Study ID	ES (95% CI)	% Weight
Christie 2010	3.33 (2.80, 3.86)	18.54
Dias 2010	2.30 (1.21, 3.39)	12.06
Dogra 2016	3.04 (0.97, 5.11)	5.53
Helmkamp 2016	1.63 (1.37, 1.89)	21.14
Mosleh 2015	3.10 (0.62, 5.58)	4.17
Pangrazio-Kulbersh 2012	2.08 (1.37, 2.79)	16.41
Weissheimer 2011	2.64 (2.60, 2.68)	22.14
Overall (I-squared = 90.8%, p = 0.000)	2.46 (1.90, 3.02)	100.00

NOTE: Weights are from random effects analysis
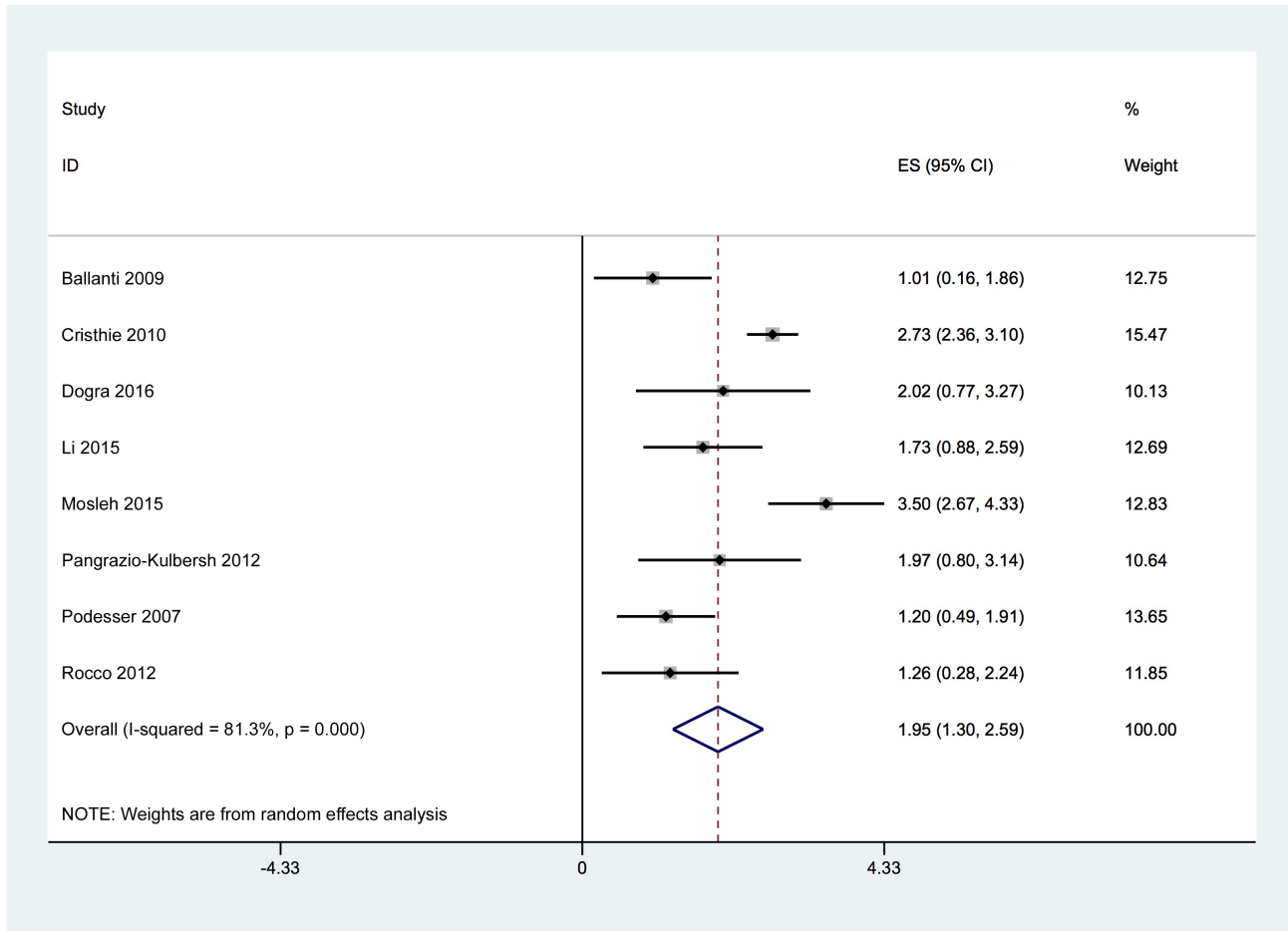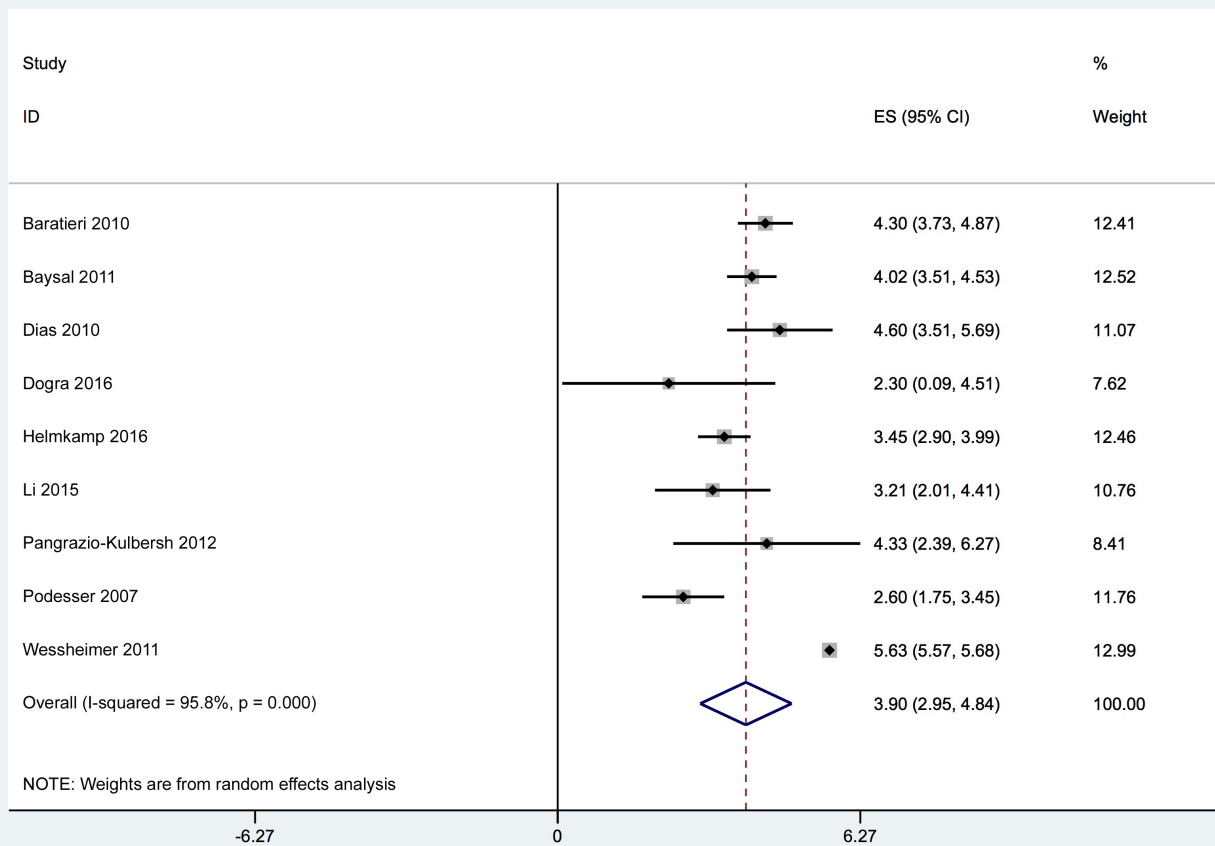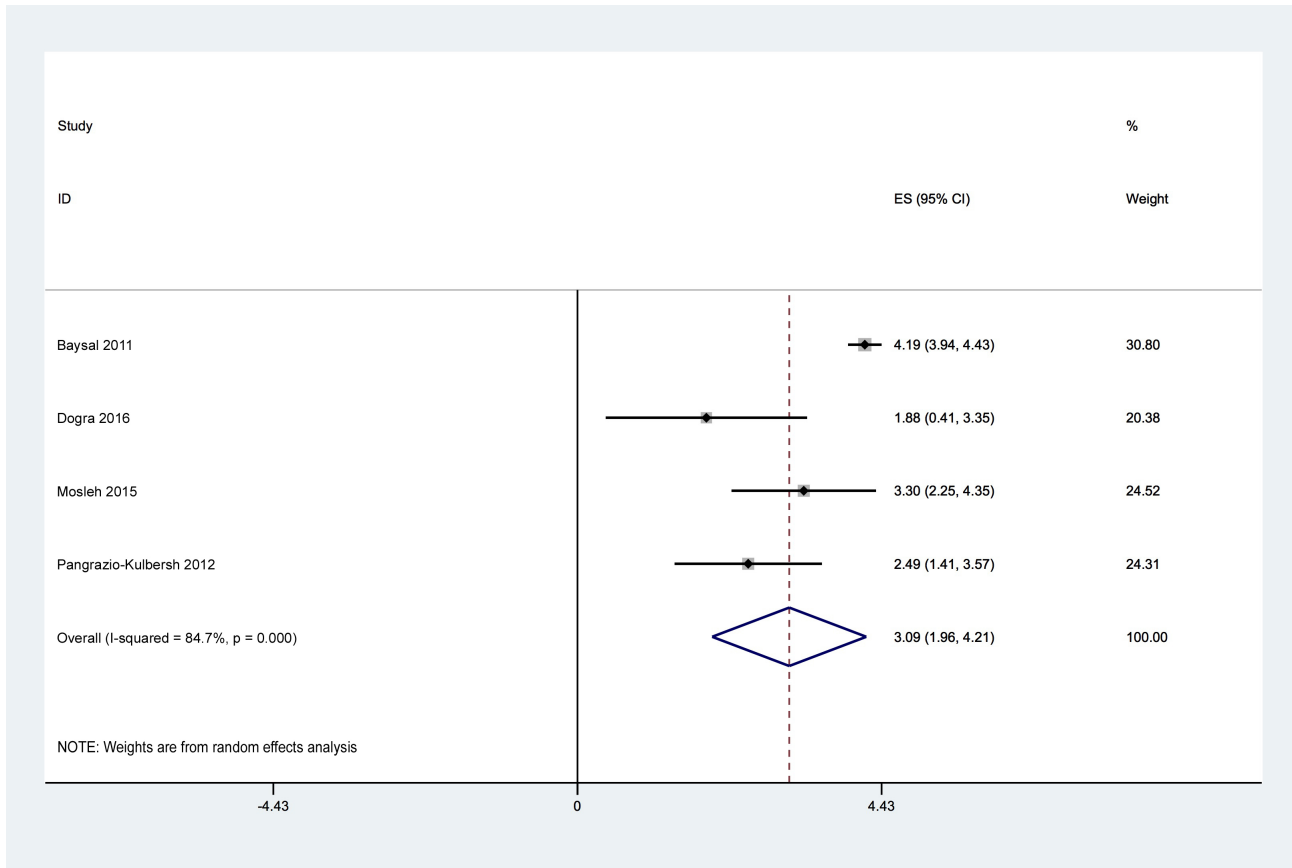
-5.58   0   5.58

Supplementary Figure 1. Forest plot of the maxillary basal bone width increments in the interval between T_0 (pre-expansion) and T_1 (post-expansion). Reported data are expressed in millimeters (mm).
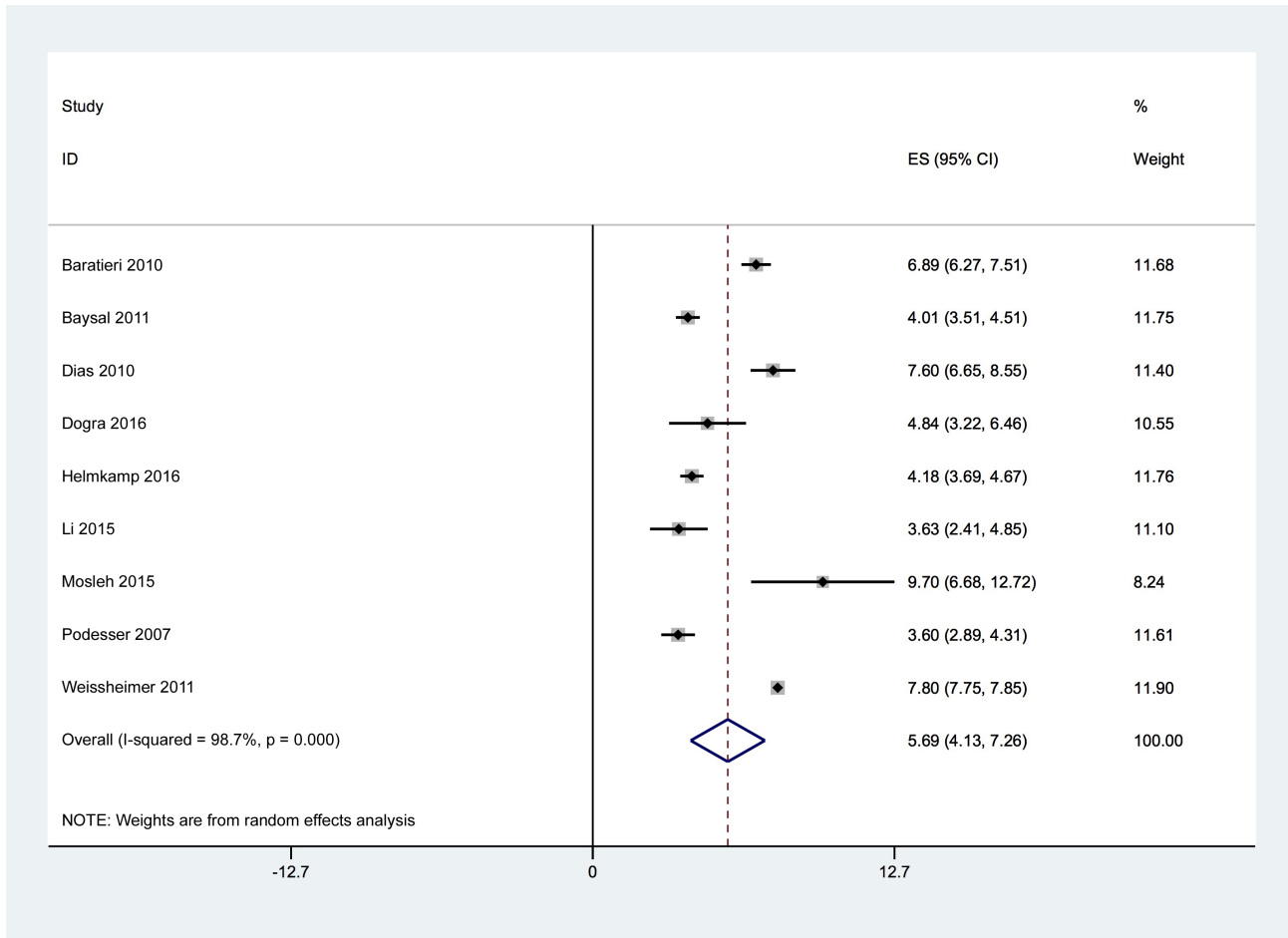
Study ID		ES (95% CI)	% Weight
Ballanti 2009		1.01 (0.16, 1.86)	12.75
Cristhie 2010		2.73 (2.36, 3.10)	15.47
Dogra 2016		2.02 (0.77, 3.27)	10.13
Li 2015		1.73 (0.88, 2.59)	12.69
Mosleh 2015		3.50 (2.67, 4.33)	12.83
Pangrazio-Kulbersh 2012		1.97 (0.80, 3.14)	10.64
Podesser 2007		1.20 (0.49, 1.91)	13.65
Rocco 2012		1.26 (0.28, 2.24)	11.85
Overall (I-squared = 81.3%, p = 0.000)		1.95 (1.30, 2.59)	100.00

NOTE: Weights are from random effects analysis

-4.33   0   4.33

Supplementary Figure 2. Forest plot of the nasal cavity width increments in the interval between T_0 (pre-expansion) and T_1 (post-expansion). Reported data are expressed in millimeters (mm).
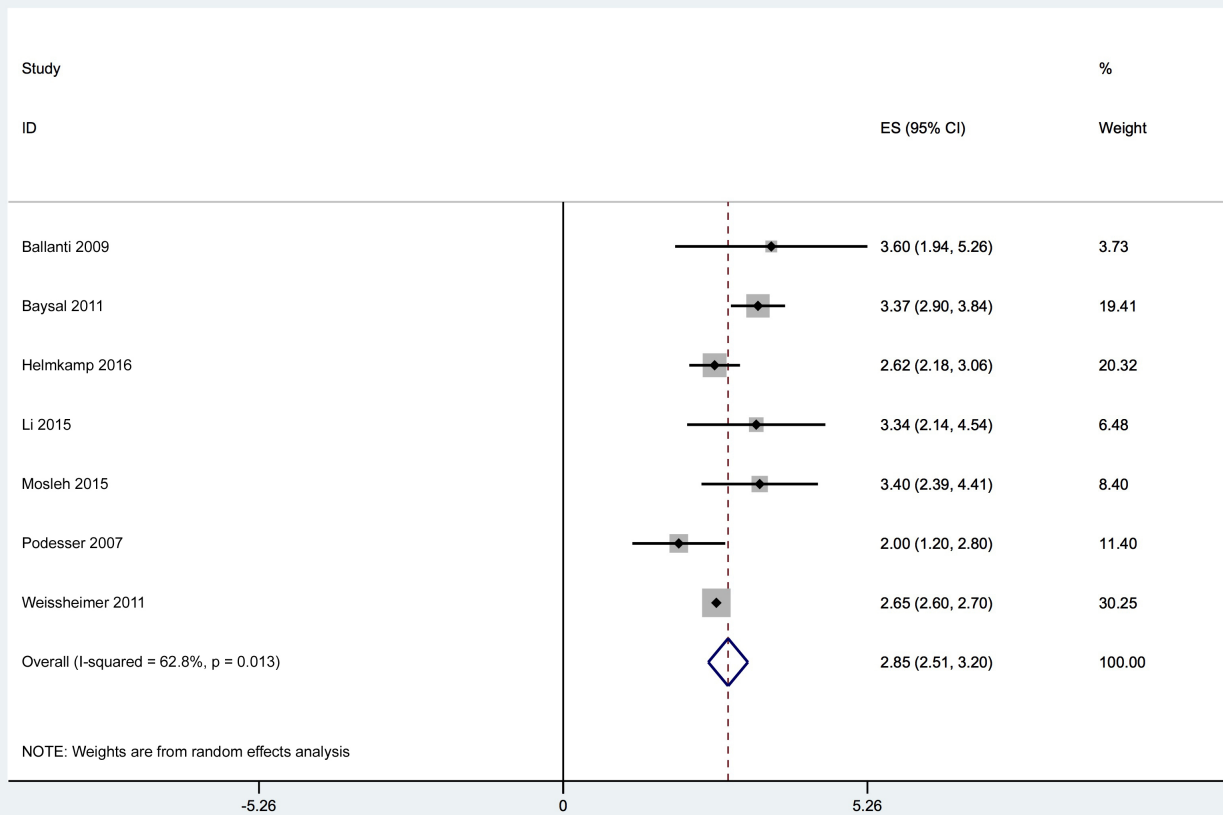
Supplementary Figure 3. Forest plot of increments in the quantitative data synthesis outcome alveolar buccal crest width in the interval between T_0 (pre-expansion) and T_1 (post-expansion). Reported data are expressed in millimeters (mm).
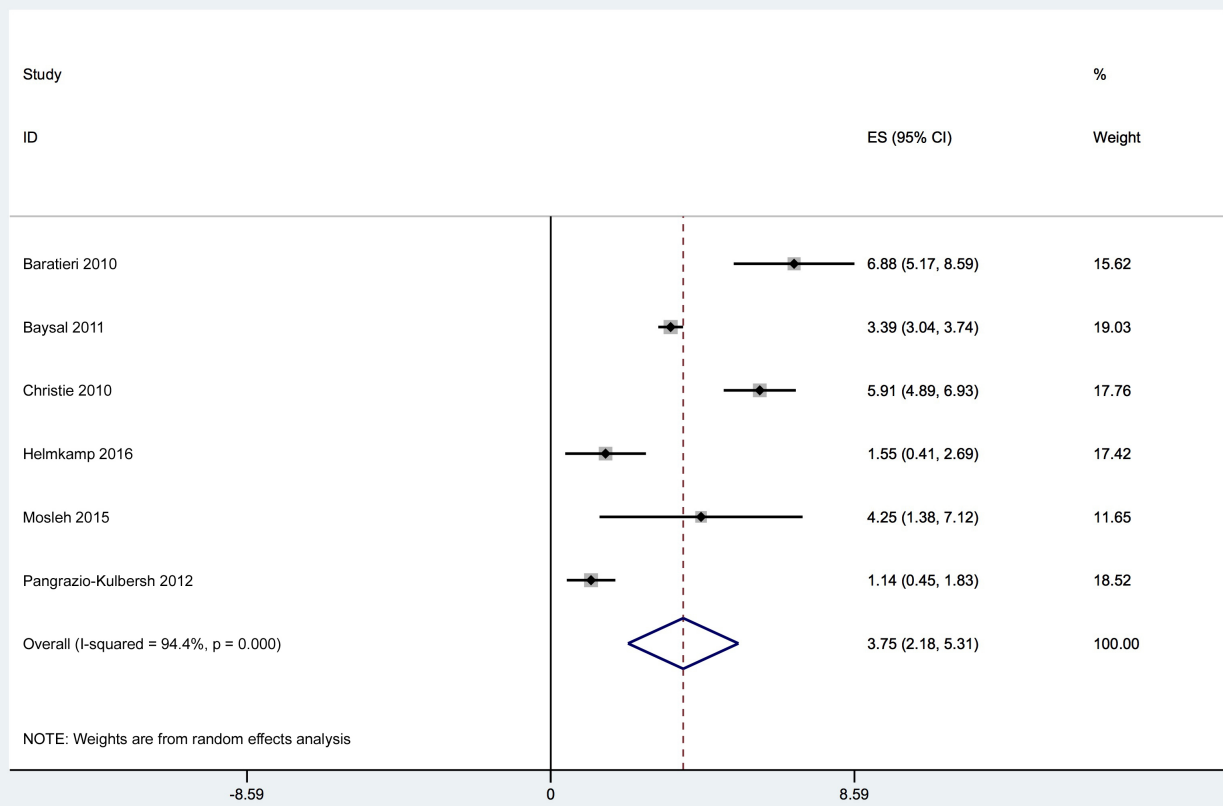
Supplementary Figure 4. Forest plot of increments in the quantitative data synthesis outcome alveolar palatal crest width in the interval between T_0 (pre-expansion) and T_1 (post-expansion). Reported data are expressed in millimeters (mm).

Study ID		ES (95% CI)	% Weight
Baratieri 2010		6.89 (6.27, 7.51)	11.68
Baysal 2011		4.01 (3.51, 4.51)	11.75
Dias 2010		7.60 (6.65, 8.55)	11.40
Dogra 2016		4.84 (3.22, 6.46)	10.55
Helmkamp 2016		4.18 (3.69, 4.67)	11.76
Li 2015		3.63 (2.41, 4.85)	11.10
Mosleh 2015		9.70 (6.68, 12.72)	8.24
Podesser 2007		3.60 (2.89, 4.31)	11.61
Weissheimer 2011		7.80 (7.75, 7.85)	11.90
Overall (I-squared = 98.7%, p = 0.000)		5.69 (4.13, 7.26)	100.00

NOTE: Weights are from random effects analysis
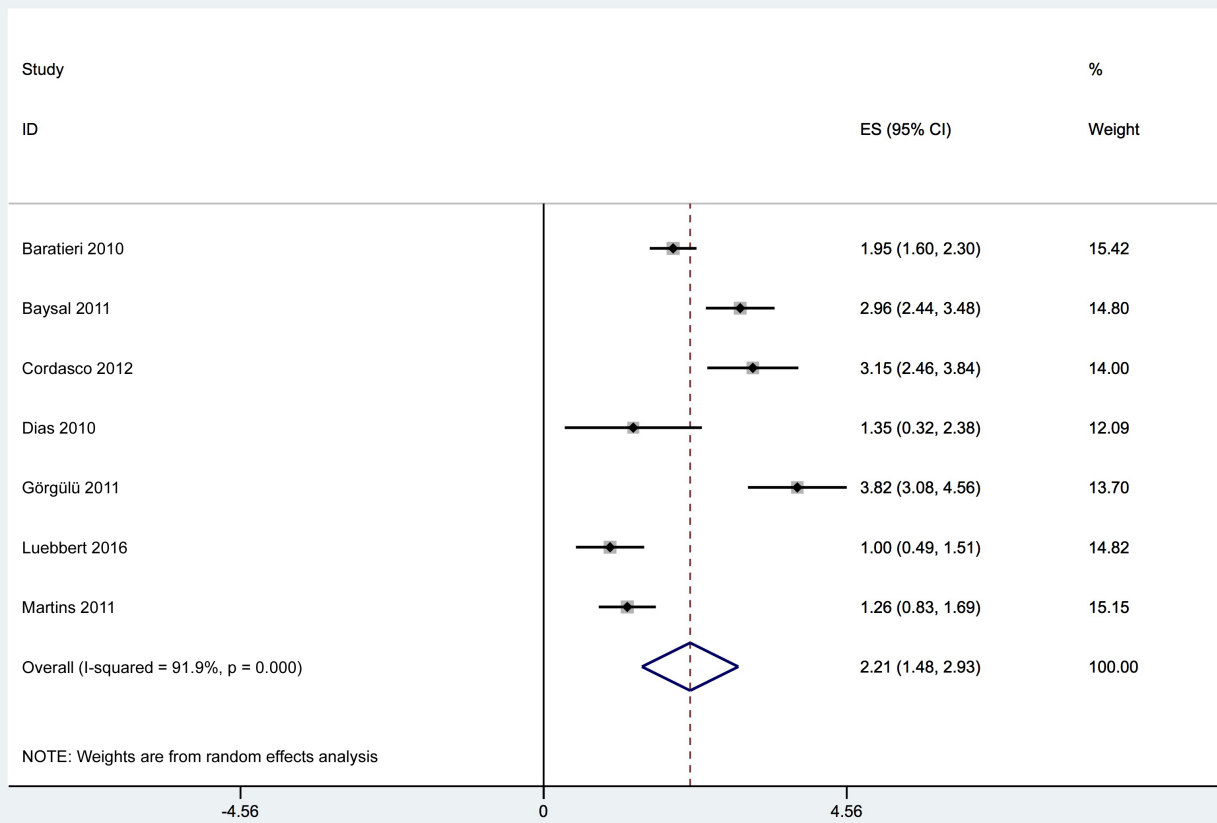
-12.7   0   12.7

Supplementary Figure 5. Forest plot of increments in the quantitative data synthesis outcome inter-molar crown width in the time interval between T_0 (pre-expansion) and T_1 (post-expansion). Reported data are expressed in millimeters (mm).
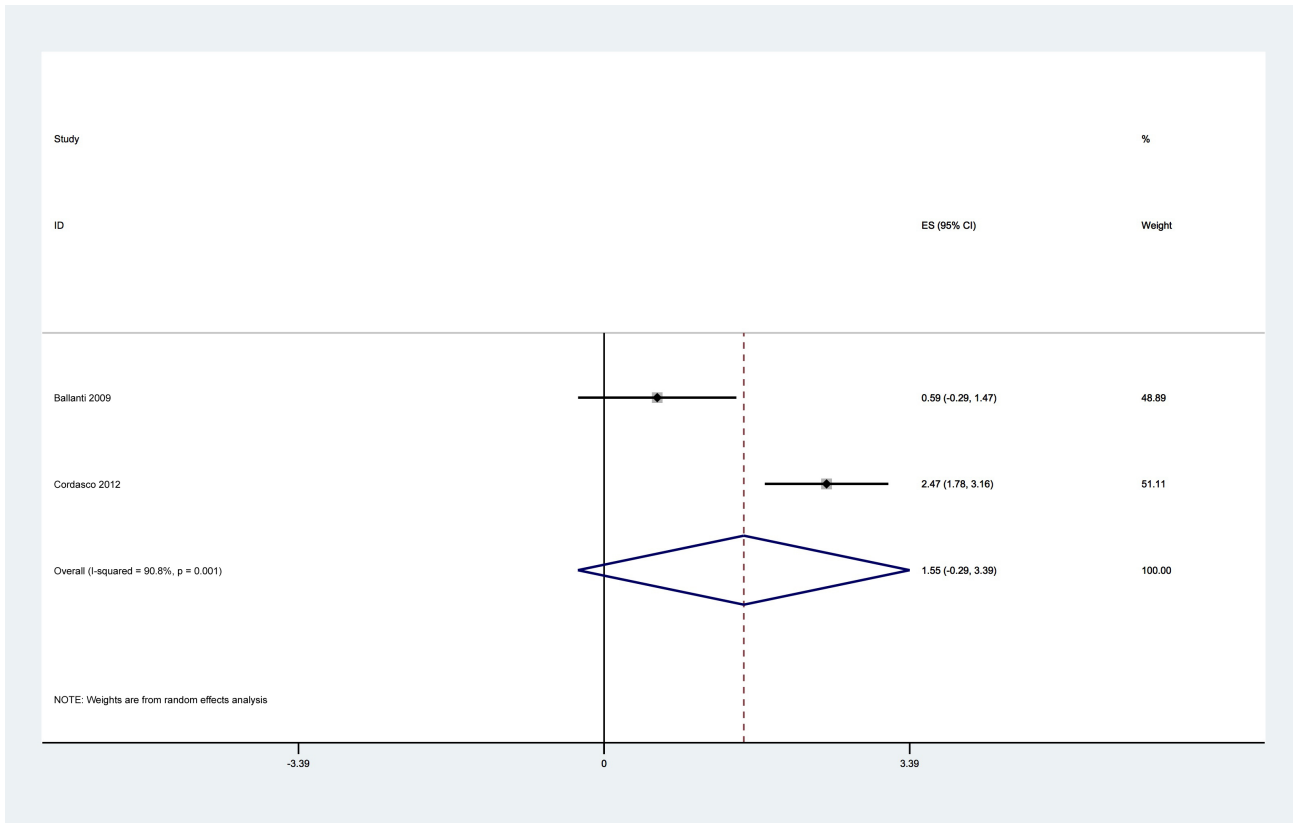
Supplementary Figure 6. Forest plot of increments in the quantitative data synthesis outcome inter-molar root apex width in the interval between T_0 (pre-expansion) and T_1 (post-expansion). Reported data are expressed in millimeters (mm).

Study ID		ES (95% CI)	% Weight
Baratieri 2010		6.88 (5.17, 8.59)	15.62
Baysal 2011		3.39 (3.04, 3.74)	19.03
Christie 2010		5.91 (4.89, 6.93)	17.76
Helmkamp 2016		1.55 (0.41, 2.69)	17.42
Mosleh 2015		4.25 (1.38, 7.12)	11.65
Pangrazio-Kulbersh 2012		1.14 (0.45, 1.83)	18.52
Overall (I-squared = 94.4%, p = 0.000)		3.75 (2.18, 5.31)	100.00

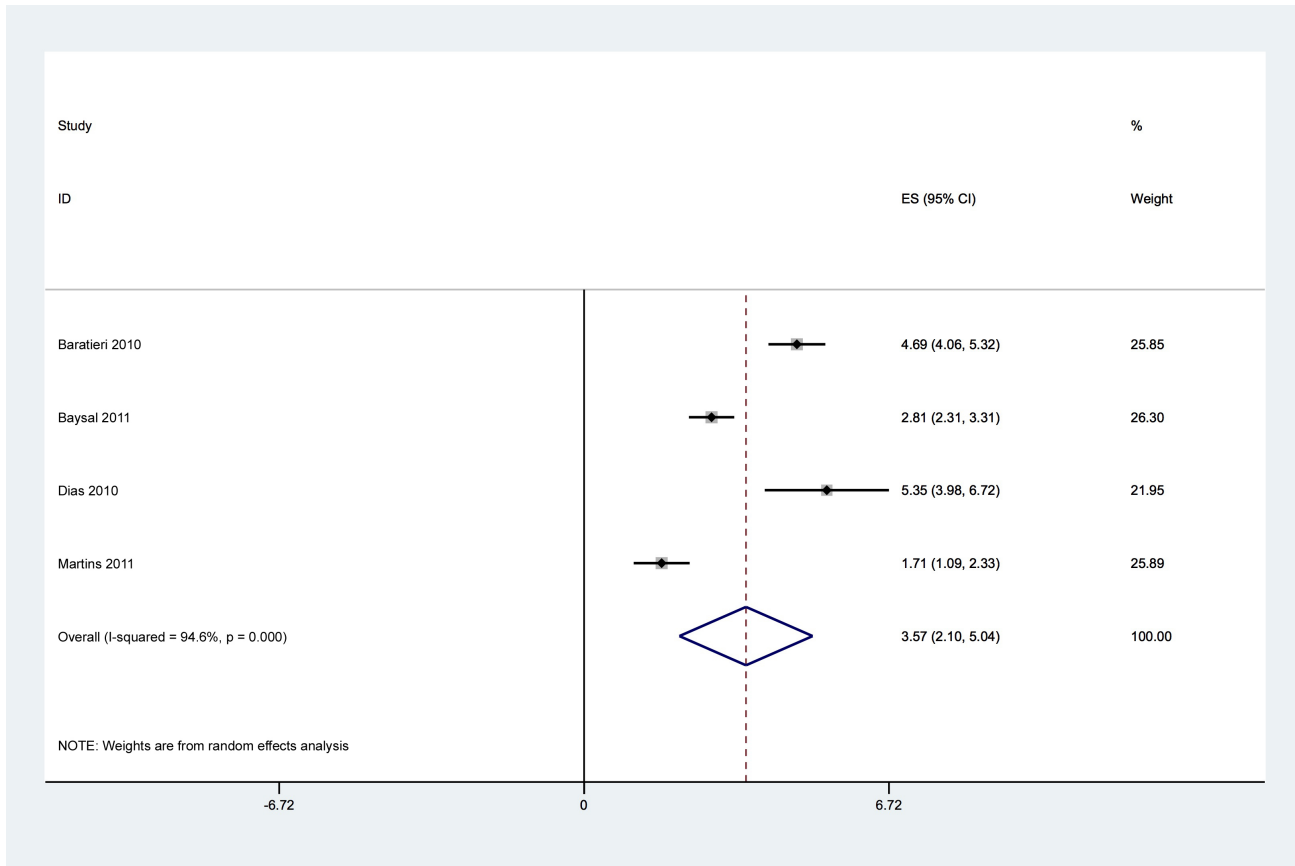NOTE: Weights are from random effects analysis

-8.59   0   8.59

Supplementary Figure 7. Forest plot of increments in the quantitative data synthesis outcome dental tipping in the interval between T_0 (pre-expansion) and T_1 (post-expansion). Reported data are expressed in angular degree (°).
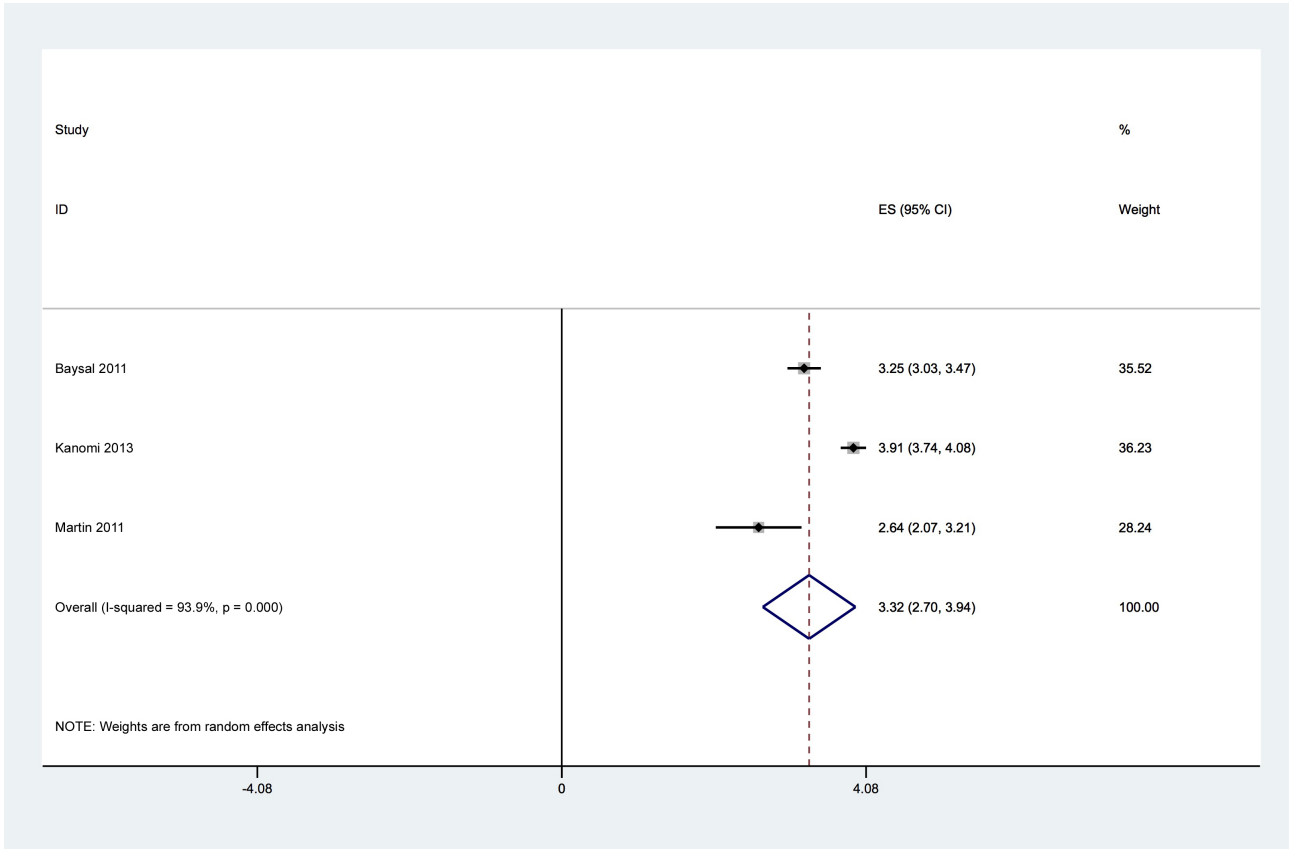
Supplementary Figure 8. Forest plot of maxillary basal bone width increments in the interval between T_0 (pre-expansion) and T_2 (post-retention). Reported data are expressed in millimeters (mm).

Study			
ID		ES (95% CI)	Weight
Ballanti 2009		0.59 (-0.29, 1.47)	48.89
Cordasco 2012		2.47 (1.78, 3.16)	51.11
Overall (I-squared = 90.8%, p = 0.001)		1.55 (-0.29, 3.39)	100.00

NOTE: Weights are from random effects analysis

-3.39   0   3.39

Supplementary Figure 9. Forest plot of nasal cavity width increments in the interval between T_0 (pre-expansion) and T_2 (post-retention). Reported data are expressed in millimeters (mm).

Study		
ID	ES (95% CI)	Weight
Baratieri 2010	4.69 (4.06, 5.32)	25.85
Baysal 2011	2.81 (2.31, 3.31)	26.30
Dias 2010	5.35 (3.98, 6.72)	21.95
Martins 2011	1.71 (1.09, 2.33)	25.89
Overall (I-squared = 94.6%, p = 0.000)	3.57 (2.10, 5.04)	100.00

NOTE: Weights are from random effects analysis
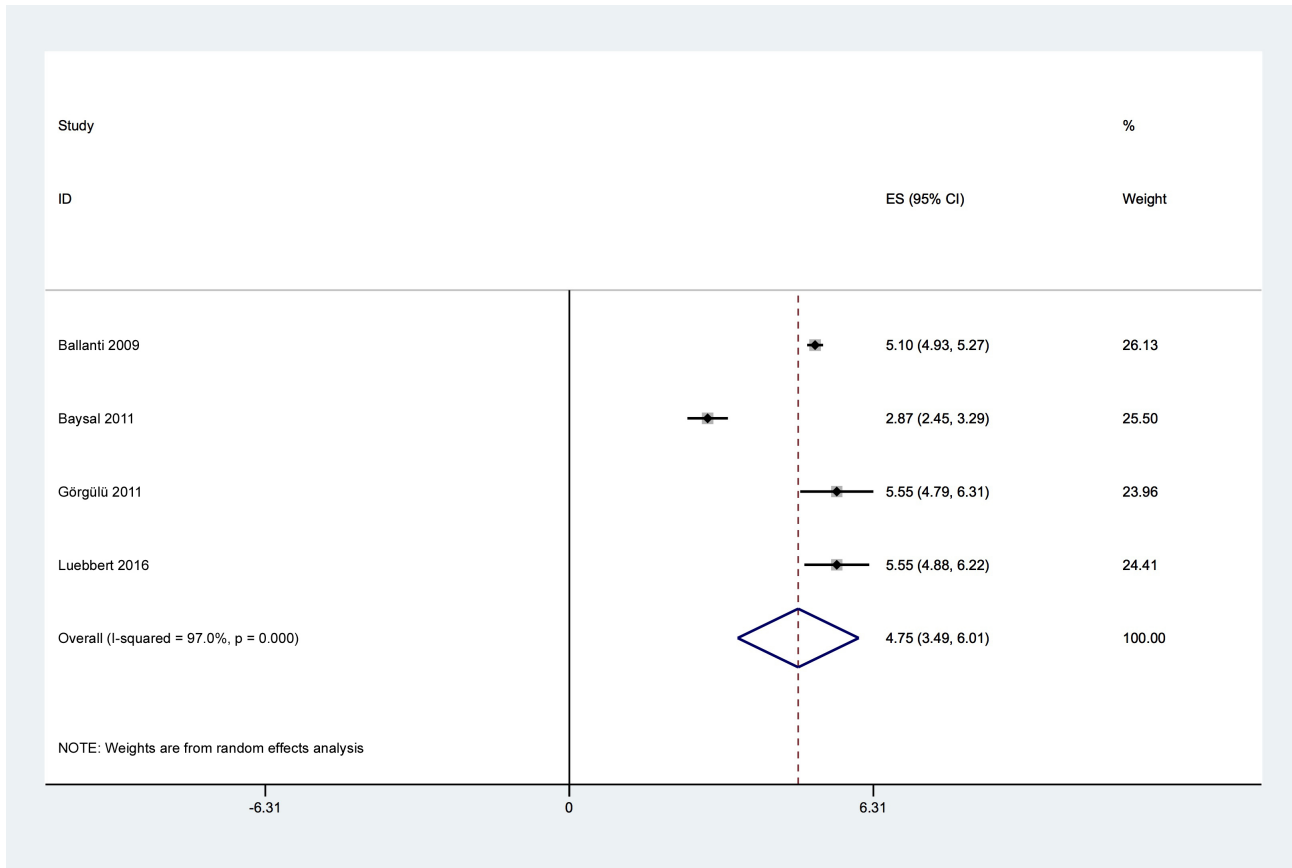
-6.72   0   6.72

Supplementary Figure 10. Forest plot of increments in the quantitative data synthesis outcome alveolar buccal crest width in the interval between T_0 (pre-expansion) and T_2 (post-retention). Reported data are expressed in millimeters (mm).
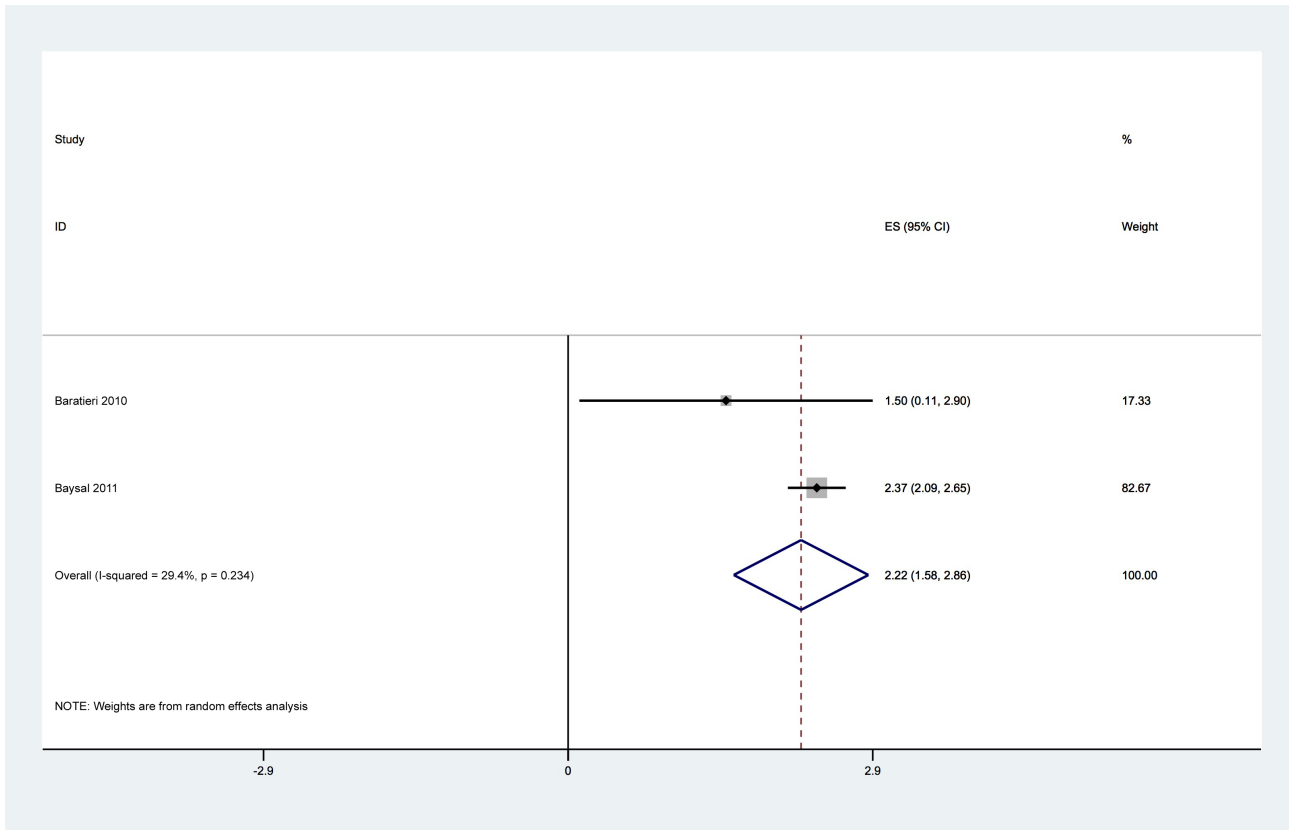
Supplementary Figure 11. Forest plot of increments in the quantitative data synthesis outcome alveolar palatal crest width in the interval between T_0 (pre-expansion) and T_2 (post-retention). Reported data are expressed in millimeters (mm).
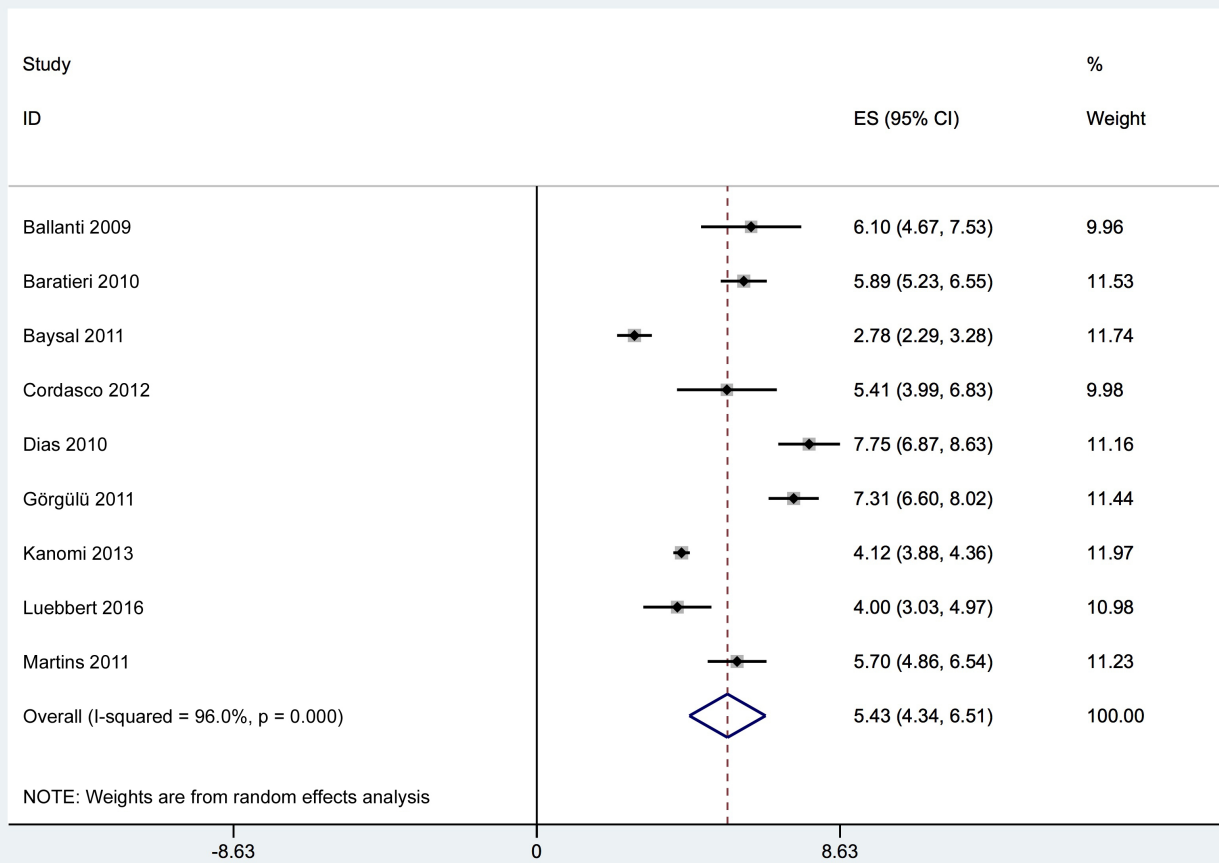
Supplementary Figure 12. Forest plot of increments in the quantitative data synthesis outcome inter-molar crown width in the interval between T_0 (pre-expansion) and T_2 (post-retention). Reported data are expressed in millimeters (mm).

Study		
ID	ES (95% CI)	% Weight
Ballanti 2009	5.10 (4.93, 5.27)	26.13
Baysal 2011	2.87 (2.45, 3.29)	25.50
Görgülü 2011	5.55 (4.79, 6.31)	23.96
Luebbert 2016	5.55 (4.88, 6.22)	24.41
Overall (I-squared = 97.0%, p = 0.000)	4.75 (3.49, 6.01)	100.00

NOTE: Weights are from random effects analysis

-6.31   0   6.31

Supplementary Figure 13. Forest plot of increments in the quantitative data synthesis outcome inter-molar root apex width in the interval between T_0 (pre-expansion) and T_2 (post-retention). Reported data are expressed in millimeters (mm).

Supplementary Figure 14. Forest plot of increments in the quantitative data synthesis outcome dental tipping in the interval between T_0 (pre-expansion) and T_2 (post-retention). Reported data are expressed in angular degree (°).
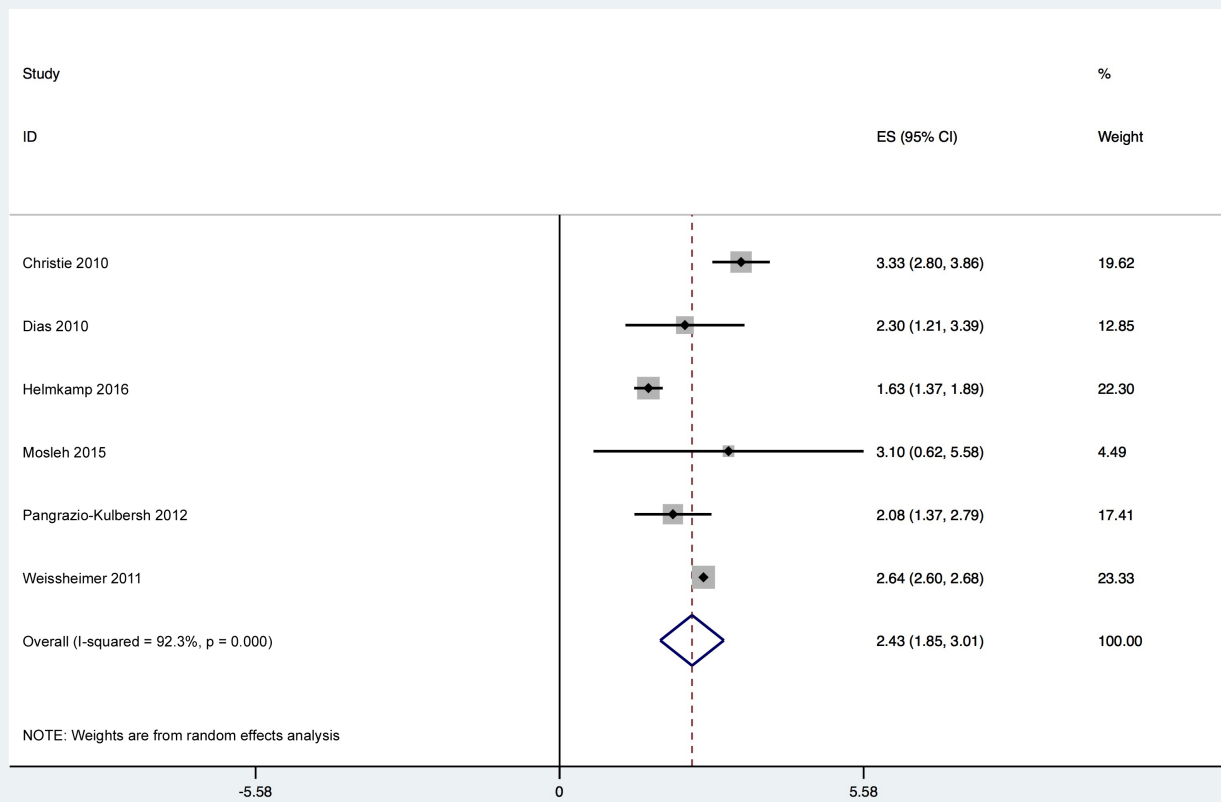
Supplementary Figure 15. Sensitivity analysis. The outcome maxillary basal bone width was evaluated after the active expansion phase (T_1–T_0), and the trial showing the highest risk of bias (Dogra et al.) was excluded. Reported data are expressed in millimeters (mm).

Supplementary Table 1. Search strategies for all the consulted databases

Searched databases	Search strategies	Hits
MEDLINE searched via PubMed searched on July 01, 2019 via www.ncbi.nlm.nih.gov/sites/entrez/	(((((((((cone beam computer tomography) OR cone beam computed tomography) OR cbct) OR low dose computer tomography) OR low dose computed tomography) OR spiral cone beam computed tomography) OR spiral cone beam computed tomography) OR tomography, x-ray computed)) AND (((((((((palatal expansion) OR maxillary expansion) OR rapid maxillary expansion) OR rme) OR rpe) OR sme) OR spe) OR palatal expansion technique) OR transverse maxillary expansion) OR maxillary transverse deficiency)	632
OvidSP searched on July 01, 2019 via https://ovidsp.tx.ovid.com/	((palatal expansion OR maxillary expansion OR rapid maxillary expansion OR RME OR RPE OR SME OR SPE OR Palatal expansion technique OR transverse maxillary expansion OR maxillary transverse deficiency)) AND ((cone beam computer tomography OR cone beam computed tomography OR CBCT OR Low dose computer tomography OR Low dose computed tomography OR spiral cone beam computer tomography OR spiral cone beam computed tomography OR tomography, X-Ray computed))	2,011
ScienceDirect searched on July 01, 2019 via https://www.sciencedirect.com/search/advanced	((palatal expansion OR maxillary expansion OR rapid maxillary expansion)) AND ((cone beam computer tomography OR cone beam computed tomography OR CBCT OR Low dose computer tomography OR Low dose computed tomography))	90
Cochrane Database searched via The Cochrane Library on July 01, 2019 via www.thecochranelibrary.com	((maxillary expansion) OR (rapid maxillary expansion) OR (palatal expansion technique) OR (maxillary transverse deficiency) OR (transverse maxillary expansion) OR (SME) OR (RME) OR (RPE) OR (SPE)) AND ((cone beam computer tomography) OR (cone beam computed tomography) OR (CBCT) OR (low dose computed tomography) OR (low dose computer tomography) OR (spiral cone beam computer tomography) OR (spiral cone beam computed tomography) OR (tomography, X-Ray computed))	70
Google Scholar searched on July 01, 2019 via www.scholar.google.com	(palatal expansion OR maxillary expansion OR rapid maxillary expansion OR rme OR rpe OR sme OR spe OR palatal expansion technique OR transverse maxillary expansion OR maxillary transverse deficiency) AND (cone beam computer tomography OR cone beam computed tomography OR CBCT OR Low dose computer tomography OR Low dose computed tomography OR spiral cone beam computer tomography OR spiral cone beam computed tomography)	770
Web of Science searched on July 01, 2019 All Databases: WOS, KJD, MEDLINE, RSCI, SCIELO via www.webofknowledge.com	((((((((((palatal expansion OR maxillary expansion) OR rapid maxillary expansion) OR RME) OR RPE) OR SME) OR SPE) OR Palatal expansion technique) OR transverse maxillary expansion) OR maxillary transverse deficiency) AND (((((((cone beam computer tomography OR cone beam computed tomography) OR CBCT) OR Low dose computer tomography) OR Low dose computed tomography) OR spiral cone beam computer tomography) OR spiral cone beam computed tomography) OR tomography, X-Ray computed)	718

Scopus searched on July 01, 2019 via www.scopus.com	(palatal AND expansion OR maxillary AND expansion OR rapid AND maxillary AND expansion OR rme OR rpe OR sme OR spe OR palatal AND expansion AND technique OR transverse AND maxillary AND expansion OR maxillary AND transverse AND deficiency) AND (cone AND beam AND computer AND tomography OR cone AND beam AND computed AND tomography OR cbct OR low AND dose AND computer AND tomography OR low AND dose AND computed AND tomography OR spiral AND cone AND beam AND computer AND tomography OR spiral AND cone AND beam AND computed AND tomography OR tomography)	31
LILACS searched on July 01, 2019 via http://bvsalud.org/en/	(tw:((tw:(palatal expansion)) OR (tw:(maxillary expansion)) OR (tw:(rapid maxilary expansion)) OR (tw:(RME)) OR (tw:(RPE)) OR (tw:(SME)) OR (tw:(SPE)) OR (tw:(Palatal expansion technique)) OR (tw:(transverse maxillary expansion)) OR (tw:(maxillary transverse deficiency)))) AND (tw:((tw:(cone beam computer tomography)) OR (tw:(cone beam computed tomography)) OR (tw:(CBCT)) OR (tw:(Low dose computer tomography)) OR (tw:(Low dose computed tomography)) OR (tw:(spiral cone beam computer tomography)) OR (tw:(spiral cone beam computed tomography)) OR (tw:(tomography, X-Ray computed))))	728

Evidence-Based Medicine searched on July 01, 2019 via https://www.tripdatabase.com/	(palatal expansion OR maxillary expansion OR rapid maxillary expansion OR RME OR RPE OR SME OR SPE OR Palatal expansion technique OR transverse maxillary expansion OR maxillary transverse deficiency) AND (cone beam computer tomography OR cone beam computed tomography OR CBCT OR Low dose computer tomography OR Low dose computed tomography OR spiral cone beam computer tomography OR spiral cone beam computed tomography OR tomography, X-Ray computed)	350
Conference proceedings		
Conference Proceedings Citation Index searched on July 01, 2019 via Web of Science Web of Science Core Collection Conference Proceedings Citation Index- Science (CPCI-S) http://thomsonreuters.com/	((((((((((palatal expansion OR maxillary expansion) OR rapid maxillary expansion) OR RME) OR RPE) OR SME) OR SPE) OR Palatal expansion technique) OR transverse maxillary expansion) OR maxillary transverse deficiency) AND ((((((cone beam computer tomography OR cone beam computed tomography) OR CBCT) OR Low dose computer tomography) OR Low dose computed tomography) OR spiral cone beam computer tomography) OR spiral cone beam computed tomography) OR tomography)))	3
Databases of research registers		
ClinicalTrials.gov searched on July 01, 2019 with other terms field via http://clinicaltrials.gov/ct2/home	"maxillary expansion" OR "palatal expansion" OR "maxillary transverse deficiency" OR "palatal expansion technique" AND "cone beam computed tomography" OR' 'cone beam computer tomography" OR "CBCT" OR "low dose computer tomography"	430
International Clinical Trials Registry Platform searched on July 01, 2019 via http://apps.who.int/trialsearch/	"maxillary expansion" OR "palatal expansion" OR "maxillary transverse deficiency" OR "palatal expansion technique" AND "cone beam computed tomography" OR' 'cone beam computer tomography" OR "CBCT" OR "low dose computer tomography"	213
Total		**6,046**

Supplementary Table 2. Risk of bias evaluation

	Ballanti (2009)	Baratieri (2010)	Baysal (2011)	Christie (2010)	Cordasco (2012)	Dias (2010)	Dogra (2016)	Görgülü (2011)	Helmkamp (2016)	Kanomi (2013)	Li (2015)	Luebbert (2016)	Martins (2011)	Mosleh (2015)	Pangrazio-Kulbersh (2012)	Podesser (2007)	Rocco (2012)	Weissheimer (2011)
Study objective																		
1. Was the hypothesis/aim/objective of the study clearly stated?	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2
Study design																		
2. Was the study conducted prospectively?	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2
3. Were the cases collected in more than one center?	No	No	No	No	No	No	No	No	Yes +2	No	No	Yes +2	No	No	No	No	No	No
4. Were patients recruited consecutively?	No	No	No	No	Yes +2	No	No	No	No	yes +2	Yes +2	No	No	No	No	No	Yes +2	No
Study population																		
5. Were the characteristics of the patients included in the study described?	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2
6. Were the eligibility criteria (i.e. inclusion and exclusion criteria) for entry into the study clearly stated?	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	No	Yes +2	Yes +2	Yes +2	Yes +2	No	Yes +2	Yes +2	Yes +2	No	Yes +2	Yes +2
7. Did patients enter the study at a similar point in the disease?	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2
Intervention and co-intervention																		
8. Was the intervention of interest clearly described?	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2

Questionnaire quality assessment — items 9–19 and total score. Each column represents one study; shaded cells indicate "Yes +2" scoring.

9. Were additional interventions (co-interventions) clearly described?

Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2

Outcome measures

10. Were relevant outcome measures established a priori?

Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2

11. Were outcome assessors blinded to the intervention that patients received?

No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes +2

12. Were the relevant outcomes measured using appropriate objective/subjective methods?

Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2

Statistical analysis

13. Were the statistical tests used to assess the relevant outcomes appropriate?

Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	no	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	No	Yes +2	Yes +2

Results and conclusions

14. Was follow-up long enough for important events and outcomes to occur?

Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	No	Yes +2	Yes +2

15. Were losses to follow-up reported?

No	Yes +2	No	No	No	No	No	No	No	No	No	No	No	No	No	No

16. Did the study provided estimates of random variability in the data analysis of relevant outcomes?

Yes +2	No	Yes +2	Yes +2	Yes +2	Yes +2	No	Yes +2	Yes +2	Yes +2	No	Yes +2	No	No	Yes +2	Yes +2

17. Were the adverse events reported?

No	Yes +2	No	No	No	No	No	No	No	No	No	No	No	No	No	No

18. Were the conclusions of the study supported by the results?

Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2	Yes +2

19. Competing interests and sources of support

No	No	No	Yes +2	Yes +2	Yes +2	No	No	No	No	No	No	No	No	No	Yes +2

Total Score

28	26	30	24	30	32	28	28	28	28	30	28	22	28	30	32

Supplementary Table 3. Should orthopedic palatal expansion be used for treating skeletal transverse maxillary deficiency?

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Orthopaedic palatal expansion[intervention]	Control	Relative (95% CI)	Absolute (95% CI)		
Maxillary basal bone width												
7	Case series	Very serious[*]	Very serious[†]	Not serious	Not serious	None	135		-	MD **2.46 higher** (1.9 higher to 3.02 higher)	⊕○○○ VERY LOW	CRITICAL
Nasal cavity width												
8	Case series	Very serious[‡]	Very serious[†]	Not serious	Not serious	None	160		-	MD **1.95 higher** (1.3 higher to 2.59 higher)	⊕○○○ VERY LOW	CRITICAL
Alveolar buccal crest width												
9	Case series	Very serious[‡]	Very serious[†]	Not serious	Not serious	None	182		-	MD **3.9 higher** (2.95 higher to 4.84 higher)	⊕○○○ VERY LOW	CRITICAL
Alveolar palatal crest width												
4	Case series	Very serious[*]	Very serious[†]	Not serious	Not serious	None	63		-	MD **3.09 higher** (1.96 higher to 4.21 higher)	⊕○○○ VERY LOW	CRITICAL
Inter-molars crown width												
9	Case series	Very serious[‡]	Very serious[†]	Not serious	Not serious	None	179		-	MD **5.69 higher** (4.13 higher to 7.26 higher)	⊕○○○ VERY LOW	CRITICAL
Inter-molars root apex width												
7	Case series	Very serious[*]	Serious[§]	Not serious	Not serious	None	152		-	MD **2.85 higher** (2.51 higher to 3.2 higher)	⊕○○○ VERY LOW	CRITICAL
Dental tipping												
6	Case series	Serious[‖]	Very serious[†]	Not serious	Not serious	None	122		-	MD **3.75 higher** (2.18 higher to 5.31 higher)	⊕○○○ VERY LOW	CRITICAL

CI**,** Confidence interval; MD**,** mean difference.
*One study did not clearly report the eligibility criteria.
[†]Heterogeneity > 75%.
[‡]Two studies did not clearly report the eligibility criteria.
[§]Heterogeneity < 75%.
[‖] Considering the intrinsic bias related to the methodological design of the included studies (case series), they were all rated to at least have a "serious" bias.