Impact of different training modalities on anthropometric outcomes in patients with obesity: a systematic review and network meta-analysis

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Table S1. Example of strategy used for the search of MEDLINE® (OvidSP).

1	Diet, Reducing/
2	(weight reduction OR weight loss OR weight maintanance).ti,ab.
3	Weight Loss/
4	#1 OR #2 OR #3
5	Obesity/th [Therapy]
6	Overweight/
7	(obese OR obesity OR overweight).ti,ab.
8	#5 OR #6 OR #7
9	exp "Physical Education and Training"/
10	exercis*.tw.
11	exp Exercise/
12	(physic* adj1 (activ* OR fit*)).ti,ab.
13	(((physic* OR strength* OR resist* OR circuit OR weight OR aerob* OR cross OR endurance OR structur* OR combined OR interval) adj3 train*) OR high-intens* OR hight intens*).ti,ab.
14	#9 OR #10 OR #11 OR #12 OR #13
15	randomi?ed.ab.
16	placebo.ab.
17	drug therapy.fs.
18	randomly.ab.
19	trial.ab.
20	groups.ab.
21	15 OR 16 OR 17 OR 18 OR 19 OR 20
22	exp animals/ NOT humans/
23	#21 NOT #22
24	#4 AND #8 AND #14 AND #23
25	24 and (adults OR men OR women OR man OR woman OR adulthood OR adult).ti,ab.

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Table S2. Additional data received by e-mail contact with primary/corresponding authors of included studies.

Reference	Data received
Donnelly et al. 2013	Waist circumference (change from baseline in treatment arms)
Gram et al. 2017	Fat mass, fat-free mass, waist circumference (pre- and post-intervention means in treatment arms)
Gepner et al.2017	Body weight, body mass index, weight circumference (pre- and post-intervention means in treatment arms)
Villareal et al.2011	Body mass index (change from baseline in treatment arms)
Villareal et al.2017	Body mass index (change from baseline in treatment arms)
Watkins et al. 2003	Waist circumference (pre- and post-intervention means in treatment arms)

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Table S3. Reasons for risk of bias assessment judgement in the present systematic review.

Cochrane RoB2 domain	Domain-level judgements	Reasons for judgement
Bias arising from the randomization process	Low risk	Available description of random sequence generation and allocation concealment (in the manuscript or trial protocol) as well as no evidence for baseline imbalances.
	Some concerns	Missing description of allocation concealment, but no evidence for baseline imbalances.
	High risk	Missing description of allocation concealment but there is an evidence that baseline imbalances were due to failure to proper random allocation of participants.
Bias due to deviations from the intended interventions	Low risk	Study used ITT (or mITT) approach and reported high adherence of participants to exercise programs (i.e ≥80% of session completed).
	Some concerns	Study used ITT (mITT) or per-protocol approach and reported moderate non-adherence of participants to exercise program (i.e. <80% of sessions completed).
	High risk	Study used per-protocol approach in case of serious non-adherence or unwillingness to continue exercise program.
Bias due to missing outcome data	Low risk	Study's drop-out rate ≤20%, with stated reasons, and dropouts were likely not dependent on their true value.
	Some concerns	Study's drop-out rate >20%, but reasons for dropouts missing, and dropouts were likely not dependent on their true value.
	High risk	Study's drop-out rate >20%, and dropouts were likely dependent on their true value (i.e., rates not equal between groups).
Bias in the measurement of the outcome	Low risk	Anthropometrics and body composition assessed using recommended reliable methodology (i.e. DXA, MRI)
	Some concerns	Anthropometrics and body composition assessed using less reliable methodology (i.e. bioimpedance analysis)
	High risk	NA
Bias in the selection of the reported result	Low risk	No evidence for results selection and pre-specified trial protocol available.
	Some concerns	No evidence for results selection but missing pre-specified trial protocol available.
	High risk	Presence of evidence for results selection.

Abbreviations: DXA – dual energy x-ray absorptiometry, ITT – intention-to-treat, mITT – modified intention-to-treat, MRI – magnetic resonance imaging; NA – not applicable;
Presented judgements are based on assessment algorithms available in the guidance document for the revised Cochrane risk-of-bias tool for randomized trials (RoB2).

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Table S4. Reasons for study and arms exclusion at the full-text eligibility assessment.

Reference	Reasons for exclusion of studies
1	Baseline cardiovascular disease
2	Baseline type 2 diabetes
3	Commentary
4-32	Duplicated report
33-47	Exercise intensity not provided
48	Exercise protocol not fully described
49	Exercise used as a weight maintaining protocol
50-58	Follow-up lasting less than 6 months
59-62	No information on baseline BMI
63-73	Non-adequate control intervention
74-90	Not obese (mean baseline BMI<30 kg/m^2 or <25 kg/m^2 in Asian studies)
91-93	Not randomised/quasi-randomised trial
94	Subjective intensity of exercise (Borg Scale)
Reference	**Reasons for exclusion of arms from included studies**
95-99	Subjective intensity of exercise
100-103	Unbalanced co-intervention
99 104 105	Not obese (arm-level mean baseline BMI <30 kg/m^2 or <25 kg/m^2 in Asian studies)

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Table S5. Characteristics of participants and training protocols in 32 randomized controlled trials included in the current systematic review.

Author, Year	Country	Study length (months)	Sample size, Female (%)	Mean age (years)	Mean BMI (kg/m²)	Specification of studied groups and exercise programs				Co-interventions in all included arms	Outcomes
						Arm 1	Arm 2	Arm 3	Arm 4		
Arsenault et al. 2009 Church et al. 2007	US	6 mo	464 100%	57.3 y	31.8	AET: supervised semi-recumbent ergometer or treadmill exercise aiming to achieve EE of (1) 4, (2) 8 or (3) 12 kcal/kg/wk (D: depending on the target EE, F: 3-4 d/wk, I: 50% $VO2_{peak}$)	C: maintain usually exercise habits	-	-	None	BW, BMI, WC, FM
Beavers et al. 2017	US	18 mo	163 71%	66.6 y	34.7	RT: resistance training on eight machines with initial resistance determined from 1 RM. Resistance was increased after each two consecutive days of sessions (D: 45 min, 3 sets of 10-12 reps, F: 4 d/wk, I: progressive to 75% RM)	C: no formal exercise	-	-	Behaviour-based weight loss program (group sessions); Diet (%E: Protein 20-25%, Fat 20-30%, CHO 45-45%)	BW, FM, FFM
Bell et al. 2010	Canada	6 mo	142 NA	49.0 y	30.5	AET: fitness training program using a treadmill, and sometimes stationary stair climbing (D: increasing from 20 to 43 min, F: from 3 to 4 d/wk, I: increasing from 55 to 70% $VO2_{peak}$)	C: maintain usual exercise habits	-	-	None	BW, BMI, WC
Blumenthal et al. 2000	US	6 mo	78 51%	46.9 y	32.7	AET: aerobic exercise sessions included 10 min warm-up, 35 min cycle ergometer and walking (eventually jogging) and 10 min cool-down exercises (D: ~55 min, F: 3-4 d/wk, I: 70-85% HRR),	C: maintain usual dietary and exercise habits	-	-	None	BW, BMI, FM, FFM

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Author, Year	Country	Study length (months)	Sample size, Female (%)	Mean age (years)	Mean BMI (kg/m²)	Arm 1	Arm 2	Arm 3	Arm 4	Co-interventions in all included arms	Outcomes
Bouchonville et al. 2014 Villareal et al. 2011	US	12 mo	107 62.6%	69.7 y	37.2	CT: supervised group-training sessions (D: total 90 min, F:3d/wk) including aerobic exercise (D: 30 min, I: gradually increased up to 70-85% HR_{max}), resistance training on weight lifting machines (D: 30 min, 2-3 sets of 6-8 reps, I: gradually increased to 80% 1 RM), flexibility and balance exercises	C: maintain usually exercise habits, any diet or exercise programs	-	-	Hypocaloric balanced diet (500-700 kcal/d deficit and ~1 g/kg BW/d of high-quality protein)	BW, BMI, WC, FM, FFM,
Brochu et al. 2009	Canada	6 mo	137 100%	57.7 y	32.3	RT: resistance training for major muscle groups of the body divided in 4 phases (with 10 min low intensity aerobic warm-up) (D: 2-4 sets of 8-15 reps, F: 3 d/wk, I: individually monitored)	C: maintain usually exercise habits	-	-	Hypocaloric balanced diet (500-800 kcal/d deficit; %E: Protein 15%, Fat 30%, CHO 55%); Nutrition classes	BW, BMI, WC, FM, FFM
Choo et al. 2014	South Korea	9 mo	110 100%	43.1 y	28.5	RT: resistance training for major upper and lower body exercises (D: 2 sets of 8-12 reps, F: 3 d/wk, I: increasing by 5% every 3 wk from 40-60% of maximum strength)	AET: aerobic session of treadmill and bike exercise (D: 60 min, F: 3 d/wk, I: 50-70% HRR)	CT: combination of AET and RT protocols		Diet targeted to ~1200-1500 kcal and ≤25% E from fat , behavioural counselling	BW, WC, FFM
Dash et al. 2018	US	6 mo	144 100%	58.2 y	35.5	AET: supervised facility sessions including treadmill or exercise bike (D: 50 min, F: 3 d/wk, I: 45-65% $VO2_{peak}$)	C: maintain usually exercise habits	-	-	None	WC
Davidson et al. 2009	Canada	6 mo	136 58%	67.6 y	30.0	AET: treadmill walking (D: ~30 min, F: 5 d/wk, I: 60-75% $VO2_{peak}$),	RT: resistance training for nine major muscle groups (D: ~20 min, 1 set of 15 reps, F: 3 d/wk, I: progressive),	CT: combination of RT and AET protocols	C: no exercise	Nutrition seminars	BW, BMI, WC, FM
Donnelly et al. 2013	US	10 mo	63 0%	23.4 y	31.7	AET(1+2): supervised sessions of treadmill walking or jogging aiming to achieve EE of (1) 400 or (2) 600 kcal/session (D: depending on the target EE, F: 5 d/wk, I: 70 progressive to 80% HR_{max})	C: no exercise	-	-	None	BW, BMI, WC, FM, FFM

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Author, Year	Country	Study length (months)	Sample size, Female (%)	Mean age (years)	Mean BMI (kg/m²)	Arm 1	Arm 2	Arm 3	Arm 4	Co-interventions in all included arms	Outcomes
						Specification of studied groups and exercise programs					
Foster-Schubert et al. 2012	US	12 mo	439 100%	58.0 y	30.9	AET: facility supervised (treadmill walking, stationary bicycling and other aerobic machines) and home (walking/hiking, aerobics, bicycling) exercise sessions (D: ~45 min, F: 5 d/wk, I: progressed to 70-85% HR_{max}),	C: exercise habits not changed.	-	-	Diet (1200-2000 kcal/d - based on body weight, %E: Fat <30%); Additional dietary counselling sessions	BW, BMI, WC, FM, FFM,
Frimel et al. 2008	US	6 mo	30 60%	69.5 y	36.8	CT: exercise training session (D: 90 min, F: 3d/wk), of flexibility exercises, low-impact aerobic exercises and high-intensity resistance training of nine exercises (D: increasing to 3 sets of 8-12 reps, I: 85% 1 RM)	C: no exercise	-	-	Hypocaloric balanced diet (~750 kcal/d deficit, %E: Protein 20%, Fat 30%, CHO 50%); Behavioural strategies for better eating habits	BW, FM, FFM
Gepner et al. 2017	Izrael	12 mo	278 11%	47.8 y	30.8	CT: aerobic training combined with resistance training (D: increasing to 45 min (AET)/15 min (RT), F: 3 d/wk, I: (AET) increasing to 80% HR_{max} and (RT) 2 sets with weight of 80% maximum weight)	C: no added physical activity	-	-	Equal-caloric MedDiet/ low-CHO (CHO intake <40-70 g/d, MedDiet food items) or low-fat diet (%E: Fat ≤30%, SFA <10%); Nutritional session and educational workshops	BW, BMI, WC
Gram et al. 2017	Denmark	6 mo	56 54.7%	35.6 y	30.1	AET: vigorous intensity (D/F: aiming to achieve EE of 1600 kcal/week for women and 2100 kcal for men, I: ~70% $VO2_{peak}$)	C: maintain habitual lifestyle	-	-	None	BW, BMI, WC, FM, FFM,
Irwin et al. 2003	US	12 mo	173 100%	60.8 y	30.6	CT: combination of overall moderate-intensity exercises (D: 45 min, F: 5 d/wk, I: gradually increased to 60-75% HR_{max}) from which one was facility session (treadmill, stationary bicycling, strength training of 2 sets of 10 reps for major muscle groups) and four sessions of various home exercises.	MI: attended to stretching sessions (D: 45 min, F: 1 d/wk) and not changed other exercise habits.	-	-	Group exercise behaviour-change education classes	BW, BMI, WC, FM

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Author, Year	Country	Study length (months)	Sample size, Female (%)	Mean age (years)	Mean BMI (kg/m²)	Specification of studied groups and exercise programs				Co-interventions in all included arms	Outcomes
						Arm 1	**Arm 2**	**Arm 3**	**Arm 4**		
Lakhadar et al. 2013	Tunisia	6 mo	20 100%	38.9 y	33.0	AET: treadmill walking or running (D: gradually increased to 45 min, F: 3 d/wk, I: gradually increased to 80% HR_{max}),	C: no added physical activity	-	-	Balanced, personalized hypocaloric diet (500 kcal deficit, %E: Protein 15%, Fat 30%, CHO 55%);	BW, BMI, WC, FM
Martin et al. 2019	US	6 mo	198 72.5%	48.9 y	31.5	AET(1+2): monitored/ supervised treadmill training with altered speed and grade, which allowed to keep the targeted HR range (F: participants-selected 3-5 d/wk, I: 65-85% $VO2_{peak}$) and duration reflecting (1) general health (D: 8 kcal/kg body weight/week, about 800-1000 kcal/wk) or (2) weight loss (D: 20 kcal/kg body weight/week, about 2000 – 2250 kcal/wk);	MI: maintained baseline physical activity level and healthy lifestyle information seminars	-	-	None	BW, BMI, WC, FM, FFM
Messier et al. 2013	US	18 mo	304 71.4%	65.5 y	33.7	CT: training protocol includes four phases: aerobic (15 min), resistance training (20min), aerobic (15 min), cool-down (10 min). Aerobic training involved walking or alternatively stationary bicycling. Resistance training consisted of exercises for upper and lower body parts. (D: 60 min, F: 3 d/wk, I: 50-75% HRR);	C: no added physical activity	-	-	Hypocaloric diet (deficit up to 1100 kcal for women and 1200 kcal for men, %E: Protein 15-20%, Fat <30%, CHO 45-60%); Nutrition education and behavioural sessions	BW, FM, FFM
Nicklas et al. 2004	US	18 mo	316 72%	68.5 y	34.4	CT: training protocol includes four phases: aerobic, resistance training, aerobic, cool-down, 15 min each (D: 60 min including 2 sets of 12 reps, F: 3 d/wk, I:50-75% HRR and increasing weight);	MI: health education and social interaction	-	-	Three-phases (intensive, transition, maintenance) dietary weight-loss intervention (deficit by 500 kcal/d), including individual and group sessions about eating behaviour	BW, BMI

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Author, Year	Country	Study length (months)	Sample size, Female (%)	Mean age (years)	Mean BMI (kg/m²)	Specification of studied groups and exercise programs				Co-interventions in all included arms	Outcomes
						Arm 1	Arm 2	Arm 3	Arm 4		
Park et al. 2017	South Korea	6 mo	50 100%	74.1 y	27.3	CT: resistance training with elastic band use for 12 body parts (D: 20-30 min, F: 5d/wk, I: 2-3 sets, each 8-15 reps) and aerobic exercise of various walking activities (D: 30-50 min, F: 5d/wk, I: 13-17 RPE) with 10 min warm-up and cool-down;	C: maintained usual physical activity	-	-	None	WC
Potteiger et al. 2012	US	6 mo	35 0%	36.1 y	31.2	RT: resistance training for all major muscle groups, training loads changed within each week (D: 45 min, 4 sets of 5-10 reps, F: 4 d/wk, I: changing: 5-7 reps with 100% of 5-7 RM or 8-10 reps with 80% of 8-10 RM)	AET: treadmill walking or jogging, stationary cycling and stationary stair climbing (D: 45 min, F: 4 d/wk, I: 65-80% HR_{max}).	-	-	Hypocaloric diet (300-600 kcal/d deficit) achieved by lower portions and choosing low-fat products	BW, BMI, WC, FM, FFM,
Ross et al. 2015	Canada	6 mo	300 65.3%	51.4 y	33.4	AET: (1) low-, low-, (2) low-, high-, (3) high-amount and how-intensity treadmill training (D: EE target of (1,2) 180-300 kcal or (3) 360-600 kcal, F: 5 d/wk, I: (1) 50% $VO2_{peak}$ or (2,3) 75% $VO2_{peak}$)	C: maintain usually exercise habits.	-	-	None	BW, BMI, WC
Said et al. 2017	Tunisia	6 mo	32 100%	30.1 y	32.6	CT: sessions (F:4 d/wk) of rhythmic aerobic exercises without jumping (D: 30 min, I: increasing to 60-65 HR_{max}), muscle strengthening exercises on machines for seven major muscle groups (D: 20 min, 2 sets, I: increasing to 80% 1 RM), warm-up and cool down	AET: sessions of high-impact aerobic rhythmic exercises in which both feet leave the ground with warm-up and cool-down (D: 50-60 min, F: 4 d/wk, I: increasing to 85% HR_{max});	-	-	None	BW, BMI, WC, FM, FFM,

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Author, Year	Country	Study length (months)	Sample size, Female (%)	Mean age (years)	Mean BMI (kg/m²)	Specification of studied groups and exercise programs				Co-interventions in all included arms	Outcomes
						Arm 1	Arm 2	Arm 3	Arm 4		
Shah et al. 2009	US	6 mo	18 72.2%	68.6 y	≥30	CT: training combined of 15 min flexibility exercises, 30 min aerobic exercises, 30 min strength training and 15 min balance exercises (D:~90 min, F: 3 d/wk, I: (AET) gradually increased to ~85% HR$_{peak}$ and (RM) 2-3 set of 6-8 reps with ~80 1 RM%)	C: recommendations for exercise were not specified;	-	-	Hypocaloric balanced diet (500-1000 kcal/d deficit, %E: Protein 20%, Fat 30%, CHO 50%); behavioral education	BW, FM, FFM
Slentz et al. 2011 Willis et al. 2012	US	32 wk	196 56.3%	48.8 y	30.5	AET: aerobic training with the use of treadmill, elliptical trainers, cycle ergometers or its combination (D: ~19.2 km/wk, about 132 min/wk, F: 3 d/wk, I:75% VO2$_{peak}$);	RT: supervising weight lifting sessions on eight machines for major muscle groups, (D: 3 sets of 8-12 reps, F:3 d/wk, I: progressive weight lifted);	CT: combination of AET and RT.	-	None	BW, WC, FM, FFM
Sweeney et al. 1993	US	6 mo	47 100%	34.2 y	35.1	AET: 15 min warm-up and aerobic training of steadily increased distance of indoor track brisk walking (increasing to D: 8.8 km, F: 3 d/wk, I: 24-27 min/km with 70-85% HR$_{max}$)	CT: same as AET (increasing to D: 6.8 km/session, F: 3 d/wk, I: 70-85% THR) plus circuit weight training of all muscle groups on seven weight and one sit-up stations with 30 s each (D: ≈5 min 45 s, F: 3 d/wk, I: increasing to 40% 1 RM)	C: no added physical activity	-	Hypocaloric diet (with %E: Protein≈15%, Fat≈30%, CHO≈55%) with two E targets: (1) Severe energy restriction providing 40% E requirement (2) moderate energy restriction providing 70%E requirement	BW, FM
Villareal et al. 2017	US	6 mo	120 64.4%	70.0 y	36.4	AET: training sessions included flexibility, 40 min aerobic (treadmill walking, stationary cycling, stairs climbing) and balance exercises (D: 60 min, F: 3d/wk, I:gradually increased from 65 to 70-85% HR$_{peak}$)	RT: training sessions included flexibility, 40 min resistance training (nine lower- and upper-body exercises on weight-lifting machines) and balance exercises (D: 60 min, 2-3 sets of 8-12 reps, F: 3 d/wk, I: gradually increased to 85% 1 RM)	CT: training sessions included flexibility, 30-40 min aerobic, 30-40 min resistance and balance exercises (D: 75-90 min, F: 3 d/wk, I: like in AET/RT protocols)	-	Weight-management program. Balanced hypocaloric diet (500 – 750 kcal/d deficit and ~1 g/kg BW/d of high-quality protein).	BW, BMI, FM, FFM
Watkins et al. 2003	US	6 mo	32 NA	≥ 29 y	33.1	AET: supervised exercise sessions of cycle ergometry or walking, eventually jogging, each with warm -up and cool-down (D: 35 min, F: 3 to 4 d/wk, I: 70-80% of initial HRR);	C: maintain usually exercise habits	-	-	None	BW, BMI, WC, FM

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Author, Year	Country	Study length (months)	Sample size, Female (%)	Mean age (years)	Mean BMI (kg/m²)	Specification of studied groups and exercise programs				Co-interventions in all included arms	Outcomes
						Arm 1	Arm 2	Arm 3	Arm 4		
Weinstock et al. 1998	US	12 mo	31 100%	43.3 y	35.7	RT: resistance training targeting the large muscle groups with 5-10 min warm-up and 5 min cool-down (increasing up to D: 40 min, 2 sets, F: 3 d/wk by 28 wk and 2 d/wk at 29 - 48 wk, I: resistance allowed to do 10-14 repetitions by wk 14)	C: no regular or formal exercise	-	-	Hypocaloric diet (from 925kcal/d at week 1 to 1500 kcal with %E: Protein 12-15%, Fat 25-30%, CHO 55-60% beginning at week 22)	BW, BMI
Wood et al. 1991	US	12 mo	89 0%	40.3 y	30.7	AET: brisk walking or jogging (D: from 25 min initially gradually to 45 min, F: 3d/wk, I: 60-80% HR_{max});	C: no change in exercise level	-	-	Hypocaloric NCPE diet (%E: Protein 15%, Fat 30%, CHO 55 %)	BW, FM
You et al. 2004	US	6 mo	50 100%	58.0 y	32.8	AET: treadmill walking (progressed from the first week to the third month D: from 30 to 45-60 min, F:3d/wk, I: 50-55% to 65-70% HRR)	C: no formal exercise	-	-	Hypocaloric diet (~250-350 kcal/d deficit); Dietary instructions	BW, FM, FFM
Zhang et al. 2016	China	12 mo	220 67.7%	53.9 y	28.0	AET: **(1)** brisk walking (D: 30 min, F: 5 d/wk for 48 wk, I: 45-55% HR) or **(2)** supervised treadmill jogging (D: 30 min, F: 5 d/wk for the first 28 wk, I: 65-80% HR) and brisk walking (D: 30 min, F: 5 d/wk starting from 28 wk, I: 45-55% HR_{max});	C: not change in physical activity	-	-	Health education sessions (identical, separately for each study group)	BW, WC, FM

Training modalities: AET – aerobic training, C – control group, CT – combined training, MI – minimal intervention, RT – resistance training;

Exercise prescription: D – duration of each exercise session, F – exercise frequency, I – exercise intensity; **Aerobic training protocols:** EE – energy expenditure, HR_{peak} and $_{max}$ – peak and maximum heart rate, HRR – heart rate reserve, RPE – Borg Scale of Perceived Exertion, $VO2_{peak}$ and $_{max}$ – peak and maximal oxygen consumption; **Resistance training protocols:** reps – repetitions, RM – repetition maximum;

Outcomes: BMI – body mass index, BW – body weight, FFM – free fat mass, FM – fat mass, WC – waist circumference;
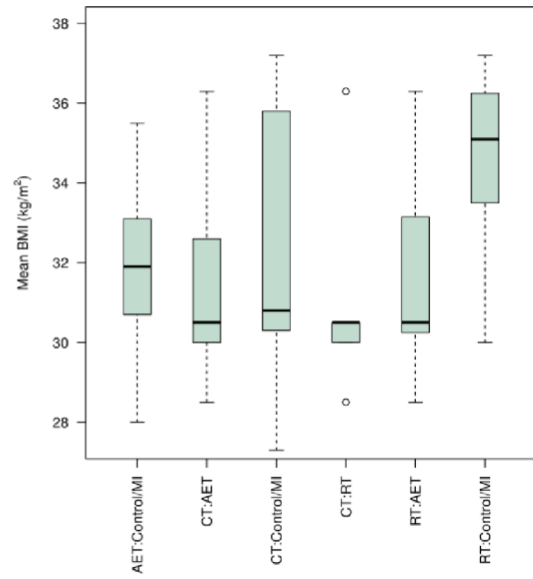
Co-interventions: CHO – carbohydrates, %E – percentage of energy intake, MedDiet – Mediterranean diet, NCPE – National Cholesterol Education Program, SFA – saturated fatty acid;
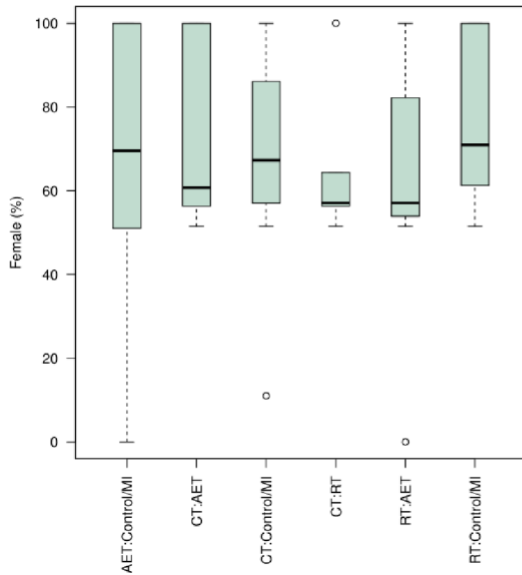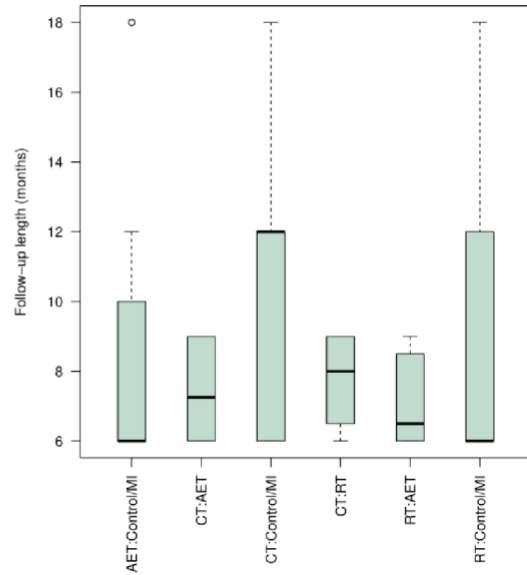
A.
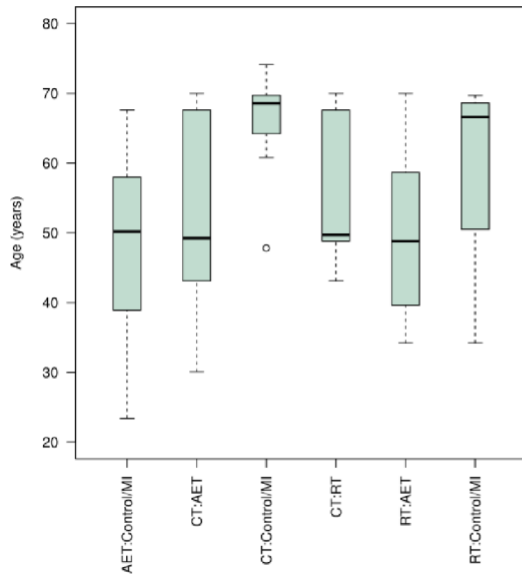
B.

C.

D.

Figure S1. Boxplots presenting the distribution of (**A**) age, (**B**) body mass index (BMI), (**C**) % of female, and (**D**) follow-up length for different pairs of comparisons.

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Risk of bias domains

Study	D1	D2	D3	D4	D5	Overall
Arsenault 2009	+	+	X	+	+	X
Beavers 2017	-	-	X	+	+	X
Bell 2010	-	-	X	+	+	X
Blumentahl 2000	-	-	+	-	-	-
Bouchonville 2014	+	+	+	+	+	+
Brochu 2009	-	-	X	+	+	X
Choo 2014	+	-	-	+	-	-
Church 2007	+	+	+	+	+	+
Dash 2018	+	-	X	+	-	X
Davidson 2009	-	+	+	+	+	-
Donnelly, 2013	+	-	+	+	+	-
Foster-Schubert 2010	+	+	+	+	+	+
Frimel 2008	-	-	+	+	-	-
Gepner 2018	+	+	+	+	+	+
Gram 2017	-	X	+	+	+	X
Irwin 2003	+	+	+	+	+	+
Lakhdar 2013	-	-	+	-	-	-
Martin 2019	+	-	+	+	+	-
Messier 2013	+	-	+	+	-	-
Nicklas 2004	+	-	-	+	-	-
Park 2017	-	+	+	+	-	-
Potteiger 2012	-	-	X	+	+	X
Ross 2015	+	+	+	+	+	+
Said 2015	-	-	+	+	+	-

Figure S2. Summary of the risk of bias assessment for studies included in the current review.

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Table S6. GRADE evaluation for body weight (kg) and all comparisons.*

Comparison	N studies	Direct evidence		Indirect evidence		Network meta-analysis	
		MD (95% CI)	Certainty of evidence	MD (95% CI)	Certainty of evidence	MD (95% CI)	Certainty of evidence
AET vs. Control/MI	16	-2.32 [-3.11; -1.53]	⊕⊕⊕○ [1]	-1.55 [-3.27; 0.17]	⊕⊕⊕○	-2.18 [-2.90; -1.46]	⊕⊕⊕○ [3,4]
AET vs. CT	5	-0.34 [-1.62; 0.94]	⊕⊕⊕⊕	-1.61 [-3.12; -0.10]	-	-0.87 [-1.85; 0.10]	⊕⊕⊕○ [3,4,5]
AET vs. RT	6	-1.87 [-3.13; -0.62]	⊕⊕⊕○ [2]	-1.44 [-3.24; 0.36]	⊕⊕⊕○	-1.73 [-2.76; -0.70]	⊕⊕○○ [3,4,5]
CT vs. Control/MI	6	-0.95 [-2.06; 0.15]	⊕⊕⊕○ [1]	-2.02 [-3.58; -0.45]	⊕⊕⊕○	-1.31 [-2.21; -0.40]	⊕⊕○○ [3,4,5]
RT vs. Control/MI	6	-1.09 [-2.45; 0.27]	⊕⊕⊕○ [2]	0.30 [-1.18; 1.78]	⊕⊕⊕○	-0.45 [-1.45; 0.55]	⊕⊕○○ [3,4,5]
CT vs. RT	4	-1.46 [-2.77; -0.19]	⊕⊕⊕○ [1]	0.77 [-1.30; 2.85]	⊕⊕⊕○	-0.86 [-1.94; 0.23]	⊕⊕○○ [3,4,5]

AET – aerobic exercise training, CT – combined training, MI – minimal intervention, RT – resistance training, MD – mean difference, CI – confidence interval;

⊕⊕⊕⊕ High; ⊕⊕⊕○ Moderate; ⊕⊕○○ Low; ⊕○○○ Very low.

[1] downgraded due to inconsistency (I^2 >50%);
[2] downgraded due to risk of bias (approximately 1/3 of included RCTs rated with high risk of bias);
[3] not downgraded due to incoherence (dominant estimate similar to network estimate);
[4] direct evidence contributing more to the NMA estimate (>50%);
[5] downgraded due to imprecision (95% CI overlaps important minimal important difference: -1 kg; and/or important harm: +1 kg);

*Direct estimates were evaluated with the following GRADE criteria: risk of bias, indirectness, inconsistency and publication bias. As suggested recently by the GRADE working group, consideration of imprecision is not necessary when rating the direct and indirect estimates to inform the rating of NMA estimates.

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Table S7. GRADE evaluation for body mass index (kg/m^2) and all comparisons.*

Comparison	N studies	Direct evidence		Indirect evidence		Network meta-analysis	
		MD (95% CI)	Certainty of evidence	MD (95% CI)	Certainty of evidence	MD (95% CI)	Certainty of evidence
AET vs. Control/MI	11	-0.99 [-1.36; -0.62]	⊕⊕◯◯ [1,2]	-0.66 [-1.60; 0.27]	⊕⊕⊕◯	-0.94 [-1.29; -0.60]	⊕⊕◯◯ [3,4]
AET vs. CT	3	-0.16 [-0.84; 0.53]	⊕⊕⊕⊕	-0.72 [-1.41; -0.03]	-	-0.43 [-0.92; 0.05]	⊕⊕⊕◯ [3,4,5]
AET vs. RT	3	-0.54 [-1.22; 0.13]	⊕⊕⊕◯ [2]	-0.41 [-1.25; 0.42]	⊕⊕◯◯	-0.49 [-1.02; 0.03]	⊕⊕◯◯ [3,4,5]
CT vs. Control/MI	4	-0.44 [-0.92; 0.55]	⊕⊕⊕◯ [1]	-0.76 [-1.66; 0.14]	⊕⊕◯◯	-0.51 [-0.94; -0.08]	⊕⊕◯◯ [3,4,5]
RT vs. Control/MI	4	-0.55 [-1.15; 0.06]	⊕⊕⊕◯ [1]	-0.26 [-1.11; 0.59]	⊕⊕◯◯	-0.45 [-0.94; 0.04]	⊕⊕◯◯ [3,4,5]
CT vs. RT	2	-0.31 [-1.01; 0.39]	⊕⊕⊕◯ [1]	0.39 [-0.54; 1.32]	⊕⊕⊕◯	-0.06 [-0.62; 0.50]	⊕⊕◯◯ [3,4,5]

AET – aerobic exercise training, CT – combined training, MI – minimal intervention, RT – resistance training, MD – mean difference, CI – confidence interval;

⊕⊕⊕⊕ High; ⊕⊕⊕◯ Moderate; ⊕⊕◯◯ Low; ⊕◯◯◯ Very low.

[1] downgraded due to inconsistency (I^2 >50%);
[2] downgraded due to risk of bias (approximately 1/3 of included RCTs rated with high risk of bias);
[3] not downgraded due to incoherence (dominant estimate similar to network estimate);
[4] direct evidence contributing more to the NMA estimate (>50%);
[5] downgraded due to imprecision (95% CI overlaps important minimal important difference: -0.5 kg/m^2; and/or important harm: +0.5 kg/m^2);

*Direct estimates were evaluated with the following GRADE criteria: risk of bias, indirectness, inconsistency and publication bias. As suggested recently by the GRADE working group, consideration of imprecision is not necessary when rating the direct and indirect estimates to inform the rating of NMA estimates.

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Table S8. GRADE evaluation for waist circumference (cm) and all comparisons.*

Comparison	Direct evidence			Indirect evidence		Network meta-analysis	
	N studies	MD (95% CI)	Certainty of evidence	MD (95% CI)	Certainty of evidence	MD (95% CI)	Certainty of evidence
AET vs. Control/MI	12	-2.49 [-3.42; -1.56]	⊕⊕◯◯ [1,2]	-1.37 [-3.60; 0.87]	⊕⊕⊕◯	-2.33 [-3.19; -1.47]	⊕⊕◯◯ [3,4]
AET vs. CT	4	-0.08 [-1.73; 1.57]	⊕⊕⊕⊕	-0.54 [-2.29; 1.21]	-	-0.30 [-1.50; 0.90]	⊕⊕⊕◯ [3,4,5]
AET vs. RT	4	-1.42 [-3.01; 0.17]	⊕⊕⊕◯ [2]	-0.61 [-3.11; 1.88]	⊕⊕◯◯	-1.19 [-2.53; 0.15]	⊕⊕◯◯ [3,4,5]
CT vs. Control/MI	5	-2.07 [-3.36; -0.79]	⊕⊕⊕◯ [1]	-1.91 [-4.01; 0.19]	⊕⊕◯◯	-2.03 [-3.12; -0.94]	⊕⊕⊕◯ [3,4,6]
RT vs. Control/MI	2	-2.16 [-4.06; -0.27]	⊕⊕⊕◯ [2]	-0.14 [-2.01; 1.74]	⊕⊕◯◯	-1.14 [-2.47; 0.19]	⊕⊕◯◯ [3,5]
CT vs. RT	3	-1.31 [-2.97; 0.36]	⊕⊕⊕◯ [2]	0.23 [-2.49; 2.94]	⊕⊕⊕◯	-0.89 [-2.31; 0.53]	⊕⊕◯◯ [3,4,5]

AET – aerobic exercise training, CT – combined training, MI – minimal intervention, RT – resistance training, MD – mean difference, CI – confidence interval;

⊕⊕⊕⊕ High; ⊕⊕⊕◯ Moderate; ⊕⊕◯◯ Low; ⊕◯◯◯ Very low.

[1] downgraded due to inconsistency (I^2 >50%);
[2] downgraded due to risk of bias (approximately 1/3 of included RCTs rated with high risk of bias);
[3] not downgraded due to incoherence (dominant estimate similar to network estimate);
[4] direct evidence contributing more to the NMA estimate (>50%);
[5] downgraded due to imprecision (95% CI overlaps important minimal important difference: -1 cm; and/or important harm: +1 cm);
[6] not downgraded due to imprecision (value close to minimal important difference/harm);

*Direct estimates were evaluated with the following GRADE criteria: risk of bias, indirectness, inconsistency and publication bias. As suggested recently by the GRADE working group, consideration of imprecision is not necessary when rating the direct and indirect estimates to inform the rating of NMA estimates.

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Table S9. GRADE evaluation for fat mass (kg) and all comparisons.*

		Direct evidence		Indirect evidence		Network meta-analysis	
Comparison	N studies	MD (95% CI)	Certainty of evidence	MD (95% CI)	Certainty of evidence	MD (95% CI)	Certainty of evidence
AET vs. Control/MI	14	-1.54 [-2.29; -0.79]	⊕⊕⊕○ [1]	-1.56 [-3.27; 0.15]	⊕⊕○○	-1.54 [-2.23; -0.85]	⊕⊕⊕○ [3,4,6]
AET vs. CT	4	0.53 [-0.75; 1.80]	⊕⊕⊕⊕	0.14 [-1.48; 1.77]	-	0.38 [-0.62; 1.38]	⊕⊕⊕○ [3,4,5]
AET vs. RT	5	-0.79 [-2.03; 0.44]	⊕⊕○○ [1,2]	0.23 [-1.43; 1.89]	⊕⊕⊕○	-0.43 [-1.42; 0.56]	⊕○○○ [3,4,5]
CT vs. Control/MI	4	-1.77 [-3.02; -0.53]	⊕⊕⊕○ [1]	-2.15 [-3.67; -0.63]	⊕⊕⊕○	-1.92 [-2.89; -0.96]	⊕⊕⊕○ [3,4,6]
RT vs. Control/MI	5	-1.55 [-2.80; -0.29]	⊕⊕⊕○ [2]	-0.50 [-1.99; 0.99]	⊕⊕○○	-1.11 [-2.07; -0.15]	⊕⊕○○ [3,4,5]
CT vs. RT	3	-1.27 [-2.56; 0.01]	⊕⊕○○ [1,2]	0.40 [-1.68; 2.48]	⊕⊕⊕○	-0.81 [-1.90; 0.28]	⊕○○○ [3,4,5]

AET – aerobic exercise training, CT – combined training, MI – minimal intervention, RT – resistance training, MD – mean difference, CI – confidence interval;

⊕⊕⊕⊕ High; ⊕⊕⊕○ Moderate; ⊕⊕○○ Low; ⊕○○○ Very low.

[1] downgraded due to inconsistency (I^2 >50%);
[2] downgraded due to risk of bias (approximately 1/3 of included RCTs rated with high risk of bias);
[3] not downgraded due to incoherence (dominant estimate similar to network estimate);
[4] direct evidence contributing more to the NMA estimate (>50%);
[5] downgraded due to imprecision (95% CI overlaps important minimal important difference: -1 kg; and/or important harm: +1 kg);
[6] not downgraded due to imprecision (value close to minimal important difference/harm);

*Direct estimates were evaluated with the following GRADE criteria: risk of bias, indirectness, inconsistency and publication bias. As suggested recently by the GRADE working group, consideration of imprecision is not necessary when rating the direct and indirect estimates to inform the rating of NMA estimates.

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Table S10. GRADE evaluation for fat-free mass (kg) and all comparisons.*

Comparison	Direct evidence			Indirect evidence		Network meta-analysis	
	N studies	MD (95% CI)	Certainty of evidence	MD (95% CI)	Certainty of evidence	MD (95% CI)	Certainty of evidence
AET vs. Control/MI	7	0.13 [-0.54; 0.81]	⊕⊕⊕◯ [1]	-0.22 [-1.25; 0.81]	⊕⊕◯◯	0.03 [-0.54; 0.59]	⊕⊕⊕◯ [3,4]
AET vs. CT	4	-0.90 [-1.76; -0.04]	⊕⊕⊕⊕	-1.21 [-2.56; 0.15]	-	-0.99 [-1.71; -0.26]	⊕⊕⊕◯ [3,4,5]
AET vs. RT	4	-1.32 [-2.18; -0.46]	⊕⊕⊕◯ [2]	-0.45 [-1.54; 0.64]	⊕⊕◯◯	-0.98 [-1.66; -0.31]	⊕⊕◯◯ [3,4,5]
CT vs. Control/MI	2	1.70 [0.46; 2.94]	⊕⊕⊕⊕	0.64 [-0.29; 1.56]	-	1.02 [0.27; 1.76]	⊕⊕⊕◯ [3,5]
RT vs. Control/MI	3	0.51 [-0.36; 1.37]	⊕⊕◯◯ [1,2]	1.66 [0.68; 2.64]	⊕⊕⊕◯	1.01 [0.36; 1.66]	⊕◯◯◯ [3,4,5]
CT vs. RT	3	-0.43 [-1.32; 0.45]	⊕⊕⊕◯ [2]	1.17 [-0.28; 2.62]	⊕⊕⊕◯	0.00 [-0.75; 0.76]	⊕⊕⊕◯ [3,4]

AET – aerobic exercise training, CT – combined training, MI – minimal intervention, RT – resistance training, MD – mean difference, CI – confidence interval;

⊕⊕⊕⊕ High; ⊕⊕⊕◯ Moderate; ⊕⊕◯◯ Low; ⊕◯◯◯ Very low.

[1] downgraded due to inconsistency (I^2 >50%);
[2] downgraded due to risk of bias (approximately 1/3 of included RCTs rated with high risk of bias);
[3] not downgraded due to incoherence (dominant estimate similar to network estimate);
[4] direct evidence contributing more to the NMA estimate (>50%);
[5] downgraded due to imprecision (95% CI overlaps important minimal important difference: 1 kg; and/or important harm: -1 kg);

*Direct estimates were evaluated with the following GRADE criteria: risk of bias, indirectness, inconsistency and publication bias. As suggested recently by the GRADE working group, consideration of imprecision is not necessary when rating the direct and indirect estimates to inform the rating of NMA estimates.

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Table S11. Relative ranking* of training effects on anthropometric outcomes.

Training modality	Body weight (↓)	BMI (↓)	Waist circumference (↓)	Fat mass (↓)	Fat-free mass (↑)	All outcomes combined
AET	**0.99**	**0.98**	**0.88**	0.68	0.18	**0.74**
RT	0.29	0.54	0.37	0.42	**0.83**	0.49
CT	0.66	0.47	0.73	**0.90**	**0.83**	0.72
Control/MI	0.06	0.02	0.02	0.00	0.16	0.05

*P-scores were calculated and presented to obtain relative ranking of training modalities. Higher P-score value indicates greater benefit (larger decrease or increase in outcome of interest) of certain intervention.

Ranking for all outcomes combined (assuming their equal importance) was obtained by taking an average of all P-scores for certain intervention.

Bolded are training modalities identified as the best for the given outcome.

AET – aerobic exercise training, CT – combined training, MI – minimal intervention, RT – resistance training;

↑ – increase is the effect of interest; ↑ – decrease is the effect of interest;

Table S12. Results of node-splitting approach to assess inconsistency for anthropometric outcomes.

Comparison	Body weight		Body mass index		Waist circumference		Fat mass		Fat-free mass	
	D	P-value	D	P-value	D	P-value	D	P-value	D	P-value
AET vs. Control/MI	-0.77	0.43	-0.33	0.52	-1.13	0.36	0.02	0.98	0.35	0.57
AET vs. CT	1.27	0.21	0.56	0.26	0.46	0.71	0.38	0.72	0.31	0.7
AET vs. RT	-0.43	0.7	-0.13	0.81	-0.81	0.59	-1.03	0.33	-0.87	0.22
CT vs. Control/MI	1.06	0.28	0.32	0.54	-0.17	0.9	0.38	0.71	1.07	0.18
RT vs. Control/MI	-1.39	0.17	-0.29	0.59	-2.02	0.14	-1.04	0.29	-1.15	0.08
CT vs. RT	-2.23	0.07	-0.7	0.24	-1.53	0.35	-1.67	0.18	-1.6	0.06

D – difference between direct and indirect estimates presented in Supplementary Tables 4-8;

AET – aerobic exercise training, CT – combined training, MI – minimal intervention, RT – resistance training;

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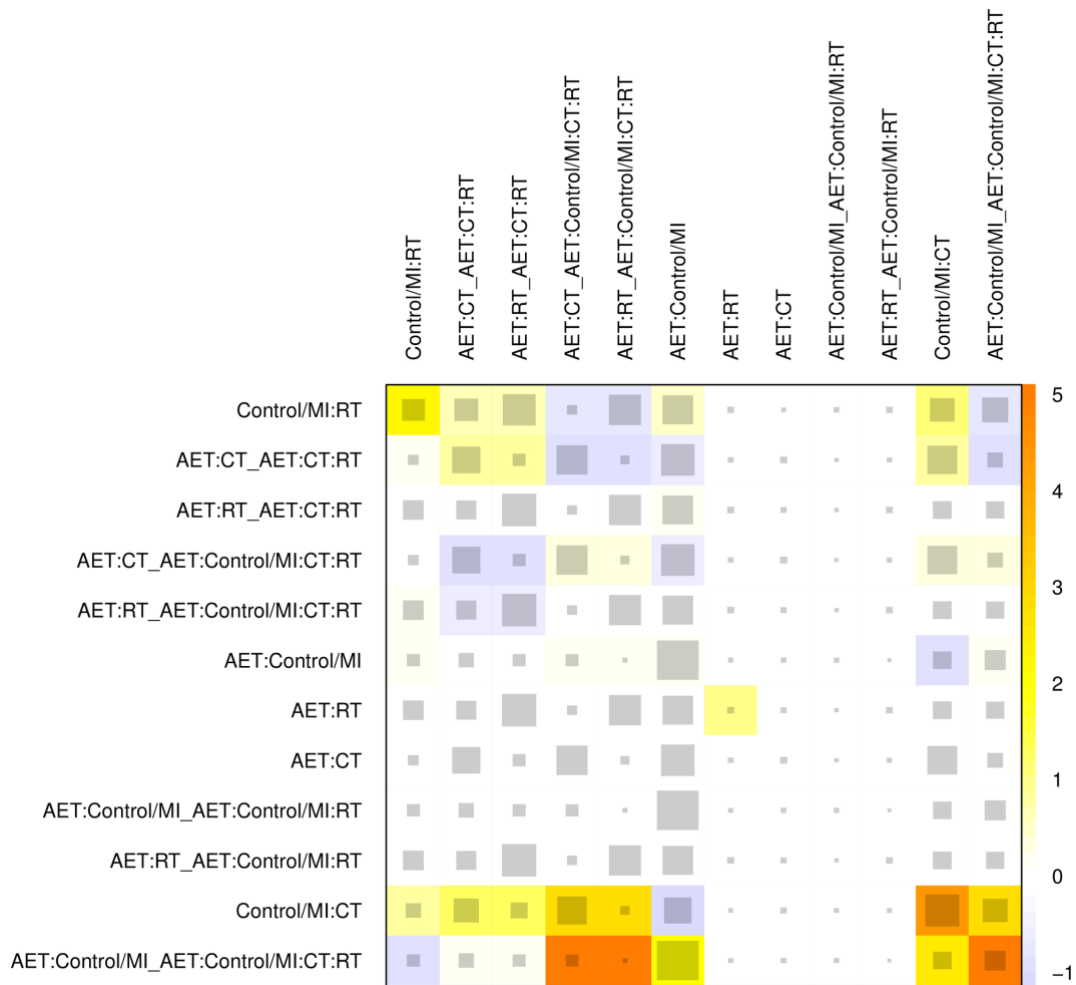
Figure S3. Net-heat plot* to assess inconsistency for body weight.

AET – aerobic exercise training, CT – combined training, MI – minimal intervention, RT – resistance training;

*This plot is a heat map where the colours on the diagonal represent the inconsistency contribution of the corresponding design and the colours on the off-diagonal are associated with the change in inconsistency between direct and indirect evidence in a network estimate in the row after relaxing the consistency assumption for the effect of a design in the column. A blue coloured element indicates that the evidence of the design in the column supports the evidence in the row; a red coloured element indicates that the evidence of the design in the column contrasts to the evidence in the row.
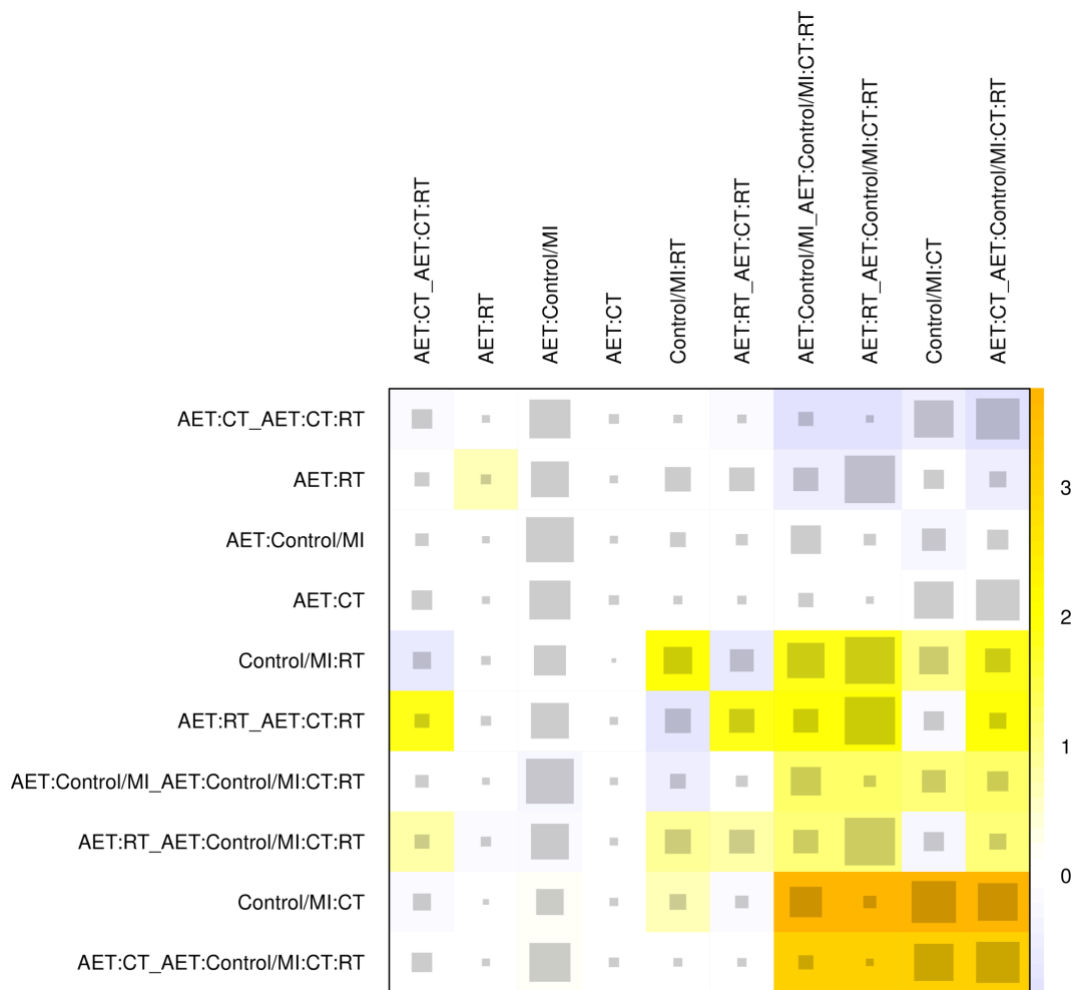
Figure S4. Net-heat plot to assess inconsistency for body mass index.

*This plot is a heat map where the colours on the diagonal represent the inconsistency contribution of the corresponding design and the colours on the off-diagonal are associated with the change in inconsistency between direct and indirect evidence in a network estimate in the row after relaxing the consistency assumption for the effect of a design in the column. A blue coloured element indicates that the evidence of the design in the column supports the evidence in the row; a red coloured element indicates that the evidence of the design in the column contrasts to the evidence in the row.
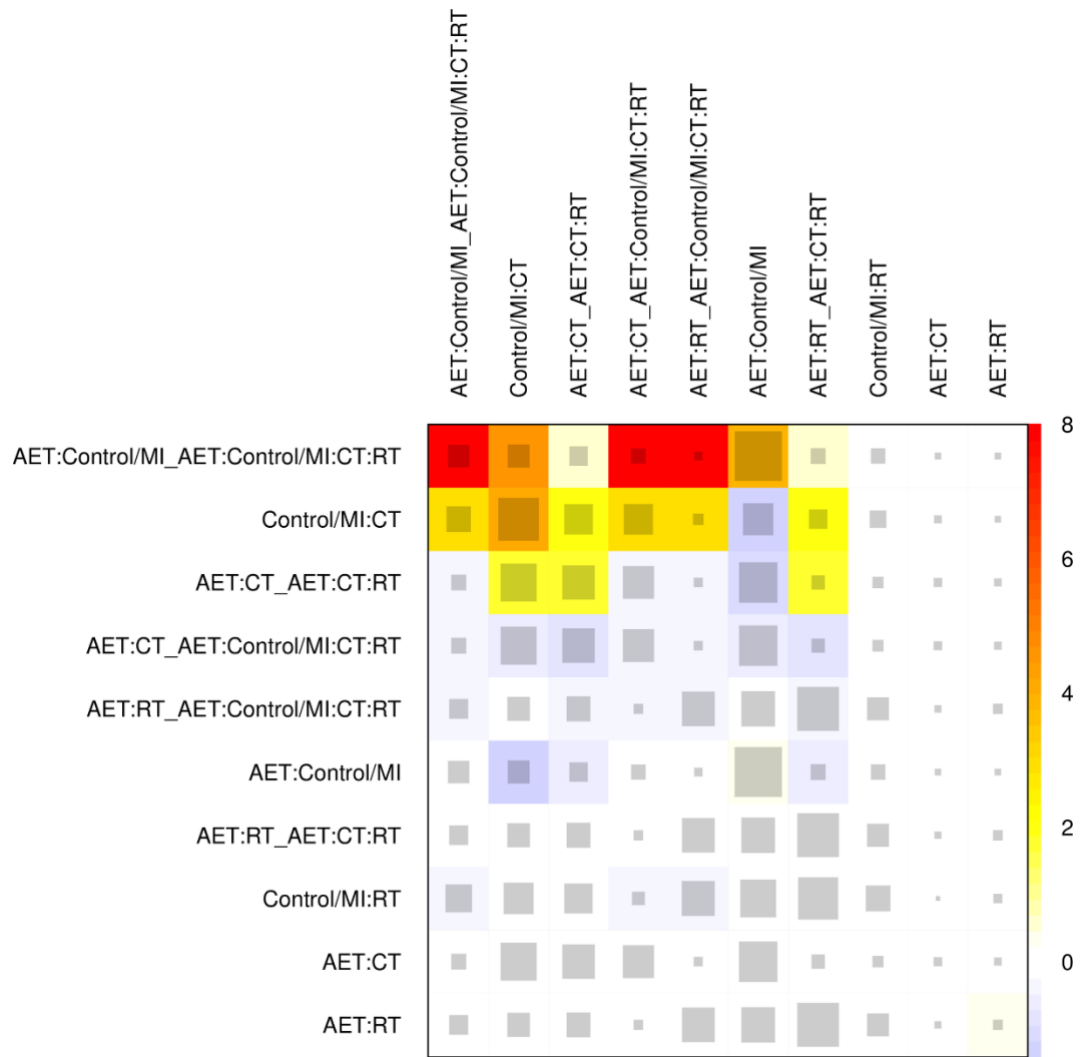
Figure S5. Net-heat plot to assess inconsistency for waist circumference.

*This plot is a heat map where the colours on the diagonal represent the inconsistency contribution of the corresponding design and the colours on the off-diagonal are associated with the change in inconsistency between direct and indirect evidence in a network estimate in the row after relaxing the consistency assumption for the effect of a design in the column. A blue coloured element indicates that the evidence of the design in the column supports the evidence in the row; a red coloured element indicates that the evidence of the design in the column contrasts to the evidence in the row.
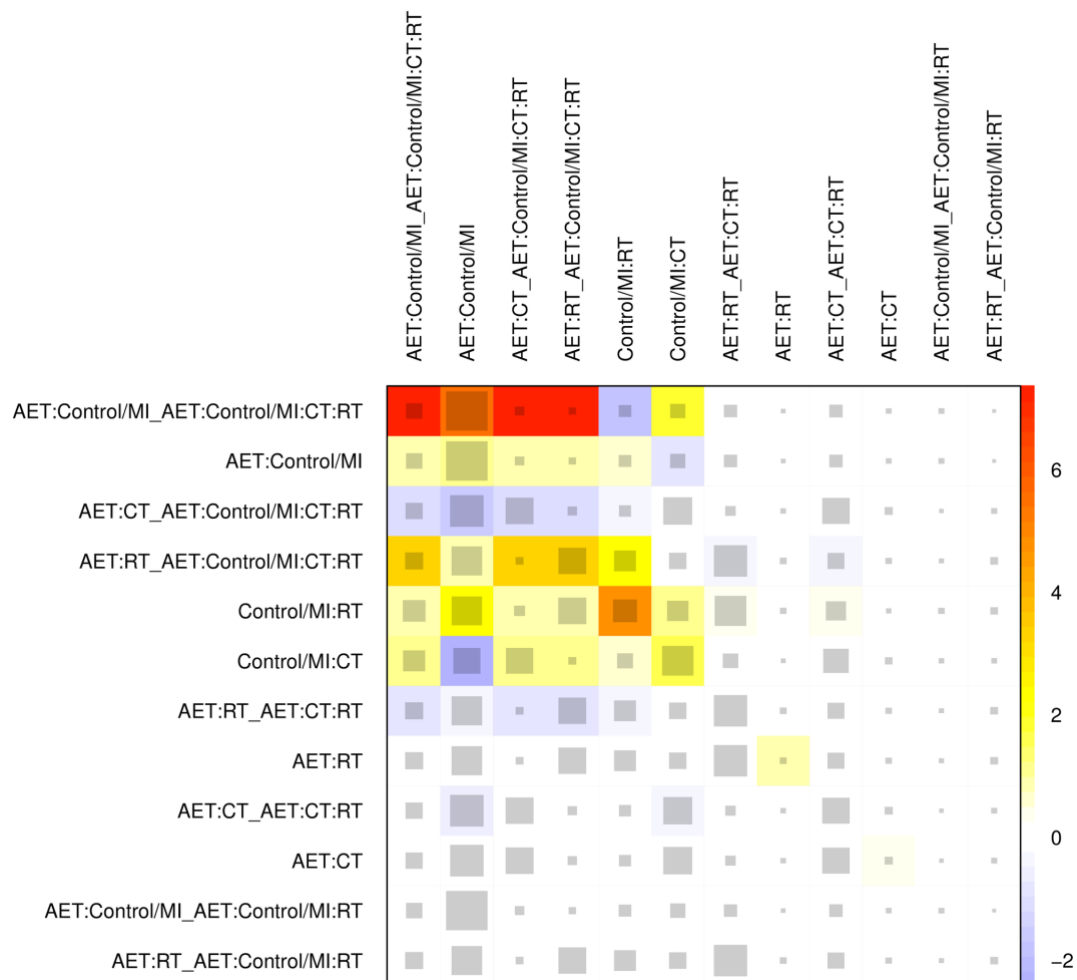
Online Supporting Information

Figure S6. Net-heat plot to assess inconsistency for fat mass.

*This plot is a heat map where the colours on the diagonal represent the inconsistency contribution of the corresponding design and the colours on the off-diagonal are associated with the change in inconsistency between direct and indirect evidence in a network estimate in the row after relaxing the consistency assumption for the effect of a design in the column. A blue coloured element indicates that the evidence of the design in the column supports the evidence in the row; a red coloured element indicates that the evidence of the design in the column contrasts to the evidence in the row.
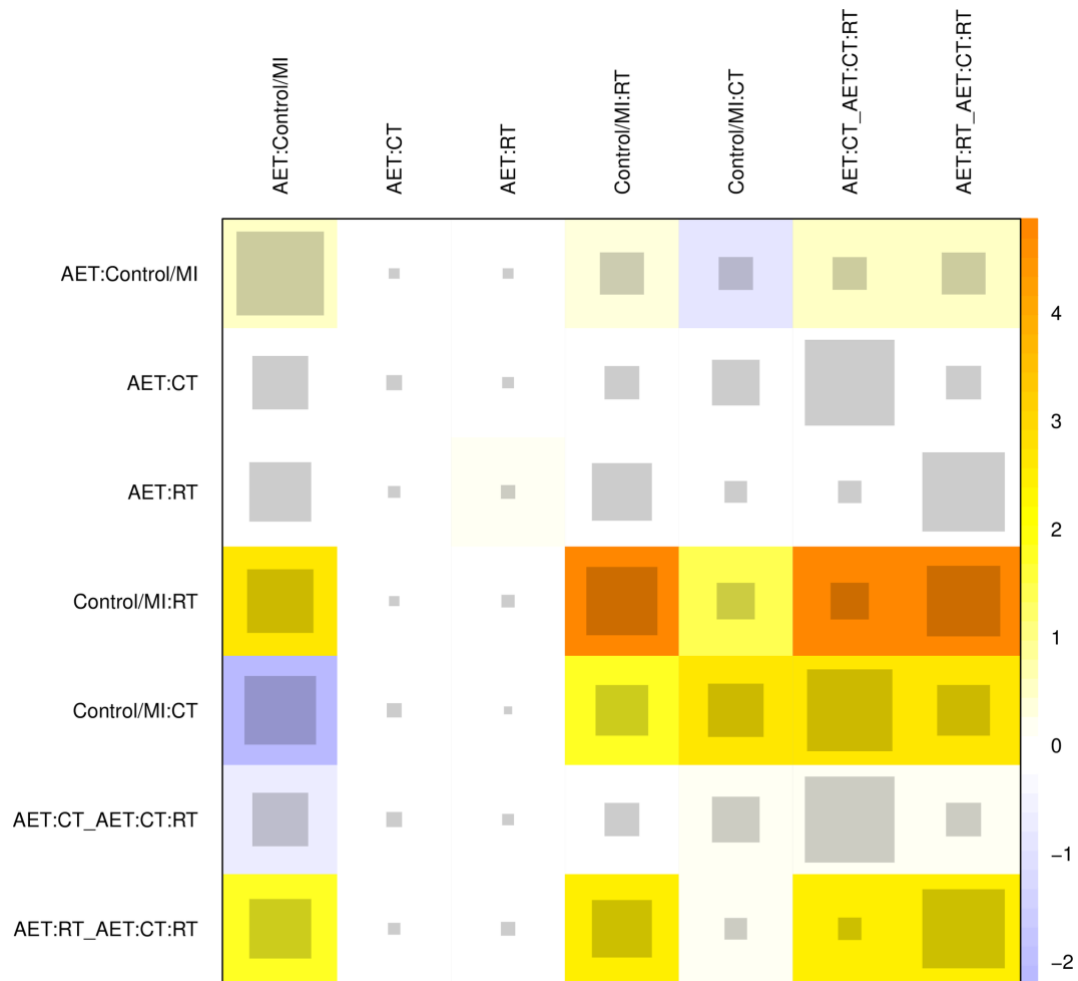
Figure S7. Net-heat plot to assess inconsistency for fat-free mass.

*This plot is a heat map where the colours on the diagonal represent the inconsistency contribution of the corresponding design and the colours on the off-diagonal are associated with the change in inconsistency between direct and indirect evidence in a network estimate in the row after relaxing the consistency assumption for the effect of a design in the column. A blue coloured element indicates that the evidence of the design in the column supports the evidence in the row; a red coloured element indicates that the evidence of the design in the column contrasts to the evidence in the row.
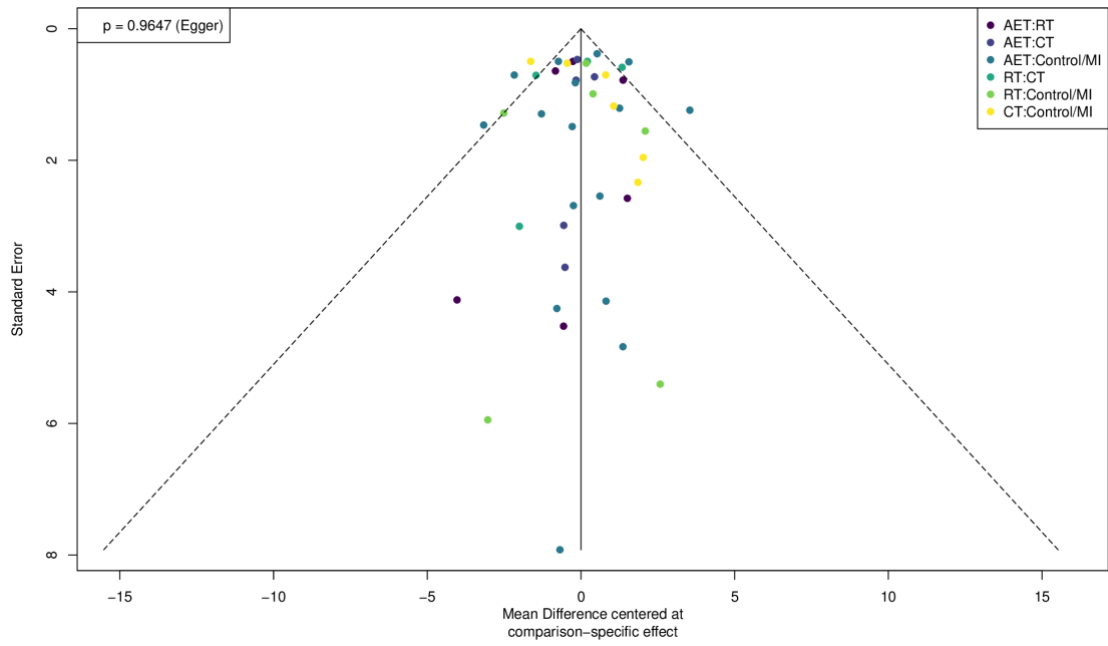
Figure S8. Comparison-adjusted funnel plot for body weight.
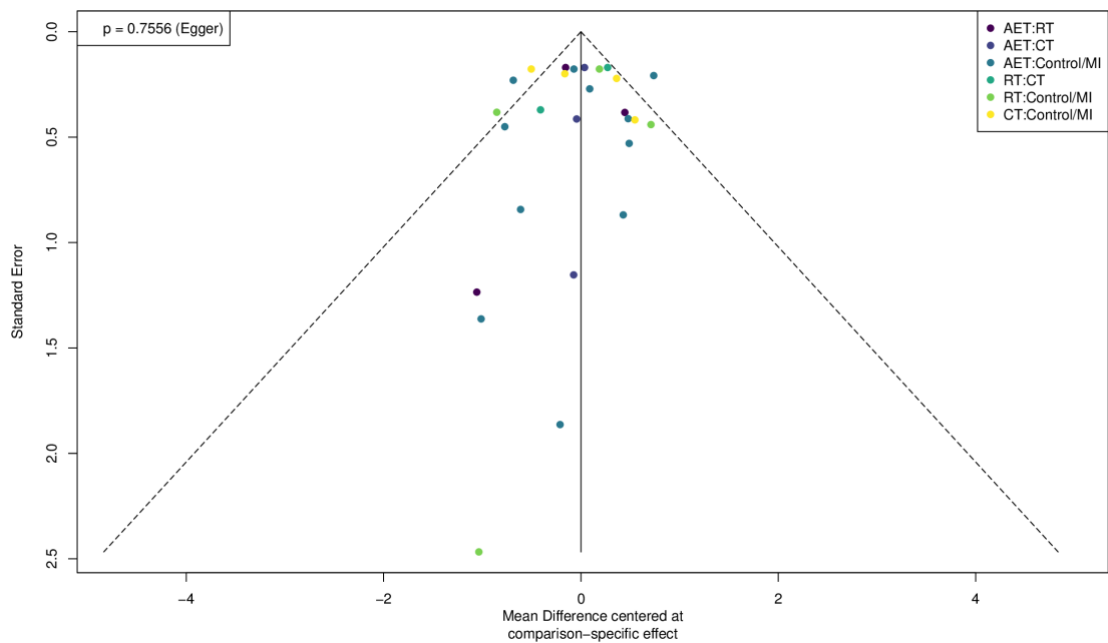
Figure S9. Comparison-adjusted funnel plot for body weight.
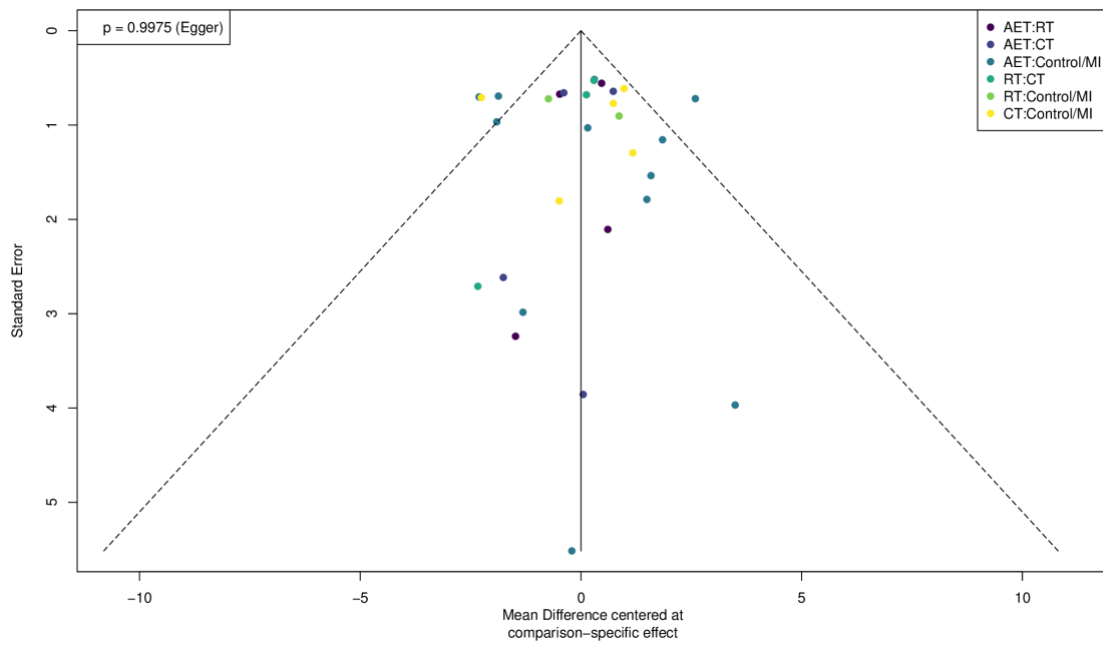
Online Supporting Information

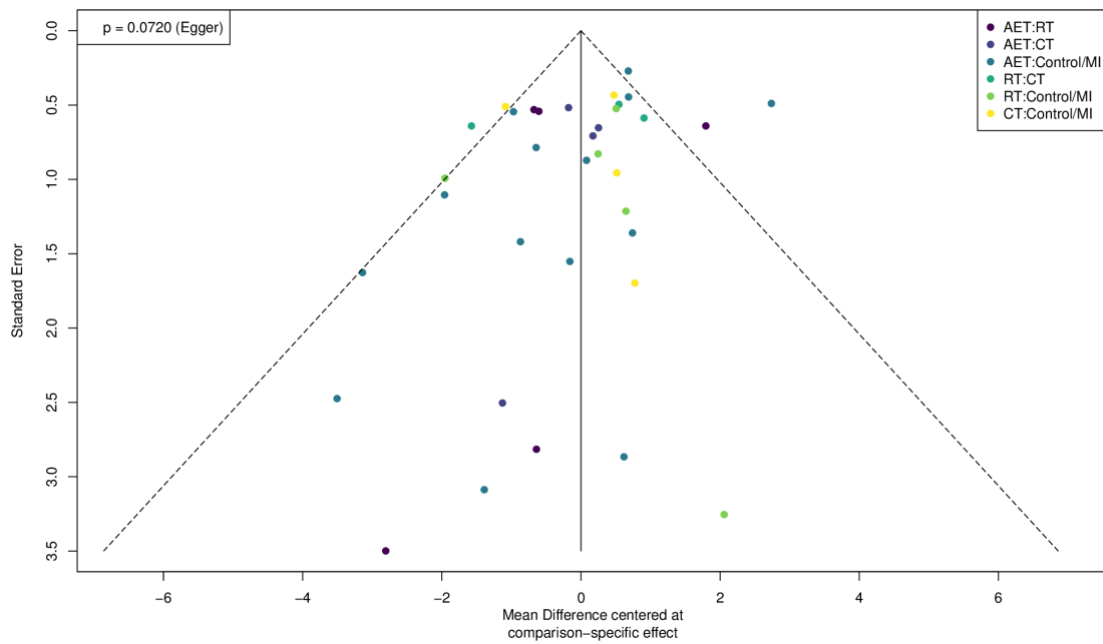**Figure S10.** Comparison-adjusted funnel plot for waist circumference.

Figure S11. Comparison-adjusted funnel plot for fat mass.
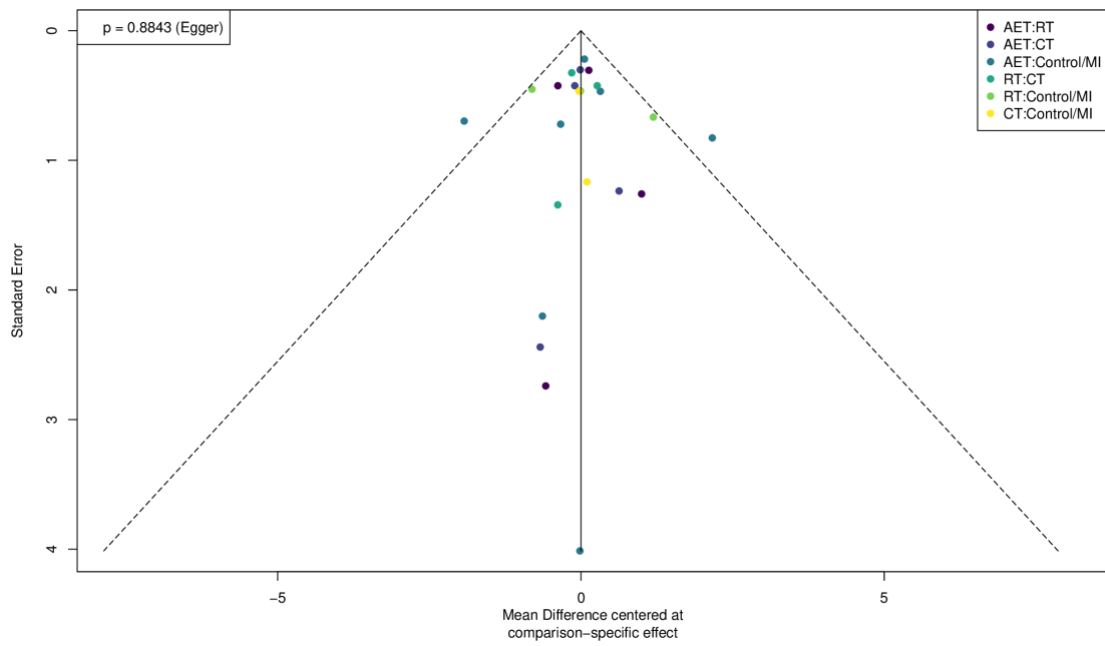
Figure S12. Comparison-adjusted funnel plot for fat-free mass.

Table S13. Subgroup analysis presenting mean differences* with 95% CI in body weight between different training modalities, stratified by mean age: <65 years (bottom-left) and ≥65 years (upper-right).

AET	-1.21 [-2.86; 0.45]	-0.96 [-2.60; 0.69]	**-2.09 [-3.80; -0.38]**
-2.43 [-4.02; -0.84]	RT	0.25 [-1.29; 1.80]	-0.88 [-2.39; 0.62]
-0.79 [-2.19; 0.61]	1.64 [-0.07; 3.35]	CT	-1.14 [-2.60; 0.32]
-2.18 [-3.00; -1.35]	**-1.39 [-2.69; -0.08]**	0.26 [-1.32; 1.83]	Control/MI

*Negative value of mean difference favours training modality to the left, whereas positive the one to the right.

AET – aerobic exercise training, CT – combined training, MI – minimal intervention, RT – resistance training;

Table S14. Subgroup analysis presenting mean differences with 95% CI in body mass index between different training modalities, stratified by mean age: <65 years (bottom-left) and ≥65 years (upper-right).

AET	-0.53 [-1.15; 0.09]	-0.25 [-0.88; 0.38]	**-0.72 [-1.39; -0.04]**
0.05 [-1.09; 1.19]	RT	0.28 [-0.31; 0.86]	-0.19 [-0.78; 0.41]
-0.64 [-1.45; 0.18]	-0.69 [-1.98; 0.61]	CT	-0.47 [-1.06; 0.13]
-1.02 [-1.45; -0.58]	-1.07 [-2.15; 0.02]	-0.38 [-1.09; 0.34]	Control/MI

Table S15. Subgroup analysis presenting mean differences with 95% CI in waist circumference between different training modalities, stratified by mean age: <65 years (bottom-left) and ≥65 years (upper-right).

AET	-1.90 [-5.36; 1.56]	-1.22 [-4.42; 1.99]	**-4.02 [-7.25; -0.80]**
-1.20 [-2.77; 0.36]	RT	0.68 [-2.54; 3.91]	-2.12 [-5.36; 1.12]
-0.37 [-1.80; 1.05]	0.83 [-0.87; 2.53]	CT	**-2.81 [-5.13; -0.49]**
-2.06 [-2.95; -1.17]	-0.85 [-2.42; 0.72]	**-1.68 [-3.02; -0.34]**	Control/MI

Table S16. Subgroup analysis presenting mean differences with 95% CI in fat mass between different training modalities, stratified by mean age: <65 years (bottom-left) and ≥65 years (upper-right).

AET	-0.10 [-1.57; 1.36]	0.29 [-1.20; 1.77]	**-1.85 [-3.35; -0.36]**
-1.22 [-2.77; 0.32]	RT	0.39 [-1.00; 1.78]	**-1.75 [-3.06; -0.44]**
0.32 [-1.20; 1.84]	1.55 [-0.24; 3.33]	CT	**-2.14 [-3.48; -0.80]**
-1.44 [-2.23; -0.66]	-0.22 [-1.76; 1.32]	**-1.77 [-3.26; -0.27]**	Control/MI

Table S17. Subgroup analysis presenting mean differences with 95% CI in fat-free mass between different training modalities, stratified by mean age: <65 years (bottom-left) and ≥65 years (upper-right).

AET	-1.33 [-3.31; 0.65]	-1.44 [-3.43; 0.55]	-0.28 [-2.35; 1.79]
-0.85 [-1.75; 0.05]	RT	-0.11 [-1.77; 1.55]	1.05 [-0.37; 2.47]
-0.74 [-1.78; 0.31]	0.11 [-0.97; 1.19]	CT	1.16 [-0.34; 2.66]
0.06 [-0.58; 0.69]	0.90 [-0.05; 1.86]	0.79 [-0.38; 1.96]	Control/MI

Table S18. Subgroup analysis presenting mean differences with 95% CI in body weight between different training modalities, stratified by mean BMI: <35 kg/m^2 (bottom-left) and ≥35 kg/m^2 (upper-right).

AET	-0.59 [-2.08; 0.90]	-0.50 [-2.00; 0.99]	-0.21 [-2.43; 2.00]
-1.88 [-3.12; -0.65]	RT	0.09 [-1.21; 1.38]	0.37 [-1.57; 2.32]
-0.79 [-1.93; 0.36]	1.10 [-0.22; 2.41]	CT	0.29 [-1.56; 2.14]
-2.29 [-3.06; -1.52]	-0.41 [-1.60; 0.78]	**-1.50 [-2.56; -0.45]**	Control/MI

*Negative value of mean difference favours training modality to the left, whereas positive the one to the right.

AET – aerobic exercise training, CT – combined training, MI – minimal intervention, RT – resistance training;

Table S19. Subgroup analysis presenting mean differences with 95% CI in body mass index between different training modalities, stratified by mean BMI: <35 kg/m^2 (bottom-left) and ≥35 kg/m^2 (upper-right).

AET	-0.10 [-0.85; 0.65]	-0.20 [-1.01; 0.61]	0.01 [-1.13; 1.14]
-0.49 [-1.19; 0.20]	RT	-0.10 [-0.83; 0.63]	0.11 [-0.74; 0.96]
-0.48 [-1.05; 0.09]	0.02 [-0.73; 0.76]	CT	0.21 [-0.91; 1.33]
-0.99 [-1.37; -0.61]	-0.50 [-1.16; 0.16]	**-0.51 [-1.00; -0.03]**	Control/MI

Table S20. Subgroup analysis presenting mean differences with 95% CI in waist circumference between different training modalities, stratified by mean BMI: <35 kg/m^2 (bottom-left) and ≥35 kg/m^2 (upper-right).

AET	NA	1.66 [-2.98; 6.30]	-0.91 [-3.92; 2.10]
-1.23 [-2.61; 0.14]	RT	NA	NA
-0.38 [-1.64; 0.87]	0.85 [-0.62; 2.31]	CT	-2.57 [-6.10; 0.97]
-2.40 [-3.30; -1.49]	-1.16 [-2.54; 0.21]	**-2.01 [-3.17; -0.85]**	Control/MI

Table S21. Subgroup analysis presenting mean differences with 95% CI in fat mass between different training modalities, stratified by mean BMI: <35 kg/m2 (bottom-left) and ≥35 kg/m2 (upper-right).

AET	0.85 [-0.35; 2.06]	0.69 [-0.63; 2.02]	-0.35 [-2.14; 1.44]
-0.74 [-1.96; 0.47]	RT	-0.16 [-1.31; 0.99]	-1.20 [-2.78; 0.37]
0.46 [-0.76; 1.68]	1.20 [-0.17; 2.57]	CT	-1.04 [-2.54; 0.45]
-1.66 [-2.41; -0.92]	-0.92 [-2.09; 0.25]	**-2.12 [-3.29; -0.95]**	Control/MI

Table S22. Subgroup analysis presenting mean differences with 95% CI in fat-free mass between different training modalities, stratified by mean BMI: <35 kg/m^2 (bottom-left) and ≥35 kg/m^2 (upper-right).

AET	**-1.63 [-2.44; -0.82]**	**-1.07 [-1.88; -0.26]**	0.43 [-0.62; 1.47]
-0.59 [-1.44; 0.27]	RT	0.56 [-0.18; 1.29]	**2.05 [1.16; 2.95]**
-0.78 [-1.80; 0.24]	-0.19 [-1.26; 0.87]	CT	**1.50 [0.71; 2.28]**
-0.01 [-0.64; 0.63]	0.58 [-0.24; 1.40]	0.77 [-0.30; 1.85]	Control/MI

Table S23. Subgroup analysis presenting mean differences with 95% CI in body weight between different training modalities, stratified by length of follow-up: <12 months (bottom-left) and ≥12 months (upper-right).

AET	1.77 [-0.78; 4.31]	**-1.10 [-2.12; -0.08]**	**-1.86 [-2.53; -1.18]**
-1.94 [-3.09; -0.80]	RT	**-2.86 [-5.43; -0.30]**	**-3.62 [-6.08; -1.17]**
-0.49 [-1.73; 0.76]	**1.46 [0.19; 2.73]**	CT	**-0.76 [-1.52; 0.00]**
-2.33 [-3.25; -1.41]	-0.39 [-1.60; 0.82]	**-1.85 [-3.19; -0.50]**	Control/MI

*Negative value of mean difference favours training modality to the left, whereas positive the one to the right.

AET – aerobic exercise training, CT – combined training, MI – minimal intervention, RT – resistance training;

Table S24. Subgroup analysis presenting mean differences with 95% CI in body mass index between different training modalities, stratified by length of follow-up: <12 months (bottom-left) and ≥12 months (upper-right).

AET	-0.60 [-1.94; 0.74]	-0.24 [-1.26; 0.77]	-0.51 [-1.44; 0.42]
-0.36 [-0.95; 0.23]	RT	0.36 [-0.68; 1.40]	0.09 [-0.87; 1.06]
-0.14 [-0.79; 0.51]	0.22 [-0.47; 0.91]	CT	-0.27 [-0.67; 0.13]
-1.10 [-1.49; -0.70]	**-0.74 [-1.34; -0.14]**	**-0.95 [-1.64; -0.27]**	Control/MI

Table S25. Subgroup analysis presenting mean differences with 95% CI in waist circumference between different training modalities, stratified by length of follow-up: <12 months (bottom-left) and ≥12 months (upper-right).

AET	NA	-0.94 [-2.22; 0.35]	**-2.22 [-3.12; -1.32]**
-1.11 [-2.66; 0.43]	RT	NA	NA
0.01 [-1.61; 1.63]	1.12 [-0.62; 2.86]	CT	**-1.28 [-2.19; -0.38]**
-2.44 [-3.55; -1.32]	-1.32 [-2.92; 0.27]	**-2.44 [-4.11; -0.78]**	Control/MI

Table S26. Subgroup analysis presenting mean differences with 95% CI in fat mass between different training modalities, stratified by length of follow-up: <12 months (bottom-left) and ≥12 months (upper-right).

AET	2.09 [-0.30; 4.47]	-0.12 [-1.57; 1.33]	**-1.41 [-2.31; -0.52]**
-0.67 [-1.84; 0.51]	RT	-2.21 [-4.70; 0.27]	**-3.50 [-5.71; -1.29]**
0.51 [-0.77; 1.80]	1.18 [-0.15; 2.52]	CT	**-1.29 [-2.43; -0.15]**
-1.54 [-2.48; -0.60]	-0.87 [-2.08; 0.34]	-2.06 [-3.42; -0.69]	Control/MI

Table S27. Subgroup analysis presenting mean differences with 95% CI in fat-free mass between different training modalities, stratified by length of follow-up: <12 months (bottom-left) and ≥12 months (upper-right).

AET	0.71 [-0.55; 1.97]	-1.26 [-2.54; 0.02]	0.41 [-0.48; 1.31]
-1.23 [-1.87; -0.58]	RT	**-1.97 [-3.24; -0.70]**	**-0.30 [-1.18; 0.58]**
-0.92 [-1.62; -0.21]	0.31 [-0.42; 1.04]	CT	1.67 [0.76; 2.58]
0.00 [-0.59; 0.60]	**0.92 [0.09; 1.75]**	**1.23 [0.53; 1.93]**	Control/MI

Table S28. Subgroup analysis presenting mean differences with 95% CI in body weight between different training modalities, stratified by use of dietary co-intervention: absent (bottom-left) and present (upper-right).

AET	-0.87 [-2.01; 0.28]	**-1.36 [-2.48; -0.23]**	**-1.80 [-2.82; -0.78]**
-2.31 [-3.81; -0.81]	RT	-0.49 [-1.55; 0.57]	-0.93 [-1.92; 0.06]
-0.26 [-1.59; 1.07]	**2.05 [0.50; 3.59]**	CT	-0.44 [-1.34; 0.45]
-2.29 [-3.19; -1.39]	0.02 [-1.54; 1.58]	**2.03 [-3.35; -0.70]**	Control/MI

*Negative value of mean difference favours training modality to the left, whereas positive the one to the right.

AET – aerobic exercise training, CT – combined training, MI – minimal intervention, RT – resistance training;

Table S29. Subgroup analysis presenting mean differences with 95% CI in body mass index between different training modalities, stratified by use of dietary co-intervention: absent (bottom-left) and present (upper-right).

AET	-0.11 [-0.83; 0.61]	-0.46 [-1.19; 0.28]	-0.59 [-1.25; 0.07]
-0.74 [-1.51; 0.03]	RT	-0.35 [-1.02; 0.32]	-0.49 [-1.06; 0.09]
-0.25 [-0.87; 0.37]	0.49 [-0.32; 1.30]	CT	-0.14 [-0.67; 0.40]
-1.04 [-1.43; -0.66]	-0.31 [-1.07; 0.45]	**-0.79 [-1.37; -0.22]**	Control/MI

Table S30. Subgroup analysis presenting mean differences with 95% CI in waist circumference between different training modalities, stratified by use of dietary co-intervention: absent (bottom-left) and present (upper-right).

AET	-0.96 [-2.98; 1.06]	-0.77 [-2.77; 1.22]	**-2.21 [-3.77; -0.65]**
-1.18 [-3.07; 0.72]	RT	0.19 [-1.83; 2.21]	-1.25 [-2.83; 0.34]
-0.14 [-1.73; 1.44]	1.03 [-0.90; 2.97]	CT	**-1.44 [-2.77; -0.10]**
-2.36 [-3.46; -1.25]	-1.18 [-3.14; 0.78]	**-2.21 [-3.74; -0.68]**	Control/MI

Table S31. Subgroup analysis presenting mean differences with 95% CI in fat mass between different training modalities, stratified by use of dietary co-intervention: absent (bottom-left) and present (upper-right).

AET	0.41 [-0.53; 1.35]	0.08 [-1.03; 1.19]	**-1.63 [-2.46; -0.79]**
-1.24 [-2.66; 0.17]	RT	-0.33 [-1.38; 0.73]	**-2.04 [-2.89; -1.19]**
0.55 [-0.70; 1.79]	**1.79 [0.32; 3.26]**	CT	**-1.71 [-2.77; -0.66]**
-1.32 [-2.19; -0.45]	-0.07 [-1.55; 1.40]	**-1.86 [-3.10; -0.63]**	Control/MI

Table S32. Subgroup analysis presenting mean differences with 95% CI in fat-free mass between different training modalities, stratified by use of dietary co-intervention: absent (bottom-left) and present (upper-right).

AET	**-0.93 [-1.86; 0.00]**	**-1.07 [-2.08; -0.06]**	-0.00 [-0.85; 0.84]
-1.25 [-3.73; 1.23]	RT	-0.14 [-1.12; 0.84]	**0.92 [0.18; 1.67]**
-1.03 [-3.32; 1.26]	0.22 [-2.27; 2.71]	CT	**1.06 [0.15; 1.98]**
0.17 [-1.38; 1.72]	1.20 [-1.57; 3.97]	1.42 [-1.50; 4.35]	Control/MI

Table S33. Sensitivity analysis presenting mean differences with 95% CI in body weight between different training modalities, after exclusion of studies with overall high risk of bias.

AET			
-1.59 [-2.94; -0.25]	RT		
-1.11 [-2.21; -0.00]	0.49 [-0.89; 1.87]	CT	
-2.08 [-2.86; -1.29]	-0.48 [-1.82; 0.85]	-0.97 [-1.96; 0.02]	Control/MI

*Negative value of mean difference favours training modality to the left, whereas positive the one to the right.

AET – aerobic exercise training, CT – combined training, MI – minimal intervention, RT – resistance training;

Table S34. Sensitivity analysis presenting mean differences with 95% CI in body mass index between different training modalities, after exclusion of studies with overall high risk of bias.

AET			
-0.62 [-1.19; -0.05]	RT		
-0.42 [-0.90; 0.07]	0.21 [-0.37; 0.78]	CT	
-0.87 [-1.24; -0.51]	-0.25 [-0.80; 0.29]	**-0.46 [-0.88; -0.04]**	Control/MI

Table S35. Sensitivity analysis presenting mean differences with 95% CI in weight circumference between different training modalities, after exclusion of studies with overall high risk of bias.

AET			
-1.03 [-3.32; 1.25]	RT		
-0.65 [-2.26; 0.96]	0.38 [-1.98; 2.75]	CT	
-2.49 [-3.59; -1.38]	-1.45 [-3.73; 0.83]	**-1.83 [-3.22; -0.45]**	Control/MI

Table S36. Sensitivity analysis presenting mean differences with 95% CI in fat mass between different training modalities, after exclusion of studies with overall high risk of bias.

AET			
-0.30 [-1.63; 1.03]	RT		
0.28 [-0.87; 1.42]	0.57 [-0.82; 1.97]	CT	
-1.38 [-2.13; -0.62]	-1.08 [-2.39; 0.24]	**-1.65 [-2.72; -0.58]**	Control/MI

Table S37. Sensitivity analysis presenting mean differences with 95% CI in fat-free mass between different training modalities, after exclusion of studies with overall high risk of bias.

AET			
-1.53 [-2.50; -0.56]	RT		
-1.13 [-2.01; -0.24]	0.40 [-0.62; 1.43]	CT	
0.27 [-0.36; 0.91]	**1.80 [0.82; 2.78]**	**1.40 [0.54; 2.27]**	Control/MI

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Table S38. Sensitivity analysis presenting mean differences with 95% CI in body weight between different training modalities, after splitting control and minimal intervention into separate nodes.

AET				
-1.76 [-2.77; -0.75]	RT			
-0.76 [-1.72; 0.21]	1.00 [-0.07; 2.08]	CT		
-1.26 [-2.76; 0.24]	0.50 [-1.18; 2.18]	-0.50 [-1.97; 0.96]	MI	
-2.36 [-3.11; -1.61]	-0.60 [-1.61; 0.40]	**-1.61 [-2.58; -0.63]**	-1.10 [-2.69; 0.48]	Control

*Negative value of mean difference favours training modality to the left, whereas positive the one to the right.

AET – aerobic exercise training, CT – combined training, MI – minimal intervention, RT – resistance training;

Table S39. Sensitivity analysis presenting mean differences with 95% CI in body mass index between different training modalities, after splitting control and minimal intervention into separate nodes.

AET				
-0.52 [-1.02; -0.02]	RT			
-0.33 [-0.80; 0.14]	0.19 [-0.36; 0.73]	CT		
-0.51 [-1.12; 0.10]	0.01 [-0.71; 0.73]	-0.18 [-0.74; 0.39]	MI	
1.05 [-1.41; -0.70]	**-0.53 [-1.01; -0.06]**	**-0.72 [-1.19; -0.25]**	-0.54 [-1.19; 0.11]	Control

Table S40. Sensitivity analysis presenting mean differences with 95% CI in weight circumference between different training modalities, after splitting control and minimal intervention into separate nodes.

AET				
-1.25 [-2.34; -0.15]	RT			
-0.09 [-1.10; 0.91]	1.15 [-0.01; 2.32]	CT		
-0.59 [-2.12; 0.93]	0.66 [-1.10; 2.41]	-0.50 [-2.00; 1.00]	MI	
-2.70 [-3.46; -1.94]	**-1.45 [-2.57; -0.34]**	**-2.61 [-3.60; -1.61]**	**-2.11 [-3.72; -0.50]**	Control

Table S41. Sensitivity analysis presenting mean differences with 95% CI in fat mass between different training modalities, after splitting control and minimal intervention into separate nodes.

AET				
-0.47 [-1.49; 0.56]	RT			
0.45 [-0.60; 1.50]	0.92 [-0.24; 2.07]	CT		
-0.85 [-2.49; 0.79]	-0.39 [-2.21; 1.44]	-1.30 [-2.94; 0.34]	MI	
-1.69 [-2.45; -0.93]	**-1.22 [-2.24; -0.21]**	**-2.14 [-3.23; -1.05]**	-0.84 [-2.57; 0.90]	Control

Table S42. Sensitivity analysis presenting mean differences with 95% CI in fat-free mass between different training modalities, after splitting control and minimal intervention into separate nodes.

AET				
-1.01 [-1.76; -0.25]	RT			
-1.01 [-1.81; -0.21]	-0.01 [-0.83; 0.82]	CT		
0.19 [-1.13; 1.51]	1.20 [-0.32; 2.72]	1.21 [-0.34; 2.75]	MI	
-0.01 [-0.70; 0.68]	**1.00 [0.28; 1.71]**	**1.00 [0.18; 1.82]**	-0.20 [-1.69; 1.29]	Control

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Table S43. Between-study heterogeneity (network τ^2 and I^2 statistic) in subgroup and sensitivity analyses.

Analysis	Body weight		Body mass index		Waist circumference		Fat mass		Fat-free mass	
	τ^2	I^2	τ^2	I^2	τ^2	I^2	τ^2	I^2	τ^2	I^2
Main (95% CI)	0.95	52.6% [29.8; 67.9%]	0.18	62.1% [39.3; 76.4%]	1.21	56.8% [31.3; 72.9%]	0.96	63.4% [44.8; 75.8%]	0.31	50.2% [14.3; 71.0%]
Age										
<65 years	1.03	49.1%	0.25	61.1%	1.07	50.5%	0.98	61.7%	0.31	44.2%
>65 years	1.20	56.4%	0.14	58.2%	2.67	64.7%	0.97	59.8%	1.13	72.5%
Baseline BMI										
BMI <35 kg/m²	1.07	57.5%	0.22	67.6%	1.29	60.9%	1.07	67.9%	0.36	48.3%
BMI <35 kg/m²	0.00	0.0%	0.00	0.0%	NA	NA	0.00	0.0%	0.00	0.0%
Length of follow-up										
<12 months	1.12	53.2%	0.20	62.0%	1.74	61.0%	1.30	65.5%	0.21	37.4%
>12 months	0.00	0.0%	0.06	36.6%	0.00	0.0%	0.29	31.2%	0.00	0.0%
Dietary co-intervention										
No	1.08	67.5%	0.17	64.3%	1.86	70.9%	0.96	73.4%	1.58	72.6%
Yes	0.00	0.0%	0.11	33.5%	0.00	0.0%	0.00	0.0%	0.35	44.7%
Exclusion of studies with high risk of bias	1.00	58.0%	0.17	66.4%	1.89	69.2%	0.98	69.2%	0.27	41.5%
Analysis with 5 nodes	0.88	48.9%	0.15	56.0%	0.62	39.1%	1.06	64.0%	0.41	51.8%