fracture.
Interventions	Intervention: romosozumab 210 mg, sc monthly for 12 months (Latin America N=1550, Rest-of-world N=2039) Control: placebo, sc monthly for 12 months (Latin America N=1534, Rest-of-world N=2057) For both treatment groups: followed by open-label denosumab 60 mg, s.c. every 6 months for an additional 12 months.
Outcomes	Clinical, major osteoporotic, vertebral, non-vertebral and hip fractures

McCloskey 2021

Methods	Independent post hoc analysis of the phase 3 FRAME study (NCT01575834): international, double-blind, placebo-controlled, parallel group trial.
Participants	Inclusion criteria and exclusion criteria: not described in this paper.
Interventions	Women with postmenopausal osteoporosis were randomly assigned to receive s.c once monthly for 12 months: Intervention 1: romosozumab 210 mg Control: placebo Followed by open-label denosumab (Prolia, Amgen), at a dose of 60 mg which was administered s.c every 6 months for an additional 12 months
Outcomes	Clinical fractures, osteoporotic fractures, major osteoporotic fractures, hip fractures, clinical vertebral fractures, nonvertebral fractures and morphometric vertebral fractures.

The FREEDOM (Fracture Reduction Evaluation of Denosumab in Osteoporosis Every 6 Months) study

Adami 2012

Methods	The FREEDOM trial: a 3-year, international, randomized, double-blind, placebo-controlled trial 214 centers in Europe, North America, South America, Australia and New Zealand
Participants	Data from 7808 women were available from the FREEDOM trial N=7762 - women received at least one dose of study treatment Inclusion criteria: women aged 60 to 90 years with a BMD T-score of -2.5 or less at the lumbar spine or total hip, but not less than -4.0 at either site. Exclusion criteria: There were no exclusion criteria based on renal function.
Interventions	Treatment duration: 3 years Intervention 1: Denosumab 60 mg, subcutaneous injection every 6 months (N=3886) Control 1: Placebo, subcutaneous injection every 6 months (N=3876)
Outcomes	Non-vertebral fractures

Austin 2012

Methods	The FREEDOM trial: multinational, randomized, double-blind trial 214 centers
Participants	N=7808 Inclusion criteria: postmenopausal women with a BMD T-score < –2.5 at the lumbar spine or total hip and not < –4.0 at either site.
Interventions	Treatment duration: 3 years Intervention: Denosumab 60 mg, subcutaneous injection every 6 months (N=3902) Control: Placebo, subcutaneous injection every 6 months (N=3906)
Outcomes	Vertebral and non-vertebral fractures

Boonen 2011

Methods	The FREEDOM trial: 3-year, randomized, double-blind, placebo-controlled, phase 3 trial - posthoc analysis in subgroups of women at higher risk of new vertebral and hip fractures 213 sites worldwide
Participants	The FREEDOM study enrolled 7808 women. Inclusion criteria: Ambulatory postmenopausal women with a BMD T-score less than -2.5 at the lumbar spine or total hip but not less than -4.0 at either site were eligible to enroll in this study. Women with two or more vertebral deformities could be eligible, as long as there were no severe vertebral deformities and at most two moderate vertebral deformities Participants enrolled in both treatments were group according to their risk for new vertebral and hip fractures:

	- For new vertebral fractures the higher-risk subgroups included women with the following: 1) two or more preexisting vertebral fractures of any degree of deformity, or one or more vertebral fracture of moderate or severe deformity, or both (prevalent vertebral fracture status); 2) a femoral neck BMD T-score of -2.5 or less; or 3) both multiple and/or moderate or severe vertebral deformities and a femoral neck BMD T-score of -2.5 or less. - For hip fractures the higher-risk subgroups included women: 1) 75 yr old or older; 2) with a femoral neck BMD T-score of -2.5 or less; or 3) 75 yr old or older and with a femoral neck BMD T-score of -2.5 or less. Women who did not have the risk factor(s) specified were included in the lower-risk subgroups.
Interventions	Intervention: denosumab 60 mg, subcutaneous injection every 6 months (N=3886) Control: placebo, subcutaneous injection every 6 months (N=3876)
Outcomes	Vertebral and hip fractures. Vertebral fractures stratified by previous fracture risk

Cummings 2009

Methods	FREEDOM: RCT, parallel group
Participants	Inclusion criteria: Women between the ages of 60 and 90 years with a bone mineral density T score of less than −2.5 at the lumbar spine or total hip. Exclusion criteria: Women were excluded if they had conditions that influence bone metabolism or had taken oral bisphosphonates for more than 3 years. If they had taken bisphosphonates for less than 3 years, they were eligible after 12 months without treatment. Women were also excluded if they had used intravenous bisphosphonates, fluoride, or strontium for osteoporosis within the past 5 ye a r s; or parathyroid hormone or its derivatives, corticosteroids, systemic hormone-replacement therapy, selective estrogen-receptor modulators, or tibolone, calcitonin, or calcitriol within 6 weeks before study enrollment. Although consensus conferences have not specified a permissible risk of fracture for placebo-controlled trials,9,10 women were excluded if they had a bone mineral density T score of less than −4.0 at the lumbar spine or total hip or any severe (or more than two moderate) prevalent vertebral fractures. As part of the consent process, potential subjects were informed about alternative treatments for osteoporosis. Women were excluded if they had a serum 25-hydroxyvitamin D level of less than 12 ng per milliliter. Subjects with a baseline 25-hydroxyvi-tamin D level of 12 to 20 ng per milliliter were given at least 800 IU of vitamin D daily, and those with a baseline level above 20 ng per milliliter were given at least 400 IU daily. If total hip bone mineral density decreased by more than 7% during a 12-month period or by 10% or more during the study or if the T score dropped below −4.0, the subject was again counseled by the local study clinician about using alternative treatments in lieu of continuing to participate in the study.
Interventions	Treatment duration: 36 months Intervention: denosumab 60 mg, subcutaneous injections every 6 months (N=3902) Control: placebo, subcutaneous injections every 6 months (N=3906)
Outcomes	Vertebral, non-vertebral and hip fractures

Jamal 2011

Methods	FREEDOM Trial: a multicentre RCT
Participants	N=7808 Inclusion criteria: Women between 60 and 90 years of age with a BMD T-score of greater than 4.0 and less than 2.5 at the lumbar spine or total hip. Exclusion criteria: Women were excluded if they had current hyper- or hypoparathyroidism, current hypocalcemia (albumin-adjusted serum calcium concentration below 2.13 mmol/L) or vitamin D deficiency (25-hydroxyvitamin D level less than 30 nmol/L). There were no exclusion criteria based on serum measures of kidney function or urinary protein.
Interventions	Treatment duration: 36 months Intervention: denosumab 60 mg, subcutaneously every 6 months (N=3902) Control: placebo, subcutaneously every 6 months (N=3906)
Outcomes	Vertebral and non-vertebral fractures

Kanis 2021

Methods	The phase 3 “Fracture Reduction Evaluation of Denosumab in Osteoporosis Every 6 Months” (FREEDOM) study: a double-blind, randomized, placebo controlled trial Multinational study of efficacy included women from Canada, Europe, Latin America, South America, and the USA
Participants	Inclusion criteria and exclusion criteria: not described in this paper.
Interventions	Intervention 1: 60-mg denosumab subcutaneously every 6 months for 36 months (N=3902) Control: placebo subcutaneously every 6 months for 36 months (N=3906) All women received supplements containing at least 1000 mg of calcium daily with vitamin D (400 to 800+ IU daily), the latter depending on the baseline serum 25-hydroxyvitamin D level.
Outcomes	Vertebral, non-vertebral and hip fractures

Kendler 2019

Methods	Posthoc analysis using data from the FREEDOM study, the placebo-controlled trial and its open-label extension FREEDOM trial: an international, multicenter, randomized, double-blind, placebo-controlled The FREEDOM Extension duration was up to 7 years, for a total of 10 years of denosumab treatment from the start of the FREEDOM study.
Participants	Inclusion criteria: FREEDOM Trial - eligible women were postmenopausal, 60–90 years old, with a lumbar spine or total hip BMD T-score less than −2.5 at either site, but greater than or equal to − 4.0 at both locations. Eligible women could not have had any severe, or more than two moderate, vertebral fractures and were free of other secondary causes of bone loss.

	FREEDOM Extension - women who completed the FREEDOM study 3-year visit and did not discontinue or miss more than one dose of investigational product in either the denosumab or placebo arm.
Interventions	FREEDOM Trial (3 years) Intervention: denosumab s.c. 60 mg every 6 months for 3 years (N=272) Control: placebo s.c. every 6 months (N=438) FREEDOM trial + Expansion (10 years) Patients who had received intervention or control during the trial period were schedule to receive subcutaneous open-label denosumab 60 mg every 6 months (± 1 month) during the extension period (N=794)
Outcomes	Clinical, vertebral, non-vertebral and hip fractures

McCloskey 2012

Methods	FREEDOM study: RCT, parallel group Canada, Europe, Latin America, South America, and the United States.
Participants	7808 women were included in FREEDOM study Inclusion criteria: women between the ages of 60 and 90 years (mean 72 years) who had a BMD T-score of less than -2.5 at the lumbar spine or total hip but not less than -4.0 at either site.
Interventions	Treatment duration: 36 months Intervention: Denosumab 60 mg, subcutaneously every 6 months (N=3902) Control: placebo, subcutaneously every 6 months (N=3906)
Outcomes	Clinical and hip fractures

McClung 2012

Methods	FREEDOM study: RCT, parallel group Ambulatory, international and multicenter.
Participants	7808 women were included in FREEDOM study, the majority was white. Inclusion criteria: women aged 60 to 90 years with a BMDT-score <-2.5 at either the lumbar spine or total hip and >=-4.0at both sites. subjects with <=3 years of oral bisphosphonate use and no use within 1 year of enrollment could enroll in the study. Exclusion criteria: Women with more than two moderate vertebral fractures or any severe vertebral fracture, assessed by the semi quantitative grading of lateral spine radiographs. Subjects who had used oral bisphosphonates for >3 years.
Interventions	Treatment duration: 3 years Intervention: Denosumab 60 mg, subcutaneous injections every 6 months(N=3902) Control: placebo, subcutaneous injections every 6 months (N=3906)
Outcomes	Vertebral and non-vertebral fractures

Palacios 2015

Methods	Post-hoc analysis of the FREEDOM study
Participants	7808 women were included in the FREEDOM study Inclusion criteria: Women aged 60–90 years with a bone mineral density (BMD) T-score of less than -2.5 but not less than -4.0 at either the lumbar spine or total hip; women with previous therapy for osteoporosis were eligible as long as they had not used intravenous bisphosphonates or strontium within the past 5 years; an oral bisphosphonate for more than 3 years; or parathyroid hormone or its derivatives, systemic hormone replacement therapy, or selective estrogen receptor modulators within 6 weeks before study enrolment. If they had taken bisphosphonates for less than 3 years, they were eligible after 12 months without treatment. Exclusion criteria: women that had any severe or more than two moderate prevalent vertebral fractures.
Interventions	Treatment duration: 36 months Intervention: Denosumab 60 mg, subcutaneous injections every 6 months (N=3900) Control: placebo, subcutaneous injections every 6 months (N=3903)
Outcomes	Clinical fractures, analysis stratified by previous fracture history and by age

Simon 2013

Methods	Data from FREEDOM study, specifically: the DXA sub study, the QCT radius sub study and overall FREEDOM study. International, multicenter
Participants	Inclusion criteria: postmenopausal women aged 60 to 90 years with a DXA BMD T-score lower than -2.5 at the lumbar spine or total hip. Exclusion criteria: women that had a BMD T-score lower than -4.0 at either site, any severe vertebral fracture or more than two moderate vertebral fractures, or conditions that affect bone metabolism; had taken oral bisphosphonates for more than 3 years; or had received intravenous bisphosphonates, fluoride, or strontium treatment for osteoporosis within the last 5 years.
Interventions	Treatment duration: 36 months Intervention: denosumab 60 mg, subcutaneous injections every 6 months (N=3902) Control: placebo, subcutaneous injections every 6 months (N=3906)
Outcomes	Non-vertebral fractures

The FREEDOM and STAND studies

Reid 2010

Methods	Analysis included data from two phase 3 clinical trials: - FREEDOM: 36-month randomized, double-blind, placebo-controlled phase 3 trial. - STAND: Study of Transitioning from AleNdronate to Denosumab (STAND) was a 12-month randomized, double-blind, double dummy, active-comparator phase 3 trial
Participants	Inclusion criteria: - FREEDOM: Participants were ambulatory postmenopausal women from 60 to 90 years of age with a bone mineral density (BMD) T–score of less than –2.5 at the lumbar spine or total hip and greater than –4.0 at both sites. - STAND: Subjects were ambulatory postmenopausal women 55 years of age or older with BMD T-scores of between –2.0 and –4.0 at the lumbar spine or total hip. All participants had 6 months or more of prior alendronate treatment. Excluded criteria: Both studies excluded women who had a disease or condition known to affect bone metabolism, as well as patients with prior intravenous bisphosphonate use. - FREEDOM: Women were excluded if they had used oral bisphosphonates for more than 3 years or if they had taken oral bisphosphonates for more than 3 months and the last dose was within 1 year of enrollment
Interventions	FREEDOM Intervention: denosumab 60 mg administered as a subcutaneous injection every 6 months Control: placebo STAND Intervention: subcutaneous denosumab 60-mg injection every 6 months plus an oral placebo tablet once weekly Control: placebo injection every 6 months plus a weekly oral alendronate tablet
Outcomes	Clinical fractures

The HORIZON-PFT (Health Outcomes and Reduced Incidence with Zoledronic Acid Once Yearly (HORIZON) Pivotal Fracture Trial (PFT))

Black 2007

Methods	The Health Outcomes and Reduced Incidence with Zoledronic Acid Once Yearly (HORIZON) Pivotal Fracture Trial. Multicenter, United States and Germany
Participants	N=7765 Inclusion criteria: Postmenopausal women between the ages of 65 and 89 years were eligible for inclusion if they had a bone mineral density T score of −2.5 or less at the femoral neck, with or without evidence of existing vertebral fracture, or a T score of −1.5 or less, with radiologic evidence of at least two mild vertebral fractures or one moderate vertebral fracture. Previous use of oral bisphosphonates was allowed, with the duration of the washout period dependent on previous use (e.g., previous use of ≥48 weeks required 2 years of washout). Concomitant use of the following osteoporosis medications was allowed at baseline and during follow-up: hormone therapy, raloxifene, calcitonin, tibolone, tamoxifen, dehydroepiandrosterone, ipriflavone, and medroxyprogesterone. Exclusion criteria: Ineligibility criteria included any previous use of parathyroid hormone or sodium fluoride, use of anabolic steroids or growth hormone within 6 months before trial entry or oral or intravenous systemic corticosteroids within 12 months, and any previous use of strontium. Patients with a serum calcium level of more than 2.75 mmol per liter or less than 2.00 mmol per liter were ineligible, as were patients with a calculated creatinine clearance of less than 30.0 ml per minute at either of two baseline visits or urine dipstick results of more than 2+ for protein, without evidence of contamination or bacteriuria.
Interventions	Patients were followed until 36 months Intervention: zoledronic acid 5 mg, 15 minute intravenous administration at baseline (day 0), at 12 months, and at 24 months (N=3875) Control: placebo, 15 minute intravenous administration at baseline (day 0), at 12 months, and at 24 months (N=3861)
Outcomes	Clinical, vertebral, non-vertebral and hip fractures

Black 2021

Methods	3-year international, randomized, double-blind, placebo-controlled phase 3 study, Health Outcomes and Reduced Incidence with Zoledronic Acid Once Yearly-Pivotal Fracture Trial (HORIZON-PFT). Multicenter, United States and Germany
Participants	N=7765 Inclusion criteria: postmenopausal women age 65 to 89 years were eligible if the following criteria were met; BMD T-score at the femoral neck ≤2.5 or T-score ≤-1.5 with at least two mild vertebral fractures or one moderate vertebral fracture. Previous use of oral bisphosphonates was allowed, with the duration of the washout period dependent on previous bisphosphonate use. The following concomitant osteoporosis medications were allowed at baseline and during follow-up: hormone therapy,

	raloxifene, calcitonin, tibolone, tamoxifen, dehydroepiandrosterone, ipriflavone, and medroxy-progesterone. Exclusion criteria: Participants were ineligible if any of the following criteria were met: any previous use of parathyroid hormone, strontium, or sodium fluoride; use of anabolic steroids or growth hormone within 6 months before study entry; intravenous systemic corticosteroids within 12 months; or a calculated creatinine clearance <30 mL/min
Interventions	Patients were monitored for 3 years. Intervention: ZOL 5 mg, 15 minutes intravenous administration at baseline (day 0), at 12 months, and at 24 months (N=3862) Control: placebo infusion at baseline (day 0), at 12 months, and at 24 months (N=3852) All participants received oral daily calcium (1000 to 1500 mg) and vitamin D (400 to 1200 IU).
Outcomes	Vertebral, non-vertebral and hip fractures

Cauley 2011

Methods	The HORIZON-PFT: 3 year RCT 240 clinical centers in 27 countries
Participants	7736 women with established osteoporosis, 79% of the women were white Inclusion criteria: All women in the HORIZON trial were between the ages of 65 and 89 years, postmenopausal, and had a femoral neck bone mineral density (BMD) T-score of -2.5 or less with or without evidence of existing vertebral fractures or a T-score of -1.5 or less with radiologic evidence of at least two mild or one moderate vertebral fracture. Prior bisphosphonate use was allowed, with the duration of washout period depending on duration of previous use.
Interventions	Intervention: Zoledronic acid 5 mg, 15-minute intravenous administration at baseline, 12 months and 24 months (N=3875) Control: placebo, 15-minute intravenous administration at baseline, 12 months and 24 months (N=3861)
Outcomes	Clinical fractures

Eastell 2009

Methods	Subgroup analysis using data from HORIZON-PFT: a 36 month RCT, parallel group
Participants	Inclusion criteria: Postmenopausal women aged 65– 89 yr were eligible for inclusion if they had a femoral neck T-score ≤ -2.5 with or without evidence of an existing vertebral fracture, or a T-score ≤ -1.5 with radiological evidence of at least two mild or one moderate vertebral fracture(s). Prior oral bisphosphonate use was allowed, with washout duration dependent on previous use (e.g. > 48 wk of usage required a 2-yr washout).
Interventions	Intervention: zoledronic acid 5 mg, single infusion at baseline, 12 and 24 months (N=3875) Control: placebo, single infusion at baseline, 12 and 24 months (N=3861)
Outcomes	Vertebral, non-vertebral and hip fractures

Jacques 2012

Methods	Data from HORIZON-PFT: a prospective, randomized, double-blind, placebo-controlled multinational trial
Participants	N=7736 Inclusion criteria: postmenopausal women that had a femoral neck BMD T-score of -2.5 or less, with or without existing vertebral fracture, or a T-score of -1.5 or less, with radiological evidence of at least two mild vertebral fractures or one moderate vertebral fracture. Prior oral bisphosphonate use was allowed, with washout duration dependent on previous use (eg, >48 weeks of usage required a 2-year washout).
Interventions	Intervention: zoledronic acid, intravenous administration at baseline, 12 and 24 months (N=3875) Control: placebo, intravenous administration at baseline, 12 and 24 months (N=3861)
Outcomes	Vertebral and non-vertebral fractures

Popp 2014

Methods	Sub study of HORIZON; follow-up: 3 years
Participants	110 women were included in this analysis, mean age 77 years 96 women completed the study over 36 months Inclusion criteria: - HORIZON Trial - Postmenopausal women between the ages of 65 and 89 years with osteoporosis, defined as a BMD T-score ≤ −2.5 at the FN with or without prevalent vertebral fracture or ≤−1.5 in the presence of at least two mild or one moderate vertebral fracture. - Sub study of HORIZON – In addition to the HORIZON Trial inclusion criteria, women had to have received at least one dose of study drug, had attended at least one follow-up visit, and did not experience weight loss ≥ 10%.
Interventions	Intervention: 15-minute intravenous administration of ZOL 5 mg at baseline, 12 and 24 months (N=55) Control: placebo at baseline, 12 and 24 months (N=55)
Outcomes	Clinical, vertebral and non-vertebral fractures

Liberman

Meunier 1997

Methods	RCT, parallel group, pooled data 18 sites in the USA and 19 sites in Australia, Canada, Europe, Israel, Mexico, New Zealand and South America
Participants	Inclusion criteria: Postmenopausal women between 45 and 80 yr of age (mean 63) with osteoporosis, defined as lumbar spine BMD at least 2.5 SD below the young adult mean, without the requisite of an existing fracture, were eligible for participation. Exclusion criteria: women with other causes of osteoporosis (e.g., treatment with glucocorticoids) or other disorders of bone and mineral metabolism (e.g., vitamin D deficiency, Paget's disease, or hyperparathyroidism); active peptic ulcer disease,

	abnormal renal function (serum creatinine level, >1.5 mg per deciliter [130 mmol per liter]), or abnormal hepatic function; abnormalities of the lumbar spine precluding the assessment of bone mineral density at a minimum of three lumbar vertebrae or a history of hip fracture; or any prior treatment with bisphosphonates or treatment within the preceding 12 months with estrogen, progestin, calcitonin, fluoride, or an anabolic steroid.
Interventions	Intervention: alendronate - 5 mg/day or 10 mg/day for 3 years; or 20 mg/day for 2 years followed by 5mg/day for the third year. (N=526) Control: placebo for 3 years (N=355)
Outcomes	Vertebral and non-vertebral fractures

Tucci 1996

Methods	RCT, parallel group 18 centers in the USA
Participants	478 women were enrolled in the study. 91% were Caucasian and 8% Asian Inclusion criteria: subjects were women 45 to 82 years of age who were postmenopausal for at least 5 years and who had osteoporosis as defined by a low lumbar spine bone mineral density (BMD) (less than 0.92 g/cm2 by Lunar DPX or less than 0.80 g/cm2 by Hologic QDR or Norland XI-26). Pre-existing vertebral fracture was not a requirement for eligibility. These subjects were otherwise in good health based on their medical history, physical examination, and laboratory screening evaluation, and were no more than 15% below or 30% above ideal body weight. Their spinal anatomy was suitable for dual-energy x-ray absorptiometry (DXA) of the lumbar spine, with at least three evaluable vertebrae from Ll-L4. Exclusion criteria: Criteria for exclusion included: 1) metabolic disease known to alter skeletal or mineral metabolism, 2) cancer, history of any illness, or significant end-organ disease that might confound the results of the study or pose additional risk to the subject, 3) history of an osteoporotic fracture of the proximal femur, 4) active upper gastrointestinal disease, 5) significantly impaired renal function (serum creatinine >1.5 mg/dL), 6) use of medications known to alter skeletal or mineral metabolism, 7) daily use of medications which have appreciable potential for gastrointestinal irritation, and 8) use of any illicit drug, smoking of more than 20 cigarettes per day, habitual ingestion of greater than six cups of coffee per day, or more than two alcohol containing beverages per day.
Interventions	Intervention 1: alendronate 5 mg/day for 3 years(N=98) Intervention 2: alendronate 10 mg/day for 3 years (N=94) Intervention 3: alendronate 20 mg/day for 2 years, switched to 5mg/day for the 3rd year (N=94) Control: placebo, daily for 3 years (N=192)
Outcomes	Non-vertebral fractures

The MORE (Multiple Outcomes of Raloxifene Evaluation) study

Agnusdei 2000

Methods	The MORE trial: 36 month, placebo-controlled, double-blind randomized trial. 180 centers in 25 countries.
Participants	Baseline and follow-up radiographs were available for 6828 women (89%) Inclusion criteria: women aged 31 to 80 years (a mean age of 67 years), who were at least 2 years postmenopausal and had no severe or chronically disabling conditions but who had osteoporosis, defined by low BMD or X ray evidence of vertebral fractures. Women were divided in 2 groups: - Study I: those whose femoral neck or lumbar spine BMD was more than 2.5 standard deviations below peak bone density, - Study II: and those with ≥1 moderate or ≥2 mild vertebral fractures in the presence of low BMD (as specified for Study I) or ≥2 moderate fractures, regardless of BMD.
Interventions	Study I Intervention: Raloxifene 60 mg or 120 mg per day (N= 2959) Control: placebo (N=1506) Study II Intervention: Raloxifene 60 mg or 120 mg per day (N= 1513) Control: placebo (N=757)
Outcomes	Vertebral and non-vertebral fractures. Vertebral fractures stratified by previous fracture history.

Barrett-Connor 2004

Methods	The MORE study consisted of a 3-year core treatment phase (a randomized, double-blind, placebo-controlled trial) followed by a 1-year extension phase for 4 years of total follow-up. During the 4th year women were allowed to take other bone-active agents, except oral estrogen or estrogen-progestin therapy. Posthoc analysis of the MORE trial based on data reported through 4 years of follow-up. 180 sites in 25 countries
Participants	N=7705, primarily white (96%). Inclusion criteria: Participants were at least 2 years postmenopausal and had osteoporosis defined by a BMD T score of 2.5 SD or less at the lumbar spine or femoral neck or radiographically apparent fractures
Interventions	Intervention 1: Raloxifene 60 mg or 120 mg per day (N=5129) Control: placebo (N=2576)
Outcomes	Hip fractures

Bjarnason 2001

Methods	The MORE trial 180 centers in 25 countries
Participants	Analysis based on 3-year follow-up data from 2722 women. The study was stratified for radiologically significant prevalent vertebral fractures such that one third of the women had prevalent vertebral fractures (sub study II) and two-thirds of the women had no significant deformities (sub study I). Inclusion criteria: postmenopausal women with a bone mineral density T-score of the spine or femoral neck below –2.5. Exclusion criteria: women diagnosed with an estrogen-sensitive cancer or had other diseases or treatments known to influence bone metabolism.
Interventions	Intervention: Raloxifene 60 mg or 120 mg per day (N=overall not stated) Control: placebo (N=overall not stated)
Outcomes	Vertebral fractures

Delmas 2003

Methods	MORE: RCT, parallel group 25 countries (including United States and Canada)
Participants	N=7705 Inclusion criteria: Women who were at least 2 years postmenopausal and had no severe or long-term disabling conditions, but who had osteoporosis, defined as low bone mineral density or radiographically apparent vertebral fractures. Exclusion criteria: Women were excluded if they had experienced bone disease other than osteoporosis, substantial postmenopausal symptoms or abnormal uterine bleeding, endometrial carcinoma, a history of or suspected breast carcinoma at any time, or a history of non-skin cancer in the previous 5y; taken an androgen, calcitonin or BP within the previous 6 mo; been taking oral estrogen within the previous 2 mo,; been receiving fluoride therapy for more than 3 mo during the previous 2y.; undergone systematic glucocorticoid therapy for more than 1 mo within the past year; taken antiseizure drugs or pharmacologic doses of cholecalciferl; had a history of thromboembolic disorders within the last 10y (except in association with an injury; experienced endocrine disorders requiring therapy (except for type 2 diabetes or hypothyroidism)); had serum creatinine levels above 225 nmol/L (2.5 mg/dL); had active renal lithiasis, abnormal hepatic function, or untreated malabsorption; or consumed more than 4 alcoholic drinks per day. In addition, we excluded women with pathologic fractures, those from whom satisfactory thoracic and lumbar radiographs could not be obtained, and those with fewer than 2 lumbar and 4 thoracic vertebrae that were evaluable.
Interventions	Treatment duration: 3 years Intervention: raloxifene 60 mg/day (N=2557) Intervention: raloxifene 120 mg/day (N=2572) Control: placebo, daily (N=2576)
Outcomes	Vertebral and non-vertebral fractures

Ettinger 1999

Methods	RCT, parallel group 180 centers in 25 countries (Approximately half the study subjects were recruited by a centralized campaign in the United States and Canada that used both print and radio advertisements.)
Participants	7705 women were enrolled in the study; 95.7% were white Inclusion criteria: women who were at least 2 years postmenopausal and had no severe or long-term disabling conditions but who had osteoporosis, defined as low bone mineral density or radiographically apparent vertebral fractures. Exclusion criteria: Women were excluded if they had experienced bone disease other than osteoporosis, substantial postmenopausal symptoms or abnormal uterine bleeding, endometrial carcinoma, a history of /or suspected breast carcinoma at anytime, or a history of non skin cancer in the previous 5 years; taken an androgen, calcitonin, or bisphosphonate within the previous 6 months; been taking oral estrogen within the previous 2 months; been receiving fluoride therapy for more than 3 months during the previous 2years; undergone systemic glucocorticoid therapy for more than 1 month within the past year; taken anti seizure drugs or pharmacologic doses of cholecalciferol; had a history of thromboembolic disorders within the last 10 years(except in association with an injury; experienced endocrine disorders requiring therapy (except for type 2 diabetes or hypothyroidism); had serum creatinine levels above 225 µmol/L (2.5 mg/dL); had active renal lithiasis, abnormal hepatic function, or untreated malabsorption; or consumed more than 4 alcoholic drinks per day. In addition, we excluded women with pathologic fractures, those from whom satisfactory thoracic and lumbar radiographs could not be obtained, and those with fewer than2 lumbar and 4 thoracic vertebrae that were evaluable.
Interventions	(Intervention 1 and 2: N=4536) Intervention 1: raloxifene 60 mg per day Intervention 2: raloxifene 120 mg per day Control: placebo (N=2292)
Outcomes	Vertebral, non-vertebral and hip fractures

Johnell 2004

Methods	MORE: a RCT, parallel group Multicenter in 25 countries (United States, Scandinavia, other parts of Europe, and other (Latin America and Asia)). Approximately half of the study subjects were recruited by a centralized campaign in the United States and Canada that used both print and radio advertisements
Participants	Inclusion criteria: women who were at least 2 years postmenopausal and had osteoporosis, defined as low BMD or a radiographically apparent vertebral fracture. Exclusion criteria: women were excluded if they had experienced bone disease other than osteoporosis, substantial postmenopausal symptoms or abnormal uterine bleeding, endometrial carcinoma, a history of or suspected breast carcinoma at any time, or a history of non-skin cancer in the previous 5 years; taken an androgen, calcitonin or BP within the previous 6 months; been taking oral estrogen within the previous 2 months; been receiving fluoride therapy for more than 3 months during the previous 2 years.; undergone systematic glucocorticoid therapy for more than 1 month within the past year; taken antiseizure drugs or pharmacologic doses of cholecalciferol; had a history of thromboembolic disorders within the last 10 years

	(except in association with an injury; experienced endocrine disorders requiring therapy (except for type 2 diabetes or hypothyroidism)); had serum creatinine levels above 225 µmol/L (2.5 mg/dL); had active renal lithiasis, abnormal hepatic function, or untreated malabsorption; or consumed more than 4 alcoholic drinks per day. In addition, we excluded women with pathologic fractures, those from whom satisfactory thoracic and lumbar radiographs could not be obtained, and those with fewer than 2 lumbar and 4 thoracic vertebrae that were evaluable.
Interventions	Treatment duration: 3 years Intervention: raloxifene 60 mg or 120 mg per day (N=4536) Control: placebo, daily (N=2292)
Outcomes	Vertebral fractures

Kanis 2003

Methods	The MORE trial
Participants	N=3204 - subgroup of patients from the MORE study Inclusion criteria: women who were at least 2 years postmenopausal and had osteoporosis, defined by a T-score of 2.5 SD or less at the lumbar spine (L1–L4) or femoral neck based on the Hologic reference data or radiographically apparent fractures.
Interventions	Treatment duration: 36 months Intervention: raloxifene 60 mg/day (N=1577) Control: placebo, daily (N=1627)
Outcomes	Vertebral fractures, analysis stratified on LS T-score

Kanis 2010

Methods	MORE: a RCT, parallel group Data from the 2 sub-studies was combined Up to 36 months of follow-up for efficacy and non-serious adverse events and up to 40 months of follow-up for serious adverse events Multicenter in 25 countries
Participants	7705 women were recruited in MORE Inclusion criteria: women aged 31 to 80 years in 25 countries who had been postmenopausal for at least 2 years and who met World Health Organization criteria for having osteoporosis. Study group 1 included those in whom femoral neck or lumbar spine bone mineral density T-score was below −2.5 SD. Study group 2 included women who had low bone mineral density and one or more moderate or severe vertebral fractures, or two or more mild vertebral fractures, or who had at least two moderate fractures regardless of their bone mineral density. Exclusion criteria: Women were excluded if they had bone disease other than osteoporosis, had taken systemic glucocorticoid therapy for more than 1 month within the previous year or consumed more than 4 alcoholic drinks daily.
Interventions	Intervention 1: raloxifene 60 mg/day Intervention 2: raloxifene 120 mg/day Control: placebo, daily

Outcomes	Clinical, vertebral and non-vertebral fractures

Maricic 2002

Methods	The MORE Trial: randomized, placebo-controlled, double-blind
Participants	The MORE Trial enrolled 7705 postmenopausal women with osteoporosis, defined by a lumbar spine or femoral neck BMD T score at or below 2.5 and/or radiographically apparent prevalent vertebral fractures.
Interventions	3 year treatment Intervention 1: raloxifene hydrochloride 60 mg/d (N=2572) Intervention 2: raloxifene hydrochloride 120 mg/d (N=2557) Control: placebo (N=2576)
Outcomes	Vertebral fractures

Qu 2005

Methods	The MORE trial: a double-blind, randomized, placebo-controlled, 4-year trial 180 study centers
Participants	N=6828 Inclusion criteria: postmenopausal women with osteoporosis (defined by a lumbar spine or femoral neck bone mineral density (BMD) T-score ≤ –2.5 using the manufacturers' reference databases, and/or radiographically apparent prevalent vertebral fractures) in MORE, who had a baseline and at least one follow-up radiograph.
Interventions	Intervention 1: raloxifene 60 mg/day (N=2259) Intervention 2: raloxifene 120 mg/day (N=2277) Control: placebo (N=2292)
Outcomes	Vertebral fractures

Sarkar 2002

Methods	MORE trial, a 3-year RCT
Participants	7705 women enrolled in the MORE trial, from which 6828 of them had at least 1 post-baseline BMD determination. Inclusion criteria: women at least 2 years postmenopausal Exclusion criteria: women that had bone disease other than osteoporosis, substantial postmenopausal symptoms, abnormal uterine bleeding, or endometrial carcinoma; women who had pathological fractures, women for whom satisfactory thoracic and lumbar spine radiographs could not be obtained, and women with fewer than two lumbar vertebrae that were evaluable.
Interventions	Intervention: raloxifene 60 mg/day or 120 mg/day(N=4536) Control: placebo, daily (N=2292)
Outcomes	Vertebral fractures

Sarkar 2004

Methods	MORE trial, a 3-year RCT Data from a subgroup of women enrolled in the MORE trial; 17 centers in 5 countries (North America, South America and Europe)
Participants	N=2503 women Inclusion criteria: - MORE Trial: postmenopausal women with osteoporosis with either BMD at least 2.5 SD below the young adult mean or at least two radiographically apparent vertebral fractures women, - Specific of this study: women had paired (baseline and endpoint) measurements of FN BMD, serum osteocalcin (OC), and bone-specific alkaline phosphatase (ALP). Exclusion criteria: women that had experienced a bone metabolic disease other than osteoporosis; had a history of or suspected breast cancer; had abnormal postmenopausal uterine bleeding or endometrial cancer; had a diagnosis of cancer other than skin cancer in the previous 5 years; used an androgen, calcitonin, or bisphosphonate within the previous 6 months; taken an oral estrogen within the last 2 months; had experienced a thromboembolic event within the last 10 years; received treatment for an endocrine disorder (other than type 2 diabetes or hypothyroidism); had renal lithiasis, abnormal hepatic function, or malabsorption; or consumed greater than four alcoholic drinks per day.
Interventions	Intervention: raloxifene 60 mg/day or 120 mg/day (N=1650) Control: placebo, daily (N=853)
Outcomes	Vertebral fractures

Siris 2002

Methods	MORE trial
Participants	7705 women were enrolled in the MORE trial Inclusion criteria: women with osteoporosis, as defined by low bone mineral density (femoral neck or lumbar spine BMD T-score ≤ -2.5) and/or radiographically apparent vertebral fractures, who were at least 2 years postmenopausal.
Interventions	Treatment duration: 3 years Intervention 1: raloxifene 60 mg/day (N=2259) Intervention 2: raloxifene 120 mg/day (N=2277) Control: placebo, daily (N=2292)
Outcomes	Vertebral fractures, analysis stratified by previous fracture history

Sontag 2010

Methods	The MORE trial, duration of 4 years: - a 3-year core treatment phase and - a 1-year extension phase (during which women were permitted to take other bone-active agents, except for oral estrogen or estrogen–progestin therapy) 180 sites in 25 countries
Participants	N=5114, primarily white (96%)

	Inclusion criteria: Patients were enrolled into two sub-studies: - One sub-study included patients whose femoral neck or lumbar spine BMD T-score was less than or equal to -2.5. - The other sub-study included patients with low BMD and one or more moderate or severe vertebral fractures or two or more mild vertebral fractures, or who had at least two moderate fractures regardless of their BMD. In the present report, prevalent vertebral fracture status was based upon the adjudicated fracture determination.
Interventions	Intervention: raloxifene 60 mg/day (N=2549) Control: placebo, daily (N=2565)
Outcomes	Vertebral fractures

Silverman 2008

Bueno 2017

Methods	3-year RCT, parallel-group, phase 3 trial 206 sites in Asia–Pacific countries, Canada, Europe, Latin America, South Africa, and the United States
Participants	Full inclusion/exclusion criteria and methodology are available in the primary publication (Silverman 2008). Inclusion criteria: generally healthy women who were at least 2 years postmenopausal and had osteoporosis. Exclusion criteria: presence of any diseases/conditions that might affect bone metabolism or interfere with densitometry, pathologic vertebral fractures, any serious conditions (eg, endometrial hyperplasia or carcinoma, abnormal vaginal bleeding, malignancy within 10 years), or vasomotor symptoms requiring treatment. Women with a history or presence of venous thromboembolic events (VTEs) were also excluded. Use of androgens, systemic estrogens (except estriol ≤2.0 mg/d), topical estrogens (>3 times/wk), progestogens, SERMs, bisphosphonates, calcitonin, parathyroid hormone, or cholecalciferol (>50,000 IU/wk) within 6 months before screening was also cause for exclusion.
Interventions	N=7492 received intervention or placebo. Intervention 1: Bazedoxifene 20 mg/d Intervention 2: Bazedoxifene 40 mg/d Intervention 2: Bazedoxifene 60 mg/d Control: placebo, once daily All participants received oral calcium (up to 1200 mg/d) and vitamin D (400-800 IU/d) supplements.
Outcomes	Vertebral fractures and non-vertebral fractures

Bruyère 2012

Methods	RCT, phase 3 trial 206 sites in Asia–Pacific countries, Canada, Europe, Latin America, South Africa, and the United States
Participants	Data was available for 5244 women. Inclusion criteria: healthy women between the ages of 55 and 85 with at least 2 years since menopause and with osteoporosis, defined as low BMD or radiographically confirmed vertebral fractures. Subjects without prevalent vertebral fracture were required to have lumbar spine or femoral neck BMD T scores between -2.5 and -4.0 (inclusive), whereas subjects with prevalent vertebral fracture (at least one mild vertebral fracture) were required to have lumbar spine and femoral neck BMD T scores not worse than -4.0.
Interventions	3476 women were treated with Bazedoxifene. Intervention 1: Bazedoxifene 20 mg, taken orally once per day Intervention 2: Bazedoxifene 40 mg, taken orally once per day Control: placebo, taken orally once per day (N=1768)
Outcomes	Vertebral fractures

Kanis 2009

Methods	3-year RCT, parallel group Included women from the Asia/Pacific countries, Canada, Europe, Latin America, South Africa, and the United States.
Participants	N=5643 Inclusion criteria: Generally healthy women between the ages of 55 and 85yr were eligible for study inclusion if they were at least 2 yr postmenopausal and had osteoporosis, defined as low BMD or radiographically confirmed vertebral fractures. Subjects without prevalent vertebral fracture were required to have lumbar spine or femoral neck BMD T-scores between −2.5 and −4.0 (inclusive), whereas subjects with prevalent vertebral fracture (at least one mild vertebral fracture) were required to have lumbar spine and femoral neck BMD T-scores not worse than −4.0. Exclusion criteria: Women were excluded if they had diseases that may affect bone metabolism, conditions that could interfere with bone mineral densitometry, pathologic vertebral fractures, vasomotor symptoms requiring treatment, or serious conditions such as endometrial hyperplasia or carcinoma, abnormal vaginal bleeding, malignancy within 10 yr of the study, endocrine disorders requiring treatment, or untreated malabsorption disorders. Subjects with an active or history of deep vein thrombosis, pulmonary embolism, orretinal vein thrombosis were also excluded, as were subjects with elevated fasting total cholesterol or triglyceride levels (≥310 or ≥300 mg/dl, respectively). The use of androgens, systemic estrogen (except estriol ≤2.0 mg/d), topical estrogen (>3 times/wk), progestogens, SERMs, bisphosphonates, calcitonin, PTH, and cholecalciferol (>50,000 IU/wk) was prohibited within 6 mo of screening.
Interventions	Intervention 1: bazedoxifene 20 mg/day (N=1886) Intervention 2: bazedoxifene 40 mg/day (N=1872) Control: placebo, daily (N=1885)

Outcomes	Clinical, vertebral and non-vertebral fractures

Kaufman 2013

Methods	Phase III RCT, parallel group International, multicenter
Participants	7492 women were included Inclusion criteria: Postmenopausal women aged 55 to 85 years who had osteoporosis, defined as a lumbar spine or femoral neck BMD T-score of≤−2.5 or presence of at least one radiologically confirmed prior vertebral fracture. Exclusion criteria: Exclusion criteria included diseases that affect bone metabolism, malignancy, endometrial hyperplasia or carcinoma, a history of venous thromboembolic disease, an abnormal lipid profile, or use of certain hormonal medications for 6 months prior to screening
Interventions	Treatment duration: 3 years Intervention 1: bazedoxifene 20 mg/day (N=1886) Intervention 2: bazedoxifene 40 mg/day (N=1872) Intervention 3: raloxifene 60 mg/day (N=1849) Control: placebo, daily (N=1885)
Outcomes	Clinical, vertebral and non-vertebral fractures

Silverman 2008

Methods	Phase 3 RCT, parallel group 206 sites in Asia-Pacific countries, Canada, Europe, Latin America, South Africa, and the United States
Participants	7492 women were randomized to treatment and received at least one dose of study medication; 87% were white Inclusion criteria: Generally healthy women between the ages of 55 and 85yr were eligible for study inclusion if they were at least 2 yr postmenopausal and had osteoporosis, defined as low BMD or radiographically confirmed vertebral fractures. Subjects without prevalent vertebral fracture were required to have lumbar spine or femoral neck BMD T-scores between −2.5 and −4.0 (inclusive), whereas subjects with prevalent vertebral fracture (at least one mild vertebral fracture) were required to have lumbar spine and femoral neck BMD T-scores not worse than −4.0. Exclusion criteria: Women were excluded if they had diseases that may affect bone metabolism, conditions that could interfere with bone mineral densitometry, pathologic vertebral fractures, vasomotor symptoms requiring treatment, or serious conditions such as endometrial hyperplasia or carcinoma, abnormal vaginal bleeding, malignancy within 10 yr of the study, endocrine disorders requiring treatment, or un-treated malabsorption disorders. Subjects with an active or history of deep vein thrombosis, pulmonary embolism, or retinal vein thrombosis were also excluded, as were subjects with elevated fasting total cholesterol or triglyceride levels (≥310 or ≥300 mg/dl, respectively). The use of androgens, systemic estrogen (except estriol ≤2.0 mg/d), topical estrogen (>3 times/wk), progestogens, SERMs, bisphosphonates, calcitonin, PTH, and cholecalciferol (>50,000 IU/wk) was prohibited within 6 mo of screening.

Interventions	Intervention 1: bazedoxifene 20 mg, orally once daily (N=1886) Intervention 2: bazedoxifene 40 mg, orally once daily (N=1872) Intervention 3: raloxifene 60 mg, orally once daily (N=1849) Control: placebo, orally once daily (N=1885)
Outcomes	Vertebral fractures

The VERO (The VERtebral fracture treatment comparisons in Osteoporotic women) Study

Body 2020

Methods	VERtebral fracture treatment comparison in Osteoporotic women (VERO) trial: International, multicenter, randomized, double-blind, active-controlled, parallel group, 24-month trial Clinical trial information: ClinicalTrials.gov Identifier: NCT01709110
Participants	Inclusion criteria: Eligible participants were ambulatory postmenopausal women aged > 45 years with a baseline bone mineral density (BMD) T-score less than or equal to −1.50 standard deviations (SD) at the femoral neck, total hip, or lumbar spine. Patients had to have radiographic evidence of at least two moderate (between a 26% and 40% reduction in vertebral body height) or one severe (more than 40% reduction in vertebral body height) prevalent vertebral fragility fractures according to the classification of Genant et al.. Prior use of bisphosphonates or other osteoporosis drugs was allowed. Exclusion criteria: Patients were excluded if they had (a) low serum 25-hydroxy-vitamin D levels (< 9.2 ng/mL or 23 nmol/L), (b) abnormally elevated serum intact parathyroid hormone (PTH [1-84]) at baseline (> 72 pg/mL or > 7.6 pmol/L), or (c) significantly impaired renal function as defined by a calculated endogenous creatinine clearance of < 30 mL/min/m^2.
Interventions	Intervention: 20 µg daily of s.c. teriparatide plus an oral weekly placebo (N=680) Control: 35 mg weekly of oral risedronate plus daily injections of placebo (N=680)
Outcomes	Clinical, vertebral and non-vertebral fractures

Geusens 2018

Methods	VERO: a RCT, parallel group
Participants	Inclusion criteria: post- menopausal women with at least 2 moderate or 1 severe VFx, according to the classification of Genant and colleagues, and a BMD T -score of -1.5 were enrolled. Exclusion criteria:
Interventions	Treatment duration: 24 months Intervention: 20 mg of s.c. teriparatide once daily plus oral weekly placebo (N=680) Control: 35 mg of oral risedronate once weekly plus daily injections of placebo (N=680)
Outcomes	Clinical and vertebral fractures

Geusens 2020

Methods	Post hoc analysis The vertebral fracture treatment comparisons in osteoporotic women (VERO): international, multicenter, randomized, double-blind, active-controlled, parallel-group, 24-month trial 116 centers in 14 countries across Europe, South and North America.
Participants	Inclusion criteria: Eligible participants were ambulatory postmenopausal women aged >45 years with a baseline BMD T-score less than or equal to −1.50 standard deviations (SD) at the femoral neck, total hip, or lumbar spine, assessed at the study site. Patients had to have radiographic evidence of at least two moderate (a reduction in vertebral body height of 26–40%) or one severe (>40% reduction) prevalent vertebral fragility fracture according to the classifcation of Genant et al. Prior use of bisphosphonates or other osteoporosis drugs was allowed. Exclusion criteria: Patients were excluded if they had (a) low serum 25-hydroxy-vitamin D levels (< 9.2 ng/mL or 23 nmol/L), (b) abnormally elevated serum intact parathyroid hormone (PTH [1-84]) at baseline (> 72 pg/mL or > 7.6 pmol/L), or (c) significantly impaired renal function as defined by a calculated endogenous creatinine clearance of < 30 mL/min/m^2.
Interventions	Intervention 1: injectable subcutaneous teriparatide (20 µg daily) plus an oral weekly placebo Intervention 2: oral risedronate (35 mg weekly) plus an injectable subcutaneous daily placebo
Outcomes	Vertebral fractures

Kendler 2018

Methods	The VERO study: randomised, double-blind, active-controlled, parallel-group trial 123 centers in 14 countries in Europe, South America and North America
Participants	1366 women participated in the VERO study (680 women in each treatment group started the treatment); most of the participants were white 1013 women completed the trial (74.2%) Inclusion criteria: ambulatory post-menopausal women older than 45 years of age with a bone mineral density T score less than or equal to –1·50 SDs at the femoral neck, total hip, or lumbar spine. Participants had to have radiographic evidence of at least two moderate (i.e., a reduction in vertebral body height of 26–40%) or one severe (more than 40% reduction) prevalent vertebral fragility fracture according to the classification of Genant and colleagues. Exclusion criteria: We excluded patients with unresolved skeletal diseases other than osteoporosis, malignant tumors in the 5 years before screening, osteonecrosis of the jaw, previous atypical subtrochanteric femoral fractures, risk factors for osteosarcoma, gastrointestinal disorders contraindicating risedronate, significantly impaired hepatic function, or a calculated creatinine clearance less than 30 mL/min using the Cockcroft–Gault equation. We also excluded patients who had undergone kyphoplasty or vertebroplasty at three or more levels before randomisation or within the 6 months before randomisation. Participants had to have normal baseline serum albumin-corrected calcium, parathyroid hormone, and free thyroxine concentrations, and 25-hydroxy-vitamin D concentration greater than 23 nmol/L.

Interventions	Treatment phase of 24 months Intervention: injectable subcutaneous teriparatide 20 µg daily plus an oral weekly placebo (N=680) Control: oral risedronate 35 mg weekly plus injectable subcutaneous daily placebo (N=680)
Outcomes	Clinical, vertebral and non-vertebral fractures

Kendler 2020

Methods	The VERtebral fracture treatment comparisons in Osteoporotic women (VERO) trial: international, multicenter, randomized, double-blind, active-controlled, parallel-group, 24-month trial
Participants	Inclusion criteria: ambulatory postmenopausal women over 45 years of age with a BMD T-score ≤-1.5 standard deviations at the femoral neck, total hip, or lumbar spine, and radiographic evidence of at least 2 moderate or 1 severe prevalent vertebral fragility fractures according to the classification of Genant et al.. Exclusion criteria: Exclusion criteria included low serum 25-hydroxy-vitamin D (25OHD) levels (< 9.2 ng/mL or 23 nmol/L), abnormally elevated serum intact parathyroid hormone (PTH [1–84]) at baseline (> 72 pg/mL or > 7.6 pmol/L), and significantly impaired renal function as defined by a calculated endogenous creatinine clearance of < 30 mL/min/m^2.
Interventions	Treatment 1: injectable subcutaneous teriparatide (20 µg) daily plus an oral weekly placebo Treatment 2: oral risedronate (35 mg) weekly plus injectable subcutaneous daily placebo
Outcomes	Vertebral, clinical, non-vertebral and major non-vertebral fractures

Minisola 2019

Methods	The VERO study: an international, multicenter, randomized, double-blind, active-controlled, parallel-group, 24 months trial (ClinicalTrials.gov Identifier: NCT01709110).
Participants	1360 women included in the VERO study; 74.2 % completed the 24-month trial Inclusion criteria: ambulatory postmenopausal women over 45 years of age with a bone mineral density Tscore ≤ − 1.5 standard deviations (SDs) at the femoral neck, total hip, or lumbar spine, and with radiographic evidence of at least two moderate or one severe prevalent vertebral fragility fracture according to the classification of Genant et al. Exclusion criteria: Patients with serum 25(OH)D levels < 9.2 ng/mL (23 nmol/L) were excluded from the study, as well as patients with abnormally elevated values of serum intact parathyroid hormone (PTH) (1–84) at baseline defined as > 72 pg/mL (or > 7.6 pmol/L) and significantly impaired renal function as defined by a calculated endogenous creatinine clearance of < 30 mL/min/m^2.
Interventions	Treatment duration: 24 months Intervention: injectable subcutaneous teriparatide 20 µg daily plus an oral weekly placebo (N=680) Control: oral risedronate 35 mg weekly plus injectable subcutaneous daily placebo (N=680)

Outcomes	Clinical, vertebral and non-vertebral fractures

The VERT (Vertebral Efficacy with Risedronate Therapy) Trials

Harris 1999

Methods	VERT: a RCT, parallel group 110 study centers in North America
Participants	2458 women met the entry criteria; 96% were white Inclusion criteria: No older than 85 years; if 5 years had elapsed since natural or surgical menopause, and if they had either 2 or more radiographically identified vertebral fractures (T4-L4, inclusive) or 1 vertebral fracture and lumbar-spine (L1-L4) BMD (defined as <=0.83 g/cm2 [Hologic instrument] or <=0.94 g/cm2 [Lunar instrument]). These values represent a t-score of -2 (2 SDs below the mean for young adults). Exclusion criteria: Women were excluded if they had conditions that might interfere with the evaluation of spinal bone loss, or if they had received drugs known to affect bone metabolism (such as calcitonin, calcitriol or cholecalciferol supplements within 1 mo prior to study entry; anabolic steroids, estrogen or estrogen-related drugs, or progestins within 3 mo; or biphosphonates, fluoride or subcutaneous estrogen implants within 6 mo).
Interventions	Treatment duration: 3 years Intervention 1: risendronate 5 mg/day, once daily for 3 year (N=813) Control: placebo, once daily for 3 years (N=815)
Outcomes	Vertebral, non-vertebral and hip fractures

Kanis 2005

Methods	VERT-MN and VERT-NA: phase III RCT VERT-MN – Europe and Australasia VERT-NA – North America
Participants	N=1802 patients that had paired spine radiographs Inclusion criteria: VERT-MN – enrolled postmenopausal women with at least two prevalent vertebral fractures; VERT-NA – enrolled postmenopausal women with either low lumbar spine BMD (T-score ≤ -2 SD) and one radiographically confirmed prevalent vertebral fracture or at least two prevalent vertebral fractures irrespective of BMD. In both trials, patients were required to be ambulatory, <85 years of age, and at least 5 years postmenopausal Exclusion criteria: Randomized trial of the effects of risedronate on vertebral fractures in women with established postmenopausal osteoporosis. Vertebral Efficacy with

	Risedronate Therapy (VERT) Study Group. Those patients enrolled because of low lumbar spine BMD and one prevalent vertebral fracture were excluded.
Interventions	Treatment duration: 3 years Intervention: risedronate 5 mg, daily (N=892) Control: placebo, daily (N=910)
Outcomes	Vertebral fractures

Reginster 2000

Methods	RCT, parallel group Study duration: 3 years 80 study centers in Europe and Australia
Participants	1226 women were randomized Inclusion criteria: Ambulatory women up to 85 years old and at least 5 years postmenopausal were eligible if they had at least two radiographically confirmed vertebral (T4–L4) fractures. Exclusion criteria: Exclusion criteria included conditions that might interfere with evaluation of spinal osteoporosis, and use of calcitonin, calcitriol or vitamin D supplements within 1 month, anabolic steroids, estrogen, estrogen-related drugs or progestogen within 3 months, or bisphosphonates, fluoride or subcutaneous estrogen implant within 6 months.
Interventions	Intervention 1: risedronate 2.5 mg, once daily for 2 years (N=410) Intervention 2: risedronate 5 mg, once daily for 3 years (N=408) Control: placebo, once daily for 3 years (N=408)
Outcomes	Vertebral, non-vertebral and hip fractures

Watts 2003

Methods	Analysis using data from two similar randomized, double-blind, placebo-controlled studies of the effect of risedronate on vertebral fracture, Vertebral Efficacy with Risedronate Therapy (VERT) Multinational (VERT-MN) and VERT-North America (VERT-NA)
Participants	Inclusion criteria: In both studies, patients were required to be ambulatory, no older than 85 yr of age, and at least 5 yr postmenopausal: - VERT-MN enrolled 1226 postmenopausal women at 80 centers in Europe and Australia. Patients in this study were required to have two or more prevalent radiographically confirmed thoracolumbar (T4–L4) vertebral fractures. - VERT-NA enrolled 2458 postmenopausal women at 110 centers in North America. Patients were required to have two or more prevalent radiographically confirmed vertebral fractures (T4–L4) or one vertebral fracture and low lumbar spine (L1–L4) bone mineral density [BMD; defined as ≤0.83 g/cm2 (Hologic instrument) or ≤0.94 g/cm2 (Lunar instrument)]. The cutoff values for low lumbar spine BMD represent a T-score of -2 (2 SD values below the mean for young adults). Exclusion criteria: Women were excluded from the studies if they had conditions that might interfere with the evaluation of spinal bone loss, or if they had received drugs known to affect bone metabolism.

Interventions	Intervention 1: risedronate 2.5 mg/d Intervention 2: risedronate 5 mg/d Control: placebo, daily
Outcomes	Vertebral fractures

The VERT trials and the HIP trial

Roux 2012

Methods	Posthoc analysis of subset of patients participating in three prospective, randomized, placebo controlled clinical trials, with durations of up to 3 years (Vertebral Efficacy with Risedronate Trial–MultiNational (VERT-MN); Vertebral Efficacy with Risedronate Trial–North America (VERT-NA); and the risedronate Hip Intervention Program (HIP)). North America, Multinational
Participants	N=5454 Inclusion criteria: Subjects that had participated the VERT-MN, VERT-NA and HIP and that received risedronate 5 mg/day or placebo with paired evaluable spinal X-rays.
Interventions	Intervention: Risedronate 5mg/day (N=2729) Control: placebo (N=2725)
Outcomes	Vertebral fractures

Seibel 2004

Methods	Subgroup analysis using data from 3 large clinical trials - the multinational and the North American VERT (Vertebral Efficacy with Risedronate Therapy) and the HIP (Hip Intervention Program) studies.
Participants	N=1593 Inclusion criteria: - VERT trials - postmenopausal women with two vertebral fractures or one vertebral fracture and a low lumbar spine BMD (T-score < -2 SD), - HIP trial - postmenopausal women 70–79 years of age with low femoral neck BMD (T-score < -3 SD) or at least 80 years of age with at least one non-skeletal risk factor for hip fracture, - subset of patients specifically for this study: Patients from the VERT trial and patients with a baseline femoral neck T-score ≤ -2.5 SD from the HIP trial. Patients who had baseline measurements of urinary excretion of deoxypyridinoline and took at least one dose of study medication and had baseline and at least one post-baseline spinal radiograph.
Interventions	Treatment duration: 3 years Intervention: risedronate 5 mg, daily (n=795) Control: placebo, daily (n=798)
Outcomes	Vertebral fractures

Watts 2005

Methods	Analysis using data from 3 randomized, double-blind, placebo-controlled, parallel group, phase III clinical studies conducted in parallel: the Vertebral Efficacy with Risedronate Therapy North America (VERT-NA) and Multinational (VERT-MN) clinical studies and the Hip Intervention Program (HIP) study
Participants	N=3979
Interventions	Treatment duration: up to 3 years Intervention: risedronate 2.5 mg or 5 mg, daily (n=1418) Control: placebo, daily (n=2561)
Outcomes	Non-vertebral fractures

The VERT and BMD trials

Siris 2008

Methods	Posthoc analysis with data from the subsets of postmenopausal women with osteopenia from 4 RCTs: BMD Multinational, BMD North America, VERT Multinational and VERT North America.
Participants	N=620 Inclusion criteria: postmenopausal women who had no radiographic vertebral fractures at baseline and had a femoral neck T-score between −1 and −2.5 SD as measured by DXA (NHANES III). Exclusion criteria: patients treated with estrogen and estrogen-related drugs within 3 months of study entry or for more than 1 month within 6 months of study entry.
Interventions	Treatment duration: 1.5 to 3 years Intervention: risedronate 5mg/day (N=311) Control: placebo, daily (N=309)
Outcomes	Major osteoporotic, vertebral and non-vertebral fractures

The ZEST (Zoledronic acid in frail Elders to STrengthen bone) study

Greenspan 2015

Methods	ZEST (the Zoledronic acid in frail Elders to STrengthen bone study): a 2-year RCT, parallel group Pittsburgh, Pennsylvania area
Participants	N=181 Inclusion criteria: We included frail women 65 years or older who resided in a nursing home or assisted-living facility, who were not receiving a bisphosphonate, and who had either a history of vertebral or hip fracture or a measured BMD below the treatment cutoff for osteoporosis (based on 2003 National Osteoporosis Foundation guidelines: lower than −2.0 SD at the spine, hip, or radius [i.e., more than 2 standard deviations below the bone density of a healthy 30-year-old]). All women whose 25-hydroxyvitamin D levels were lower than 20 ng/dL received vitamin D supplements (50 000 IU/wk for 2 months) and were rescreened. All participants received a daily divided dose of vitamin D (800 IU/d) and 1200 mg/d of elemental calcium (supplement plus diet). We included women who had cognitive and functional impairment, immobility, multiple medical conditions, and who were prescribed multiple medications (including glucocorticoids and antiseizure medications). Exclusion criteria: We excluded those with a projected life expectancy of less than 2 years or an estimated glomerular filtration rate below 30 mL/min.
Interventions	Intervention: zoledronic acid 5 mg, one infusion(N=89) Control: placebo, one infusion (N=92)
Outcomes	Clinical and vertebral fractures

S5 Table. Funding and conflict of interest statements of included studies

Reference Author Year	**Funding sources / Sources of support** (as stated in the manuscript)	**Conflict of interest** (as stated in the manuscript)
Adachi 2009	Financial support for this research and its publication was provided by Merck & Co., Inc., Rahway, New Jersey, the manufacturer of Fosamax.	Drs. Adachi, Faraawi, O'Mahony, and Nayar have received funding from Merck for clinical studies and/or have acted as consultants or speakers for Merck. Dr. Massaad, Ms. Yacik, and Dr. Evans are employees of Merck and may hold stock options in the company. Dr. Adachi has received consultant's fees from, been a member of the speakers' bureau of, or participated in clinical trials for Amgen Canada Inc., AstraZeneca Pharmaceuticals LP, Eli Lilly Canada Inc., GlaxoSmithKline, Merck, Novartis Pharmaceuticals Corporation, Pfizer Inc., Procter and Gamble Pharmaceuticals, Roche Diagnostics Corp, sanofi-aventis Canada Inc., Servier, and Wyeth Pharmaceuticals.
Adami 2008	This study was funded by Lilly Research Laboratories, Eli Lilly andCompany, Indianapolis IN.	Drs. Li Xie, Gail P. Dalsky, and Adrien Sipos are full-time employees of Eli Lilly and Company. Dr. Javier San Martin was an employee of Eli Lilly and Company at the time the study was done. This study was funded by Lilly Research Laboratories, Eli Lilly and Company, Indianapolis IN.
Anastasilakis 2015	Not stated.	Athanasios D. Anastasilakis has received lecture fees and research grant from Amgen and lecture fees from Lilly; Stergios A. Polyzos has received lecture fee and research grant from Amgen; Athina Gkiomisi, Zacharias G. Saridakis, Dimitrios Digkas, Ilias Bisbinas, Grigorios T. Sakellariou, Athanasios Papatheodorou, and Panagiotis Kokkoris have nothing to declare. Polyzois Makras has received lecture fees and research grants from Amgen, and lecture fees from Glaxo, Lilly, Pfizer, Leo, Genesis, ELPEN, VIANEX. Neither Amgen nor Novartis had any implication in any stage of this study (study's conception and design, analysis and interpretation of data, drafting, or revising the manuscript).
Aro 2018	This investigator-initiated academic investigation had a shared funding from the Academy of Finland (contract #117058), Novartis Inc. (contract CDJN608 FI01), and Turku University Hospital (government-sponsored research contract #13705). The femoral component was RSA-marked by Stryker Inc., and the hospital purchased the implants without extra charge. The sponsors	The authors declare that they have no conflict of interest

Reference Author Year	Funding sources / Sources of support (as stated in the manuscript)	Conflict of interest (as stated in the manuscript)
	had no further role in the study.	
Ascott Evans 2003	This study was funded by Merck & Co, Inc, which markets alendronate.	Ms Vandormael and Drs Stuch and Melton are employees of Merck & Co, Inc and own stock in the company.
Barrett-Connor 2006	Supported by Eli Lilly, Indianapolis.	Dr. Barrett-Connor reports having received salary support from Eli Lilly for serving as principal investigator and as an investigator at a clinical site for the RUTH trial; having served on paid advisory boards for Merck, Eli Lilly, Procter & Gamble, and Amgen; and having received grant support from Amgen. Dr. Mosca reports having received consulting fees from Eli Lilly and Organon. Dr. Collins reports having received consulting fees from Eli Lilly, Berlex, Merck, Pantarhei, and Pfizer; having received lecture fees from Berlex, Merck, Pfizer, Novo Nordisk, and Organon; and having received grant support from Eli Lilly, Organon, and Merck. Dr. Grady reports having received salary support, by means of contracts with the University of California, San Francisco, from Berlex, Eli Lilly, Merck, Pfizer, and WyethAyerst Research and consulting fees for chairing a data and safety monitoring board at Organon. Dr. Kornitzer reports having received grant support and lecture fees from Eli Lilly, Merck, Bristol-Meyers Squibb, Sandoz, and AstraZeneca. Dr. Wenger reports having received salary support from Eli Lilly for serving as coprincipal investigator and as principal investigator at a clinical site for the RUTH trial; having received consulting fees from Eli Lilly, CV Therapeutics, NitroMed, Schering-Plough, and the Leadership Council for Improving Cardiovascular Care; having received speaker's fees from Pfizer, Novartis, Merck, Eli Lilly, and NitroMed; and having received research grants or contracts or having served on trial steering committees for Eli Lilly, AstraZeneca, and Pfizer. Dr. Geiger and Ms. McNabb are full-time employees and stockholders of Eli Lilly. No other potential conflict of interest relevant to this article was reported.
Bell 2002	Not stated.	Not stated.
Bock 2012	This study was supported by an unrestricted research grant from Roche Pharma AG.	Dieter Felsenberg has acted as a consultant and speaker for Roche, Novartis, Procter and Gamble and MSD but has not received royalties from the companies. Oliver Bock has acted as a speaker for the same companies. Other research studies of the Center for Muscle and Bone Research have been supported financially by Roche, Novartis, Procter and Gamble and MSD. Peter Martus received an institutional grant from Roche. All other authors have no conflicts of interest.
Body 2002	This work was supported by a grant from Eli Lilly and Co. (India- napolis, IN).	Not stated.

Reference Author Year	**Funding sources / Sources of support** (as stated in the manuscript)	**Conflict of interest** (as stated in the manuscript)
Bone 1997	This work was supported by Merck Research Laboratories.	Not stated.
Bone 2000	This work was supported by grants from Merck Research Laboratories.	Not stated.
Bone 2008	This work was supported by Amgen Inc.	H.G.B. is an investigator, consultant, and/or speaker for Amgen Inc., Osteologix, Nordic Bioscience, Merck, Zelos, Pfizer, Eli Lilly, GSK/Roche, NPS Pharmaceuticals, and Novartis. M.A.B. is a consultant and/or speaker for Amgen Inc., Roche, GSK, and Eli Lilly. C.K.Y. is an investigator for Amgen Inc. and an advisory board member for Amgen Canada, Novartis, Servier, and Wyeth. D.L.K. is an adviser and speaker and/or has received research grants from Merck, Eli Lilly, Novartis, Takeda, Wyeth, Amgen Inc., Zelos, Pfizer, and Servier. H.W., Y.L., and J.S.M. are employed by Amgen Inc.
Brown 2009	This study was supported by Amgen (Thousand Oaks, CA, USA).	Dr Brown is an investigator for Amgen and has served as a consultant for and/or received honoraria or research funding from Abbott, Amgen Arthrolab, Bristol Myers Squibb, Eli Lilly, Genizon, GlaxoSmithKline, Merck Frosst, Nicox, Novartis, Pfizer, Procter & Gamble, Roche, Sanofi-Aventis, Servier, Roche, Wyeth, and Zelos. Dr Prince is an investigator for Amgen and has received honoraria or research funding and/or served as a consultant for Eli Lilly, Merck, Novartis, and Servier. Dr Deal has served as a consultant for, on the speakers bureau of, and/or received research funding or consulting fees from Amgen, Eli Lilly, GlaxoSmithKline, Novartis, and Procter & Gamble. Dr Recker is an investisultant for, on the speakers bureau of, and/or received research funding or consulting fees from Amgen, Eli Lilly, GlaxoSmithKline, Novartis, and Procter & Gamble. Dr Recker is an investigator for Amgen and has served as a consultant for and/or received honoraria from Allelix, Amgen, Eli Lilly, GlaxoSmithKline, Merck, Novartis, NPS, Procter & Gamble, Roche, and Wyeth. Dr Kiel has received honoraria and/or research funding from Amgen, Hologic, Merck, Novartis, and Pfizer and has served as a consultant or on the speakers bureau for Amgen, Eli Lilly, GSK, Merck, Novartis, Procter & Gamble, Roche, and Wyeth. Dr Alvaro-Gracia is an investigator for Amgen. Dr de Gregorio has received research grants from Amgen, Merck, and Roche. Dr Hadji is an investigator for Amgen. Dr Hofbauer is an investigator for Amgen. Drs Wang, Austin, Wagman, Newmark, Cesar Libanati, and Javier San Martin are employees and shareholders of Amgen. Dr Bone is an investigator for Amgen, Eli Lilly, Merck, Novartis, Pfizer, and Zelos; has served as a consultant for Amgen, Merck, Nordic Bioscience, Osteologix, Pfizer, and Zelos; and has received speaker honoraria from Merck and Novartis.
Brown 2021	The study was funded by Amgen Inc., Astellas	Jacques P. Brown has received research support from Mereo BioPharma, Radius Health, and Servier; has served as a consul-tant for Amgen and Servier; and has served on speakers' bureaus for Amgen.

Reference Author Year	Funding sources / Sources of support (as stated in the manuscript)	Conflict of interest (as stated in the manuscript)
	Pharma, Inc., and UCB Pharma.	Klaus Engelke is a part time employee of BioClinica. Tony M. Keaveny has served as a consultant for Amgen, O.N. Diagnostics, AgNovos Healthcare, and Bone Health Technologies and owns equity in O.N. Diagnostics. Arkadi Chines, Zhenxun Wang, and Mary K. Oates are employees of Amgen and own stock in Amgen. Roland Chapurlat has received research support from Amgen, UCB Pharma, Chugai, and MSD, and has served as a consultant for Amgen, UCB Pharma, Pfizer, PKMed, Sanofi, Arrow, and BMS. A. Joseph Foldes has nothing to disclose. Xavier Nogues has served as a consultant for Amgen, Eli Lilly, and STADA, and has served on speakers' bureaus for Amgen, Eli Lilly, Italfarmaco, and FAES. Roberto Civitelli has received research support from Mereo BioPharma. Tobias De Villiers has served as a consul-tant for Eli Lilly and has served on speakers' bureaus for Abbott, Pfizer, and Adcock Ingram. Fabio Massari has nothing to disclose. Cristiano A.F. Zerbini has received research support from Amgen, Eli Lilly, Pfizer, and Sanofi. Christopher Recknor has received grants/research support from Amgen, CytoDyn, Eli Lilly, and Roche, and has served as a consultant for Amgen and CytoDyn. Cesar Libanati is an employee of UCB Pharma and owns stock in UCB Pharma
Clemmesen 1997	Not stated.	Not stated.
Cosman 2001	This work was supported in part by National Institutes of Health (NIH) grants AR39191 and DK46381.	Not stated.
Cosman 2005	Supported in part by a grant (AR39191) from the National Institutes of Health.	Dr. Cosman reports having received speakers' fees from Eli Lilly, Merck, Roche-GlaxoSmithKline, and Novartis; advisory or consulting fees from Eli Lilly, Merck, Novartis, Pfizer, NPS, and RocheGlaxoSmithKline; and grants from Novartis, Merck, RocheGlaxoSmithKline, and Eli Lilly. Dr. Lindsay reports having received speakers' fees from Procter & Gamble, Aventis, Eli Lilly, RocheGlaxoSmithKline, Novartis, and Wyeth; advisory or consulting fees from NPS, Wyeth, Procter & Gamble, Aventis, Pfizer, RocheGlaxoSmithKline, and Novartis; and grants from Wyeth, Aventis, Roche-GlaxoSmithKline, Novartis, and Ilex. Dr. Nieves reports having received speakers' fees from Merck. Dr. Luckey reports having received speakers' fees from Merck, Procter & Gamble, Aventis, and Eli Lilly; advisory or consulting fees from Wyeth, Roche, Procter & Gamble, and Merck; and grants from Amgen, Merck, Procter & Gamble, and Roche.
Cosman 2009	Lilly Research Laboratories (Indianapolis, IN) funded the study.	F.C. has received lecture fees, consulting fees and/or grant support from Eli Lilly and Company, Novartis, Merck, Zosano, Procter and Gamble, Amgen, and Pfizer. C.R. has received consulting fees from and is an advisor for Eli Lilly and Company, Roche, and Procter and Gamble and has received honoraria from Eli Lilly and Company, Roche, Procter and Gamble, GlaxoSmithKline, Merck, and Aventis. L.X., E.V.G., and J.H.K. are

Reference Author Year	Funding sources / Sources of support (as stated in the manuscript)	Conflict of interest (as stated in the manuscript)
		employees of Eli Lilly and Company. R.A.W. and K.F.M. have nothing to declare.
Cosman 2011	This study and editorial support for the development of this article were funded by Novartis Pharmaceuticals Corporation of East Hanover, NJ, USA.	FC consults for Amgen, Eli Lilly, Merck, and Novartis. EFE has been an employee of and owns stock in Novartis. CR receives research grants from Procter & Gamble; consults for Amgen, Eli Lilly, GlaxoSmithKline, Merck, Novartis, NPS, Roche, Procter & Gamble, and Zelos; and speaks for Aventis, Eli Lilly, GlaxoSmithKline, Merck, Procter & Gamble, and Roche. PDM receives research grants from and/or consults for Amgen, Eli Lilly, GlaxoSmithKline, Merck, Novartis, NPS, Procter & Gamble, Roche, and Sanofi-Aventis. NG has served on advisory boards for Amgen, Wyeth, and MSD. CK has received research grants from and consulted for Amgen, Novartis, and Servier. PP is an employee of and owns stock in Novartis. AR and HR are employees of Novartis. JAG is an employee of the Novartis Institute for BioMedical Research. CBR is an employee of and owns stock in Novartis. SB is senior clinical investigator of the Fund for Scientific Research, Flanders, Belgium (FWOVlaanderen) and receives research grants from Amgen, Eli Lilly, Novartis, Pfizer, Procter & Gamble, Sanofi-Aventis, and RocheGlaxoSmithKline and consults or speaks for Amgen, Eli Lilly, Merck, Novartis, Procter & Gamble, Sanofi-Aventis, and Servier.
Cosman 2020	The study was funded by Amgen Inc., Astellas, and UCB Pharma.	FC has received institutional grants and research support from Amgen and Eli Lilly; has served as a consultant for Amgen, Eli Lilly, Merck, Radius, and Tarsa/R-Pharm; has served on the speakers' bureaus for Amgen, Eli Lilly, and Radius; and has served on advisory boards for Amgen, Eli Lilly, Merck, and Radius. EML has received institutional research grants for his employer, New Mexico Clinical Research & Osteoporosis Center, from Radius, Amgen, Mereo, and Bindex; has received income for service on scientific advisory boards or consulting for Amgen, Radius, Alex-ion, Sandoz, and Samsung Bioep is and for service on speakers' bureaus for Radius and Alexion; has received project development funds for the University of New Mexico; has received royal-ties from UpToDate for sections on DXA, fracture risk assessment, and prevention of osteoporosis; and is a board member of the National Osteoporosis Foundation, International Society for Clin-ical Densitometry, and Osteoporosis Foundation of New Mexico. PRE has received grants/research support from Amgen and Eli Lilly; has served as a consultant for Amgen; and has received honoraria from Amgen and Theramex. EH has served as a consul-tant for AgNovos and has received other financial or materialsupport (not specified) from Amgen and Eli Lilly. NN has served as a consultant for Amgen and Eli Lilly. TM has served as a consul-tant for Chugai, Teijin Pharma, Daiichi Sankyo, and Astellas-Amgen Biopharma; and has served on an advisory board for Amgen. DBC was an employee and stockholder of Amgen at the time of the study. MR and WY are employees and stock-holders of Amgen. CL is an employee and stockholder of UCB Pharma. SF has received grants/research support from UCB Pharma and Merck, Sharp & Dohme

Reference Author Year	Funding sources / Sources of support (as stated in the manuscript)	Conflict of interest (as stated in the manuscript)
		and has served as a consul-tant for Amgen, UCB Pharma, Labatec, and AgNovos.
Downs Jr. 2000	Funded and supported by Merck & Co., Inc. (West Point, PA).	Development of the experimental design, selection of investigative sites, collection and analysis of the data were performed by Merck. Interpretation of the data and compilation of the manuscript was a joint effort between Merck personnel and non-Merck authors of the manuscript.
Dursun 2001	Not stated.	Not stated.
Ensrud 2008	This study was funded by Eli Lilly and Company, Indianapolis,IN, USA.	Dr Ensrud received research grant support through contracts with the University of Minnesota from Eli Lilly and Company, Pfizer, Merck, Roche, Berlex, and Bionovo. Dr Stock is a full-time employee of Eli Lilly and Company. Dr Barrett-Connor received research grant support through contracts with the University of California–San Diego from Amgen, Merck, Organon, Envision Pharma, and Eli Lilly and Company. Dr Grady received research grant support through contracts with the University of California–San Francisco from Berlex, Bionovo, Eli Lilly and Company, and Pfizer and research and consulting fees for chairing a data and safety monitoring board at Organon. Dr Mosca received consulting fees from Pfeizer, Organon, Merck, Sheray Plough, Novartis, Wyeth, Amgen, and Eli Lilly and Company. Dr Khaw received consultant fees for endpoint adjudication from Eli Lilly and Company. Drs Zhao and Agnusdei are full-time employees of Eli Lilly and Company. Dr Cauley received research grant support through contracts with the University of Pittsburgh from Merck & Company, Pfizer Pharmaceuticals, Novartis Pharmaceuticals, and Eli Lilly and Company; honorarium from Merck & Company, Novartis, and Eli Lilly and Company, and speaker's bureau for Merck and Company.
Fogelman 2000	Supported by Procter & Gamble Pharmaceuticals and Aventis Pharmaceuticals.	Not stated.
Freemantle 2012	The DAPS study was sponsored by Amgen Inc.	N. Freemantle has received research grants from Amgen and has served as a consultant for Amgen, SanofiAventis, Pfizer, Wyeth, and Eli Lilly. S. Satram-Hoang has served as a consultant for Amgen. E. Tang, P. Kaur, D. Macarios, and S. Siddhanti are employees and shareholders of Amgen. J. Borenstein previously was employed by Amgen. D. Kendler has received grant or research support from Amgen, Merck, Eli Lilly, Novartis, Procter & Gamble, GlaxoSmithKline, Pfizer, Roche Biosante, and Wyeth and has served as an advisor for Amgen, Merck, Eli Lilly, Novartis, Wyeth, Nycomed, Procter & Gamble, and Pfizer.
Galesanu 2018	No information.	No information.

Reference Author Year	Funding sources / Sources of support (as stated in the manuscript)	Conflict of interest (as stated in the manuscript)
Greenspan 1998	Ostex International and Metra Biosystems for their support of this study. Support was also provided by CDC Grant No. CC102550, National Institutes of Health Grant No. RR01032, Harvard-Thorndike General Clinical Research Center, Beth Israel Deaconess Medical Center, and Merck Research Laboratories, Rahway, NJ, U.S.A.	Not stated.
Greenspan 2003	The study was conducted at the Harvard-Thorndike General Clinical Research Center, Beth Israel Deaconess Medical Center, Boston, Mass. Support was provided by an NIH grant (R01 AG13069-04) awarded to Dr Greenspan and an NIH grant (M01-RR1032) awarded to the HarvardThorndike General Clinical Research Center, Beth Israel Deaconess Medical Center. Wyeth-Ayerst Laboratories (Philadelphia, Pa) provided the Premarin and Prempro, matching placebo, and Os-Cal Plus D, and Merck Research Laboratories (Rahway, NJ) provided the alendronate and matching placebo used in this study.	Dr Greenspan has had research support and has been on the speaker's bureau and a consultant forMerck Research Laboratories,Rahway, NJ. Dr Parker has been a consultant forMerck Research Laboratories.

Reference Author Year	Funding sources / Sources of support (as stated in the manuscript)	Conflict of interest (as stated in the manuscript)
Grey 2009	This work was supported by funding from the Health Research Council of New Zealand.	A.G.,M.J.B., D.W., A.H., and G.G. have nothing to declare; I.R.R has received research funding and speaker and consultancy fees from Novartis, Merck, Procter & Gamble, and Amgen.
Grey 2012	Grant support was from the Health Research Council of New Zealand and the University of Auckland. The study drug was provided by Novartis.	A.G., M.B., S.W., A.H., and G.G. have no conflict of interest to declare. I.R.R. has received research funding and speaker and consultancy fees from Novartis,Merck, Procter & Gamble, and Amgen.
Hadji 2012	This study was funded by Eli Lilly and Company.	P. Hadji was a recipient of a grant/research support from Eli Lilly and Company, Procter & Gamble; speakers bureau with Eli Lilly and Company (Lilly) and Procter & Gamble; advisory board membership of Lilly and Procter & Gamble; consulting fees from Lilly and Procter & Gamble; lecture fees from Lilly and Procter & Gamble; and speaker fees from Lilly and Procter & Gamble. J. Zanchetta received an advisory board membership of Lilly, Amgen, GlaxoSmithKline, Merck, Pfizer, and Servier and consulting fees from Lilly, Amgen, GlaxoSmithKline, Merck, Pfizer, and Servier. C. Recknor received an advisory board membership of Lilly, Zelos, Takeda, and Novartis; consulting fees from Lilly, Zelos, Takeda, and Novartis; and lecture fees from Amgen and Novartis. K. Saag was a recipient of a grant/research support from Lilly, Novartis, GlaxoSmithKline, Sanofi Aventis, and Procter & Gamble; speakers bureau with Novartis; and consulting fees from Lilly, Novartis, Merck, Procter & Gamble, Aventis, and Amgen. F. McKiernan received consulting fees from Lilly and Amgen. S. Silverman was a recipient of a grant/research support from Alliance for Better Bone Health, Lilly, Pfizer; speakers bureau with Amgen, Lilly, Pfizer, and Roche Pharmaceuticals; consulting fees from Amgen, Lilly, Novartis, Pfizer, Roche Pharmaceuticals, Roche Diagnostics, and Warner Chilcott. J. Alam, R. Burge, J. Krege, M. Lakshmanan, D. Masica, B. Mitlak, and J. Stock were shareholders and employees of Lilly.
Hooper 2005	This study was supported by a grant from Procter & Gamble Pharmaceuticals, Cincinnati, Ohio and sanofi-aventis, Bridgewater, New Jersey, USA.	Dr Hooper has received honoraria and/or research funding from Aventis Pharma, Eli Lilly and Company, Merck, Sharp & Dohme, Novartis, Pfizer, Procter & Gamble, Roche, Sanofi and Wyeth. Dr Ebeling has received honoraria from Aventis and Eli Lilly and Company, and research funding from Procter & Gamble, Merck, Sharp & Dohme, Roche and Amgen. Dr Roberts has received consultancy fees and research funding from Aventis Pharma, Eli Lilly and Company, and Merck, Sharp & Dohme, and research funding from Procter & Gamble, Novartis, and Wyeth. Dr Graham has received consulting fees from Aventis Pharma and Merck, and research funding from Aventis Pharma, Procter & Gamble, Merck, Sharp & Dohme, Pfizer, Eli Lilly and Company, Sevier Laboratories, Novartis, and Amgen. Dr Nicholson has received honoraria and travel grants from Aventis Pharma, Merck, Sharp & Dohme Australia, and Eli

Reference Author Year	Funding sources / Sources of support (as stated in the manuscript)	Conflict of interest (as stated in the manuscript)
		Lilly Australia. Dr D'Emden has no potential conflicts of interest. Drs Ernst and Wenderoth are employees of Procter & Gamble Pharmaceuticals.
Hosking 1998	Supported by a grant from Merck Research Laboratories.	Not stated.
Hosking 2003	This project was funded by Merck & Co., Inc.	Not stated.
Kendler 2010	Amgen Inc., sponsored this study.	Dr. Kendler is an investigator for Merck, Amgen, Eli Lilly, Novartis, Takeda, GlaxoSmithKline, Pfizer, Servier, Biosante, and Wyeth and has served as a speaker, consultant, or advisor for and/or received honoraria from Merck, Amgen, Eli Lilly, Novartis, Servier, Nycomed, and Wyeth. Professor Roux is an investigator for Amgen and has served as a consultant for and/or received honoraria or research funding from Amgen, Roche, Merck Sharp & Dohme, Alliance for Better Bone Health, Novartis, Servier, Lilly, and Wyeth. Professor Benhamou is an investigator for Amgen and has served as a consultant and/or investigator for Amgen, Lilly, Merck Sharp & Dohme, Novartis, Alliance for Better Bone Health, Pierre Fabre, Servier, and Wyeth. Dr. Brown is an investigator for Amgen and has served as a consultant for and/or received honoraria or research funding from Abbott, Amgen, Arthrolab, Bristol Myers Squibb, Eli Lilly, Genizon, GlaxoSmithKline, Merck Frosst, Nicox, Novartis, Pfizer, Procter & Gamble, Roche, Sanofi-aventis, Servier, Wyeth, and Zelos. Dr. Lillestol is an investigator for Amgen and reports financial disclosures for Alexion, Amgen, Astra/Zeneca, Bausch & Lomb, BioSante, Boehringer Ingelheim, Bristol Myers Squibb, CombinatoRx, Covance, Daiichi Sankyo, DP Clinical, Endo Pharmaceuticals, Forest, GlaxoSmithKline, Hisamitsu, i3 Research, Lilly, Novartis, Novo Nordisk, NPS Allelix, NPS Pharmaceuticals, Otsuka, Pfizer, PPD, Quintiles, Roche, Sanofi-Aventis, Schering-Plough, Sepacor, Smith Kline Beecham, Takeda, Viropharma, and Wyeth. Dr. Siddhanti, Ms. Man, and Dr. San Martin are full-time employees of Amgen Inc., and may own stock or stock options in Amgen Inc. Dr. Bone is an investigator for Amgen, Eli Lilly, Merck, Nordic Biosciences, Takeda, and Zelos; has served as a consultant for Amgen, Merck, Nordic Bioscience, Osteologix, Pfizer, Takeda, and Zelos; and has received speaker honoraria from Merck and Novartis.
Kendler 2020	This study was sponsored by Amgen Inc.	D.K. has grant/research support from Amgen, AstraZeneca, and Eli Lilly and consultant/speakers' bureau/advisory activities with Amgen, Pfizer, and Eli Lilly. P.C. has grant/research support from CONACYT (Mexico) Fondos Federales (Mexico); consultant/speakers' bureau/advisory activities with Amgen, Eli Lilly, and Pfizer; board membership with IOF and National University of Mexico UNAM; and patent licensing for 613227. P.R.E. has grant/research support from Amgen and Eli Lilly and consultant/speakers' bureau/advisory activities with Amgen, Alexion, and Eli Lilly. M.M. has grant/research support from Amgen and

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		consultant/ speakers' bureau/advisory activities with Amgen and Radius Health. Y.R. has grant/research support from the Korean Ministry of Health and Welfare, Korean Ministry of Science and ICT and consultant/speakers' bureau/advisory activities with Amgen. A.C., S.H., and R.K.S. are company employees and have stock ownership or royalties with Amgen.
Langdahl 2017	Amgen, Astellas, and UCB Pharma.	BLL reports fees (to her institution), during the conduct of the study; she reports personal fees from Amgen, Eli Lilly, Merck, and UCB; non-financial support from Eli Lilly and Orkla Health; and grants and non-financial support from Novo Nordisk, outside the submitted work. CL is an employee of UCB Pharma and reports UCB Pharma stock and stock options. DBC, NSD, JMad, and AG are employees of Amgen and report Amgen stock or stock options. JPB reports research grants from Amgen (paid to institution), during the conduct of the study; and grants (paid to institution) and personal fees from Amgen and Eli Lilly and personal fees from Merck and Radius, outside of the submitted work. KE reports personal fees from Amgen Bone Academy Germany, outside the submitted work. HKG reports consulting fees from Amgen, Lilly, Merck, Novartis, Pfizer, Janssen, Daiichi, Medtronic, AgNovos Healthcare, BioMarin, Clementia, and BioClinica, outside the submitted work. SG reports grants, personal fees, and non-financial support from Amgen, during the conduct of the study; and grants from MSD, Novartis, UCB, and Eli Lilly, outside the submitted work. EJ-G reports personal fees for consulting from UCB Pharma, personal fees for consulting and speaking from Eli Lilly, and personal fees and other fees for clinical trials, consulting, and speaking from Merck and Amgen, outside the submitted work. TMK reports consulting fees from and equity ownership in ON Diagnostics and consulting fees from Amgen and AgNovos Healthcare, outside the submitted work. In addition, he has a patent US Application 11/241,627 pending to UC Berkeley, a patent US Application 14/311,242 pending to ON Diagnostics, and a patent US Application 14/455,867 pending to ON Diagnostics, and he serves as consulting Chief Science Officer for ON Diagnostics, which was paid to perform some of the technical services for this study. DK reports research grants and honoraria from Amgen and Eli Lilly, research grants from AstraZeneca and Astellas, and consulting fees from Merck, during the conduct of the study. PL reports personal fees from Amgen, Merck, Sanofi, Fresenius-Kabi, and Servier, outside the submitted work. JFM reports research funding from Amgen. All other authors declare no competing interests.
Lewiecki 2007	This study was supported by a grant from Amgen.	Dr Lewiecki has received grant/research support from Merck, Eli Lilly, Novartis, Sanofi-Aventis, Amgen, Pfizer, Wyeth-Ayerst, Roche, GlaxoSmithKline, and Procter & Gamble. He participates as a consultant and/or as part of an advisory board, speakers' bureau, or sponsored speaking event for Merck, Eli Lilly, Novartis, Procter & Gamble, Sanofi-Aventis, Roche, GlaxoSmithKline, Wyeth-Ayerst, Servier, and Amgen. He is a direct stock shareholder of General Electric and Procter & Gamble. Dr Miller has received scientific grants from Procter & Gamble, Aventis, Roche, Eli Lilly, Pharmacia, Merck & Co., Novartis, Pfizer, and Amgen. He

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		is a consultant and/or on speaker boards or advisory boards for Procter & Gamble, Aventis, Merck & Co., Eli Lilly, Amgen, NPS, Novartis, Roche, and GlaxoSmithKline. Dr McClung has received research grants and/or consulting fees from Amgen, Eli Lilly, Merck, Novartis, Procter & Gamble, Roche, Sanofi-Aventis, and Wyeth. Dr Cohen has been a clinical investigator and research consultant for Genentech, Biogen-IDEC, Merck, Sanofi-Aventis, Procter & Gamble, Pfizer, Centocor, Amgen, Scios, Bristol Myers Squibb, and Wyeth-Ayerst. Dr Bolognese is a speaker for Merck, Procter & Gamble, GlaxoSmithKline, Pfizer, Wyeth, Roche, and AstraZeneca. He is a clinical investigator for Merck, Pfizer, Roche, GlaxoSmithKline, Procter & Gamble, AstraZeneca, Amgen, and Abbot Pharmaceuticals. Drs Liu, Wang, and Siddhanti are fulltime employees of Amgen and own stock in Amgen. At the time the study was conducted, Dr Fitzpatrick was a full-time employee of Amgen; she is currently a full-time employee of GlaxoSmithKline.
Lindsay 1997	This study was supported by PHS grants NIAMS AR39191 and by the National Institute of Diabetes, Digestive, and Kidney Diseases (DK42892and DK4631).	Not stated.
Luckey 2004	Funding provided by Merck & Co., Inc., West Point, PA.	Not stated.
Lufkin 1998	This work was supported by a grant from Eli Lilly and Company.	Not stated.
Malouf-Sierra 2017	The study was funded by Eli Lilly and Company (ClinicalTrials.gov Identifier: NCT00887354).	Pedro A. García-Hernández, Umberto Tarantino, Costantino Corradini, Lars Boris, Eric Lespessailles, Kyriakos Papavasiliou: None. Jorge Malouf-Serra: Speaker and consultation fees from: Amgen, Lilly, Gruenenthal, Mundipharma, Esteve, FAES Pharma. Soren Overgraad: Research grants: Biomet, DePuy, Protesekom-pagniet, Lilly. Frede Frigagen: Speaker fees: Lilly, Research grants: Lilly, Takeda, Amgen. Per Aspenberg: Research grants from Eli Lilly. José R. Caeiro: Speaker and Consultant fees from Amgen, Lilly. Jan J. Stepan: Speaker fees: Lilly, Research grants: Lilly. Helmut Petto: Employee, Lilly. Fernando Marin: Employee, Lilly.
Masud 2009	The study was funded by Procter and Gamble	TM: has received financial support to attend conferences and for research from the following companies: Merck, Procter & Gamble, Roche, Novartis, Shire, Servier, Strackan; he has also sat in Advisory Board meetings for the above mentioned companies. MM: has received

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	Pharmaceuticals and sanofi-aventis.	research grants and/or consulting fees from Amgen, Lilly, Merck, Novartis, Procter & Gamble and sanofi-aventis. PG: has received research grants and/or consulting fees from Amgen, Lilly, Merck, Roche, Servier, Novartis, Procter & Gamble, sanofi-aventis, Wyeth, Schering-Plough and Abbott
McClung 2001	Supported by grants from Procter & Gamble Pharmaceuticals (Cincinnati) and Aventis Pharma (Bridgewater, N.J.).	The authors have received research grants from or have served as consultants to or members of speakers' bureaus for Procter & Gamble, Aventis Pharma, and other companies that make products used in the treatment of osteoporosis.
McClung 2005	This research was supported by Eli Lilly and Company.	Drs McClung and Miller received research grants from Eli Lilly and Company and from Merck and Company, Inc, West Point, Pa. In addition, Dr Miller has served as a paid consultant to Eli Lilly and Company and to Merck and Company, Inc. Drs Civitelli and Bandeira have received research grants from and served as paid consultants to Eli Lilly and Company. In addition, Dr Civitelli owns stock in Eli Lilly and Company. Dr Omizo has served as a paid consultant to Eli Lilly and Company.
McClung 2006	Supported by Amgen.	Dr. McClung reports having served as a consultant to Amgen, Eli Lilly, Merck, Novartis, NPS Pharmaceuticals, Procter & Gamble, Roche, Sanofi-Aventis, and Wyeth and having received grant support from Amgen, Eli Lilly, Merck, Novartis, Organon, Pfizer, Roche, and Sanofi-Aventis. Dr. Lewiecki reports having served as a consultant to Merck, Procter & Gamble, and Eli Lilly; having received lecture fees from Procter & Gamble; and having received grant support from Amgen. Dr. Cohen reports having served as a consultant to Amgen, Abbott, and Genentech; having equity interests in Merck and Pfizer; and having received lecture fees from Abbott, Genentech, and Amgen. Dr. Cohen is medical director of Radiant Research, Dallas, which receives grant support for clinical trials. Dr. Bolognese reports having received lecture fees from Eli Lilly, Roche, and Aventis. Dr. Woodson reports having received grant support from Amgen. Dr. Peacock reports having received consulting fees from Amgen. Dr. Miller reports having served as a consultant to Merck, Eli Lilly, Wyeth–Ayerst, Roche, Procter & Gamble, and Aventis; having received lecture fees from Eli Lilly, Procter & Gamble, Aventis, Roche, Amgen, Merck, and Novartis; and having received grant support from Merck, Procter & Gamble, Aventis Eli Lilly, Roche, Novartis, and Amgen. Dr. Lederman reports having received lecture fees from Eli Lilly. Dr. Chesnut reports having received grant support from Amgen. Dr. Lain reports having equity interests in Merck and Pfizer. Dr. Kivitz reports having an equity interest in Amgen. Drs. Holloway, Zhang, Peterson, and Bekker report having equity interests in Amgen; at the time the study was conducted, they were employees of Amgen. No other potential conflict of interest relevant to this article was reported.

Reference Author Year	Funding sources / Sources of support (as stated in the manuscript)	Conflict of interest (as stated in the manuscript)
McClung 2009	This study was supported and funded by Roche	Not stated.
McClung 2014	Supported by Amgen and UCB Pharma. Dr. McClung reports receiving consulting fees from Amgen, Eli Lilly, Merck, and Novartis, other honoraria from Novartis and Warner Chilcott, and grant support from Amgen and Merck	Dr. McClung reports receiving consulting fees from Amgen, Eli Lilly, Merck, and Novartis, other honoraria from Novartis and Warner Chilcott, and grant support from Amgen and Merck. Drs. Grauer, Wasserman, Katz, Maddox, Yang, and Libanati are employees of and hold stock in Amgen. Dr. Bolognese reports receiving lecture fees from Amgen and Vivus and grant support from Amgen and Regeneron. Dr. Brown reports receiving consulting fees from Amgen, Eli Lilly, Merck, and Sanofi-Aventis, lecture fees from Amgen, Eli Lilly, Merck, Novartis, and Warner Chilcott, and grant support from Abbott Laboratories, Amgen, Bristol-Myers Squibb, Eli Lilly, Merck, Novartis, Pfizer, Roche, Sanofi-Aventis, Servier, Takeda Pharmaceuticals, and Warner Chilcott. Dr. Diez-Perez reports receiving consulting fees from Eli Lilly and Amgen, lecture fees from Eli Lilly, Novartis, Merck, ViiV Healthcare, and Amgen, and travel support from Eli Lilly and holding stock in Active Life Scientific. Dr. Langdahl reports receiving personal fees from Amgen, Merck Sharp & Dohme, and Eli Lilly and grant support from Merck Sharp & Dohme and Eli Lilly. Dr. Reginster reports receiving consulting fees from Amgen, Eli Lilly, Novartis, Roche, GlaxoSmithKline, Servier, Negma Laboratories, Wyeth Pharmaceuticals, Merckle, NPS, UCB Pharma, Nycomed, and Theramex; lecture fees from Merck Sharp & Dohme, Rottapharm, Teva Pharmaceuticals, Eli Lilly, Novartis, Roche, GlaxoSmithKline, Servier, Nycomed, Theramax, Institut Biochimique Société Anonyme, Genevrier Biotechnology, Teijin, Ebewe Pharma, Zodiac Pharmaceuticals, Analis, Novo Nordisk, and Nolver; and grant support from Bristol-Myers Squibb, Merck Sharp & Dohme, Rottapharm, Teva Pharmaceuticals, Amgen, Eli Lilly, Novartis, Roche, GlaxoSmithKline, and Servier. Dr. Zanchetta reports serving as a member of the advisory board for Amgen, Eli Lilly, GlaxoSmithKline, and Merck and receiving consulting fees from Eli Lilly and lecture fees from GlaxoSmithKline. Dr. Bone reports receiving consulting fees from Merck, Novartis, Amgen, and Tarsa Therapeutics and grant support from Amgen, Merck, Novartis, Tarsa Therapeutics, and Nordic Bioscience. No other potential conflict of interest relevant to this article was reported.
McClung 2020	This study was funded by Amgen Inc., UCB Pharma, and Astellas.	MRM has received consulting fees and honoraria from Amgen and consulting fees from Myovant. MAB has received contract fees from and has been a speaker for Amgen. JPB has received research funding from Amgen, Eli Lilly, Mereo Biopharma, Radius Health, and Servier; has received consulting fees from Amgen, Eli Lilly, Orimed, and Servier; and has received lecture fees from Amgen and Eli Lilly. J-YR has received research funding from IBSA-Genevrier, Mylan, CNIEL, and Radius Health; has received lecture fees from IBSA-Genevrier, Mylan, CNIEL, and Dairy Research Council; and has received consulting fees from or participated in paid advisory boards for IBSA-Genevrier, Mylan, Radius Health, and Pierre Fabre. BLL has received research funding from Amgen and Novo Nordisk; has received consulting fees from Amgen, Eli Lilly, and UCB;

Reference Author Year	Funding sources / Sources of support (as stated in the manuscript)	Conflict of interest (as stated in the manuscript)
		and has received lecture fees from Amgen, Eli Lilly, and UCB. JM, YS, and MR are employees of and hold stock in Amgen. PDM is an employee of and holds stock in UCB Pharma. AG was an employee of Amgen at the time of the study and holds stock in Amgen.
McClung 2021	This study was funded by Amgen Inc., UCB Pharma, and Astellas Pharma Inc.	Representatives of the sponsor, Amgen Inc., designed the clinical study in collaboration with some of the study investigators and UCB Pharma, and performed the analyses according to a prespecified statistical analysis plan. Amgen Inc. maintained the study database. Lisa A. Humphries, PhD, of Amgen Inc. and Martha Mutomba (on behalf of Amgen Inc.) provided medical writing support. Michael R. McClung has received consulting fees from Amgen and Myovant and has received honorarium from Amgen and Alexion. Michael A. Bolognese has received contract fees and speaker fees from Amgen. Jacques P. Brown has received grants/research support from Mereo BioPharma, Radius Health, and Servier; has received consulting fees from Amgen and Servier; and has served on a speakers' bureau for Amgen. Jean-Yves Reginster has received grants/research support from IBSA-Genevrier, Mylan, CNIEL, and Radius Health; has received lecture fees from IBSA-Genevrier, Mylan, CNIEL, and Dairy Research Council; and has received consulting fees/participated on advisory boards for IBSA-Genevrier, Mylan, Radius Health, and Pierre Fabre. Bente L. Langdahl has received grants/research support from Amgen and Novo Nordisk and has served on speakers' bureaus for UCB Pharma, Amgen, Eli Lilly, Gedeon-Richter, and Gilead. Yifei Shi, Arkadi Chines, and Mary K. Oates are employees of and own stock in Amgen. Jen Timoshanko and Cesar Libanati are employees of and own stock in UCB Pharma.
Miller 2008	This study was supported by Wyeth Research, Collegeville, PA, USA.	Dr Miller receives grant support from and/or serves as a consultant for Amgen, Merck, Novartis, Procter & Gamble, Roche, and Sanofi-Aventis. Dr Christiansen serves as a consultant for Wyeth. Dr Kendler serves as a consultant for Eli Lilly, Merck, Novartis, Servier, Wyeth, and Zelos. Dr Lewiecki receives grant support from and/or serves as a consultant for Amgen, Eli Lilly, GlaxoSmithKline, Merck, Novartis, Pfizer, Procter & Gamble, Roche, and Wyeth and owns stock in Procter & Gamble. Dr Woodson receives grant support from Amgen, Eli Lilly, GlaxoSmithKline, Merck, and Wyeth and is a speaker for Eli Lilly. Drs Levine, Chines, and Constantine are employees of Wyeth Pharmaceuticals. Dr Delmas serves as a consultant for Wyeth. Dr Hoeck states that he has no conflicts of interest.
Miller 2016b	This work was supported by Amgen Inc.	P.D.M. has received research grants from Alexion, Lilly, Amgen, Novartis, NBHA, Pfizer, the University of Alabama, Boehringer Ingelheim, Merck, Merck Serono, and Radius; is a consultant for Grünenthal, Shionogi, Radius, Amgen, and Lilly; and is a speakers' bureau member for Radius, Alexion, and Amgen. N.P., C.W., and R.B.W. are employed by Amgen and may have Amgen stock/stock options. J.P.B. has received research grants from Amgen, Eli Lilly, and Novartis and is a consultant and speakers' bureau member for Amgen and Eli Lilly. E.C. has received research grants and lecture fees from Amgen.

Reference Author Year	Funding sources / Sources of support (as stated in the manuscript)	Conflict of interest (as stated in the manuscript)
		B.S.N. is a principal investigator for several Amgen studies. M.A.B. has received research grants from Pfizer, Amgen, Sanofi, and Lilly and is a consultant and speakers' bureaumember for Amgen. J.M.is a speakers' bureau member for Amgen, Lilly, Grünenthal, and Mundipharma and has received other financial support from AbbVie. H.G.B. has received research grants from Amgen andMerck;is a consultant for Amgen,Merck, and Grünenthal; and is a speakers' bureau member for Amgen and Shire. J.-Y.R. has received research grants from Bristol-Myers Squibb, Merck Sharp and Dohme, Rottapharm, Teva, Roche, Amgen, Lilly, Novartis, GlaxoSmithKline, Servier, Pfizer, Theramex, Danone, Organon, Therabel, Boehringer Ingelheim,Chiltern, andGalapagos;is a consultant or adviser for Servier, Novartis, Negma, Lilly, Wyeth, Amgen, GlaxoSmithKline, Roche, Merckle, Nycomed-Takeda, NPS, IBSA-Genévrier, Theramex, UCB, Asahi Kasei, and Endocyte; and has received lecture fees from Merck Sharp and Dohme, Lilly, Rottapharm, IBSA-Genévrier, Novartis, Servier, Roche, GlaxoSmithKline, Merckle, Teijin, Teva, Analis, Theramex, Nycomed, Novo Nordisk, Ebewe Pharma, Zodiac, Danone,Will-Pharma, and Amgen. A.S. has received research grants from Amgen; is a consultant for Amgen, Actavis, and Eli Lilly; and is a speakers' bureau member for Amgen and Actavis. S.R.C. is a consultant for Amgen.
Mortensen 1998	Financial support for this study was provided by Procter & Gamble Pharmaceuticals.	Not stated.
Muscoso 2004	Not stated.	Not stated.
Panico 2011	Departmental sources - Department of Molecular and Clinical Endocrinology and Oncology, University "Federico II", Naples, Italy.	Not stated.
Pols 1999	This study was supported by funding from Merck & Co., Inc., Whitehouse Station, New Jersey, USA.	Not stated.
Recker 2004	This trial was sponsored by F. Hoffmann-La Roche Ltd, Basel, Switzerland.	Not stated.

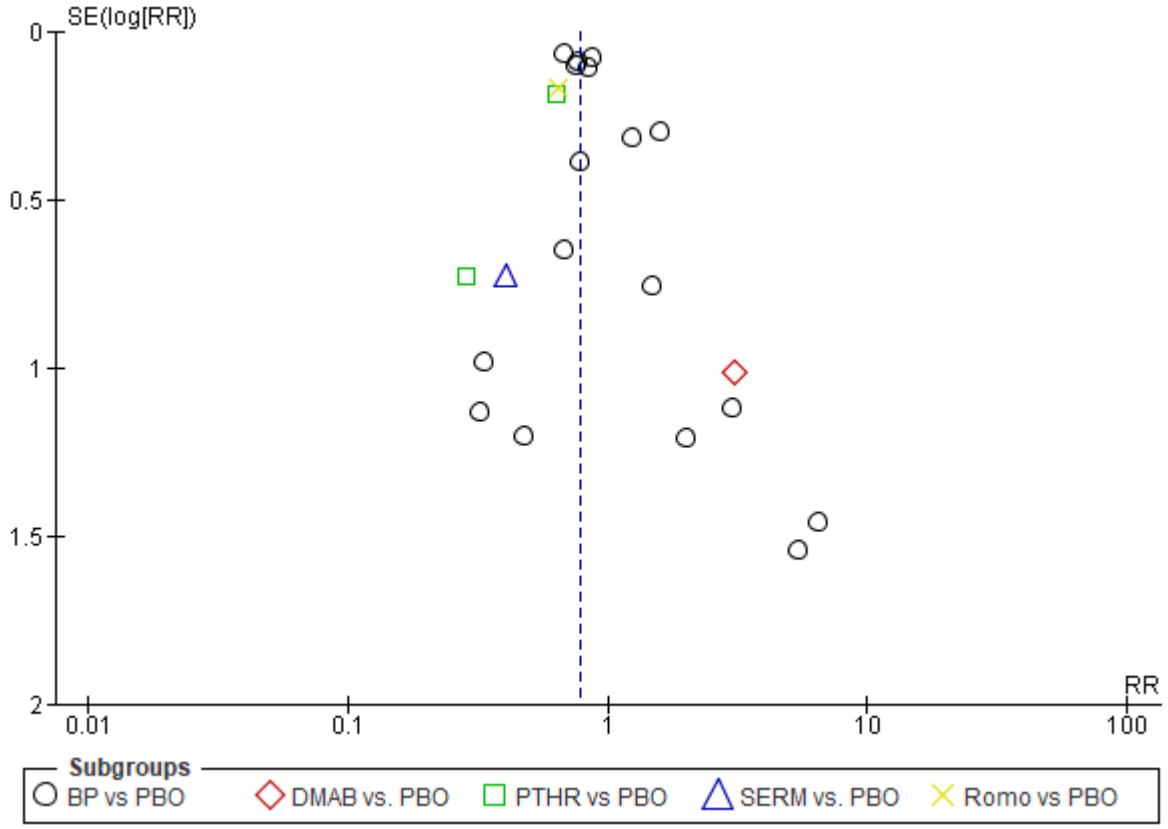
Reference Author Year	Funding sources / Sources of support (as stated in the manuscript)	Conflict of interest (as stated in the manuscript)
Recker 2007	Eli Lilly and Company sponsored this study. Drs. Lorraine, Qu, Kulkarni, Gaich, Wong, Plouffe, and Stock are employees of Eli Lilly and Company	Drs. Lorraine, Qu, Kulkarni, Gaich, Wong, Plouffe, and Stock are employees of Eli Lilly and Company.
Recknor 2013	Sponsored by Amgen Inc, Thousand Oaks, California.	Dr. Recknor has received consulting and advisory fees from Amgen Inc, Eli Lilly, and Novartis, lecture fees from Novartis and Warner Chilcott, a grant from Medi, and is a shareholder in Ion Med Systems. Dr. Czerwinski has received research grants from Amgen Inc, Eli Lilly, Johnson & Johnson, Merck, Serono, Novartis, Pfizer, Roche, and Servier and lecture fees from Amgen Inc, Roche, and Servier. Dr. Bone has received research grants from Amgen Inc, Merck, Novartis, and Tarsa, is a consultant or advisor for Amgen Inc, Merck, and Tarsa, and is a member of the speakers' bureau for Amgen Inc. Dr. Bonnick has received research grants from Amgen Inc, Merck, Takeda, and Wyeth and is a member of the speakers' bureau for Amgen Inc and Novartis. Dr. Binkley has received research grants from Amgen Inc, Eli Lilly, Merck, and Tarsa and is a consultant for Eli Lilly, Merck, and Tarsa. Dr. Palacios has received research grants from Amgen Inc, Gynea, Leon Farma, Merck, Pfizer, PregLem, and Servier and is a consultant or advisor for Abbott, Amgen Inc, Arkopharma, Bioiberica, C Fleet, Ferrer, GlaxoSmithKline, Isdin, Pfizer, Rovi, Servier, and Shionogi. Drs. Siddhanti, Ferreira, Wagman, and Hall are employees of and have stock ownership in Amgen Inc. Mrs Ghelani has received consulting fees from Amgen Inc. D. Bolognese is a consultant for Amgen Inc, Eli Lilly, Roche, and Vivus. Dr. Benhamou has received research grants from Amgen Inc, Eli Lilly, Merck, Novartis, Roche, and Servier and is member of the speakers' bureau for Amgen Inc, Merck, .Novartis, and Servier. Dr. Moffett did not report any potential conflicts of interest.
Reginster 2003	This work was supported by Eli Lilly & Co.	Not stated.
Reid 2002	Supported by a grant from Novartis Pharma.	Not stated.
Reid 2004	This study was supported by a grant from Lilly Research Laboratories.	Drs Reid, Eastell, Fogelman, Adachi, Netelenbos, Watts, and Seeman have served as consultants for or received research funding from Eli Lilly and Company.
Reid 2018	Supported by grants from the Health Research Council of New Zealand. Trial	Dr. Reid reports receiving grant support, lecture fees, and consulting fees from Amgen and Merck, consulting fees from Novartis, and lecture fees and consulting fees from Eli Lilly. No other potential conflict of interest relevant to this article was reported.

Reference Author Year	Funding sources / Sources of support (as stated in the manuscript)	Conflict of interest (as stated in the manuscript)
	medication was supplied by Novartis	
Reid 2019	Supported by grants from the Health Research Council of New Zealand.	IRR has received fees or research funding from Amgen, Merck, Novartis and Eli Lilly. Other authors have no interests to declare.
Reid 2020	This work was supported by grants from the Health Research Council of New Zealand. Trial medication was supplied by Novartis.	IRR has received fees or research funding from Amgen, Merck, Novartis, and Eli Lilly. Other authors have no interests to declare.
Roux 2014	This study was funded by Amgen Inc.	C Roux: Research grants and/or consulting or speaking fees from Amgen Inc., Bongrain, Lilly, MSD, Novartis, Roche, and Servier. LC Hofbauer: Research grants and/or consulting fees from Amgen Inc., Merck, and Novartis, and the osteoporosis program is supported by DFG Forschergruppe-1586 (SKELMET). PR Ho, I Ferreira, S Siddhanti, and RB Wagman: Employees of Amgen Inc. and may own stock and/or stock options in Amgen Inc. JD Wark: Research grants and/or consulting or speaking fees from Amgen Inc., Eli Lilly, Merck, Novartis, Servier, Sanofi, and UCB. MC Zillikens: Consulting and/or speaking fees from Amgen Inc., Eli Lilly, Merck, Novartis, and Servier. A Fahrleitner-Pammer: Research grants and/or consulting or speaking fees from Amgen Inc., Eli Lilly, Novartis, Roche, Sanofi, Servier, and Takeda. F Hawkins: Nothing to disclose. M Micaelo: Nothing to disclose. S Minisola: Consulting and/or speaking fees from Abiogen, Amgen Inc., Bruno Farmaceutici, Eli Lilly, GSK, Medtronic, Merck Sharp & Dohme, Nycomed, Neopharmed, Novartis, Pfizer, Roche, Sigma Tau, Stroder, and Warner Chilcott. N Papaioannou: Research grants and/or consulting or speaking fees from Amgen Inc., Eli Lilly, and Servier. M Stone: Research grants and/or consulting or speaking fees from Amgen Inc., Eli Lilly, Merck, and Servier. JP Brown: Research grants and/or consulting or speaking fees from Amgen Inc., Bristol-Myers Squibb, Eli Lilly, Merck, Novartis, Pfizer, Sanofi, Servier, Takeda, and Warner-Chilcott.
Saag 2017	Supported by Amgen, Astellas Pharma, and UCB Pharma.	Dr. Saag reports receiving grant support and consulting fees from Amgen and Merck and consulting fees from Radius Health and Eli Lilly; Drs. Petersen, Maddox, Fan, and Grauer, being employed by and owning stock and stock options in Amgen; Dr. Karaplis, receiving grant support from and being a member of the National Advisory Board of Amgen Canada; Dr. Lorentzon, receiving lecture fees from Amgen, Eli Lilly, Meda Pharmaceuticals, and UCB Pharma, consulting fees from Radius Health and Consilient Health, and lecture fees and consulting fees from Renapharma; Dr. Thomas, receiving grant support, lecture fees, and consulting fees from Amgen, Merck Sharp & Dohme, and UCB Pharma, grant support and lecture fees from Chugai and Pfizer, consulting fees

Reference Author Year	Funding sources / Sources of support (as stated in the manuscript)	Conflict of interest (as stated in the manuscript)
		from Expanscience, Gilead Sciences, LCA, Thuasne, and Medac, grant support and consulting fees from HAC Pharma, grant support from Novartis, lecture fees from AbbVie and Bristol-Myers Squibb, and lecture fees and consulting fees from Eli Lilly and Teva Pharmaceutical Industries; and Dr. Meisner, being employed by and owning stock and stock options in UCB Pharma. No other potential conflict of interest relevant to this article was reported.
Sambrook 2004	Funding for this clinical trial was provided by Merck & Co., Inc., Whitehouse Station, NJ, USA	P. Sambrook and P. Geusens have served as paid consultants and speakers for Merck & Co., Inc. K. Gaines, N. Verbruggen and M. Melton are employees of Merck & Co., Inc. and potentially own stock and/or hold stock options in the Company.
Valimaki 2007	Funding for this study was provided by the Alliance for Better Bone Health (Procter & Gamble and sanofiaventis)	The authors received editorial and writing support in the preparation of the manuscript, funded by the Alliance for Better Bone Health. Corine Visser, PhD, provided writing and editorial support. The authors were fully responsible for content and editorial decisions for the manuscript.

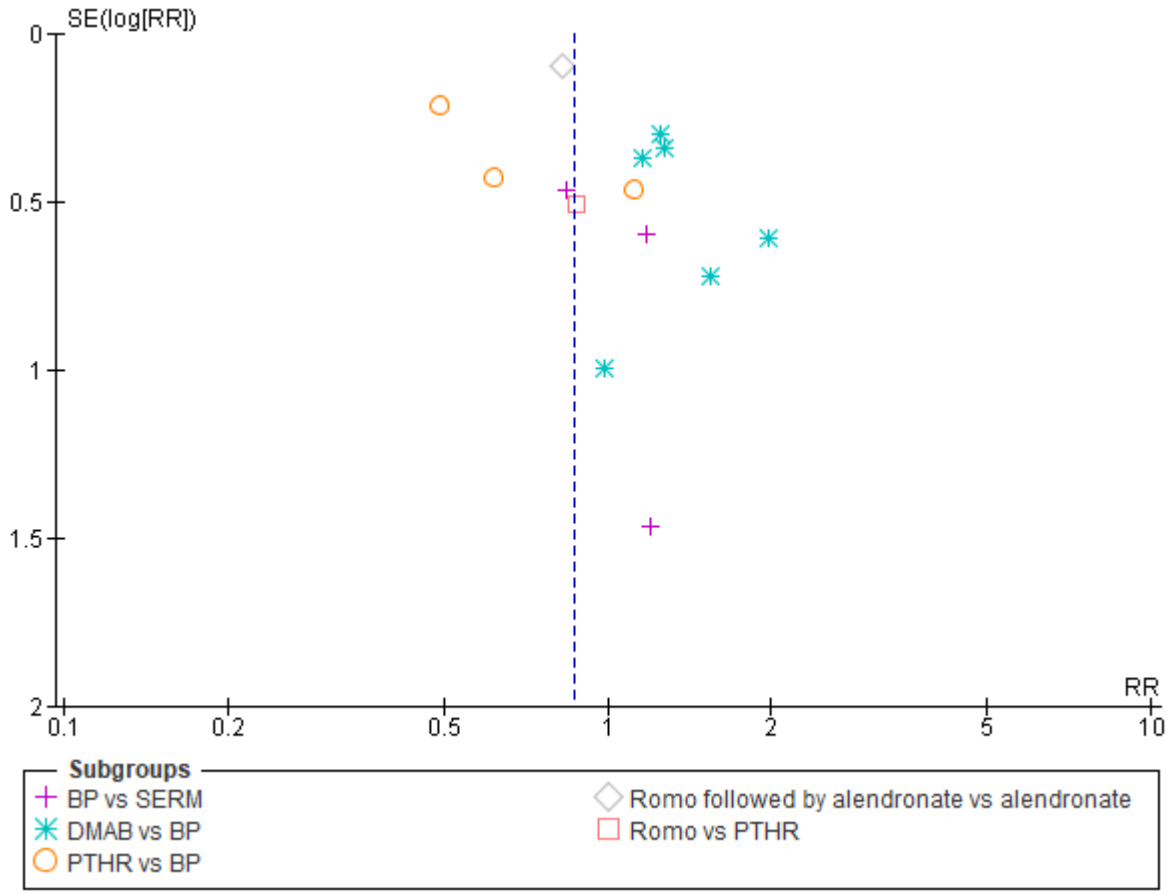
S1 Fig. Funnel Plots

Funnel plot of comparison: Treatment vs. Placebo, outcome: Clinical fractures



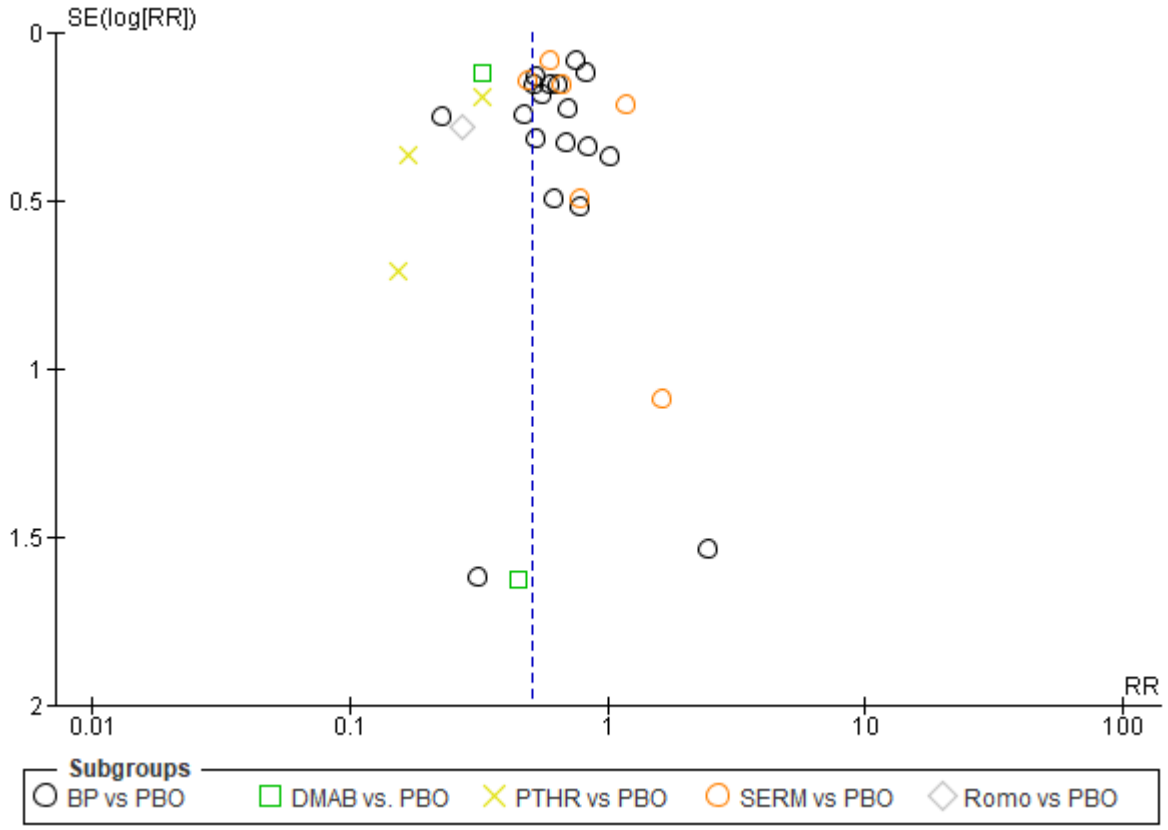
Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor agonist [PTHR], placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM], SE [standard error], RR [risk ratio]

Funnel plot of comparison: Treatment vs. Comparator, outcome: Clinical fractures



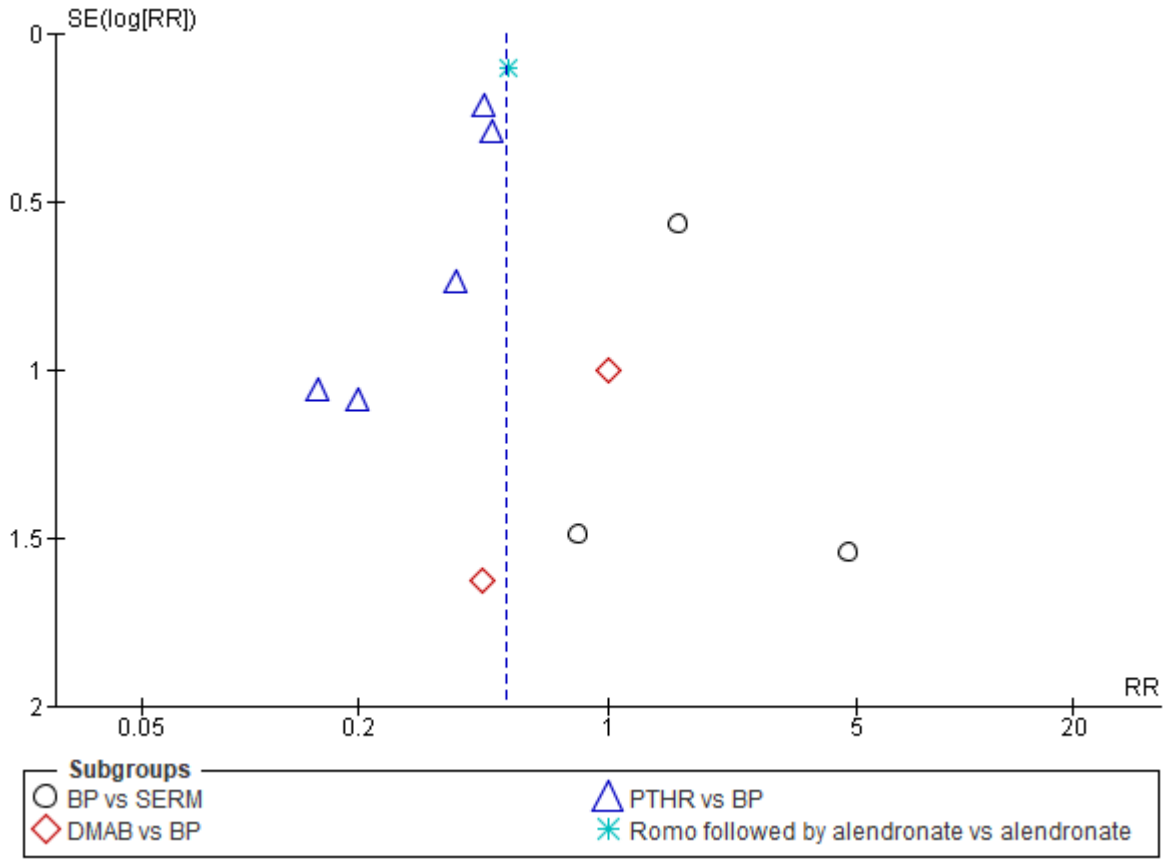
Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor agonist [PTHR], romosozumab [Romo], selective oestrogen receptor modulators [SERM], SE [standard error], RR [risk ratio]

Funnel plot of comparison: Treatment vs. Placebo, outcome: Vertebral fractures



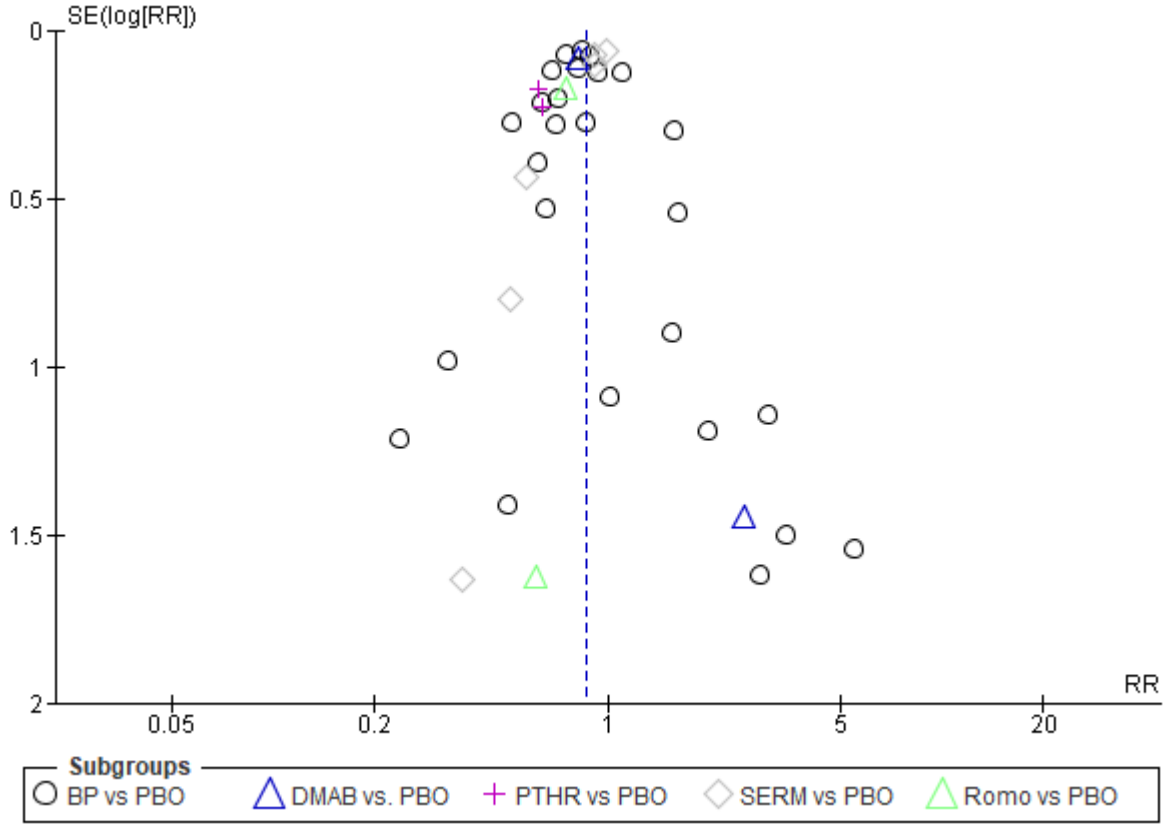
Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor agonist [PTHR], placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM], SE [standard error], RR [risk ratio]

Funnel plot of comparison: Treatment vs. Comparator, outcome: Vertebral fractures



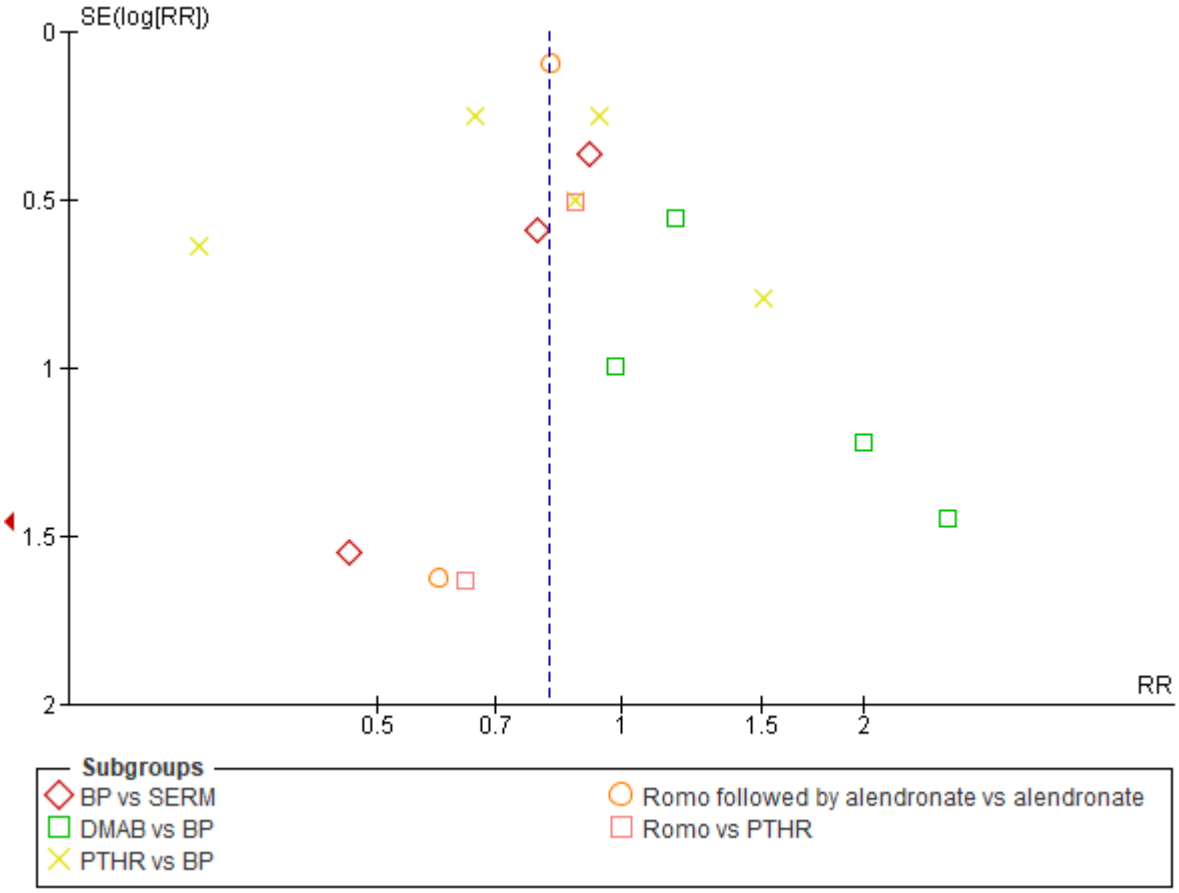
Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor agonist [PTHR], romosozumab [Romo], selective oestrogen receptor modulators [SERM], SE [standard error], RR [risk ratio]

Funnel plot of comparison: Treatment vs. Placebo, outcome: Non-vertebral fractures



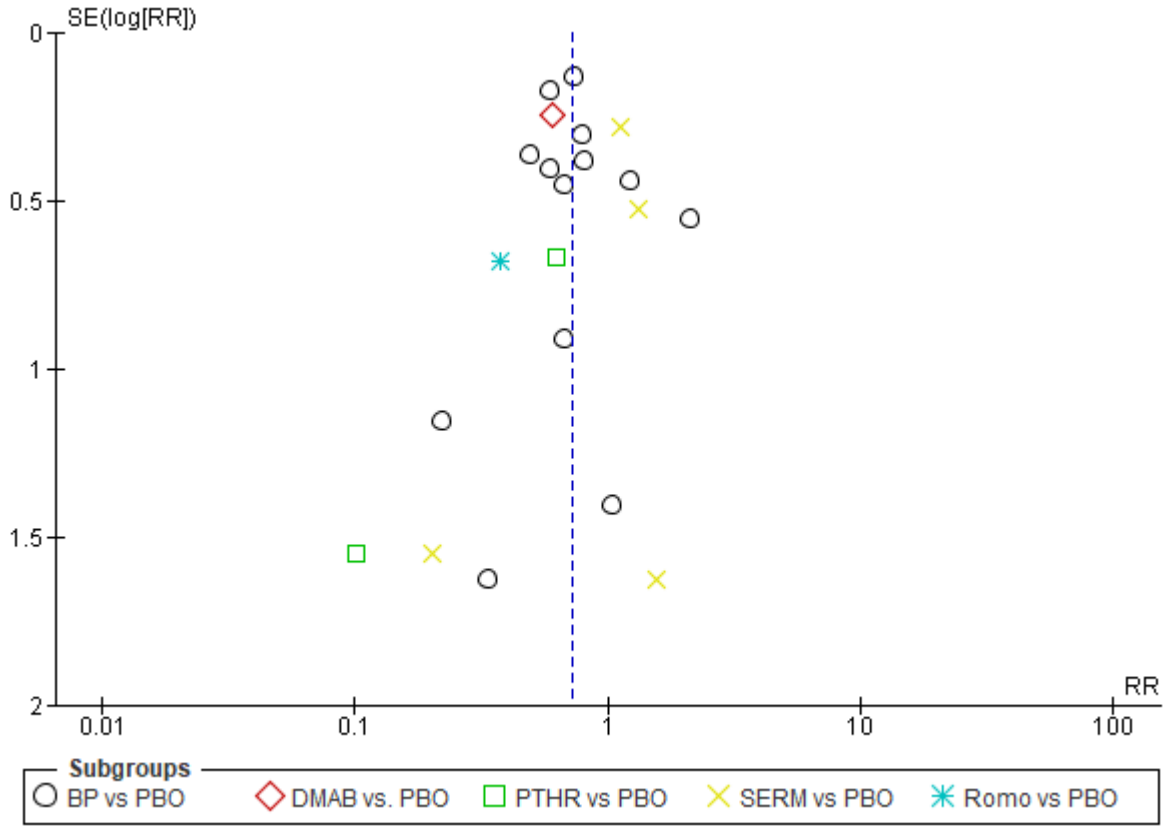
Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor agonist [PTHR], selective oestrogen receptor modulators [SERM], SE [standard error], RR [risk ratio]

Funnel plot of comparison: Treatment vs. Comparator, outcome: Non-vertebral fractures



Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor agonist [PTHR], romosozumab [Romo], selective oestrogen receptor modulators [SERM], SE [standard error], RR [risk ratio]

Funnel plot of comparison: Treatment vs. Placebo, outcome: Hip fractures



Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor agonist [PTHR], placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM], SE [standard error], RR [risk ratio]

S6 Table. Estimates of effects and quality ratings for comparison of drugs

Estimates of effects and quality ratings for comparison of drugs to prevent vertebral fractures

	Direct evidence		Network meta-analysis	
	Relative Risk [95% CI]	**Absolute Risk* [95% CI]**	**Odds Ratio [95% CI]**	**Certainty of Evidence**
Comparison				
PTHR *v* PBO	0.24 [0.14, 0.41]	96 fewer per 1000 [from 112 fewer to 74 fewer][§]	-	MODERATE[a]
SERM *v* PBO	0.67 [0.52, 0.86]	14 fewer per 1000 [from 20 fewer to 6 fewer] [§§]	-	MODERATE[a]
Romo *v* PBO	0.27 [0.16, 0.47]	13 fewer per 1000 [from 15 fewer to 10 fewer] [§§§]	-	MODERATE[a]
PTHR *v* BP	0.43 [0.31, 0.60]	63 fewer per 1000 [from 77 fewer to 44 fewer] [§§§§]	-	MODERATE[a]
Dmab *v* BP	0.80 [0.15, 4.24]	-	-	LOW[a,d]
Romo *v* BP	0.52 [0.43, 0.64]	57 fewer per 1000 [from 68 fewer to 43 fewer] [§§§§§]	-	MODERATE[a]
Romo *v* PTHR	-	-	-	LOW[a,d]
BP *v* Dmab	-	-	1.83 [1.14, 2.93]	MODERATE[a]
BP *v* PBO	0.61 [0.52, 0.70]	26 fewer per 1000 [from 32 fewer to 20 fewer] [§§§§§§]	0.58 [0.50, 0.67]	MODERATE[a]
BP *v* PTHR	-	-	2.51 [1.82, 3.46]	MODERATE[a]
BP *v* Romo	-	-	2.06 [1.40, 3.03]	MODERATE[a]
BP *v* SERM	1.64 [0.61, 4.38]	-	0.97 [0.73, 1.29]	LOW[a,d]
Dmab *v* PBO	0.33 [0.26, 0.41]	46 fewer per 1000 [from 50 fewer to 40 fewer] [§§§§§§§]	0.32 [0.20, 0.50]	MODERATE[a]
Dmab *v* PTHR	-	-	1.37 [0.79, 2.39]	LOW[a,d]
Dmab *v* Romo	-	-	1.13 [0.62, 2.06]	LOW[a,d]
Dmab *v* SERM	-	-	0.53 [0.32, 0.89]	LOW[a,d]
PBO *v* PTHR	-	-	4.36 [3.15, 6.01]	MODERATE[a]
PBO *v* Romo	-	-	3.58 [2.41, 5.32]	MODERATE[a]
PBO *v* SERM	-	-	1.69 [1.32, 2.16]	MODERATE[a]
PTHR *v* Romo	-	-	0.82 [0.50, 1.35]	LOW[a,d]
PTHR *v* SERM	-	-	0.39 [0.26, 0.58]	MODERATE[a]
Romo *v* SERM	-	-	0.47 [0.30, 0.75]	MODERATE[a]

Abbreviations: Bisphosphonates [BP], confidence interval [CI], denosumab [Dmab], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM].
*The absolute measure of intervention effects is a difference between the baseline risk of an outcome (median in control group) and the risk of outcome after the intervention is applied. [§] Baseline risk calculated from Neer 2001; [§§] Baseline risk calculated from Silverman 2008; [§§§] Baseline risk calculated from Cosman 2016; [§§§§] Baseline risk calculated from Cosman 2005; [§§§§§] Baseline risk calculated from Saag 2017; [§§§§§§] Baseline risk calculated from Bone 1997; [§§§§§§§] Baseline risk calculated from Cummings 2009

[a] Downgraded due to serious risk of bias; [b] Downgraded due to serious risk of inconsistency; [c] Downgraded due to serious risk of indirectness; [d] Downgraded due to serious risk of imprecision; [e] Downgraded due to serious risk of publication bias.

Estimates of effects and quality ratings for comparison of drugs to prevent non-vertebral fractures.

The network meta-analysis did not provide information on non-vertebral fractures

	Direct evidence		Network meta-analysis	
	Relative Risk [95% CI]	**Absolute Risk* [95% CI]**	**Odds Ratio [95% CI]**	**Certainty of Evidence**
Comparison				
PTHR *v* PBO	0.63 [0.48, 0.82]	15 fewer per 1000 [from 21 fewer to 7 fewer][§]	-	MODERATE[a]
SERM *v* PBO	0.94 [0.86, 1.02]	-	-	LOW[a,d]
Romo *v* PBO	0.75 [0.53, 1.05]	-	-	LOW[a,d]
PTHR *v* BP	0.77 [0.56, 1.05]	-	-	LOW[a,d]
Dmab *v* BP	1.29 [0.56, 2.99]	-	-	LOW[a,d]
Romo *v* BP	0.82 [0.68, 0.99]	-	-	LOW[a,d]
Romo *v* PTHR	0.85 [0.33, 2.20]	-	-	LOW[a,d]
BP *v* Dmab	-	-	-	-
BP *v* PBO	0.83 [0.76, 0.90]	8 fewer per 1000 [from 11 fewer to 5 fewer][§§]	-	MODERATE[a]
BP *v* PTHR	-	-	-	-
BP *v* Romo	-	-	-	-
BP *v* SERM	0.76 [0.42, 1.39]	-	-	LOW[a,d]
Dmab *v* PBO	0.82 [0.69, 0.96]	14 fewer per 1000 [from 23 fewer to 3 fewer][§§§]	-	MODERATE[a]
Dmab *v* PTHR	-	-	-	-
Dmab *v* Romo	-	-	-	-
Dmab *v* SERM	-	-	-	-
PBO *v* PTHR	-	-	-	-
PBO *v* Romo	-	-	-	-
PBO *v* SERM	-	-	-	-
PTHR *v* Romo	-	-	-	-
PTHR *v* SERM	-	-	-	-
Romo *v* SERM	-	-	-	-

Abbreviations: Bisphosphonates [BP], confidence interval [CI], denosumab [Dmab], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM].
*The absolute measure of intervention effects is a difference between the baseline risk of an outcome (median in control group) and the risk of outcome after the intervention is applied. [§] Baseline risk calculated from Miller 2016 (ACTIVE study); [§§] Baseline risk calculated from Hooper 2005; [§§§] Baseline risk calculated from Cummings 2009.

[a] Downgraded due to serious risk of bias; [b] Downgraded due to serious risk of inconsistency; [c] Downgraded due to serious risk of indirectness; [d] Downgraded due to serious risk of imprecision; [e] Downgraded due to serious risk of publication bias.

Estimates of effects and quality ratings for comparison of drugs to prevent hip fractures

	Direct evidence		Network meta-analysis	
	Relative Risk [95% CI]	**Absolute Risk* [95% CI]**	**Odds Ratio [95% CI]**	**Certainty of Evidence**
Comparison				
PTHR *v* PBO	0.43 [0.10, 1.82]	-	-	LOW[a,d]
SERM *v* PBO	1.11 [0.69, 1.79]	-	-	LOW[a,d]
Romo *v* PBO	0.37 [0.10, 1.41]	-	-	LOW[a,d]
PTHR *v* BP	0.68 [0.20, 2.40]	-	-	LOW[a,d]
Dmab *v* BP	0.33 [0.01, 8.14]	-	-	LOW[a,d]
Romo *v* BP	0.62 [0.42, 0.91]	12 fewer per 1000 [from 19 fewer to 3 fewer][§]	-	MODERATE[a]
Romo *v* PTHR	3.00 [0.12, 73.24]	-	-	LOW[a,d]
BP *v* Dmab	-	-	1.25 [0.74, 2.13]	LOW[a,d]
BP *v* PBO	0.70 [0.59, 0.83]	4 fewer per 1000 [from 5 fewer to 2 fewer][§§]	0.72 [0.60, 0.85]	MODERATE[a]
BP *v* PTHR	-	-	1.63 [0.81, 3.26]	LOW[a,d]
BP *v* Romo	-	-	1.63 [1.10, 2.42]	MODERATE[a]
BP *v* SERM	0.42 [0.06, 2.88]	-	0.72 [0.45, 1.16]	LOW[a,d]
Dmab *v* PBO	0.61 [0.37, 0.98]	4 fewer per 1000 [from 7 fewer to 0 fewer][§§§]	0.57 [0.35, 0.95]	MODERATE[a]
Dmab *v* PTHR	-	-	1.30 [0.55, 3.07]	LOW[a,d]
Dmab *v* Romo	-	-	1.31 [0.68, 2.52]	LOW[a,d]
Dmab *v* SERM	-	-	0.58 [0.30, 1.13]	LOW[a,d]
PBO *v* PTHR	-	-	2.28 [1.13, 4.58]	MODERATE[a]
PBO *v* Romo	-	-	2.28 [1.50, 3.48]	MODERATE[a]
PBO *v* SERM	-	-	1.01 [0.65, 1.58]	LOW[a,d]
PTHR *v* Romo	-	-	1.00 [0.45, 2.22]	LOW[a,d]
PTHR *v* SERM	-	-	0.44 [0.20, 1.01]	LOW[a,d]
Romo *v* SERM	-	-	0.44 [0.24, 0.81]	MODERATE[a]

Abbreviations: Bisphosphonates [BP], confidence interval [CI], denosumab [Dmab], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM].
*The absolute measure of intervention effects is a difference between the baseline risk of an outcome (median in control group) and the risk of outcome after the intervention is applied. [§] Baseline risk calculated from Saag 2017; [§§] Baseline risk calculated from Reid 2018; [§§§] Baseline risk calculated from Cummings 2009.
[a] Downgraded due to serious risk of bias; [b] Downgraded due to serious risk of inconsistency; [c] Downgraded due to serious risk of indirectness; [d] Downgraded due to serious risk of imprecision; [e] Downgraded due to serious risk of publication bias.

Estimates of effects and quality ratings for comparison of drugs to prevent major osteoporotic fractures

	Direct evidence		Network meta-analysis	
	Relative Risk [95% CI]	**Absolute Risk* [95% CI]**	**Odds Ratio [95% CI]**	**Certainty of Evidence**
Comparison				
PTHR *v* PBO	0.52 [0.37, 0.75]	20 fewer per 1000 [from 26 fewer to 10 fewer]	-	MODERATE[a]
SERM *v* PBO	0.57 [0.24, 1.34]	-	-	LOW[a,d]
Romo *v* PBO	0.60 [0.40, 0.89]	7 fewer per 1000 [from 11 fewer to 2 fewer]	-	MODERATE[a]
PTHR *v* BP	0.46 [0.27, 0.79]	32 fewer per 1000 [from 44 fewer to 13 fewer]	-	MODERATE[a]
Dmab *v* BP	1.26 [0.67, 2.38]	-	-	LOW[a,d]
Romo *v* BP	0.72 [0.52, 0.99]	-	-	MODERATE[a]
BP *v* Dmab	-	-	0.71 [0.30, 1.66]	LOW[a,d]
BP *v* PBO	1.01 [0.19, 5.38]	-	0.66 [0.46, 0.94]	MODERATE[a]
BP *v* PTHR	-	-	1.29 [0.69, 2.42]	LOW[a,d]
BP *v* Romo	-	-	1.28 [0.84, 1.95]	LOW[a,d]
BP *v* SERM	-	-	1.18 [0.33, 4.27]	LOW[a,d]
Dmab *v* PBO	3.73 [0.22, 61.96]	-	0.93 [0.38, 2.26]	LOW[a,d]
Dmab *v* PTHR	-	-	1.82 [0.65, 5.07]	LOW[a,d]
Dmab *v* Romo	-	-	1.81 [0.71, 4.60]	LOW[a,d]
Dmab *v* SERM	-	-	1.66 [0.37, 7.56]	LOW[a,d]
PBO *v* PTHR	-	-	1.96 [1.15, 3.33]	MODERATE[a]
PBO *v* Romo	-	-	1.95 [1.26, 3.04]	MODERATE[a]
PBO *v* SERM	-	-	1.79 [0.52, 6.21]	LOW[a,d]
PTHR *v* Romo	-	-	1.00 [0.50, 1.98]	LOW[a,d]
PTHR *v* SERM	-	-	0.92 [0.24, 3.52]	LOW[a,d]
Romo *v* SERM	-	-	0.92 [0.25, 3.42]	LOW[a,d]

Abbreviations: Bisphosphonates [BP], confidence interval [CI], denosumab [Dmab], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM].
*The absolute measure of intervention effects is a difference between the baseline risk of an outcome (median in control group) and the risk of outcome after the intervention is applied. [§] Baseline risk calculated from Miller 2016 (ACTIVE); [§§] Baseline risk calculated from Reid 2018; [§§§] Baseline risk calculated from Cummings 2009.
[a] Downgraded due to serious risk of bias; [b] Downgraded due to serious risk of inconsistency; [c] Downgraded due to serious risk of indirectness; [d] Downgraded due to serious risk of imprecision; [e] Downgraded due to serious risk of publication bias.

Estimates of effects and quality ratings for comparison of drugs in relation to all-cause mortality

	Direct evidence		Network meta-analysis	
	Relative Risk [95% CI]	**Absolute Risk [95% CI]**	**Odds Ratio [95% CI]**	**Certainty of Evidence**
Comparison				
PTHR *v* PBO	1.27 [0.64, 2.51]	-	-	LOW[a,d]
SERM *v* PBO	0.94 [0.85, 1.05]	-	-	LOW[a,d]
Romo *v* PBO	0.81 [0.22, 2.96]	-	-	LOW[a,d]
PTHR *v* BP	0.70 [0.24, 2.02]	-	-	LOW[a,d]
Dmab *v* BP	0.62 [0.17, 2.20]	-	-	LOW[a,d]
Romo *v* BP	0.98 [0.74, 1.31]	-	-	LOW[a,d]
Romo *v* PTHR	0.82 [0.10, 6.62]	-	-	LOW[a,d]
SERM *v* BP	1.63 [0.20, 13.20]	-	-	LOW[a,d]
BP *v* Dmab	-	-	1.34 [0.95, 1.89]	LOW[a,d]
BP *v* PBO	0.99 [0.86, 1.12]	-	0.99 [0.86, 1.13]	LOW[a,d]
BP *v* PTHR	-	-	0.86 [0.51, 1.43]	LOW[a,d]
BP *v* Romo	-	-	0.96 [0.75, 1.24]	LOW[a,d]
BP *v* SERM	-	-	1.05 [0.87, 1.26]	LOW[a,d]
Dmab *v* PBO	0.77 [0.57, 1.05]	-	0.73 [0.53, 1.01]	LOW[a,d]
Dmab *v* PTHR	-	-	0.69 [0.35, 1.17]	LOW[a,d]
Dmab *v* Romo	-	-	0.72 [0.48, 1.08]	LOW[a,d]
Dmab *v* SERM	-	-	0.78 [0.55, 1.10]	LOW[a,d]
PBO *v* PTHR	-	-	0.87 [0.52, 1.46]	LOW[a,d]
PBO *v* Romo	-	-	0.98 [0.76, 1.27]	LOW[a,d]
PBO *v* SERM	-	-	1.06 [0.94, 1.21]	LOW[a,d]
PTHR *v* Romo	-	-	1.13 [0.64, 1.98]	LOW[a,d]
PTHR *v* SERM	-	-	1.22 [0.72, 2.08]	LOW[a,d]
Romo *v* SERM	-	-	1.09 [0.81, 1.45]	LOW[a,d]

Abbreviations: Bisphosphonates [BP], confidence interval [CI], denosumab [Dmab], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM].
[a] Downgraded due to serious risk of bias; [b] Downgraded due to serious risk of inconsistency; [c] Downgraded due to serious risk of indirectness; [d] Downgraded due to serious risk of imprecision; [e] Downgraded due to serious risk of publication bias.

Estimates of effects and quality ratings for comparison of drugs in relation to adverse events

	Direct evidence		Network meta-analysis	
	Relative Risk [95% CI]	**Absolute Risk [95% CI]**	**Odds Ratio [95% CI]**	**Certainty of Evidence**
Comparison				
PTHR *v* PBO	0.97 [0.89, 1.06]	-	-	LOW[a,d]
SERM *v* PBO	1.00 [0.99, 1.00]	-	-	LOW[a,d]
Romo *v* PBO	0.99 [0.97, 1.01]	-	-	LOW[a,d]
PTHR *v* BP	0.94 [0.87, 1.01]	-	-	LOW[a,d]
Dmab *v* BP	0.98 [0.95, 1.02]	-	-	LOW[a,d]
Romo *v* BP	0.98 [0.96, 1.00]	-	-	LOW[a,d]
Romo *v* PTHR	1.15 [1.00, 1.33]	-	-	LOW[a,d]
SERM *v* BP	1.01 [0.94, 1.09]	-	-	LOW[a,d]
BP *v* Dmab	-	-	1.09 [0.94, 1.26]	LOW[a,d]
BP *v* PBO	1.01 [1.00, 1.02]	-	1.11 [1.02, 1.20]	LOW[a,d]
BP *v* PTHR	-	-	1.19 [0.99, 1.44]	LOW[a,d]
BP *v* Romo	-	-	1.09 [0.91, 1.30]	LOW[a,d]
BP *v* SERM	-	-	1.07 [0.91, 1.25]	LOW[a,d]
Dmab *v* PBO	1.00 [0.98, 1.01]	-	1.02 [0.87, 1.19]	LOW[a,d]
Dmab *v* PTHR	-	-	1.09 [0.86, 1.38]	LOW[a,d]
Dmab *v* Romo	-	-	1.00 [0.80, 1.26]	LOW[a,d]
Dmab *v* SERM	-	-	0.98 [0.80, 1.21]	LOW[a,d]
PBO *v* PTHR	-	-	1.07 [0.89, 1.30]	LOW[a,d]
PBO *v* Romo	-	-	0.98 [0.82, 1.18]	LOW[a,d]
PBO *v* SERM	-	-	0.97 [0.83, 1.12]	LOW[a,d]
PTHR *v* Romo	-	-	0.92 [0.73, 1.16]	LOW[a,d]
PTHR *v* SERM	-	-	0.90 [0.71, 1.14]	LOW[a,d]
Romo *v* SERM	-	-	0.98 [0.78, 1.24]	LOW[a,d]

Abbreviations: Bisphosphonates [BP], confidence interval [CI], denosumab [Dmab], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM].
[a] Downgraded due to serious risk of bias; [b] Downgraded due to serious risk of inconsistency; [c] Downgraded due to serious risk of indirectness; [d] Downgraded due to serious risk of imprecision; [e] Downgraded due to serious risk of publication bias.

Estimates of effects and quality ratings for comparison of drugs in relation to number of patients cardiovascular related serious adverse events

	Direct evidence		Network meta-analysis	
	Relative Risk [95% CI]	**Absolute Risk [95% CI]**	**Odds Ratio [95% CI]**	**Certainty of Evidence**
Comparison				
SERM *v* PBO	1.03 [0.95, 1.11]	-	-	LOW[a,d]
Romo *v* PBO	1.04 [0.76, 1.41]	-	-	LOW[a,d]
PTHR *v* BP	0.74 [0.20, 2.69]	-	-	LOW[a,d]
Dmab *v* BP	1.24 [0.37, 4.23]	-	-	LOW[a,d]
Romo *v* BP	1.08 [0.85, 1.37]	-	-	LOW[a,d]
Romo *v* PTHR	4.91 [0.24, 101.65]	-	-	LOW[a,d]
BP *v* Dmab	-	-	0.91 [0.67, 1.23]	LOW[a,d]
BP *v* PBO	0.91 [0.77, 1.09]	-	0.94 [0.76, 1.16]	LOW[a,d]
BP *v* PTHR	-	-	1.36 [0.71, 2.59]	LOW[a,d]
BP *v* Romo	-	-	0.91 [0.72, 1.15]	LOW[a,d]
BP *v* SERM	-	-	0.91 [0.72, 1.15]	LOW[a,d]
Dmab *v* PBO	0.98 [0.62, 1.53]	-	1.04 [0.83, 1.31]	LOW[a,d]
Dmab *v* PTHR	-	-	1.50 [0.73, 3.05]	LOW[a,d]
Dmab *v* Romo	-	-	1.01 [0.72, 1.41]	LOW[a,d]
Dmab *v* SERM	-	-	1.00 [0.78, 1.29]	LOW[a,d]
PBO *v* PTHR	-	-	1.44 [0.73, 2.84]	LOW[a,d]
PBO *v* Romo	-	-	0.97 [0.75, 1.25]	LOW[a,d]
PBO *v* SERM	-	-	0.97 [0.87, 1.07]	LOW[a,d]
PTHR *v* Romo	-	-	0.67 [0.34, 1.33]	LOW[a,d]
PTHR *v* SERM	-	-	0.67 [0.34, 1.33]	LOW[a,d]
Romo *v* SERM	-	-	1.00 [0.76, 1.32]	LOW[a,d]

Abbreviations: Bisphosphonates [BP], confidence interval [CI], denosumab [Dmab], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM].
[a] Downgraded due to serious risk of bias; [b] Downgraded due to serious risk of inconsistency; [c] Downgraded due to serious risk of indirectness; [d] Downgraded due to serious risk of imprecision; [e] Downgraded due to serious risk of publication bias.

S7 Table. Cochrane Risk of Bias tool 2

Risk of bias assessment as assessed by the Cochrane risk of bias tool 2. The specific type of bias is presented in the top column, and the individual studies in the left row. The tool includes the following domains on risk of bias: arising from the randomization process (D1), due to deviations from the intended interventions (D2), due to missing outcome data (D3), in measurement of the outcome (D4), and in selection of the reported result (D5).

The crib sheet for parallel trials was applied, and we aimed to assess the effect of assignment to the intervention. The risk of bias was assumed to be equivalent across different fracture site outcomes. Each of the domains was scored as 'high', 'low' or 'some concerns' in relation to risk of bias. An overall risk of bias judgement for each study was made. High risk of bias was given if there was high risk of bias in at least one domain, or if three or more domains were rated to have some concerns. Low risk of bias was given if there were low risk of bias in all domains, and some concerns was given, if there were some concerns in at least one domain, but not high risk of bias in any of the domains. The following sources were obtained to help inform the risk of bias assessment: journal article(s), conference abstract(s), trial protocol or trial registry record (e.g. clinicaltrials.gov) and was therefore exclusively based on published information.

Study	**D1**	**D2**	**D3**	**D4**	**D5**	**Overall**
Adachi 2009	Low	Low	High	Low	Some concerns	High
Adami 2008	High	Some concerns	High	Low	Some concerns	High
Anastasilakis 2015	Some concerns	High	High	Low	Some concerns	High
Ascott Evans 2003	Some concerns	Low	High	Low	Some concerns	High
Bell 2002	Some concerns	Low	High	Low	Some concerns	High
Black 1996 (FIT 1)	Some concerns	Low	Low	Low	Some concerns	Some concerns
Black 2007 (HORIZON PFT)	Some concerns	Low	Low	Low	Some concerns	Some concerns
Bock 2012	Low	Low	Low	Low	Some concerns	Some concerns
Body 2002	Some concerns	Low	Low	Low	Some concerns	Some concerns
Bone 1997	Some concerns	Low	Some concerns	Low	Some concerns	High
Bone 2000	Some concerns	Low	Some concerns	Low	Some concerns	High
Brown 2009 (DECIDE)	Some concerns	Low	Some concerns	Low	Some concerns	Some concerns
Chesnut 2004 (BONE)	Some concerns	Low	Some concerns	Low	Some concerns	High
Clemmesen 1997	Some concerns	Low	High	Low	Some concerns	High
Cosman 2001	Low	Some concerns	High	Low	Some concerns	High
Cosman 2005	Some concerns	Some concerns	Some concerns	Low	Some concerns	High

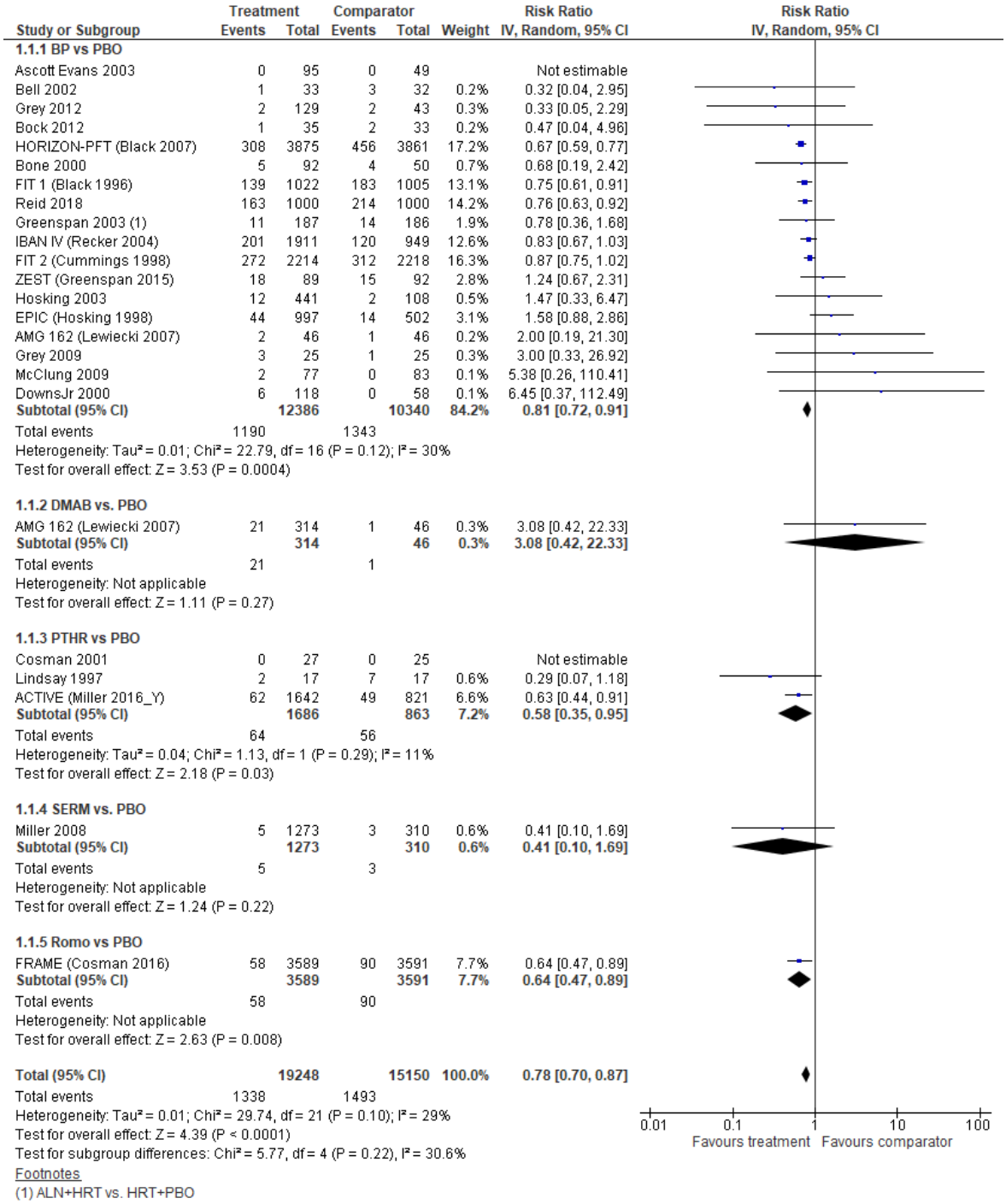
Study	D1	D2	D3	D4	D5	Overall
Cosman 2009	Some concerns	Some concerns	Some concerns	Low	Some concerns	High
Cosman 2011	Some concerns	Low	Some concerns	Low	Some concerns	High
Cosman 2016 (FRAME)	Low	Low	Low	Low	Low	Low
Cummings 1998 (FIT 2)	Low	Low	Some concerns	Low	Some concerns	Some concerns
Cummings 2009 (FREEDOM)	Some concerns	Some concerns	High	Low	Low	High
DownsJr 2000	Some concerns	Low	High	Low	Some concerns	High
Dursun 2001	Some concerns	High	High	Low	Some concerns	High
Ensrud 2008 (RUTH)	Some concerns	Low	High	Low	Some concerns	High
Ettinger 1999 (MORE)	Low	Low	Some concerns	Low	Some concerns	Some concerns
Fogelman 2000	Some concerns	Low	High	Low	Some concerns	High
Freemantle 2012 (DAPS)	Some concerns	Some concerns	Low	Low	Some concerns	High
Galesanu 2018	Some concerns	High	High	Some concerns	Some concerns	High
Geusens 2018 (VERO)	Some concerns	Some concerns	High	Low	High	High
Greenspan 1998	Some concerns	Low	High	Low	Some concerns	High
Greenspan 2003	Low	Low	Low	Low	Some concerns	Some concerns
Greenspan 2015 (ZEST)	Some concerns	Low	Low	Low	Some concerns	Some concerns
Grey 2009	Some concerns	Low	Low	Low	Low	Some concerns
Grey 2012	Low	Low	Low	Low	Some concerns	Some concerns
Hadji 2012	Some concerns	Low	Some concerns	Low	Some concerns	High
Harris 1999 (VERT USA)	Some concerns	Low	Low	Low	Some concerns	Some concerns
Hooper 2005	Some concerns	Low	Low	Low	Some concerns	Some concerns
Hosking 1998 (EPIC)	Some concerns	Low	Low	Low	Some concerns	Some concerns
Hosking 2003	Low	Low	Low	Low	Some concerns	Some concerns
Kendler 2010 (STAND)	Some concerns	Low	Low	Low	Some concerns	Some concerns
Langdahl 2017 (STRUCTURE)	Low	Some concerns	Some concerns	Low	Some concerns	High
Lewiecki 2007 (AMG BONE)	Some concerns	High	High	Low	Some concerns	High
Lindsay 1997	Some concerns	Some concerns	Low	Low	Some concerns	High

Study	D1	D2	D3	D4	D5	Overall
Lufkin 1998	Some concerns	Low	High	Low	Some concerns	High
Malouf-Sierra 2017	Some concerns	Low	Low	Low	Some concerns	Some concerns
McClung 2001 (HIP)	Some concerns	Low	Some concerns	Low	Some concerns	High
McClung 2005	Some concerns	Low	Some concerns	Low	Some concerns	Some concerns
McClung 2009	Some concerns	Low	High	Low	Some concerns	High
McClung 2014	Some concerns	Low	Low	Low	Some concerns	Some concerns
Miller 2008	Low	Low	Some concerns	Low	Some concerns	Some concerns
Miller 2016_x	Low	Some concerns	Low	Low	Low	Some concerns
Miller 2016_y (ACTIVE)	Some concerns	Low	Low	Low	Low	Some concerns
Mortensen 1998	Some concerns	Low	Some concerns	Low	Some concerns	High
Muscoso 2004	Some concerns	Some concerns	Low	Low	Some concerns	High
Neer 2001 (FPT)	Some concerns	Low	Low	Low	Some concerns	Some concerns
Panico 2011	Some concerns	High	High	Low	Some concerns	High
Pols 1999 (FOSIT)	Some concerns	Low	High	Low	Some concerns	High
Recker 2004 (IBAN IV)	Some concerns	Low	High	Low	Some concerns	High
Recker 2007 (EVA)	Low	Low	Some concerns	Low	Some concerns	Some concerns
Recknor 2013	Low	Low	High	Low	Some concerns	High
Reginster 2000 (VERT EU)	Some concerns	Low	Some concerns	Low	Some concerns	High
Reginster 2003	Some concerns	Low	Low	Low	Some concerns	Some concerns
Reid 2002	Some concerns	Low	High	Low	Some concerns	High
Reid 2004	Some concerns	Low	Some concerns	Low	Some concerns	High
Reid 2018	Low	Low	Low	Low	Low	Low
Roux 2014	Some concerns	Low	Low	Low	Some concerns	Some concerns
Sambrook 2004 (EFFECT)	Some concerns	Low	Some concerns	Low	Some concerns	High
Silverman 2008	Low	Low	High	Low	Some concerns	High
Saag 2017 (ARCH)	Low	Low	Low	Low	Low	Low
Tucci 1996 (Liberman)	Some concerns	Low	High	Low	Some concerns	High

Study	**D1**	**D2**	**D3**	**D4**	**D5**	**Overall**
Välmaki 2007	Some concerns	Low	Low	Low	Some concerns	Some concerns

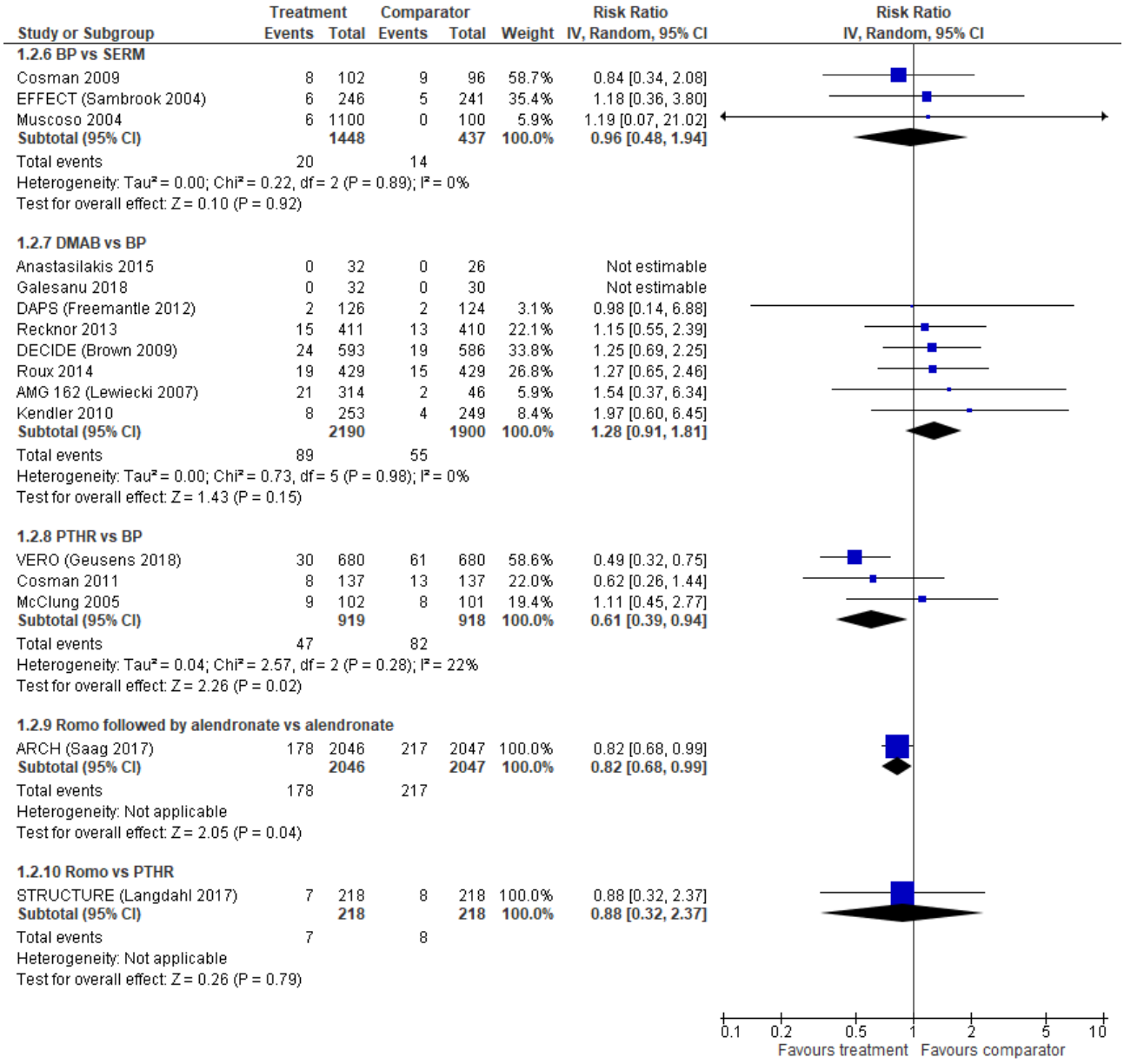
S2 Fig. Forest Plots

Forest plot of risk ratio on clinical fractures comparing treatment to placebo



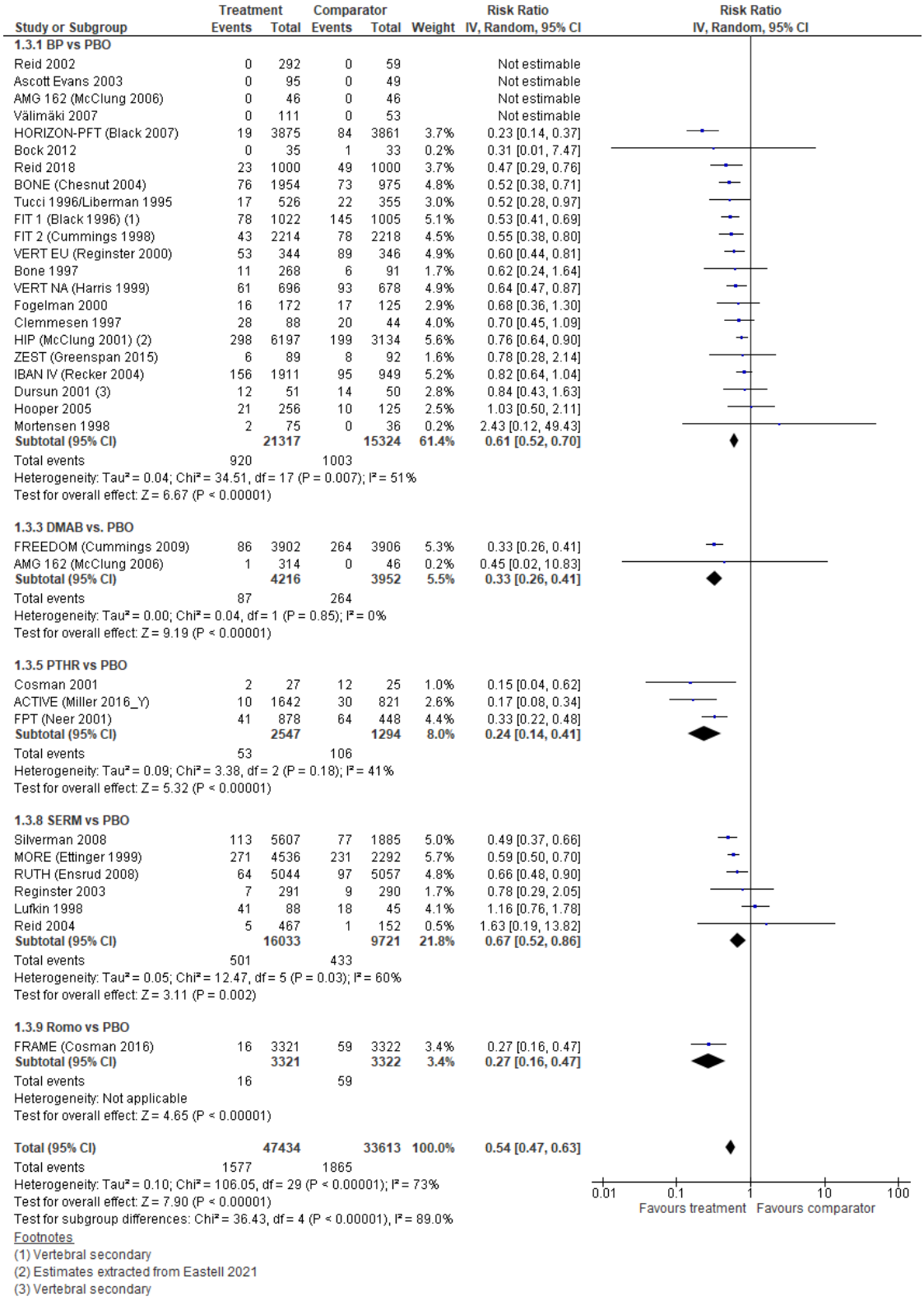
Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM], confidence interval [CI].

Forest plot of risk ratio on clinical fractures comparing treatment to other treatments



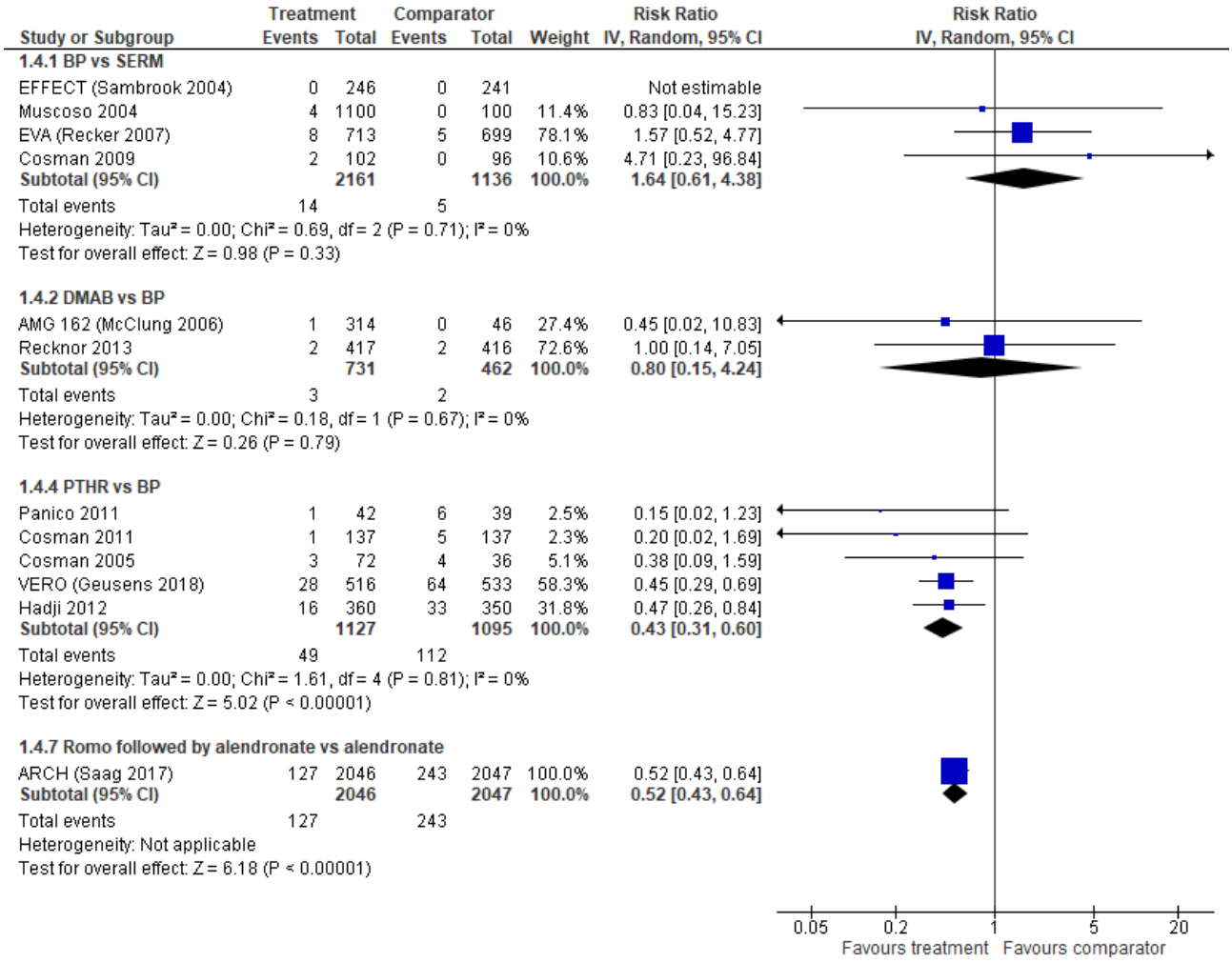
Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor [PTHR] agonists, romosozumab [Romo], selective oestrogen receptor modulators [SERM], confidence interval [CI].

Forest plot of risk ratio on vertebral fractures comparing treatment to placebo



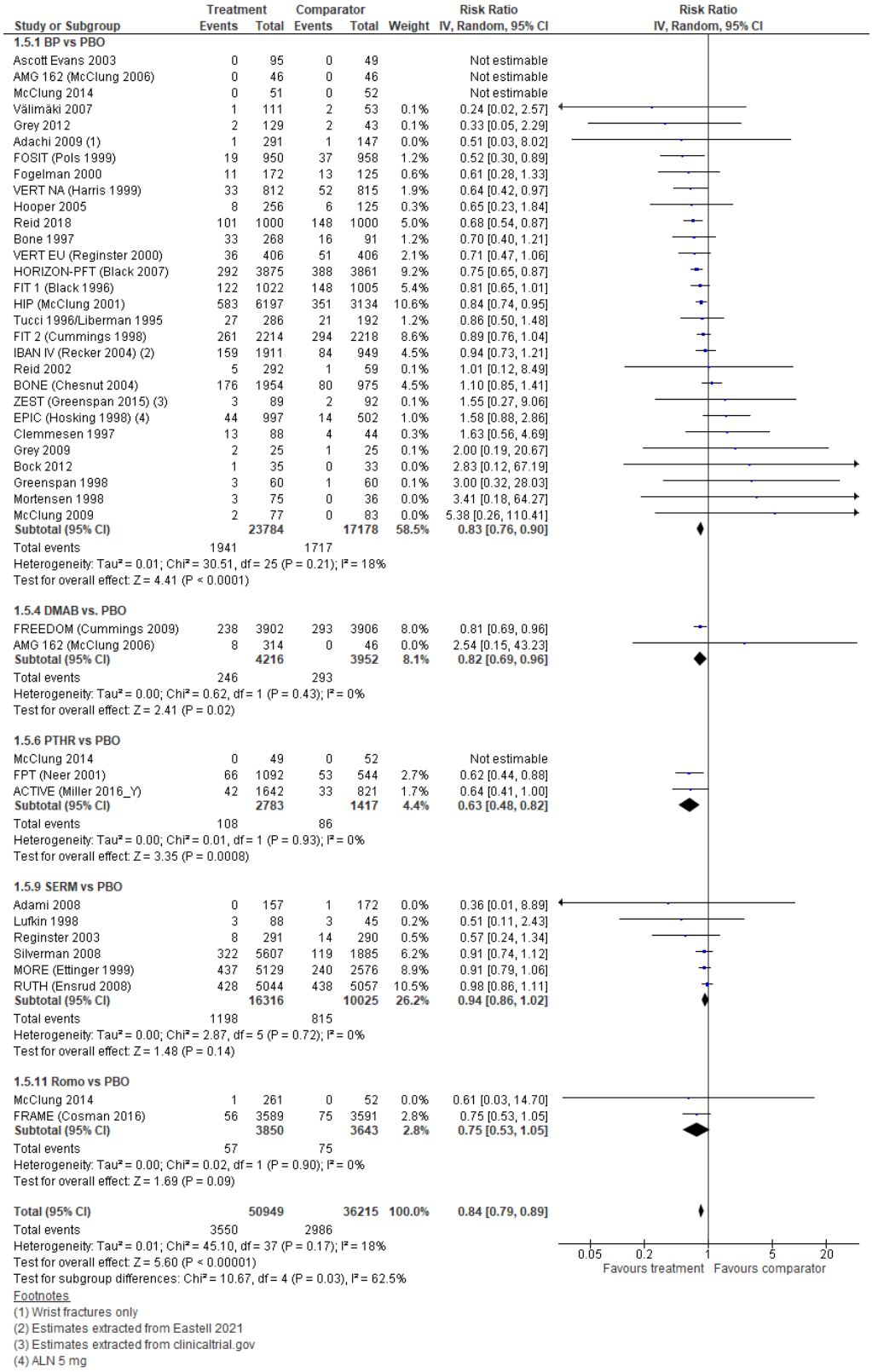
Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM], confidence interval [CI].

Forest plot of risk ratio on vertebral fractures comparing treatment to other treatments



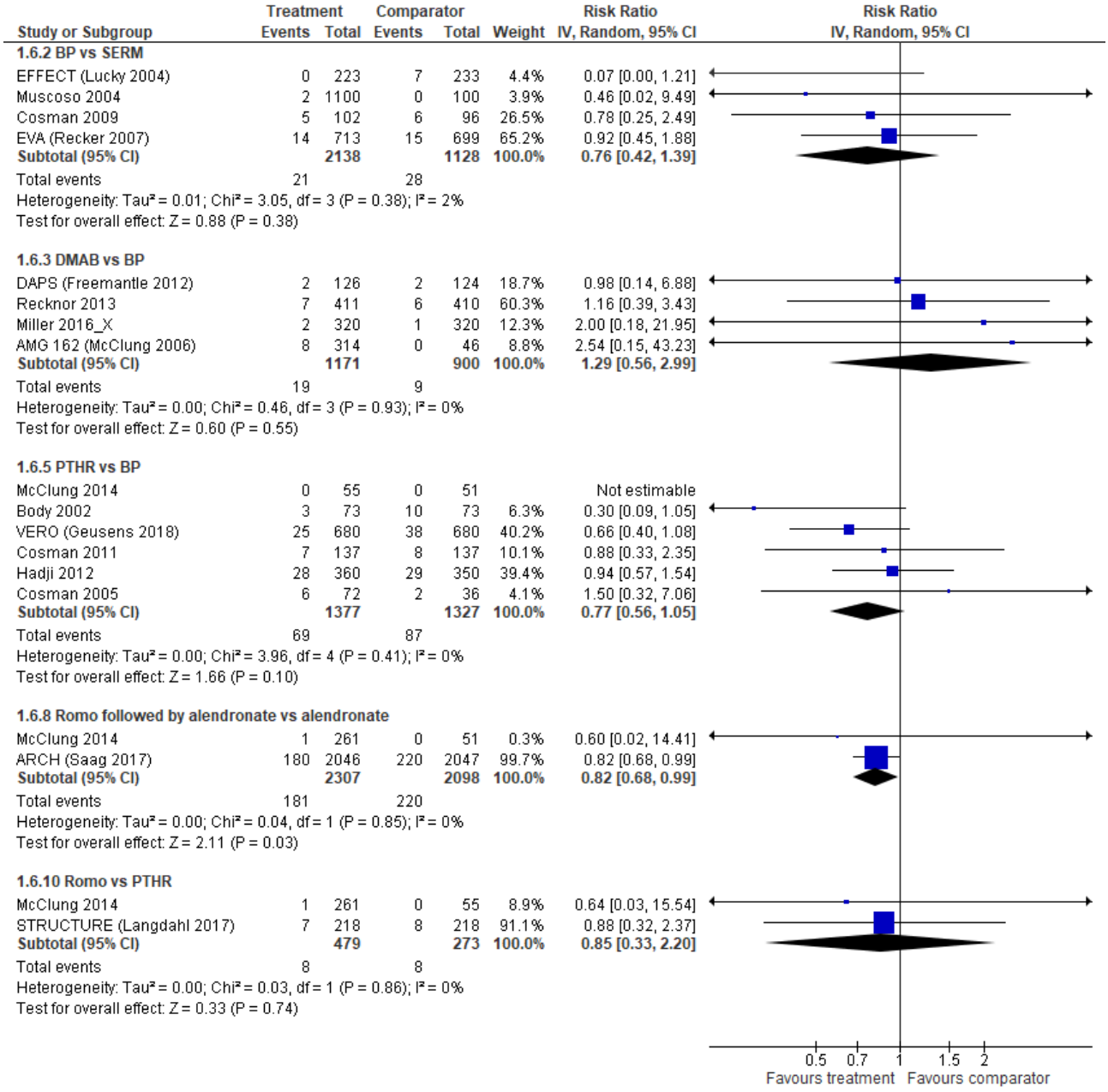
Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor [PTHR] agonists, romosozumab [Romo], selective oestrogen receptor modulators [SERM], confidence interval [CI].

Forest plot of risk ratio on non-vertebral fractures comparing treatment to placebo



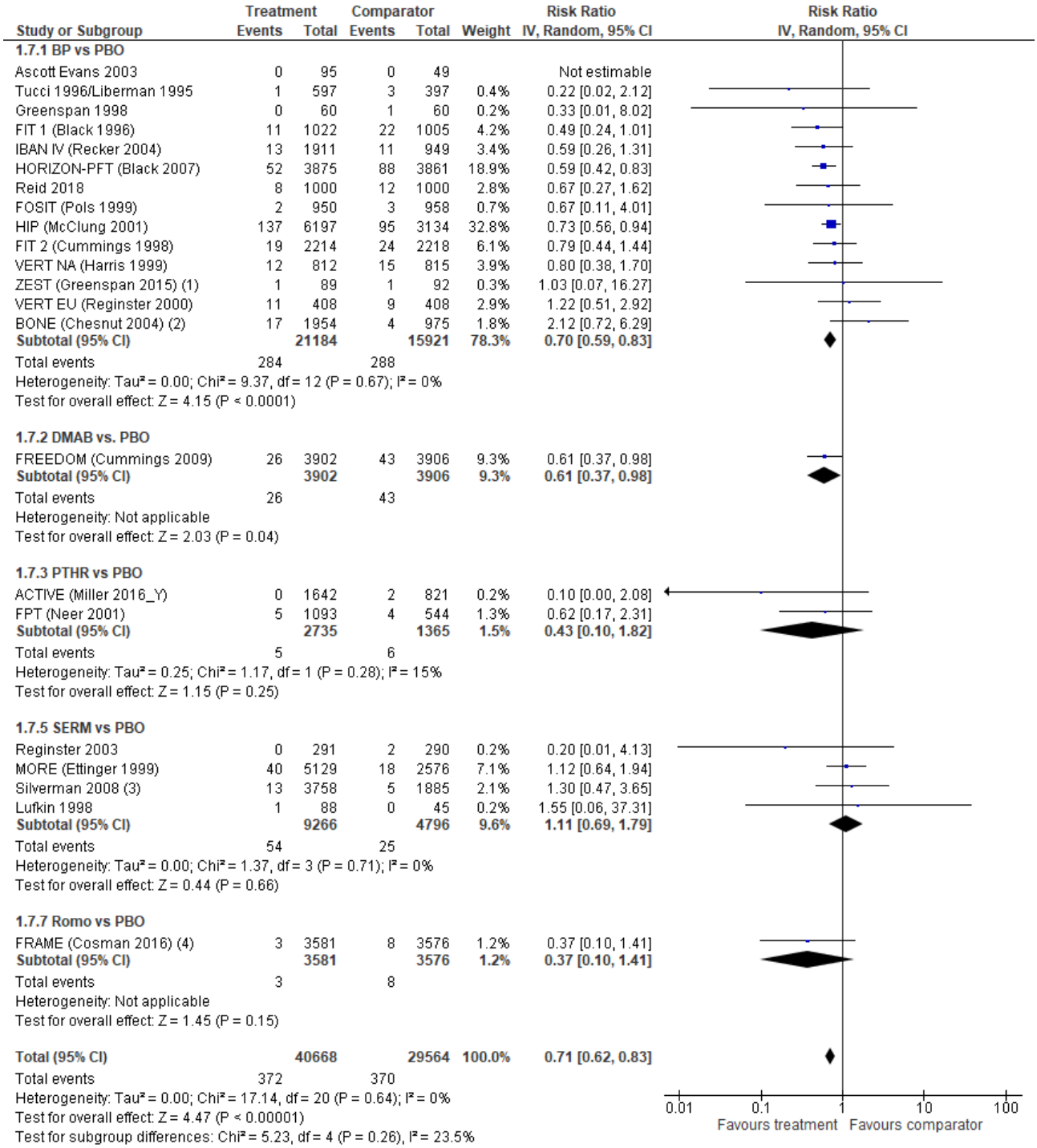
Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM], confidence interval [CI].

Forest plot of risk ratio on non-vertebral fractures comparing treatment to other treatments



Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor [PTHR] agonists, romosozumab [Romo], selective oestrogen receptor modulators [SERM], confidence interval [CI].

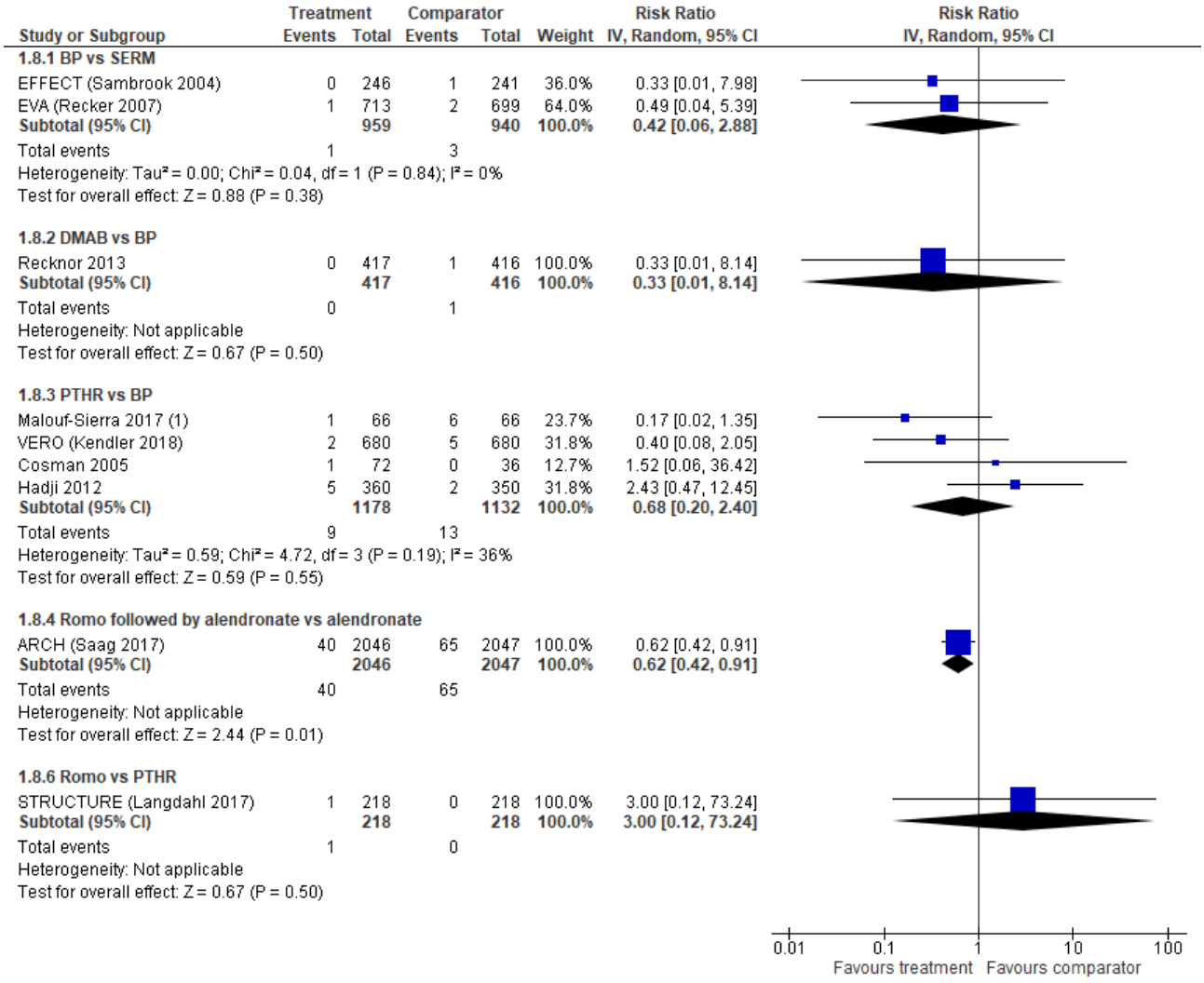
Forest plot of risk ratio on hip fractures comparing treatment to placebo



Footnotes

(1) Estimates extracted from clinicaltrial.gov
(2) Estimates extracted from Eastell 2021
(3) Estimates extracted from Eastell 2021
(4) Estimates extracted from clinicaltrial.gov

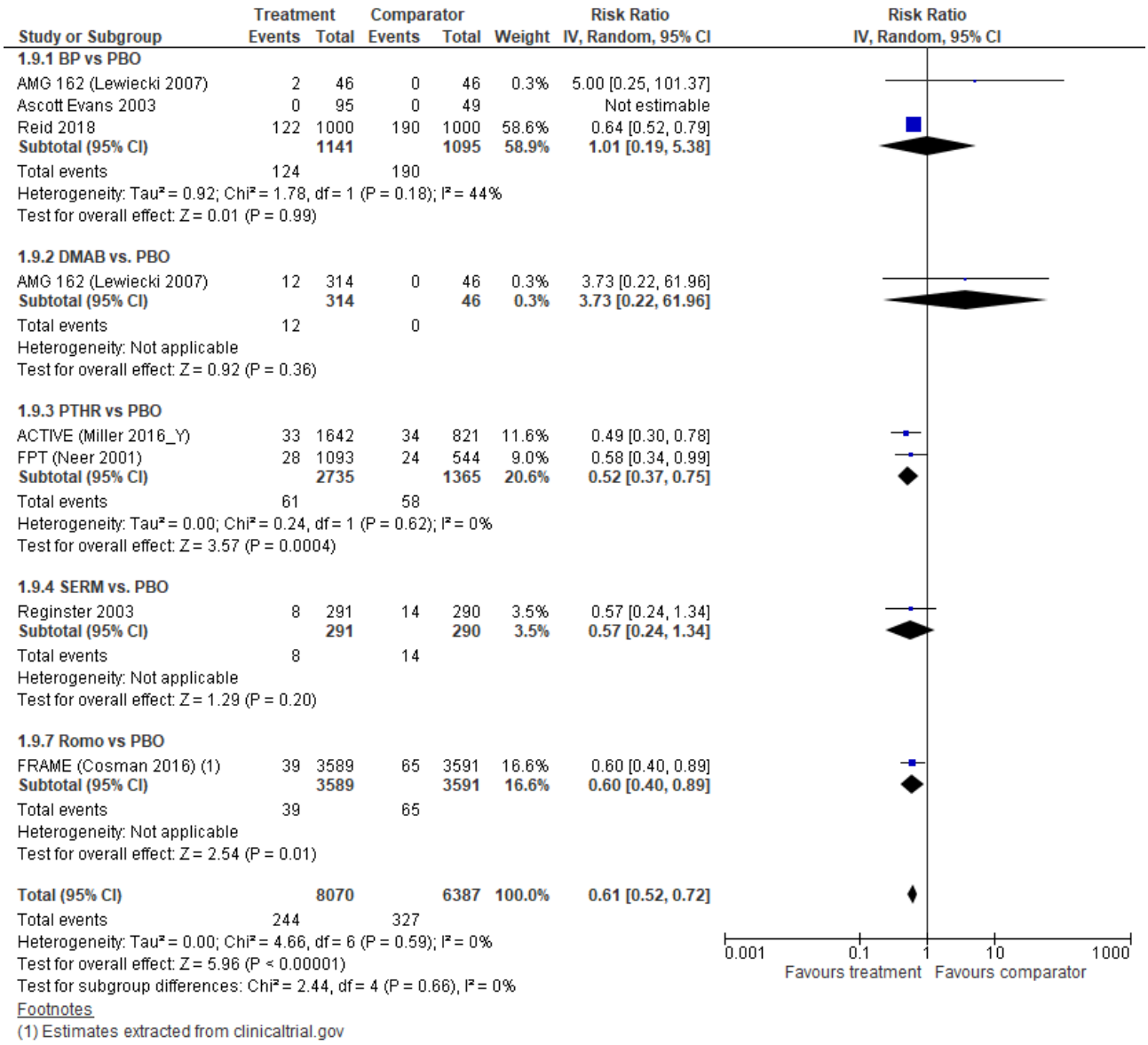
Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM], confidence interval [CI].Forest plot of risk ratio on hip fractures comparing treatment to other treatments



Footnotes
(1) Data on women only obtained from the authors

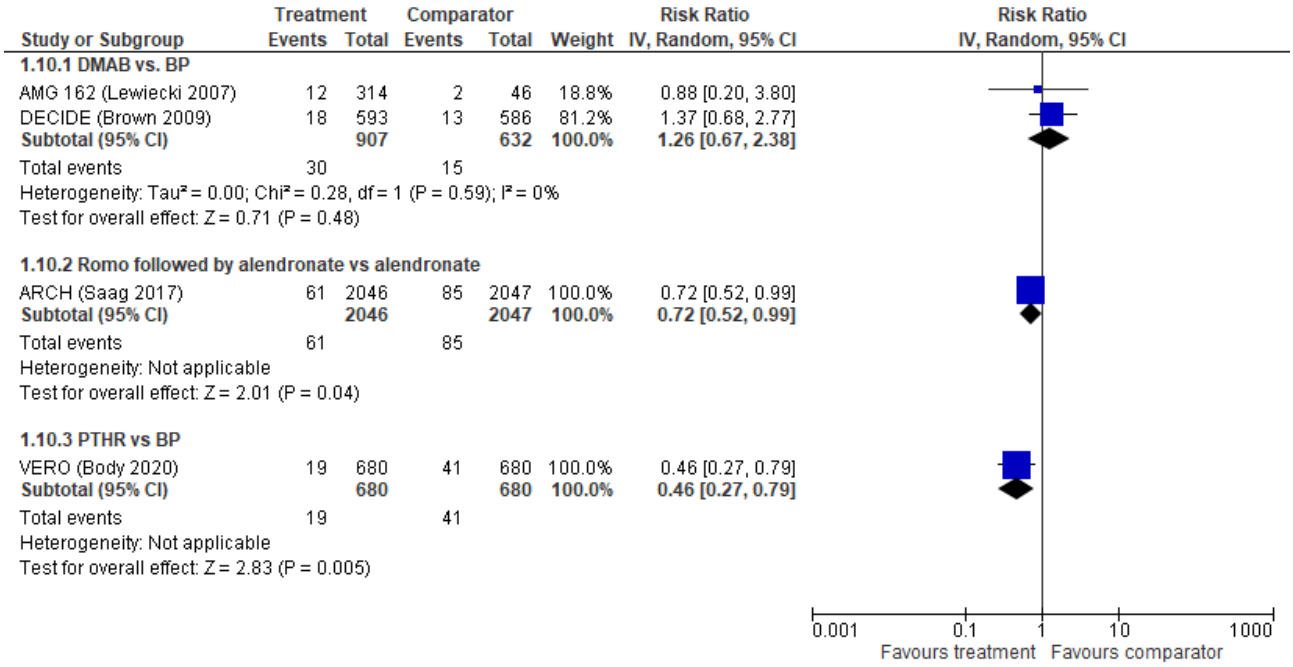
Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor [PTHR] agonists, romosozumab [Romo], selective oestrogen receptor modulators [SERM], confidence interval [CI].

Forest plot of risk ratio on major osteoporotic fractures comparing treatment to placebo



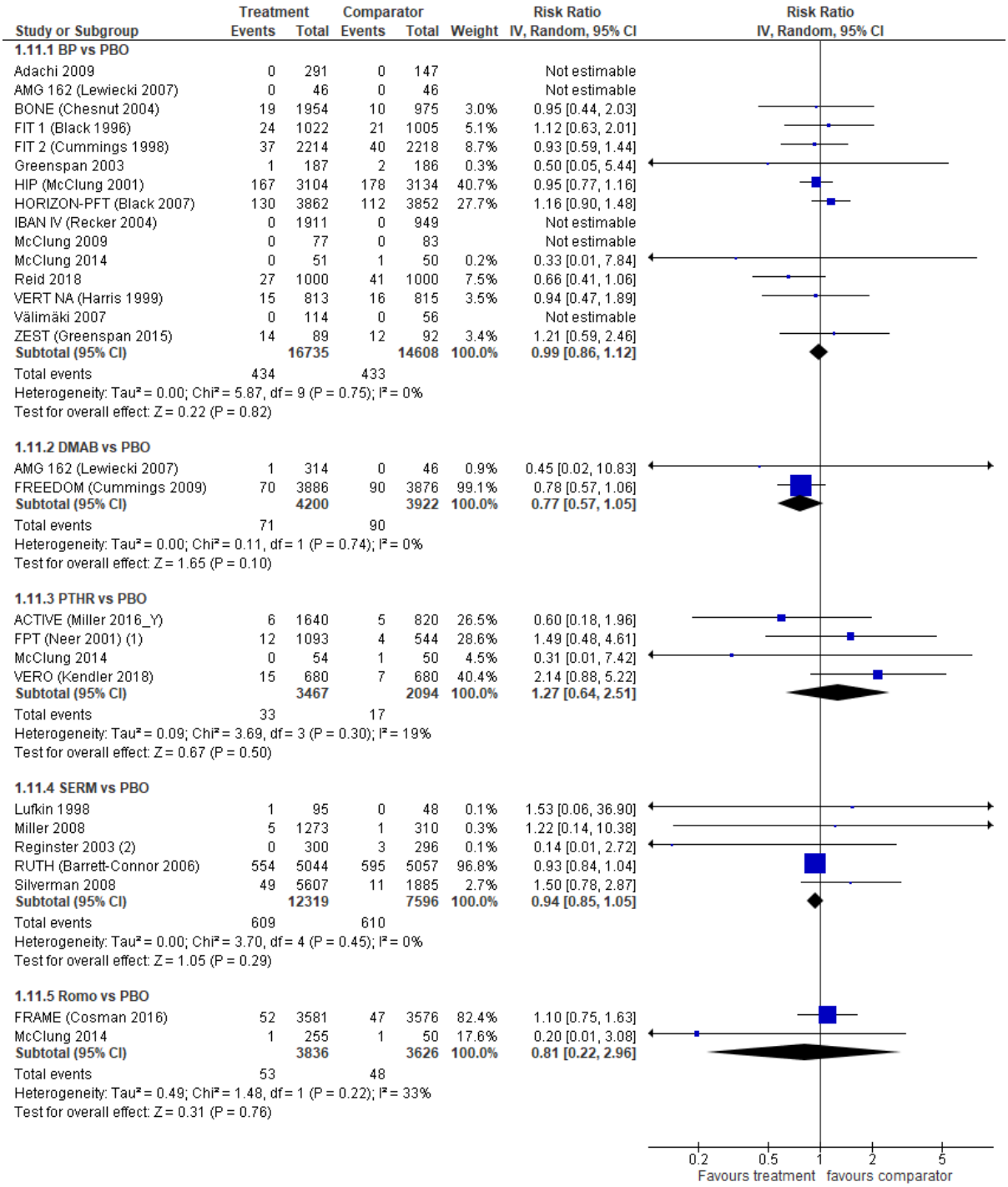
Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM], confidence interval [CI].

Forest plot of risk ratio on major osteoporotic fractures comparing treatment to other treatments



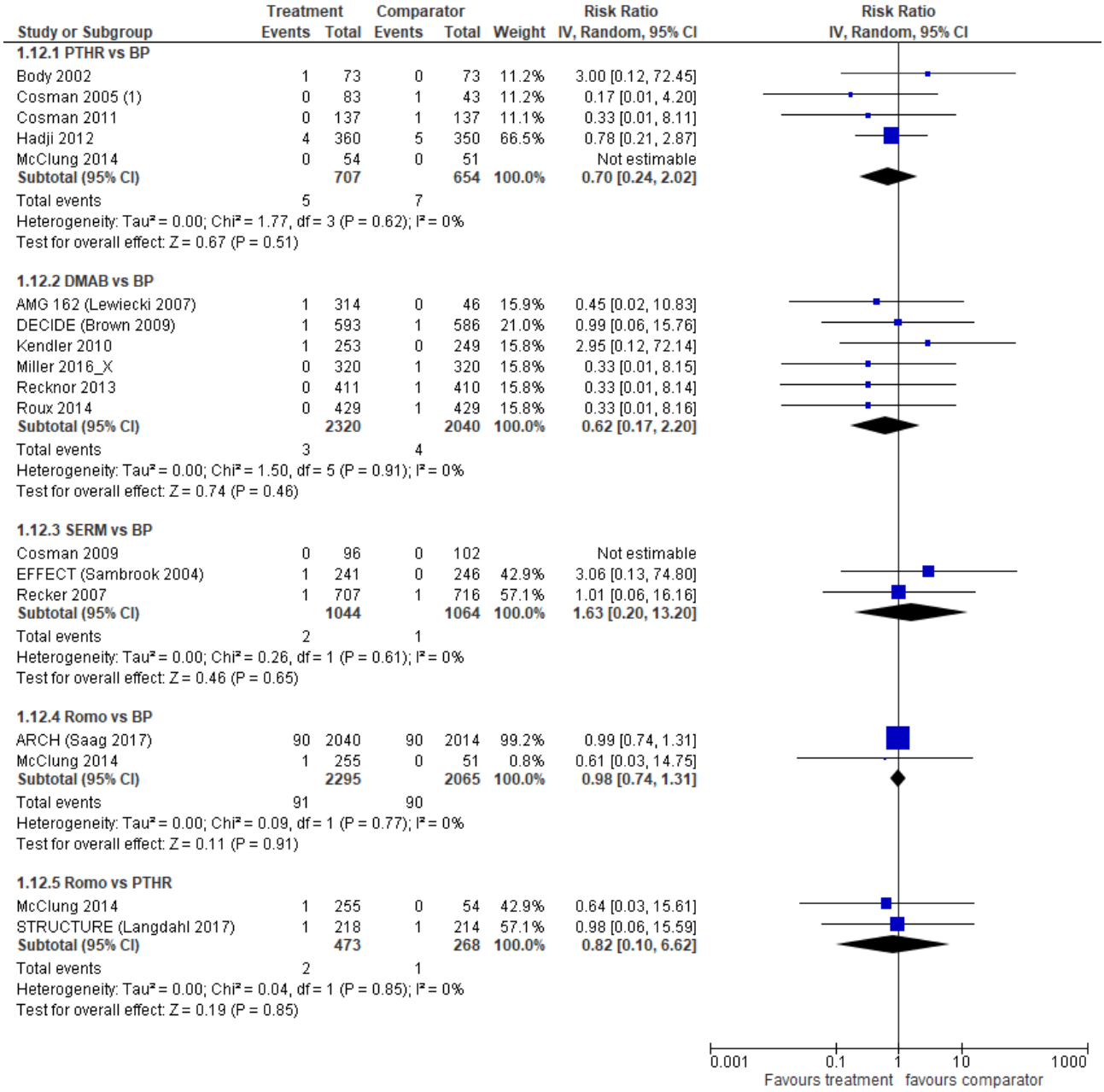
Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor [PTHR] agonists, romosozumab [Romo], selective oestrogen receptor modulators [SERM], confidence interval [CI].

Forest plot of risk ratio on all-cause mortality comparing treatment to placebo



Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM], confidence interval [CI].

Forest plot of risk ratio on all-cause mortality comparing treatment to other treatments

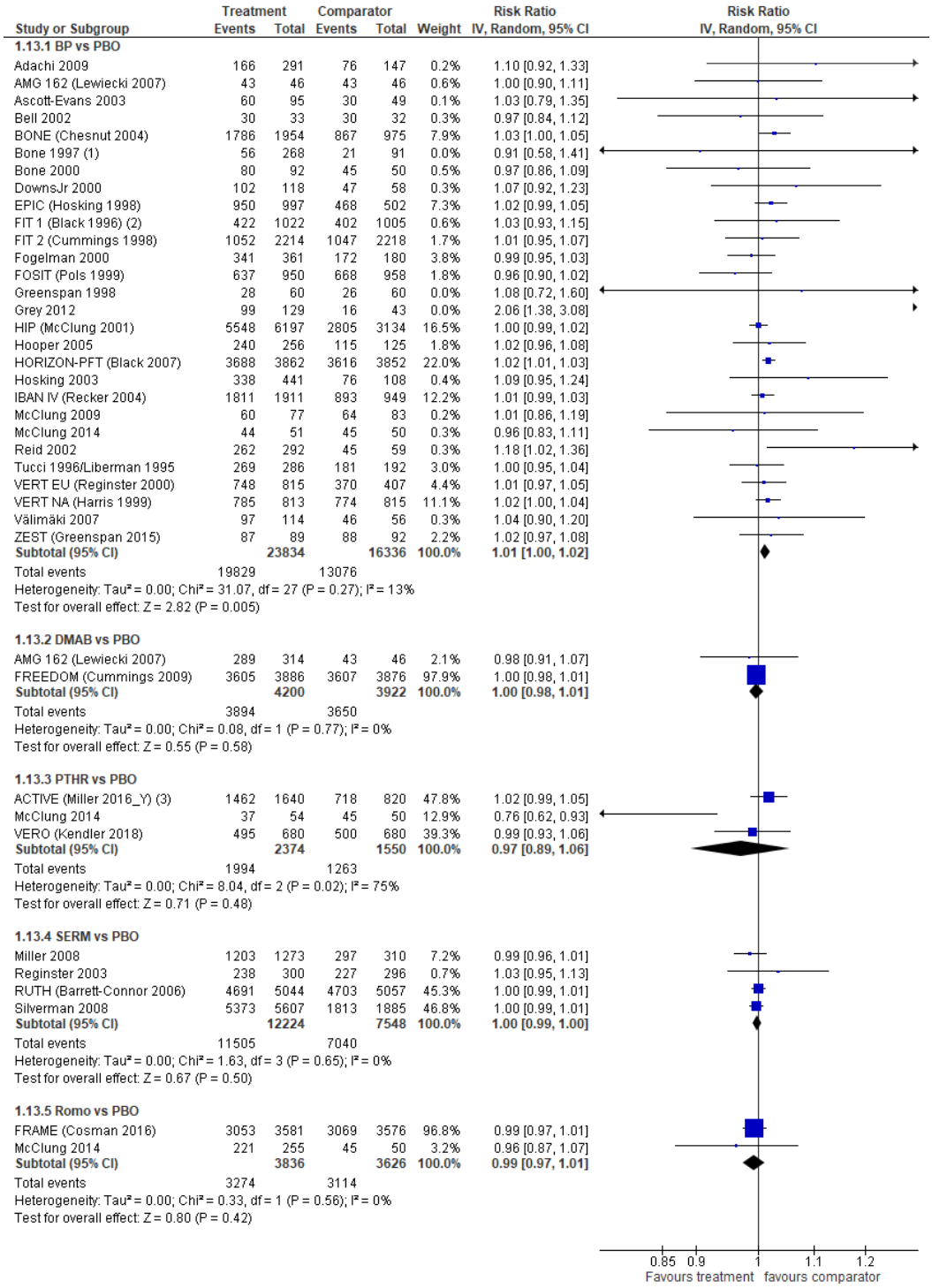


Footnotes

(1) Death from complications of aortic-valve surgery

Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor [PTHR] agonists, romosozumab [Romo], selective oestrogen receptor modulators [SERM], confidence interval [CI].

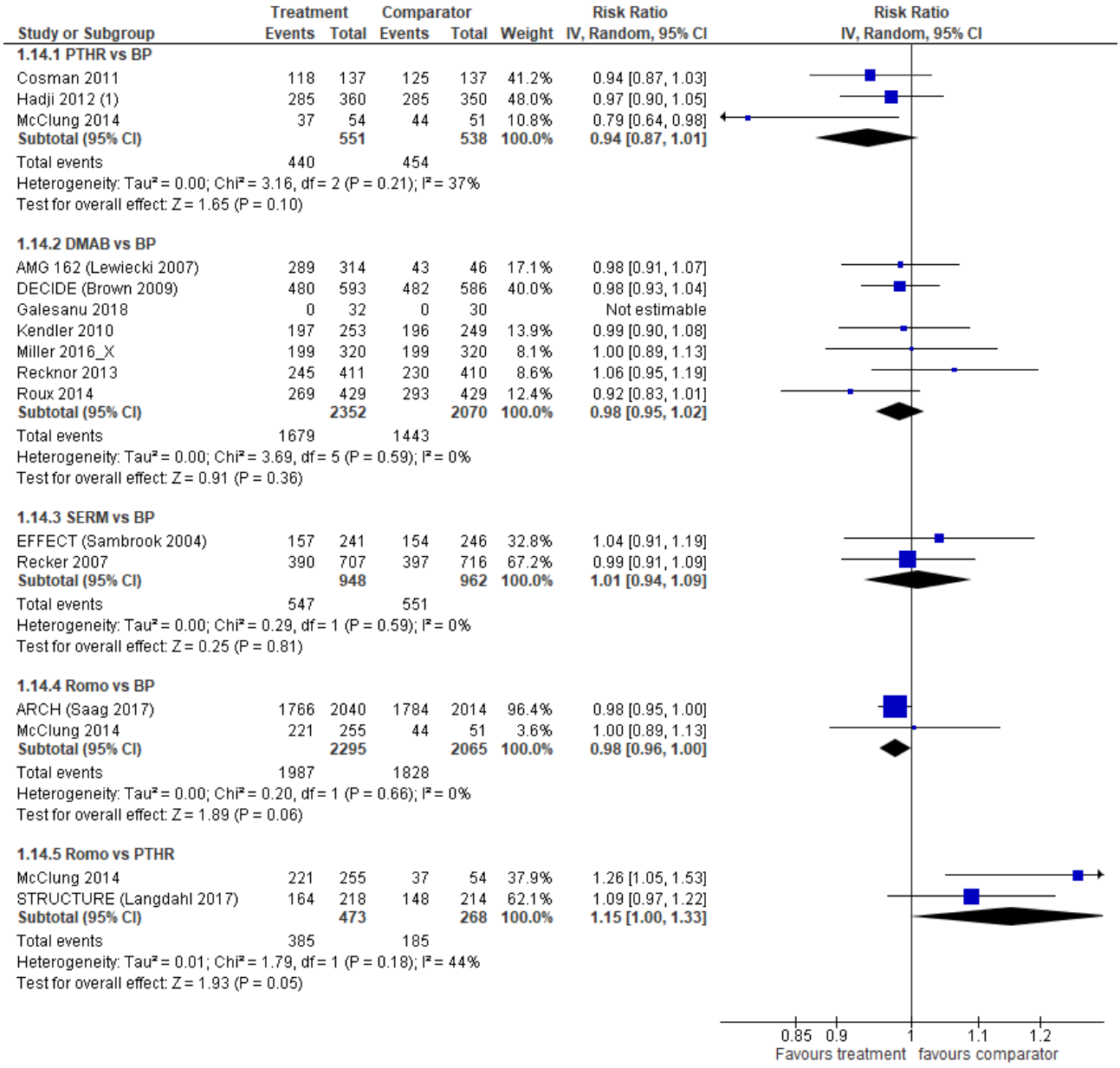
Forest plot of risk ratio on number of patients with any adverse events comparing treatment to placebo



Footnotes
(1) adverse experiences suspected of being durg related
(2) Any upper-gastrointestinal problem
(3) Treatment emergent adverse events

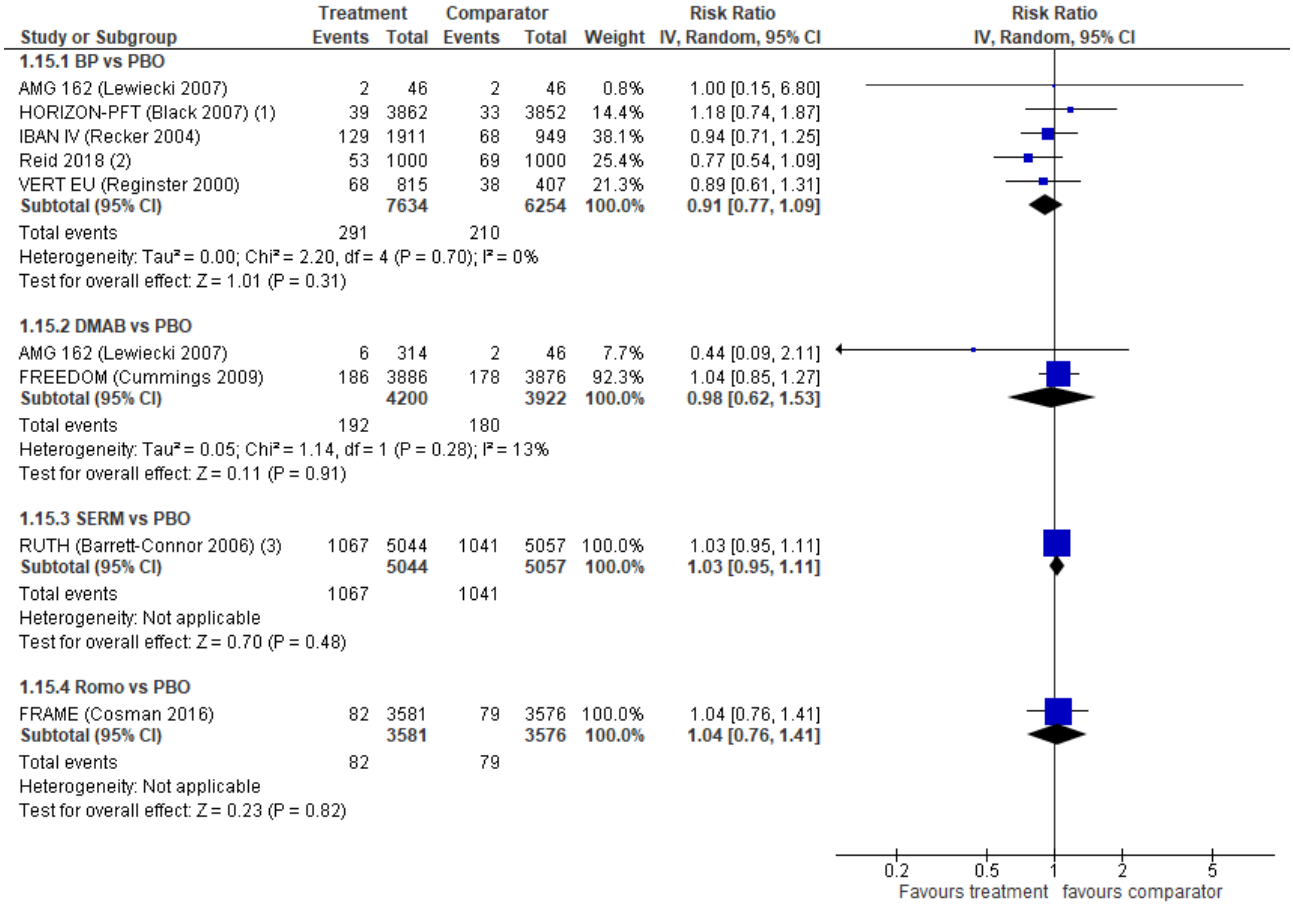
Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM], confidence interval [CI].

Forest plot of risk ratio on number of patients with any adverse events comparing treatment to other treatments



Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor [PTHR] agonists, romosozumab [Romo], selective oestrogen receptor modulators [SERM], confidence interval [CI].

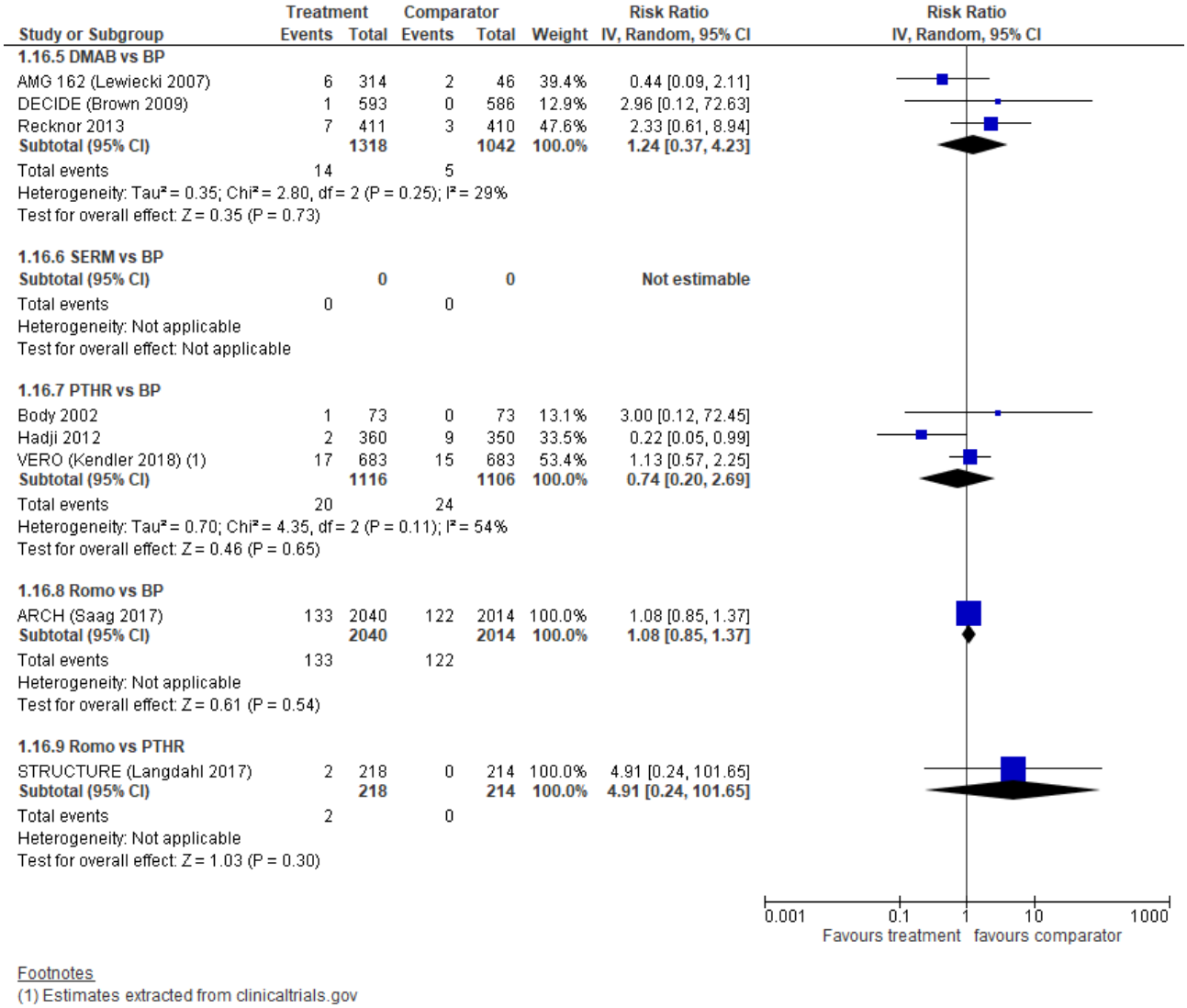
Forest plot of risk ratio on number of patients with cardiovascular related serious adverse events comparing treatment to placebo



Footnotes
(1) Death from cardiovascular causes
(2) Composite of vascular events
(3) Death from cardiovascular causes, nonfatal myocardial infarction, hospitalization for an acute coronary syndrome, myocardial revascularization, or...

Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM], confidence interval [CI].

Forest plot of risk ratio on number of patients with cardiovascular related serious adverse events comparing treatment to other treatments

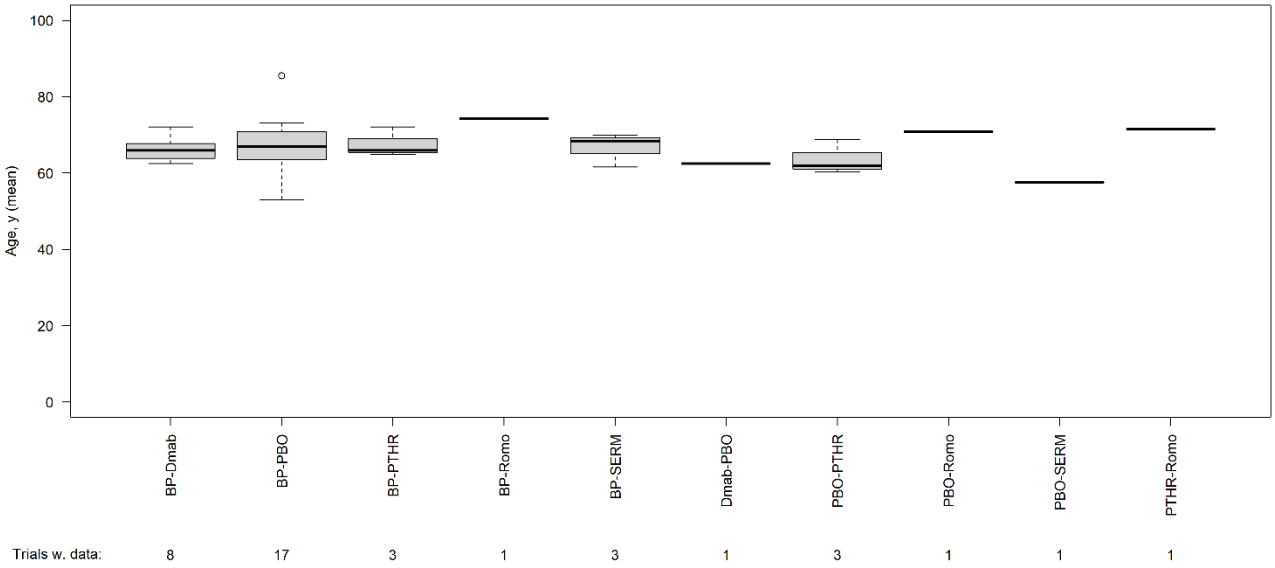


Footnotes
(1) Estimates extracted from clinicaltrials.gov

Abbreviations: Bisphosphonates [BP], denosumab [DMAB], parathyroid hormone receptor [PTHR] agonists, romosozumab [Romo], selective oestrogen receptor modulators [SERM], confidence interval [CI].

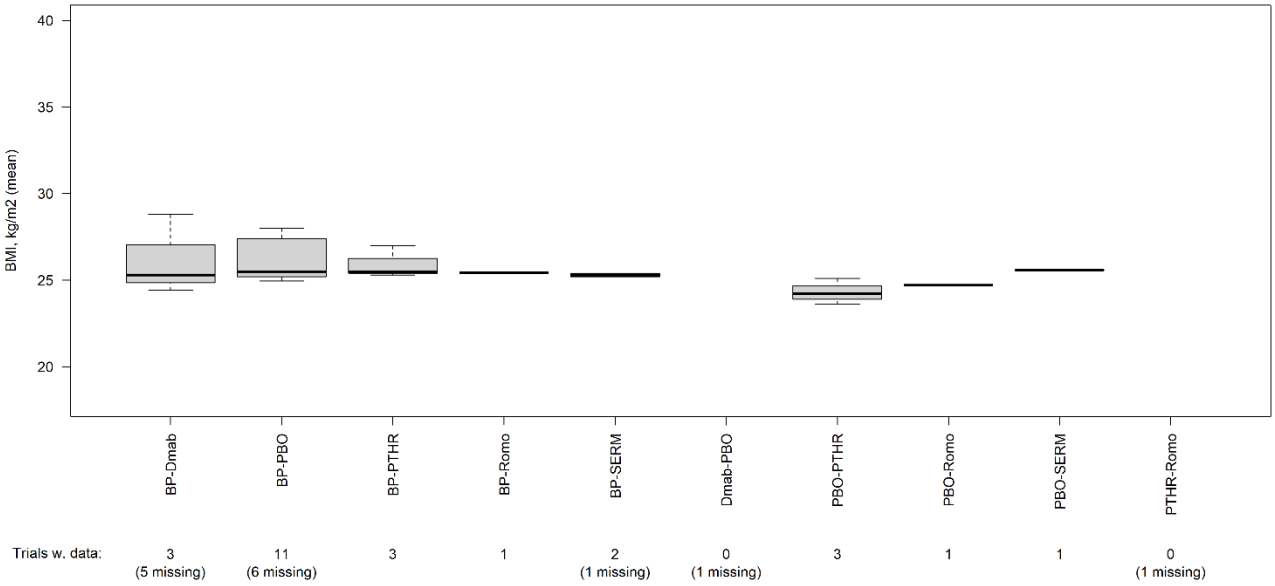
S3 Fig. Distribution of baseline risk indicators across the direct comparisons included in network meta-analysis

The distribution of baseline risk indicator (mean age) across the direct comparisons included in the network meta-analysis



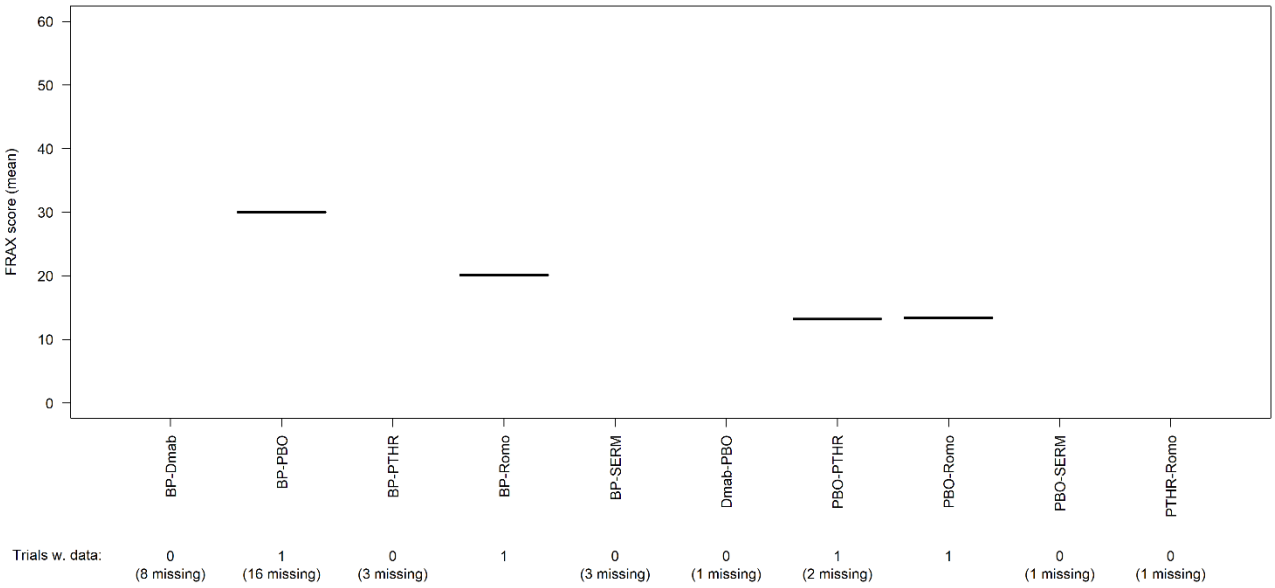
Abbreviations: Bisphosphonates [BP], denosumab [Dmab], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM].

The distribution of baseline risk indicator (mean BMI) across the direct comparisons included in the network meta-analysis



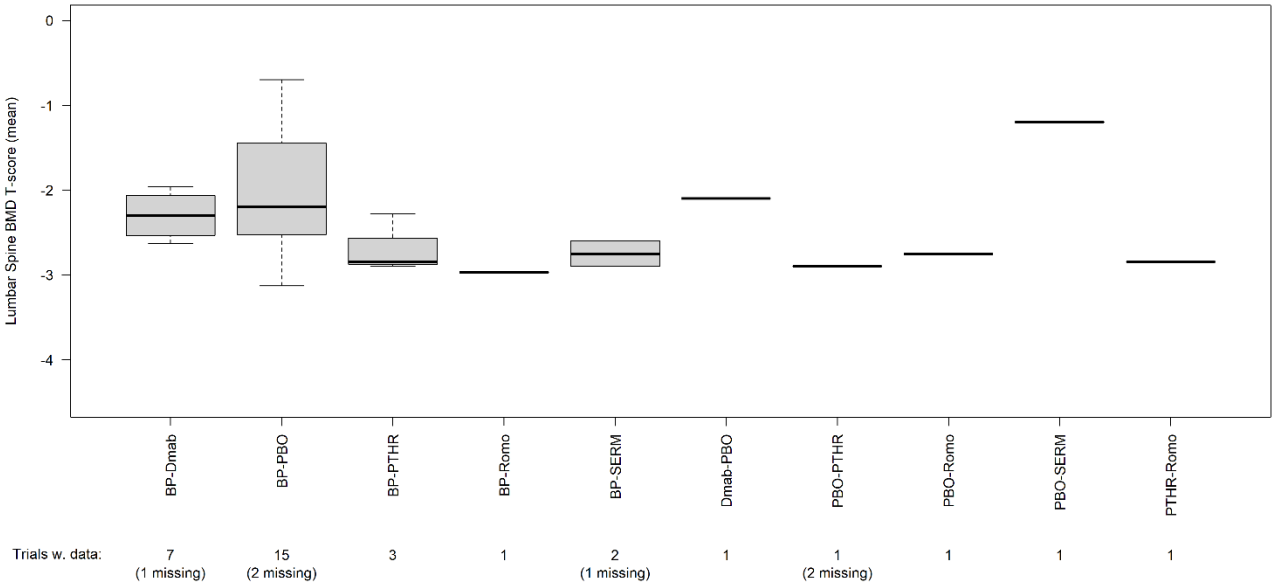
Abbreviations: Bisphosphonates [BP], body mass index [BMI], denosumab [Dmab], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM].

The distribution of baseline risk indicator (FRAX) across the direct comparisons included in the network meta-analysis



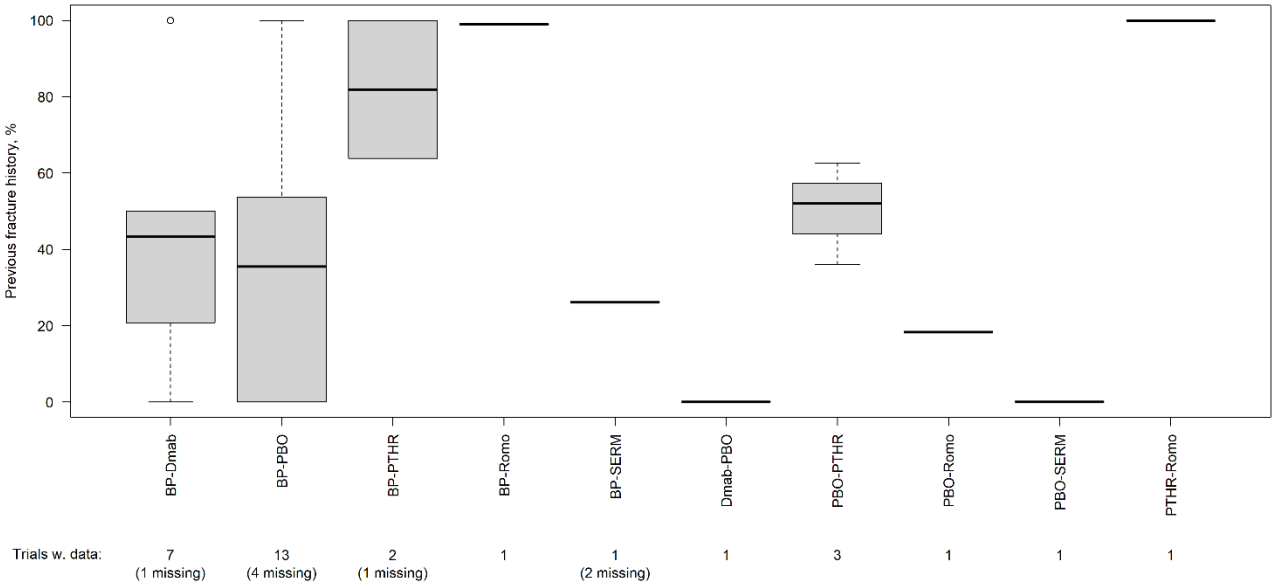
Abbreviations: Bisphosphonates [BP], denosumab [Dmab], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM].

The distribution of baseline risk indicator (lumbar spine BMD T-score) across the direct comparisons included in the network meta-analysis



Abbreviations: Bisphosphonates [BP], bone mineral density [BMD], denosumab [Dmab], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM].

The distribution of baseline risk indicator (previous fracture history) across the direct comparisons included in the network meta-analysis



Abbreviations: Bisphosphonates [BP], denosumab [Dmab], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM].

S8 Table. Network meta-analysis, sensitivity analyses

Sensitivity analyses adjusting each group for the study duration multiplied by the specific number of participants randomly allocated (i.e., a proxy for patient-years) are presented in supplemental material

Sensitivity analyses, fractures outcomes

	Clinical fractures		VF		Non-VF		Hip		MOF	
	OR	**95%CI**	**OR**	**95%CI**	**OR**	**95%CI**	**OR**	**95%CI**	**OR**	**95%CI**
BP vs Dmab	0.801	(0.56 to 1.14)	1.829	(1.11 to 3.01)	0.991	(0.76 to 1.29)	1.181	(0.68 to 2.06)	0.667	(0.28 to 1.59)
BP vs PBO	0.756	(0.66 to 0.86)	0.578	(0.49 to 0.68)	0.794	(0.72 to 0.88)	0.671	(0.54 to 0.84)	0.653	(0.46 to 0.93)
BP vs PTHR	1.519	(1.13 to 2.04)	2.517	(1.81 to 3.50)	1.283	(1.01 to 1.63)	1.568	(0.78 to 3.17)	1.573	(0.78 to 3.18)
BP vs Romo	1.245	(0.97 to 1.60)	2.063	(1.38 to 3.09)	1.208	(0.96 to 1.53)	1.616	(1.08 to 2.43)	1.3	(0.85 to 1.98)
BP vs SERM	1.437	(0.74 to 2.80)	0.963	(0.70 to 1.32)	0.957	(0.80 to 1.15)	0.782	(0.47 to 1.29)	1.098	(0.30 to 4.01)
Dmab vs PBO	0.944	(0.65 to 1.37)	0.316	(0.20 to 0.51)	0.801	(0.62 to 1.03)	0.568	(0.34 to 0.95)	0.979	(0.40 to 2.40)
Dmab vs PTHR	1.896	(1.20 to 3.00)	1.376	(0.77 to 2.45)	1.295	(0.92 to 1.83)	1.327	(0.56 to 3.16)	2.358	(0.77 to 7.18)
Dmab vs Romo	1.554	(1.01 to 2.39)	1.128	(0.60 to 2.11)	1.22	(0.87 to 1.72)	1.368	(0.69 to 2.70)	1.948	(0.76 to 5.01)
Dmab vs SERM	1.794	(0.85 to 3.80)	0.526	(0.30 to 0.93)	0.966	(0.71 to 1.31)	0.662	(0.32 to 1.38)	1.646	(0.36 to 7.47)
PBO vs PTHR	2.009	(1.48 to 2.72)	4.357	(3.12 to 6.08)	1.616	(1.27 to 2.05)	2.338	(1.16 to 4.73)	2.409	(1.29 to 4.49)
PBO vs Romo	1.646	(1.27 to 2.13)	3.572	(2.36 to 5.41)	1.523	(1.20 to 1.93)	2.41	(1.54 to 3.78)	1.991	(1.28 to 3.10)
PBO vs SERM	1.901	(0.97 to 3.73)	1.667	(1.22 to 2.28)	1.205	(1.01 to 1.44)	1.166	(0.68 to 1.99)	1.681	(0.48 to 5.87)
PTHR vs Romo	0.82	(0.57 to 1.19)	0.82	(0.49 to 1.37)	0.942	(0.68 to 1.30)	1.031	(0.46 to 2.30)	0.826	(0.39 to 1.74)
PTHR vs SERM	0.946	(0.46 to 1.96)	0.383	(0.25 to 0.59)	0.746	(0.56 to 1.00)	0.499	(0.21 to 1.17)	0.698	(0.17 to 2.88)
Romo vs SERM	1.155	(0.57 to 2.35)	0.467	(0.28 to 0.77)	0.792	(0.59 to 1.06)	0.484	(0.25 to 0.92)	0.845	(0.23 to 3.17)

Abbreviations: bisphosphonate [BP], confidence interval [CI], Denosumab [Dmab], major osteoporotic fractures [MOF], odds ratio [OR], parathyroid hormone receptor agonist [PTHR], placebo [PBO], romosozumab [Romo]; selective oestrogen receptor modulators [SERM], vertebral fractures [VF]

Sensitivity analysis, safety outcomes

	AE		SAE CVD		Deaths	
	OR	**95%CI**	**OR**	**95%CI**	**OR**	**95%CI**
BP vs Dmab	1.092	(0.94 to 1.27)	0.83	(0.60 to 1.14)	No info	
BP vs PBO	1.116	(1.02 to 1.22)	0.859	(0.68 to 1.08)		
BP vs PTHR	1.196	(0.99 to 1.45)	1.324	(0.69 to 2.56)		
BP vs Romo	1.089	(0.90 to 1.31)	0.877	(0.69 to 1.12)		
BP vs SERM	1.065	(0.90 to 1.26)	0.825	(0.64 to 1.07)		
Dmab vs PBO	1.022	(0.87 to 1.20)	1.034	(0.82 to 1.30)		
Dmab vs PTHR	1.096	(0.86 to 1.40)	1.595	(0.78 to 3.28)		
Dmab vs Romo	0.998	(0.79 to 1.26)	1.056	(0.75 to 1.49)		
Dmab vs SERM	0.975	(0.78 to 1.22)	0.993	(0.77 to 1.28)		
PBO vs PTHR	1.072	(0.88 to 1.31)	1.542	(0.78 to 3.07)		
PBO vs Romo	0.976	(0.81 to 1.18)	1.021	(0.79 to 1.33)		
PBO vs SERM	0.954	(0.81 to 1.13)	0.96	(0.86 to 1.07)		
PTHR vs Romo	0.911	(0.72 to 1.16)	0.662	(0.33 to 1.32)		
PTHR vs SERM	0.89	(0.70 to 1.14)	0.623	(0.31 to 1.25)		
Romo vs SERM	0.978	(0.77 to 1.25)	0.941	(0.71 to 1.25)		

Abbreviations: adverse events [AE], cardiovascular related serious adverse events [SAE CVD], bisphosphonate [BP], confidence interval [CI], Denosumab [Dmab], odds ratio [OR], parathyroid hormone receptor agonist [PTHR], placebo [PBO], romosozumab [Romo]; selective oestrogen receptor modulators [SERM]

S9 Table. Mean ranks on clinical fractures

Treatment	Mean rank
PTHR	1.40
Romo	2.31
SERM	2.92
BP	3.70
Placebo	5.14
Dmab	5.53

Abbreviations: Bisphosphonates [BP], denosumab [Dmab], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM].

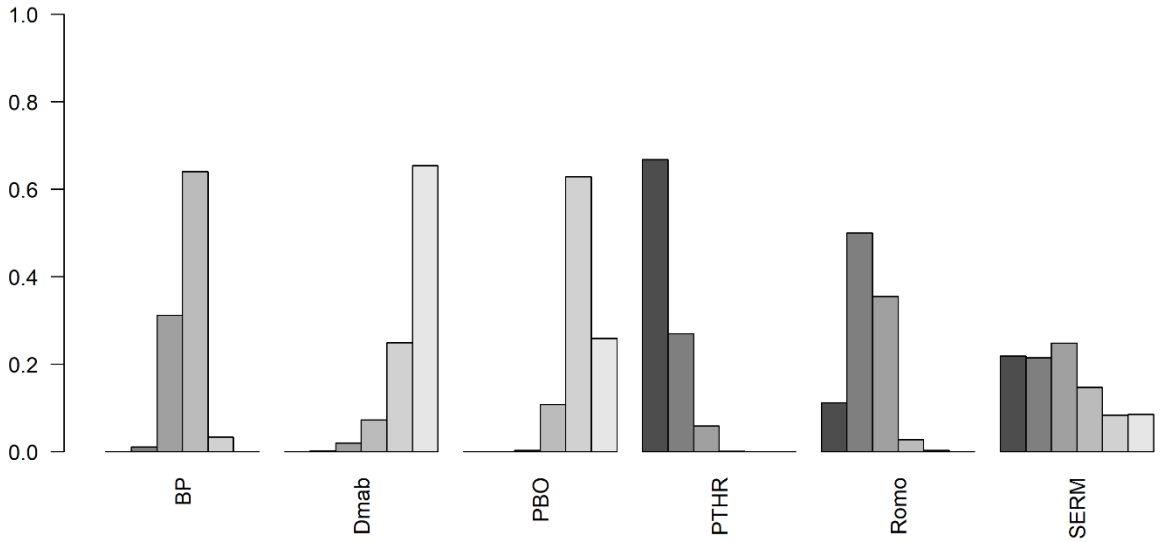
S10 Table. SUCRA on clinical fractures

The surface under the cumulative ranking curve (SUCRA) is a numeric presentation of the overall ranking and presents a single number associated with each treatment on clinical fractures. SUCRA values range from 0 to 1. The higher the SUCRA value, the higher the likelihood that a therapy is in the top rank or one of the top ranks; the closer to 0, the more likely that a therapy is in the bottom rank, or one of the bottom ranks. Abbreviations: Bisphosphonates [BP], denosumab [Dmab], parathyroid hormone receptor [PTHR] agonists, romosozumab [Romo], selective oestrogen receptor modulators [SERM].

Treatment	SUCRA value
PTHR	0.921
Romo	0.737
SERM	0.616
BP	0.460
Placebo	0.172
Dmab	0.094

S4 Fig. Rankogram on clinical fractures.

Histograms are shown for each treatment reflecting corresponding probabilities for each position in the ranking of the five interventions (rankograms). The shades of gray visualise the ranks; bars with the darkest gray colour are the probability of the treatment being ranked highest, and the bars with the lightest gray colour are the probability of the intervention being ranked the lowest. Abbreviations: Bisphosphonates [BP], denosumab [Dmab], parathyroid hormone receptor [PTHR] agonists, placebo [PBO], romosozumab [Romo], selective oestrogen receptor modulators [SERM].



S11 Table. Meta-regression analyses

Meta-regression analyses on clinical fracture risk

Risk indicator	*k* comparisons	β	95% CI	tau^2	tau^2_0§	$\%tau^2_{explained}$*	I^2	p-value†
Antiresorptives *v* placebo								
Previous fracture history, %	15	0.998	(0.994 to 1.002)	0.01	0.01	0%	20	0.347
Age, y (mean)	17	0.979	(0.960 to 0.998)	0.00	0.01	97%	1	**0.031**
Lumbar Spine BMD T-score (mean)	17	1.100	(0.921 to 1.314)	0.02	0.01	0%	33	0.294
BMI, kg/m² (mean)	12	0.998	(0.835 to 1.193)	0.03	0.02	0%	50	0.981
BP *v* placebo								
Previous fracture history, %	13	0.998	(0.994 to 1.002)	0.01	0.01	0%	24	0.345
Age, y (mean)	16	0.976	(0.958 to 0.996)	0.00	0.01	100%	0	**0.016**
Lumbar Spine BMD T-score (mean)	15	1.114	(0.929 to 1.336)	0.02	0.01	0%	37	0.244
BMI, kg/m² (mean)	11	0.995	(0.827 to 1.196)	0.03	0.02	0%	56	0.954
Anabolics *v* placebo								
Previous fracture history, %	3	1.000	(0.982 to 1.018)	0.05	0.00	0%	13	0.998
Age, y (mean)	3	1.068	(0.925 to 1.233)	0.00	0.00	100%	0	0.367
BMI, kg/m² (mean)	3	1.366	(0.600 to 3.112)	0.00	0.00	100%	0	0.458
Anabolics *v* BP								
Previous fracture history, %	3	1.000	(0.971 to 1.030)	0.06	0.04	0%	68	0.998
Age, y (mean)	4	0.985	(0.892 to 1.088)	0.07	0.03	0%	52	0.763
Lumbar Spine BMD T-score (mean)	4	0.546	(0.280 to 1.062)	0.00	0.03	100%	0	**0.075**
BMI, kg/m² (mean)	4	0.773	(0.580 to 1.031)	0.00	0.03	100%	0	**0.079**

Abbreviations: bisphosphonate (BP), body mass index (BMI), bone mineral density (BMD), confidence interval (CI), year (y)

Estimates from REML-based meta-regressions for the association between log(RR) for the outcome and the covariates were back-transformed. The slope, β, should be interpreted as the proportional increase (or decrease) in the treatment effect (i.e. risk ratio) pr. unit increase in the baseline risk indicator. § tau-squared for the model without the covariate; * $\%tau^2_{explained}$ was calculated as $(tau^2_{model\ w.\ risk\ indicator} - tau^2_{model\ without\ risk\ indicator})/tau^2_{model\ without\ risk\ indicator}*100$;

† P-value from a Wald test for the effect of the covariate in the model. Bold p-values are presented as figures in supplemental material.

Meta-regression on vertebral fracture risk

Risk indicator	k comparisons	β	95% CI	tau^2	tau^2_0§	$\%tau^2_{explained}$*	I^2	p-value†
Antiresorptives vs. placebo								
Previous fracture history, %	20	1.000	(0.995 to 1.005)	0.07	0.06	0%	70	0.960
Age, y (mean)	26	0.977	(0.949 to 1.005)	0.07	0.08	2%	67	0.112
Lumbar Spine BMD T-score (mean)	17	1.111	(0.848 to 1.455)	0.08	0.07	0%	72	0.444
BMI, kg/m² (mean)	20	1.026	(0.894 to 1.178)	0.09	0.08	0%	74	0.711
BP vs. placebo								
Previous fracture history, %	14	0.999	(0.992 to 1.005)	0.06	0.06	0%	64	0.656
Age, y (mean)	18	0.984	(0.955 to 1.013)	0.05	0.05	0%	55	0.263
Lumbar Spine BMD T-score (mean)	12	1.064	(0.800 to 1.413)	0.08	0.07	0%	68	0.671
BMI, kg/m² (mean)	13	1.048	(0.888 to 1.237)	0.06	0.05	0%	60	0.582
Anabolic treatment vs. placebo								
Previous fracture history, %	4	1.003	(0.991 to 1.016)	0.08	0.02	0%	32	0.636
Age, y (mean)	4	1.066	(0.923 to 1.230)	0.02	0.02	0%	22	0.387
Lumbar Spine BMD T-score (mean)	3	3.969	(0.638 to 24.673)	0.00	0.01	100%	0	0.139
BMI, kg/m² (mean)	4	1.220	(0.893 to 1.666)	0.01	0.02	54%	5	0.212
FRAX score (mean)	3	1.063	(0.966 to 1.170)	0.00	0.01	100%	0	0.210
Anabolic treatment vs. BP								
Previous fracture history, %	6	1.013	(0.992 to 1.033)	0.00	0.00	0%	0	0.228
Age, y (mean)	6	1.076	(0.974 to 1.189)	0.00	0.00	0%	0	0.148
Lumbar Spine BMD T-score (mean)	6	0.935	(0.495 to 1.766)	0.00	0.00	0%	0	0.835
BMI, kg/m² (mean)	5	1.066	(0.727 to 1.562)	0.04	0.00	0%	16	0.743

Abbreviations: bisphosphonate (BP), body mass index (BMI), bone mineral density (BMD), Fracture Risk Assessment Tool (FRAX), confidence interval (CI), year (y)
Estimates from REML-based meta-regressions for the association between log(RR) for the outcome and the covariates were back-transformed. The slope, β, should be interpreted as the proportional increase (or decrease) in the treatment effect (i.e. risk ratio) pr. unit increase in the baseline risk indicator.

§ tau-squared for the model without the covariate

* $\%tau^2_{explained}$ was calculated as $(tau^2_{model\ w.\ covariate} - tau^2_{model\ without\ covariate})/tau^2_{model\ without\ covariate}*100$.

† P-value from a Wald test for the effect of the covariate in the model. Bold p-values are presented as figures in Fig 1 and in supplemental material.

Meta-regression on non-vertebral fracture risk

Risk indicator	k comparisons	β	95% CI	tau^2	tau^2_0§	$\%tau^2_{explained}$*	I^2	p-value†
Antiresorptives vs. placebo								
Previous fracture history, %	26	0.999	(0.997 to 1.002)	0.00	0.01	2%	20	0.518
Age, y (mean)	34	0.988	(0.975 to 1.002)	0.00	0.01	43%	11	0.082
Lumbar Spine BMD T-score (mean)	21	0.943	(0.823 to 1.080)	0.00	0.01	21%	16	0.395
BMI, kg/m^2 (mean)	24	1.031	(0.975 to 1.090)	0.01	0.01	21%	21	0.284
BP vs. placebo								
Previous fracture history, %	20	1.001	(0.998 to 1.004)	0.01	0.00	0%	20	0.629
Age, y (mean)	26	0.990	(0.972 to 1.008)	0.01	0.01	0%	19	0.267
Lumbar Spine BMD T-score (mean)	16	0.958	(0.805 to 1.140)	0.01	0.01	1%	33	0.629
BMI, kg/m^2 (mean)	18	0.960	(0.837 to 1.100)	0.01	0.01	0%	32	0.556
Anabolic treatment vs. placebo								
Previous fracture history, %	4	0.998	(0.992 to 1.004)	0.00	0.00	0%	0	0.444
Age, y (mean)	4	1.098	(0.859 to 1.403)	0.00	0.00	0%	0	0.455
Lumbar Spine BMD T-score (mean)	4	0.787	(0.209 to 2.961)	0.00	0.00	0%	0	0.723
BMI, kg/m^2 (mean)	3	0.923	(0.730 to 1.167)	0.00	0.00	0%	0	0.503
FRAX score (mean)	3	0.979	(0.911 to 1.053)	0.00	0.00	0%	0	0.568
Anabolic treatment vs. BP								
Previous fracture history, %	6	0.994	(0.977 to 1.012)	0.00	0.00	0%	0	0.529
Age, y (mean)	7	1.018	(0.946 to 1.096)	0.00	0.00	0%	0	0.635
Lumbar Spine BMD T-score (mean)	6	0.803	(0.390 to 1.654)	0.00	0.00	0%	0	0.552
BMI, kg/m^2 (mean)	5	0.938	(0.694 to 1.268)	0.00	0.00	0%	0	0.678

Abbreviations: bisphosphonate (BP), body mass index (BMI), bone mineral density (BMD), Fracture Risk Assessment Tool (FRAX), confidence interval (CI), year (y)
Estimates from REML-based meta-regressions for the association between log(RR) for the outcome and the covariates were back-transformed. The slope, β, should be interpreted as the proportional increase (or decrease) in the treatment effect (i.e. risk ratio) pr. unit increase in the baseline risk indicator.
§ tau-squared for the model without the covariate; * $\%tau^2_{explained}$ was calculated as $(tau^2_{model\ w.\ covariate} - tau^2_{model\ without\ covariate})/tau^2_{model\ without\ covariate}*100$.
† P-value from a Wald test for the effect of the covariate in the model. Bold p-values are presented as figures in supplemental material.

Meta-regression on hip fracture risk

Risk indicator	k comparisons	β	95% CI	tau^2	tau^2_0§	$\%tau^2_{explained}$*	I^2	p-value†
Antiresorptives vs. placebo								
Previous fracture history, %	15	1.001	(0.994 to 1.009)	0.00	0.00	0%	3	0.723
Age, y (mean)	18	0.984	(0.948 to 1.022)	0.01	0.00	0%	3	0.416
Lumbar Spine BMD T-score (mean)	13	0.928	(0.570 to 1.511)	0.03	0.02	0%	17	0.765
BMI, kg/m² (mean)	16	1.107	(0.824 to 1.487)	0.00	0.00	0%	2	0.500
BP vs. placebo								
Previous fracture history, %	11	1.002	(0.994 to 1.010)	0.00	0.00	0%	0	0.669
Age, y (mean)	13	1.001	(0.960 to 1.043)	0.00	0.00	0%	0	0.962
Lumbar Spine BMD T-score (mean)	9	0.905	(0.541 to 1.514)	0.01	0.00	0%	7	0.704
BMI, kg/m² (mean)	11	1.130	(0.814 to 1.569)	0.00	0.00	0%	0	0.466
Anabolic treatment vs. placebo								
Previous fracture history, %	3	1.006	(0.984 to 1.029)	0.00	0.00	0%	0	0.586
Age, y (mean)	3	0.709	(0.205 to 2.446)	0.00	0.00	0%	0	0.586
FRAX score (mean)	3	1.090	(0.800 to 1.485)	0.00	0.00	0%	0	0.586
Anabolics vs. BP								
Previous fracture history, %	5	1.010	(0.975 to 1.046)	0.16	0.00	0%	23	0.578
Age, y (mean)	5	0.780	(0.570 to 1.068)	0.00	0.00	100%	0	0.121
Lumbar Spine BMD T-score (mean)	4	0.652	(0.014 to 30.283)	0.60	0.02	0%	42	0.827
BMI, kg/m² (mean)	3	0.711	(0.268 to 1.891)	0.00	0.00	0%	0	0.495

Abbreviations: bisphosphonate (BP), body mass index (BMI), bone mineral density (BMD), Fracture Risk Assessment Tool (FRAX), confidence interval (CI), year (y)
Estimates from REML-based meta-regressions for the association between log(RR) for the outcome and the covariates were back-transformed. The slope, β, should be interpreted as the proportional increase (or decrease) in the treatment effect (i.e. risk ratio) pr. unit increase in the baseline risk indicator.
§ tau-squared for the model without the covariate; * $\%tau^2_{explained}$ was calculated as $(tau^2_{model\ w.\ covariate} - tau^2_{model\ without\ covariate})/tau^2_{model\ without\ covariate}*100$;
† P-value from a Wald test for the effect of the covariate in the model.