Resistance training prescription to increase muscle function and hypertrophy in healthy adults: An overview of reviews

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Supplementary Appendix 1: PRIOR checklist.

Section Topic	#	Item	Location reported
TITLE			
Title	1	Identify the report as an overview of reviews.	**Page 1**
ABSTRACT			
Abstract	2	Provide a comprehensive and accurate summary of the purpose, methods, and results of the overview of reviews.	**Page 3**
INTRODUCTION			
Rationale	3	Describe the rationale for conducting the overview of reviews in the context of existing knowledge.	**Page 5**
Objectives	4	Provide an explicit statement of the objective(s) or question(s) addressed by the overview of reviews.	**Page 6**
METHODS			
Eligibility criteria	5a	Specify the inclusion and exclusion criteria for the overview of reviews. If supplemental primary studies were included, this should be stated, with a rationale.	**Page 7**
	5b	Specify the definition of 'systematic review' as used in the inclusion criteria for the overview of reviews.	**Page 7**
Information sources	6	Specify all databases, registers, websites, organizations, reference lists, and other sources searched or consulted to identify systematic reviews and supplemental primary studies (if included). Specify the date when each source was last searched or consulted.	**Page 7**
Search strategy	7	Present the full search strategies for all databases, registers and websites, such that they could be reproduced. Describe any search filters and limits applied.	**Page 7; Appendix 2**
Selection process	8a	Describe the methods used to decide whether a systematic review or supplemental primary study (if included) met the inclusion criteria of the overview of reviews.	**Page 7-8**
	8b	Describe how overlap in the populations, interventions, comparators, and/or outcomes of systematic reviews was identified and managed during study selection.	**Page 7-8**
Data collection process	9a	Describe the methods used to collect data from reports.	**Page 8**
	9b	If applicable, describe the methods used to identify and manage primary study overlap at the level of the comparison and outcome during data collection. For each outcome, specify the method used to illustrate and/or quantify the degree of primary study overlap across systematic reviews.	**Page 8**
	9c	If applicable, specify the methods used to manage discrepant data across systematic reviews during data collection.	**NA**
Data items	10	List and define all variables and outcomes for which data were sought. Describe any assumptions made and/or measures taken to identify and clarify missing or unclear information.	**Page 8; Appendix 3**
Risk of bias assessment	11a	Describe the methods used to *assess* risk of bias or methodological quality of the included systematic reviews.	**Page 8-9**
	11b	Describe the methods used to *collect* data on (from the systematic reviews) and/or *assess* the risk of bias of the primary studies included in the systematic reviews. Provide a justification for instances where flawed, incomplete, or missing assessments are identified but not re-assessed.	**Page 8-9**
	11c	Describe the methods used to *assess* the risk of bias of supplemental primary studies (if included).	**NA**
Synthesis methods	12a	Describe the methods used to summarize or synthesize results and provide a rationale for the choice(s).	**Page 8-9**
	12b	Describe any methods used to explore possible causes of heterogeneity among results.	**Page 8-9**
	12c	Describe any sensitivity analyses conducted to assess the robustness of the synthesized results.	**Page 8-9**
Reporting bias assessment	13	Describe the methods used to *collect* data on (from the systematic reviews) and/or *assess* the risk of bias due to missing results in a summary or synthesis (arising from reporting biases at the levels of the systematic reviews, primary studies, and supplemental primary studies, if included).	**Page 8-9**
Certainty assessment	14	Describe the methods used to *collect* data on (from the systematic reviews) and/or *assess* certainty (or confidence) in the body of evidence for an outcome.	**Page 8-9**
RESULTS			
Systematic review and supplemental primary study selection	15a	Describe the results of the search and selection process, including the number of records screened, assessed for eligibility, and included in the overview of reviews, ideally with a flow diagram.	**Page 9**
	15b	Provide a list of studies that might appear to meet the inclusion criteria, but were excluded, with the main reason for exclusion.	**NA**

Section Topic	#	Item	Location reported
Characteristics of systematic reviews and supplemental primary studies	16	Cite each included systematic review and supplemental primary study (if included) and present its characteristics.	**Page 9-18**
Primary study overlap	17	Describe the extent of primary study overlap across the included systematic reviews.	**NA**
Risk of bias in systematic reviews, primary studies, and supplemental primary studies	18a	Present assessments of risk of bias or methodological quality for each included systematic review.	**Appendix 7**
	18b	Present assessments (*collected* from systematic reviews or *assessed* anew) of the risk of bias of the primary studies included in the systematic reviews.	**Appendix 7**
	18c	Present assessments of the risk of bias of supplemental primary studies (if included).	**Appendix 7**
Summary or synthesis of results	19a	For all outcomes, summarize the evidence from the systematic reviews and supplemental primary studies (if included). If meta-analyses were done, present for each the summary estimate and its precision and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	**Page 9-18**
	19b	If meta-analyses were done, present results of all investigations of possible causes of heterogeneity.	**NA**
	19c	If meta-analyses were done, present results of all sensitivity analyses conducted to assess the robustness of synthesized results.	**NA**
Reporting biases	20	Present assessments (*collected* from systematic reviews and/or *assessed* anew) of the risk of bias due to missing primary studies, analyses, or results in a summary or synthesis (arising from reporting biases at the levels of the systematic reviews, primary studies, and supplemental primary studies, if included) for each summary or synthesis assessed.	**NA**
Certainty of evidence	21	Present assessments (*collected* or *assessed* anew) of certainty (or confidence) in the body of evidence for each outcome.	**NA**
DISCUSSION			
Discussion	22a	Summarize the main findings, including any discrepancies in findings across the included systematic reviews and supplemental primary studies (if included).	**Page 18-19**
	22b	Provide a general interpretation of the results in the context of other evidence.	**Page 19-24**
	22c	Discuss any limitations of the evidence from systematic reviews, their primary studies, and supplemental primary studies (if included) included in the overview of reviews. Discuss any limitations of the overview of reviews methods used.	**Page 23-25**
	22d	Discuss implications for practice, policy, and future research (both systematic reviews and primary research). Consider the relevance of the findings to the end users of the overview of reviews, e.g., healthcare providers, policymakers, patients, among others.	**Page 25**
OTHER INFORMATION			
Registration and protocol	23a	Provide registration information for the overview of reviews, including register name and registration number, or state that the overview of reviews was not registered.	**Page 6**
	23b	Indicate where the overview of reviews protocol can be accessed, or state that a protocol was not prepared.	**Page 6**
	23c	Describe and explain any amendments to information provided at registration or in the protocol. Indicate the stage of the overview of reviews at which amendments were made.	**Page 7-8**
Support	24	Describe sources of financial or non-financial support for the overview of reviews, and the role of the funders or sponsors in the overview of reviews.	**Page 26**
Competing interests	25	Declare any competing interests of the overview of reviews' authors.	**Page 26**
Author information	26a	Provide contact information for the corresponding author.	**Page 2**
	26b	Describe the contributions of individual authors and identify the guarantor of the overview of reviews.	**Page 26**
Availability of data and other materials	27	Report which of the following are available, where they can be found, and under which conditions they may be accessed: template data collection forms; data collected from included systematic reviews and supplemental primary studies; analytic code; any other materials used in the overview of reviews.	**NA**

Supplementary Appendix 2: Systematic search strategy.

Ovid® Support & Training Feedback Brad Currier Close

Database(s): **Ovid Emcare** 1995 to 2024 Week 02

Search Strategy:

#	Searches	Results
1	resistance training/ or weight training/	10422
2	weight lifting/	1689
3	muscle isometric contraction/	5028
4	isometric exercise/	1459
5	((weight* or isometric or strength or resistance) adj3 (train* or lift* or exercise*)).ti,ab,kf,kw.	27449
6	external resistance.ti,ab,kf,kw.	143
7	(isometric* adj2 contract*).ti,ab,kf,kw.	3702
8	(isometric* adj1 response).ti,ab,kf,kw.	4
9	or/1-8	35282
10	muscle strength/	24368
11	hand strength/ or grip strength/ or pinch strength/	9600
12	((muscle* or muscular) adj3 (function* or strength* or hypertroph* or mass or power or size or biops* or endurance or force or velocit* or thick* or ultrasound* or CT or MRI or tomography imag*)).ti,ab,kf,kw.	56273
13	(hand strength or pinch strength or grip strength).ti,ab,kw,kf.	9481
14	hypertrophy/	5473
15	creatinine/	28144
16	creatinine.ti,ab,kf,kw.	31026
17	krebiozen.ti,ab,kw,kf.	0
18	X ray/	20436
19	dual energy x ray absorptiometry/	12093
20	(DXA or DEXA or x-ray* or xray*).ti,ab,kf,kw.	77016
21	(bio-electric* imped?nce or bioelectric* imped?nce or BIA).ti,ab,kf,kw.	5332
22	BODY COMPOSITION/ and impedance/	1496
23	or/10-22	205530
24	exp Meta Analysis/	60433
25	meta analy*.mp.	149309
26	metaanaly*.mp.	3134
27	"meta analysis (topic)"/	10559
28	"systematic review"/	125807
29	(systematic adj (review*1 or overview*1)).mp.	209060
30	umbrella review.mp.	949
31	or/24-30	265526
32	9 and 23 and 31	949
33	limit 32 to english language	910

1. Comparison of the effects of high and low-moderate load lower limb resistance training on muscle strength and exercise capacity in individuals with COPD: A systematic review and meta-analysis.

   Topcuoglu C., Saglam M., Yagli N.V.

   Heart and Lung. 64 (pp 107-116), 2024. Date of Publication: 01 Mar 2024.

   [Review]

   AN: 2029217451

   DOI
   https://dx-doi-org.libaccess.lib.mcmaster.ca/10.1016/j.hrtlng.2023.12.003

American College of Sports Medicine: Resistance Training Prescription

Supplementary Appendix 3: List of data items sought.

General Information

- Title of review
- Year of publication
- Name of lead author
- Name and email address of corresponding author

Characteristics of Included Reviews

- Type of evidence synthesis (e.g., systematic review, meta-analysis, network meta-analysis)
- Was the protocol/review registered (yes/no)
- Protocol/review registration identifier
- Resistance training program variable investigated
- Eligibility criteria (population, intervention, comparator(s), outcome(s), study design)
- Number of databases searched
- Name of each database searched
- Date of last search
- Was the full search strategy provided for at least one database?

Results

For every relevant outcome reported in a review, the following data was sought:

- Was the outcome evaluated with meta-analysis?
- Total number of studies included in synthesis
- Total number of participants included in synthesis
- Summary data (minimum, maximum, and/or average) of resistance training program details (duration, intensity, frequency, sets, etc.) for all studies included in synthesis
- Synthesized outcome with error range, significance, and heterogeneity statistic (e.g., standardized mean difference, 95% confidence interval, P value, I^2 statistic)

Supplementary Appendix 4: A Measurement Tool to Assess Systematic Reviews (AMSTAR) checklist.

1. Was an 'a priori' design provided? The research question and inclusion criteria should be established before the conduct of the review. *Note: Need to refer to a protocol, ethics approval, or pre-determined/a priori published research objectives to score a "yes."* *Note 2: If a study has an a priori design and thus would receive the answer 'yes', and appears not to have followed this design, it would be scored a "can't answer" or even "no".*	Yes No Can't answer Not applicable
2. Was there duplicate study selection and data extraction? There should be at least two independent data extractors and a consensus procedure for disagreements should be in place. *Note: 2 people do study selection, 2 people do data extraction, consensus process or one person checks the other's work.*	Yes No Can't answer Not applicable
3. Was a comprehensive literature search performed? At least two electronic sources should be searched. The report must include years and databases used (e.g., Central, EMBASE, and MEDLINE). Key words and/or MESH terms must be stated and where feasible the search strategy should be provided. All searches should be supplemented by consulting current contents, reviews, textbooks, specialized registers, or experts in the particular field, and by reviewing the references in the studies found. *Note: If at least 2 electronic sources + one supplementary source is used, select "yes" (Cochrane register and CENTRAL count as 2 separate sources; a grey literature search counts as supplementary).* *Note 2: The elements stated in Question 3 are examples of the items that should be reported in the paper. All these elements do not need to be present to receive a "yes", or vice versa, the absence of one of these elements is not enough to receive a "no". If the databases and methods used to perform the search are reported and are appropriate, then it would receive a "yes". However, when critically appraising a systematic review, it would be good to mention the items that were not addressed.*	Yes No Can't answer Not applicable
4. Was the status of publication (i.e. grey literature) used as an inclusion criterion? The authors should state that they searched for reports regardless of their publication type. The authors should state whether or not they excluded any reports (from the systematic review), based on their publication status, language etc. *Note: If review indicates that there was a search for "grey literature" or "unpublished literature," indicate "yes." SIGLE database, dissertations, conference proceedings, and trial registries are all considered grey for this purpose. If searching a source that contains both grey and non-grey, must specify that they were searching for grey/unpublished lit.* *Note 2: What is meant with the question is: 'Was grey or unpublished literature included in the search?' The aim of this question is to increase the value of grey and unpublished literature. The paper would receive a "yes" if there was a search for grey literature (or other) and reported those that were excluded. If a search for grey literature is not considered necessary for a specific topic, answer "not applicable".*	Yes No Can't answer Not applicable
5. Was a list of studies (included and excluded) provided? A list of included and excluded studies should be provided. *Note: Acceptable if the excluded studies are referenced. If there is an electronic link to the list but the link is dead, select "no."*	Yes No Can't answer Not applicable
6. Were the characteristics of the included studies provided? In an aggregated form such as a table, data from the original studies should be provided on the participants, interventions and outcomes. The ranges of characteristics in all the studies analyzed e.g., age, race, sex, relevant socioeconomic data, disease status, duration, severity, or other diseases should be reported. *Note: Acceptable if not in table format as long as they are described as above.*	Yes No Can't answer Not applicable

7. Was the scientific quality of the included studies assessed and documented? 'A priori' methods of assessment should be provided (e.g., for effectiveness studies if the author(s) chose to include only randomized, double-blind, placebo controlled studies, or allocation concealment as inclusion criteria); for other types of studies alternative items will be relevant. *Note: Can include use of a quality scoring tool or checklist, e.g., Jadad scale, risk of bias, sensitivity analysis, etc., or a description of quality items, with some kind of result for EACH study ("low" or "high" is fine, as long as it is clear which studies scored "low" and which scored "high"; a summary score/range for all studies is not acceptable).* *Note 2: The word "and" is imperative, i.e. if a study provides the procedure for quality appraisal, but not the results of this appraisal, it would receive a "no". Because authors are supposed to report results on all findings this includes the quality appraisal of the studies.*	Yes No Can't answer Not applicable
8. Was the scientific quality of the included studies used appropriately in formulating conclusions? The results of the methodological rigor and scientific quality should be considered in the analysis and the conclusions of the review, and explicitly stated in formulating recommendations. *Note: Might say something such as "the results should be interpreted with caution due to poor quality of included studies." Cannot score "yes" for this question if scored "no" for question 7.*	Yes No Can't answer Not applicable
9. Were the methods used to combine the findings of studies appropriate? For the pooled results, a test should be done to ensure the studies were combinable, to assess their homogeneity (i.e., Chi-squared test for homogeneity, I2). If heterogeneity exists a random effects model should be used and/or the clinical appropriateness of combining should be taken into consideration (i.e., is it sensible to combine?). *Note: Indicate "yes" if they mention or describe heterogeneity, i.e., if they explain that they cannot pool because of heterogeneity/variability between interventions.* *Note 2: This question mainly applies to the traditional statistical methods, as used for example by the Cochrane Collaboration.* *Note 3: If a study uses correct statistical methods, although combining the findings was not appropriate in the first place, the item would receive a "no".*	Yes No Can't answer Not applicable
10. Was the likelihood of publication bias assessed? An assessment of publication bias should include a combination of graphical aids (e.g., funnel plot, other available tests) and/or statistical tests (e.g., Egger regression test). *Note: If no test values or funnel plot included, score "no". Score "yes" if mentions that publication bias could not be assessed because there were fewer than 10 included studies.* *Note 2: If a study just states 'No publication bias was suspected', it is not enough to receive a "yes". Authors need to state how they assessed it and include graphical aids or statistical tests like the Egger test and funnel plots. An additional method to assess publication bias is by consulting trial registers.*	Yes No Can't answer Not applicable
11. Was the conflict of interest included? Potential sources of support should be clearly acknowledged in both the systematic review and the included studies. *Note: To get a "yes," must indicate source of funding or support for the systematic review AND for each of the included studies.*	Yes No Can't answer Not applicable

Supplementary Appendix 5: Standardized effectiveness statements definitions.

Summary statement	Translation
Sufficient evidence	Evidence to make a decision about the effect of the intervention(s) in relation to a specific outcome(s). This includes evidence of an effect in terms of (i) benefit or (ii) harm. Statistically significant results are considered to represent sufficient evidence on which to base decisions, but a judgement of sufficient evidence is also made based on the number of studies/participants included in the analysis for a particular outcome. A rating of sufficient evidence is often based on meta-analysis producing a statistically significant pooled result that is based on a large number of included studies/participants. This judgement may also be made based on the number of studies and/or study participants showing a statistically significant result - for example a result where 12 studies of a total of 14 for a specific outcome showed a statistically significant effect of an intervention would be considered to represent **sufficient evidence**.
Some evidence	Less conclusive evidence to make a decision about the effects of a particular intervention(s) in relation to a specific outcome(s). In this case, the result is qualified according to the findings of the review - for example, 'some evidence (5 studies of 9) reported a positive effect of .....' (This would be based on a more equivocal set of results than those obtained for 'sufficient evidence' above. For example, while 12/14 statistically significant studies would be classed as 'sufficient evidence', 5/9 statistically significant studies is more equivocal and would be classed as 'some evidence.') This may also be based on a statistically significant result obtained in a small number of studies; a statistically significant result obtained from studies with a small number of participants; or a statistically significant result obtained from studies of low quality.
Insufficient evidence	Not enough evidence to support decisions about the effects of the intervention(s) on the basis of the included studies. This should be interpreted as 'no evidence of effect', rather than 'evidence of no effect'. Statistically non-significant results are considered to represent insufficient evidence. Where the number of studies is small, and/or the number of participants included in the studies is small, insufficient evidence might reflect underpowering of the included studies to be able to detect an effect of the intervention. Where the number of studies is large, and/or the number of participants included in these studies is large, 'insufficient evidence' may reflect underlying ineffectiveness of the intervention to affect the outcomes being examined. In such cases the intervention may additionally be described as 'generally ineffective' in order to separate such results from those cases where insufficient evidence is used to describe results but this is based on a small number of studies and/or participants (where non-significant results may reflect underpowering of studies rather than ineffectiveness).
Insufficient evidence to determine	Not enough evidence to be able to determine whether an intervention is effective or not on the basis of the included studies. This statement is about reporting gaps in the evidence (ie where there are too few studies to be able to determine effects), rather than the situation of the summary statement above, which is about ineffectiveness (eg several studies reporting a statistically non-significant result). It is likely to arise when the numbers of included studies is very small.

Supplementary Appendix 6: Method to rate quality of evidence (QoE).

Initial Quality of Body of Evidence	AMSTAR
High (4) if systematic review & meta-analysis	-1 if review of moderate quality (AMSTAR: 4–7)
Moderate (3) if systematic review (no meta-analysis)	-2 if review of low quality (AMSTAR: 0–3)

Outcomes:

QoE = 1 (very low)

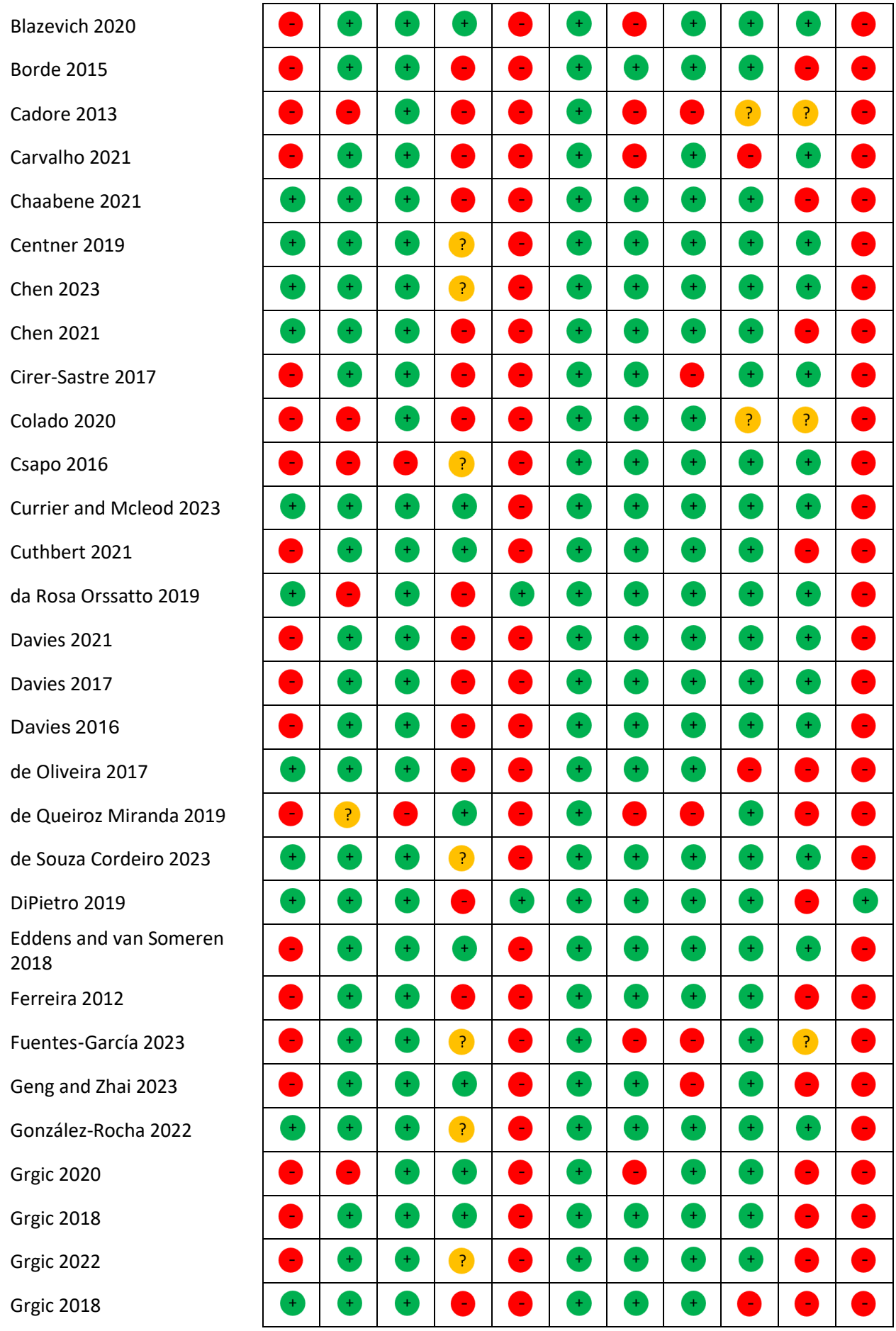
QoE = 2 (low)

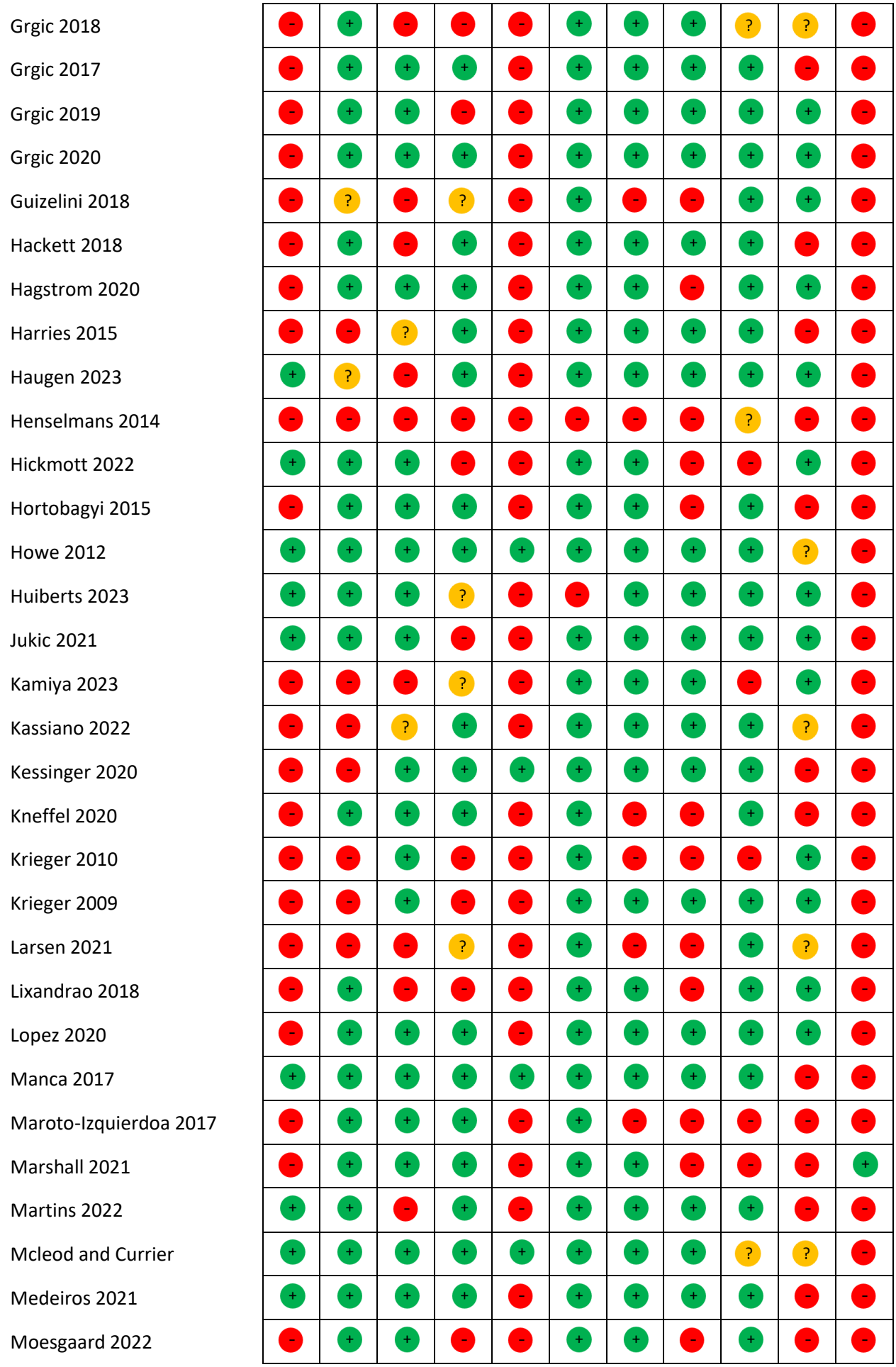
QoE = 3 (moderate)

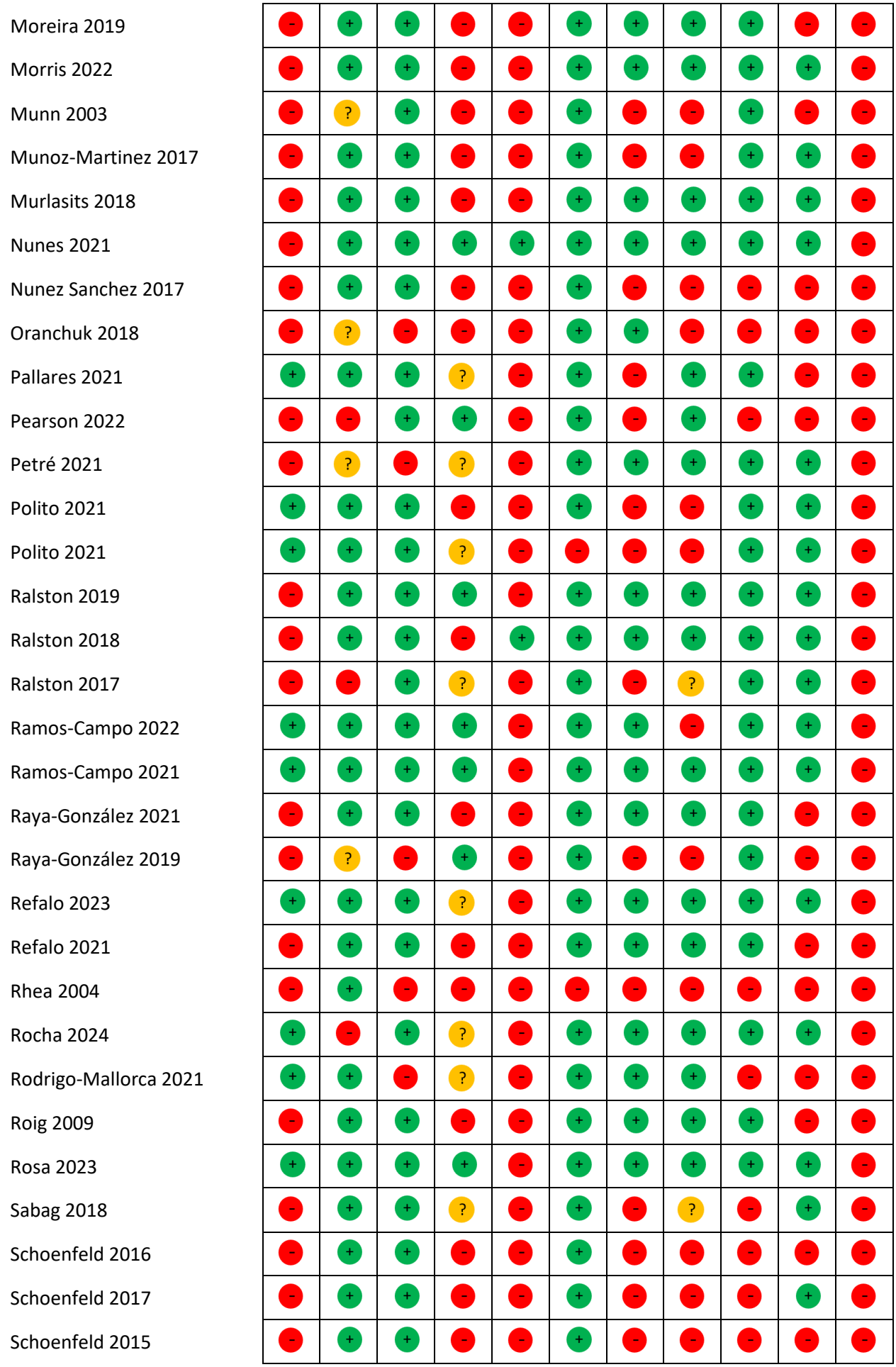
QoE = 4 (high)

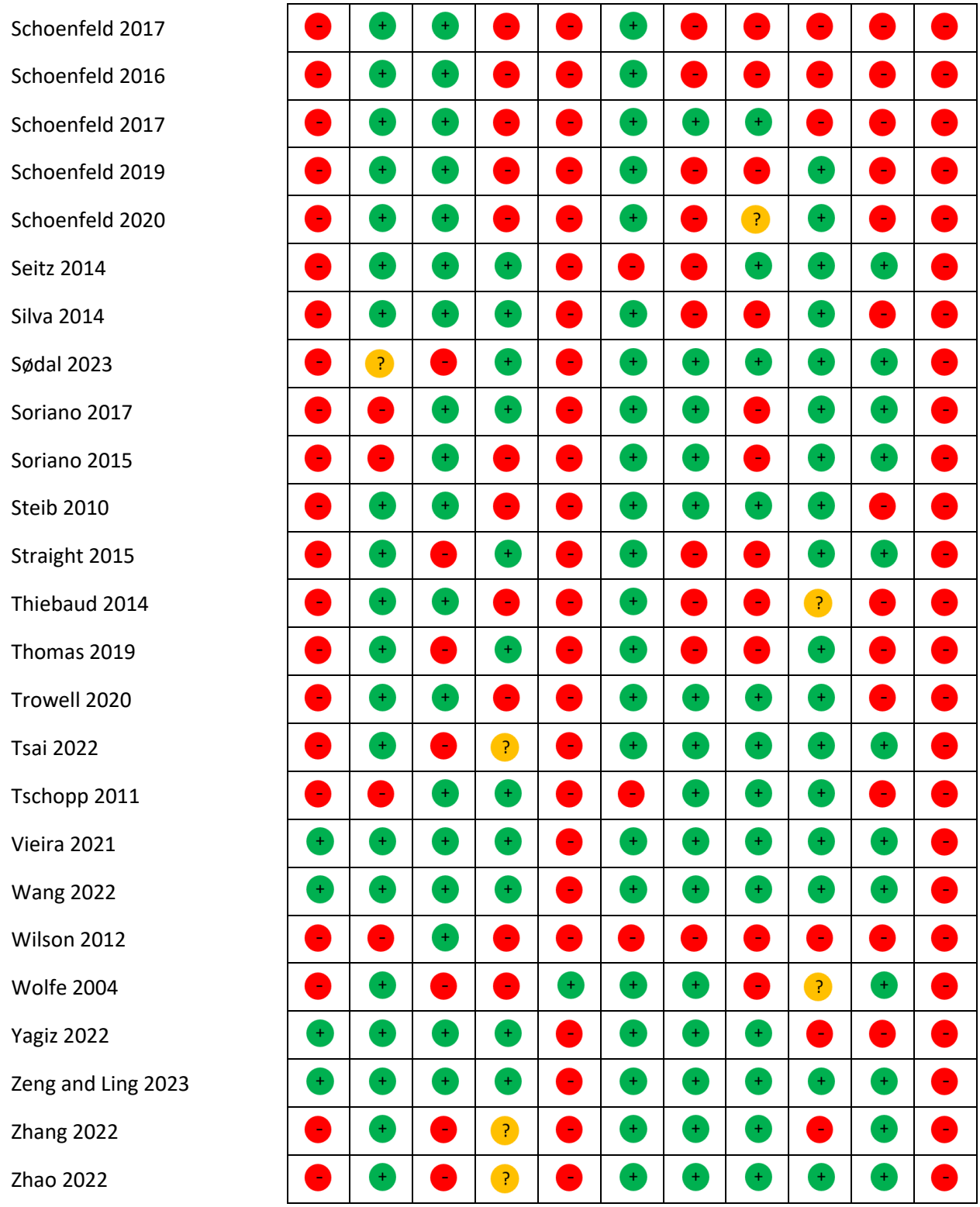
Supplementary Appendix 7: AMSTAR results for included reviews.

	(1) A priori design?	(2) Duplicate study selection: data extraction?	(3) Comprehensive literature search?	(4) Status of publication used as inclusion criterion?	(5) List of included and excluded studies?	(6) Characteristics of included studies provided?	(7) Scientific quality of studies assessed and reported?	(8) Scientific quality used in formulating conclusions?	(9) Appropriate methods of combining the findings?	(10) Publication bias assessed?	(11) Conflict of interest included?
Abbema 2015	-	+	+	-	-	+	+	+	+	+	-
Alcaraz-Ibanez 2017	-	?	+	-	-	+	+	+	?	?	-
Almeida 2020	-	+	-	?	-	+	+	+	?	?	-
Amiri 2021	-	+	+	-	-	+	+	+	+	+	-
Andrews 2019	-	-	+	?	-	+	-	-	+	-	-
Androulakis-Korakakis 2020	?	-	-	+	-	+	+	+	+	-	-
Arnold 2014	-	+	+	?	-	+	+	+	+	-	-
Asikainen 2004	-	-	+	?	-	+	-	+	?	-	-
Bagenhammar 2007	-	-	+	-	-	+	+	+	?	-	-
Balachandran 2022	-	-	+	?	+	+	+	+	+	+	-
Bandeira-Guimarães 2023	+	+	+	+	-	+	-	+	+	+	-
Baena-Marin 2022	+	?	+	-	-	+	-	-	?	-	-
Bandeira de Mello 2019	-	+	-	-	-	+	+	+	+	-	-
Baz-Valle 2022	-	+	+	+	-	+	+	+	+	-	-
Beaudart 2017	-	+	+	-	-	+	+	+	?	?	-
Beckwée 2019	-	-	+	-	-	+	+	+	?	?	-
Behm 2015	-	+	-	+	-	+	+	+	+	-	-
Beijersbergen 2013	-	-	+	-	-	-	-	-	+	-	-
Bernárdez-Vázquez 2022	-	+	+	?	-	+	+	+	+	?	-
Berryman 2017	-	+	+	-	-	-	-	-	+	-	-


Blazevich 2020
Borde 2015
Cadore 2013
Carvalho 2021
Chaabene 2021
Centner 2019
Chen 2023
Chen 2021
Cirer-Sastre 2017
Colado 2020
Csapo 2016
Currier and Mcleod 2023
Cuthbert 2021
da Rosa Orssatto 2019
Davies 2021
Davies 2017
Davies 2016
de Oliveira 2017
de Queiroz Miranda 2019
de Souza Cordeiro 2023
DiPietro 2019
Eddens and van Someren 2018
Ferreira 2012
Fuentes-García 2023
Geng and Zhai 2023
González-Rocha 2022
Grgic 2020
Grgic 2018
Grgic 2022
Grgic 2018


Grgic 2018
Grgic 2017
Grgic 2019
Grgic 2020
Guizelini 2018
Hackett 2018
Hagstrom 2020
Harries 2015
Haugen 2023
Henselmans 2014
Hickmott 2022
Hortobagyi 2015
Howe 2012
Huiberts 2023
Jukic 2021
Kamiya 2023
Kassiano 2022
Kessinger 2020
Kneffel 2020
Krieger 2010
Krieger 2009
Larsen 2021
Lixandrao 2018
Lopez 2020
Manca 2017
Maroto-Izquierdoa 2017
Marshall 2021
Martins 2022
Mcleod and Currier
Medeiros 2021
Moesgaard 2022


Moreira 2019
Morris 2022
Munn 2003
Munoz-Martinez 2017
Murlasits 2018
Nunes 2021
Nunez Sanchez 2017
Oranchuk 2018
Pallares 2021
Pearson 2022
Petré 2021
Polito 2021
Polito 2021
Ralston 2019
Ralston 2018
Ralston 2017
Ramos-Campo 2022
Ramos-Campo 2021
Raya-González 2021
Raya-González 2019
Refalo 2023
Refalo 2021
Rhea 2004
Rocha 2024
Rodrigo-Mallorca 2021
Roig 2009
Rosa 2023
Sabag 2018
Schoenfeld 2016
Schoenfeld 2017
Schoenfeld 2015


Schoenfeld 2017
Schoenfeld 2016
Schoenfeld 2017
Schoenfeld 2019
Schoenfeld 2020
Seitz 2014
Silva 2014
Sødal 2023
Soriano 2017
Soriano 2015
Steib 2010
Straight 2015
Thiebaud 2014
Thomas 2019
Trowell 2020
Tsai 2022
Tschopp 2011
Vieira 2021
Wang 2022
Wilson 2012
Wolfe 2004
Yagiz 2022
Zeng and Ling 2023
Zhang 2022
Zhao 2022

Supplementary Appendix 8: Conflict of interest declaration for included reviews.

Reference	Conflicts/competing interests statement
Abbema 2015	The authors declare that they have no competing interests.
Alcaraz-Ibañez 2017	No potential conflict of interest was reported by the authors.
Almeida 2020	The authors declare that they have no conflict of interest.
Amiri 2021	The authors declare that they have no conflict of interest.
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Supplementary Appendix 9: Summary of resistance training prescriptions that impact multicomponent function, running performance, jumping performance, muscular endurance, and agility.

	Multicomponent Function	**Running Performance**	**Jumping Performance**	**Muscular Endurance**	**Agility**
Standard RT vs CTRL	✓ ↑ 5 reviews; n=1,667 QoE=70%	? ↑ 1 review; n=NR QoE=75% ? 2 reviews; n=154 QoE=50%	? ND	✓ ↑ 1 review; n=357 QoE=75% ? 1 review; n=NR QoE=50%	? ? 1 review; n=78 QoE=75%
Special RT vs CTRL Elastic Band RT	✓ ↑ 2 reviews; n=1,291 QoE=63%	? ND	? ND	? ND	? ND
Special RT vs CTRL Flywheel RT	? ND	? ↑ 1 review; n=134 QoE=75%	✓ ↑ 1 review; n=235 QoE=75%	? ND	? ? 1 review; n=71 QoE=75%
Special RT vs CTRL Home-based RT	✓ ↑ 1 review; n=631 QoE=25%	? ND	? ND	✓ ↑ 1 review; n=734 QoE=75%	? ND
Special RT vs CTRL Unstable Surface RT	? ND	? ND	? ND	? ? 1 review; n=60 QoE=75%	? ND
Special RT vs CTRL Velocity-based RT	? ND	? ? 1 review; n=166 QoE=75%	✓ ↑ 1 review; n=186 QoE=75%	? ? 1 review; n=145 QoE=75%	? ND
Intensity Load	? ? 1 review; n=168 QoE=75%	? ND	? ? 1 review; n=52 QoE=50%	? ? 1 review; n=46 QoE=50%	? ND
Type Elastic Band RT	✓ ↑ 1 review; n=411 QoE=75%	? ND	? ND	? ND	? ND
Type Eccentric Flywheel	? ND	? ? 1 review; n=92 QoE=75%	? ? 1 review; n=120 QoE=75%	? ND	? ND
Type Machine vs Free-weight	? ND	? ND	? ? 1 review; n=164 QoE=75%	? ND	? ND

Type Unstable vs Stable Surface	? ND	? ND	? ND	? ? 1 review; n=145 QoE=75%	? ND
Time Time-Under-Tension	✗ ↓ 1 review; n=692 QoE=75%	? ND	? ND	? ND	? ND
Technique Olympic Weightlifting	? ND	? ? 1 review; n=127 QoE=75%	? ND	? ND	? ? 1 review; n=42 QoE=75%
Technique Range of Motion	? ↓ 1 review; n=194 QoE=75%	? ND	? ND	? ND	? ND
Technique Power Training	✓ ↑ 3 reviews; n=1,226 QoE=83%	? ND	? ND	? ? 1 review; n=38 QoE=50%	? ND
Technique Velocity-based	? ND	✓ ↑ 1 review; n=406 QoE=25%	✓ ↑ 1 review; n=363 QoE=25%	? ND	? ND
Volume Sets	✗ ↓ 1 review; n=290 QoE=75%	? ND	? ND	? ? 1 review; n=32 QoE=50%	? ND
Set Structure	? ND	? ? 1 review; n=122 QoE=75%	✗ ? 2 reviews; n=354 QoE=88%	? ? 1 review; n=133 QoE=100% ↓ 1 review; n=237 QoE=75%	? ND
Concurrent Training	? ? 1 review; n=NR QoE=25%	? ? 1 review; n=50 QoE=75%	? ND	? ND	? ND

✓, impacts outcome; ?, cannot determine impact on outcome; ✗, does not impact outcome; CTRL, non-exercising control; ND, no data; QoE, quality of evidence. Within each box, the small symbol and text represent details of reviews for each respective decision, and the enlarged symbol represents the overall decision. The quality of evidence (QoE) is the quotient of the average QoE and highest (best) possible quality of evidence, expressed as a percentage. The number of participants was calculated from most common measurement in reviews reporting outcome-specific samples sizes.

Supplementary Appendix 10: Summary of resistance training prescriptions that impact contraction velocity, Short Physical Performance Battery, walking performance, and functional reach test performance.

	Contraction Velocity	**SPPB**	**Walking Performance**	**Functional Reach Test**
Standard RT vs CTRL	✓ ↑ 1 review; n=988 QoE=75%	✗ ↓ 1 review; n=420 QoE=100%	? ↓ 1 review; n=199 QoE=100%	? ? 1 review; n=98 QoE=100%
Special RT vs CTRL Elastic Band RT	? ND	? ND	? ? 1 review; n=175 QoE=75%	? ND
Special RT vs CTRL Home-based RT	? ND	? ND	? ND	? ND
Special RT vs CTRL Power Training RT	? ND	? ? 1 review; n=66 QoE=75%	? ND	? ND
Technique Power Training	? ND	✓ ↑ 1 review; n=241 QoE=100% ? 1 review; n=68 QoE=75%	✓ ? 2 reviews; n=229 QoE=88%	? ND
Set Structure	? ? 1 review; n=142 QoE=100% ↓ 1 review; n=225 QoE=75%	? ND	? ND	? ND

✓, impacts outcome; ?, cannot determine impact on outcome; ✗, does not impact outcome; CTRL, non-exercising control; ND, no data; QoE, quality of evidence. Within each box, the small symbol and text represent details of reviews for each respective decision, and the enlarged symbol represents the overall decision. The quality of evidence (QoE) is the quotient of the average QoE and highest (best) possible quality of evidence, expressed as a percentage. The number of participants was calculated from most common measurement in reviews reporting outcome-specific samples sizes.

Supplementary Appendix 11: Details of included reviews assessing strength.

Reference	MA	No. of studies (participants)	Synthesized Outcome	Bottom-line statement	SES	AMSTAR	QoE
Standard RT vs CTRL							
Chen 2023	Y	Handgrip: NR (1330) Chest press: NR (53) Leg press: NR (1330)	Handgrip: MD: 2.21; 95% CrI: 1.18, 3.34 (RT favoured) Chest press: MD: 3.49; 95% CrI: -4.17, 11.5 (neither condition favoured) Leg press: MD: 8.24; 95% CrI: 3.78, 12.7 (RT favoured)	RT improved strength compared with CTRL, with higher-intensity RT potentially yielding greater improvements than lower-intensity RT	Sufficient evidence in favour	8	4
de Souza Cordeiro 2023	Y	5 (138)	SMD: 0.39; 95% CI: -0.28, 1.06; P=0.25; I2=70% (neither condition favoured)	RT did not increase strength compared to CTRL, but the results should be interpreted with caution due to the low number of included studies	Insufficient evidence to determine	8	4
Currier and Mcleod 2023	Y	178 (5097)	10/12 resistance training prescriptions significantly increased strength versus CTRL, with SMDs ranging from 0.75 to 1.60 (RT favoured)	All RT prescriptions promoted strength compared with no exercise. The highest-ranked prescriptions for strength involved higher loads and multiple sets.	Sufficient evidence in favour	9	4
Geng and Zhai 2023	Y	8 (365)	MD: 2.58; 95% CI: 1.06, 4.07 (RT favoured)	RT increased grip strength compared to CTRL	Sufficient evidence in favour	6	3
Kamiya 2023	Y	7 (275)	SMD: 0.62; 95% CI: 0.32, 0.91; P<0.0001; I2=26% (RT favoured)	Low-intensity RT increased strength compared to CTRL	Some evidence in favour	4	3
Mcleod and Currier 2023	N	6 (4920)	4/6 reviews found RT improved strength versus CTRL; 2/6 reviews could not determine the effect of RT	RT increased strength vs CTRL	Sufficient evidence in favour	8	3
Zeng and Ling 2023	Y	17 (794)	SMD: 3.76; 95% CI: 1.26, 6.05; P<0.05 (RT favoured)	RT increased hand grip strength compared to CTRL	Sufficient evidence in favour	9	4
González-Rocha 2022	Y	7 (292)	MD: 2.81 kg; 95% CI: 1.61, 4.00; P<0.00001; I2=0% (RT favoured)	RT increased hand grip strength compared to CTRL	Sufficient evidence in favour	8	4
Wang 2022	Y	10 (344)	MD: 4.31 kg; 95% CI: 3.22, 5.39; P<0.00001; I2=33% (RT favoured)	RT increased grip strength compared to CTRL	Sufficient evidence in favour	9	4
Zhao 2022	Y	11 (480)	SMD: 0.60; 95% CI: 0.30, 0.89; P<0.01; I2=59% (RT favoured)	RT increased grip strength compared to CTRL	Sufficient evidence in favour	6	3
Polito 2021	Y	28 (687)	SMD: 0.94; 95% CI: 0.71, 1.16 (RT favoured)	RT increased muscle strength compared to CTRL	Sufficient evidence in favour	5	3
Amiri 2021	Y	Leg press: 3 (66) Bench press: 4 (110)	Leg press: SMD: 0.82; 95% CI: 0.30, 1.34; P=0.002; I2=65% (RT favoured) Bench press: SMD: 0.82; 95% CI: 0.42, 1.23; P<0.0001; I2=11% (RT favoured)	RT significantly increased lower and upper limb strength	Some evidence in favour	7	3

Chen 2021	Y	Handgrip: 11 (473) Knee extension: 7 (223)	Handgrip: SMD: 0.81; 95% CI: 0.35, 1.27; P=0.0005; I2=81% (RT favoured) Knee extension: SMD: 0.98; 95% CI: 0.62, 1.34; P<0.00001; I2=67% (RT favoured)	RT improves muscle strength in healthy older people with sarcopenia	Sufficient evidence in favour	7	3
Polito 2021	Y	Younger: 56 (1077) Older: 63 (856)	Younger: SMD: 1.43; 95% CI: 1.23, 1.63; I2=81.72% (RT favoured) Older: SMD: 1.22; 95% CI: 1.03, 1.41; I2=82.67% (RT favoured)	Different combinations of RT factors improved strength in younger and older individuals	Sufficient evidence in favour	6	3
Grgic 2020	Y	17 (880)	SMD: 0.97; 95% CI: 0.50, 1.44; P=0.001; I2=87% (RT favoured)	RT increases muscle strength in very elderly people	Sufficient evidence in favour	8	4
Hagstrom 2020	Y	Upper body: 15 (613) Lower body: 19 (735)	Upper body: SMD: 1.70; 95% CI: 1.28, 2.13; P<0.001; I2=16.93% (RT favoured) Lower body: SMD: 1.40; 95% CI: 1.03, 1.76; P<0.001; I2=32.89% (RT favoured)	RT elicits large improvements in muscular strength in healthy adult females	Sufficient evidence in favour	7	3
Beckwée 2019	N	7 (2869)	6/7 reviews found RT increased muscle strength	RT increased muscle strength compared to CTRL	Sufficient evidence in favour	4	2
Andrews 2019	Y	8 (462*)	SMD: 1.44; 95% CI: 0.49, 2.39; P=0.002 (RT favoured)	Exercise improved muscle strength	Sufficient evidence in favour	3	2
Bandeira de Mello 2019	N	4 (488)	0/4 studies found RT did not improve strength	RT has a negligible effect and clinical impact on strength in elders diagnosed with sarcopenia	Insufficient evidence in favour	5	2
de Queiroz Miranda 2019	N	6* (152*)	4/6 studies found improvement in maximal strength.	RT and plyometrics in combination with exercises designed specifically for the sport (tennis drills) were the most efficient to increase strength	Insufficient evidence to determine	3	1
Moreira 2019	Y	Dynamic strength: 15 (502) Isometric strength: 6 (196)	Dynamic strength: SMD: 1.05; 95% CI: 0.61, 1.50; P<0.00001; I2=78% (RT favoured) Isometric strength: SMD: 0.87; 95% CI: 0.16, 1.58; P=0.02; I2=80% (RT favoured)	RT has a large effect in improving different manifestations of muscle strength	Sufficient evidence in favour	6	3
Guizelini 2018	Y	10 (333)	MD (%): 18.40; 95% CI: 13.69, 23.30; P<0.001 (RT favoured)	RT has a significant beneficial effect on muscle strength	Sufficient evidence in favour	3	2
Beaudart 2017	N	35 (NR)	29/35 studies found muscle strength increased following the exercise intervention	Physical exercise has a beneficial impact on muscle strength in healthy subjects aged 60 years and older	Sufficient evidence in favour	5	2
Borde 2015	Y	25 (463)	SMD: 1.57; 95% CI: 1.20, 1.94; P<0.01; I2=80% (RT favoured)	RT has a large effect on muscle strength	Sufficient evidence in favour	6	3
Arnold 2014	N	15 (266)	15/15 studies found RT significantly increased strength	RT appears to increase strength in elderly persons	Sufficient evidence in favour	6	2

Silva 2014	Y	15 (528)	SMD: 2.00; 95% CI: 1.76, 2.23; P=0.000; I2=92.8% (RT favoured)	RT increases strength compared to CTRL in healthy sedentary elderly people, and different combinations of variables (intensity, sets, frequency) may be equally effective	Sufficient evidence in favour	5	3
Beijersbergen 2013	N	1 (NR)	1/1 studies found RT increased strength	A paucity of data prevents robust conclusions	Insufficient evidence to determine	2	1
Ferreira 2012	Y	10 (NR)	SMD: 0.68; 95% CI: 0.49, 0.87 (RT favoured)	RT has a greater impact on strength than physical activity, though both appear beneficial for strength	Sufficient evidence in favour	6	3
Asikainen 2004	N	2 (75)	2/2 studies found RT with weight machines increased strength	RT increases muscle strength in women at postmenopausal age	Some evidence in favour	3	1
Munn 2003	Y	13 (309)	MD (%): 20.5; 95% CI: 16.0, 25.1; P<0.0001 (RT favoured)	Unilateral strength training increases strength in the trained limb	Sufficient evidence in favour	3	2
Special RT vs CTRL Circuit RT							
Ramos-Campo 2022	Y	Arms: 3 (113) Trunk: 2 (92) Lower Limbs: 3 (111)	Arms: SMD: 0.80; 95% CI: 0.13, 1.47; P<0.02; I2=61% (circuit RT favoured) Trunk: SMD: 1.31; 95% CI: 0.86, 1.77; P<0.0001; I2=0% (circuit RT favoured) Lower Limbs: SMD: 1.25; 95% CI: 0.83, 1.66; P<0.0001; I2=0% (circuit RT favoured)	Circuit RT improves arm, trunk, and lower limb strength performance	Some evidence in favour	8	4
Ramos-Campo 2021	Y	Bench Press: 14 (490) Elbow Flexion: 5 (116) Front Pull Down: 4 (98) Hand Grip: 2 (132)	Bench Press: SMD: 0.96; 95% CI: 0.66, 1.25; P<0.00001; I2=55% (RT favoured) Elbow Flexion: SMD: 5.89; 95% CI: 4.48, 7.30; P<0.00001; I2=0% (RT favoured) Front Pull Down: SMD: 12.14; 95% CI: 7.78, 15.50; P<0.00001; I2=0% (RT favoured) Hand Grip: SMD: 0.41; 95% CI: -2.70, 3.52; P=0.79; I2=0% (neither condition favoured)	Circuit RT had a significant and large effect on strength performance	Sufficient evidence in favour	9	4
Munoz-Martınez 2017	Y	6 (223)	SMD: 0.94; 95% CI: 0.64, 1.24; P<0.0001; I2=81% (RT favoured)	Circuit RT, independent of the protocol, increases strength in healthy adults	Sufficient evidence in favour	5	3
Special RT vs CTRL Elastic Band RT							

Tsai 2022	Y	3 (175)	MD: 3.20 kg; 95% CI: 1.14, 5.27; P=0.002; I2=82% (elastic band RT favoured)	RT with elastic bands appeared to improve strength compared to CTRL	Some evidence in favour	6	3
Colado 2020	N	Young adults: 7 (136) Middle-aged adults: 6 (244) Older adults: 32 (1746)	Young adults: 4/7 studies found RT with elastic bands increased strength Middle-aged adults: 2/6 studies found RT with elastic bands increased strength Older adults: 15/32 studies found RT with elastic bands increased strength	RT with elastic bands improves muscle strength, and these improvements appear similar to those seen with traditional isotonic machines and free weights	Some evidence in favour	4	2
de Oliveira 2017	Y	2 (51)	MD (kg): 1.89; 95% CI: 0.44, 3.35; P=0.01; I2=86% (RT favoured)	RT with elastic bands increases strength in healthy adults	Insufficient evidence to determine	6	3
Special RT vs CTRL Flywheel RT							
Nunez Sanchez 2017	Y	12^ (140)	The effect size in the experimental group (0.6) was significantly increased (P< 0.05) compared with the effect size of CTRL (0.28)	Increases in muscle force were noted with flywheel RT	Insufficient evidence to determine	3	2
Special RT vs CTRL Home-based RT							
Chaabene 2021	Y	10 (261)	SMD: 0.30; 95% CI: 0.12, 0.48; P<0.01; I2=0% (RT favoured)	Results indicated small effects of home-based training on muscle strength	Some evidence in favour	7	3
Thiebaud 2014	N	8 (631)	4/8 studies found RT significantly increased strength	Home-based RT can improve strength	Some evidence in favour	3	1
Special RT vs CTRL Nordic Hamstring RT							
Medeiros 2021	Y	Eccentric peak torque: 5 (112) Eccentric peak force: 3 (78)	Eccentric peak torque: SMD: 0.68; 95% CI: 0.29, 1.06; P=0.0005; I2=0% (RT favoured) Eccentric peak force: SMD: 1.11; 95% CI: 0.62, 1.61; P<0.00001; I2=55% (RT favoured)	Nordic hamstring training has the potential of increasing knee flexor eccentric strength	Some evidence in favour	8	4
Special RT vs CTRL Olympic Weightlifting							
Morris 2022	Y	2 (44)	SMD: 2.40; 95% CI: 1.50, 3.30; P<0.00001; I2=16% (RT favoured)	Olympic weightlifting appears to increase strength compared to CTRL	Insufficient evidence to determine	7	3
Special RT vs CTRL Unilateral RT (cross-education)							
Cirer-Sastre 2017	Y	10 (409)	SMD: 0.56; 95% CI: 0.34, 0.78; P<0.01 (RT increased strength in contralateral limb)	Unilateral RT prescription impacts strength gain in non-training limb. Fast eccentric sets with moderate	Sufficient evidence in favour	6	3

				volumes and rest intervals maximize contralateral gains.			
Manca 2017	Y	31 (785)	SMD: 0.67; 95% CI: 0.48, 0.87; P<0.00001 (RT increased strength in contralateral limb)	Unilateral RT induces significant contraction type-dependent gains in the contralateral untrained limb	Sufficient evidence in favour	9	4
Special RT vs CTRL Velocity-based RT							
Zhang 2022	Y	9 (253)	SMD: 0.76; 95% CI: 0.58, 0.94; P<0.001; I2=0% (velocity-based RT favoured)	Velocity-based RT improved strength compared to CTRL	Some evidence in favour	5	3
Baena-Marín 2022	N	22 (617)	21/22 studies found RT increased squat 1RM strength	Velocity-based RT is an effective method to improve 1RM strength	Sufficient evidence in favour	3	1
Special RT vs CTRL Unstable Surface RT							
Behm 2015	Y	5 (172)	SMD: 0.91; 95% CI: 0.36, 1.46; P=0.001; I2=61% (RT favoured)	RT on an unstable surface improves strength compared to CTRL	Some evidence in favour	6	3
Frequency							
Mcleod and Currier 2023	N	5 (2001)	2/5 reviews found frequency impacted strength; 1/5 reviews found no effect; 2/5 reviews could not determine the effect	RT frequency impacted strength development	Sufficient evidence in favour	8	3
Cuthbert 2021	Y	10 (269)	Upper body: SMD: 0.088; 95% CI: -0.171, 0.348; P=0.505; I2=0% (neither condition favoured) Lower body: SMD: 0.061; 95% CI: -0.202, 0.323; P=0.651; I2=0% (neither condition favoured)	There was no clear difference in maximal strength development between training frequencies in well-trained populations.	Some evidence in favour of no effect	7	3
Androulakis Korakakis 2020	Y	5 (170)	MD (1RM kg): 12.09; 95% CI: 6.30, 16.03; I2=0% (higher frequency favoured)	Performing a single set of 6-12 repetitions with loads ranging from approximately 70-85% 1RM 2-3 times per week with high intensity of effort for 8-12 weeks can produce suboptimal, yet significant increases in 1RM strength in resistance-trained men.	Some evidence in favour	5	3
Kessinger 2020	N	4 (81)	4/4 studies found similar strength increases between higher and lower frequency	Lower-frequency RT produces equal improvements in muscular strength compared to higher-frequency RT when volume is equated.	Some evidence in favour of no effect	7	2
Kneffel 2020	N	11 (448)	SMD: 0.14; 95% CI: 0.08, 0.21; P=0.001 (higher frequency favoured)	Maximum strength was slightly improved with additional training days, but it seems unlikely that more than two weekly training sessions would further benefit older adults	Some evidence in favour	5	2

Grgic 2018	Y	22 (912)	1x/wk: SMD: 0.74; 95% CI: 0.48, 1.01 2x/wk: SMD: 0.82; 95% CI: 0.55, 1.09 3x/wk: SMD: 0.93; 95% CI: 0.65, 1.21 4+ x/wk: SMD: 1.08; 95% CI: 0.74, 1.42 P=0.003 (higher frequency favoured)	There is a dose-response relationship between RT frequency and muscular strength gains; however, when volume is equated, there was no significant effect	Sufficient evidence in favour	6	3
Ralston 2018	Y	11 (258)	SMD: 0.09; 95% CI: -0.06, 0.24; P=0.25; I2=0% (neither condition favoured)	When RT is volume-equated, there is no significant effect of RT frequency on muscular strength gain	Insufficient evidence in favour	8	4
Intensity Load							
Bandeira-Guimarães 2023	Y	3 (151)	SMD: 0.30; 95% CI: -0.03, 0.62; P= 0.072; I2=11.4% (neither condition favoured)	Power training intensity did not influence changes in muscle strength, but cautious interpretation is warranted considering the inclusion of only three studies.	Insufficient evidence to determine	8	4
Mcleod and Currier 2023	N	8 (3793)	6/8 reviews found load impacted strength; 2/8 reviews could not determine the effect of load	RT load impacted strength development	Sufficient evidence in favour	8	3
Carvalho 2021	Y	High load vs low load: 11 (353) High load vs moderate load: 9 (339) Moderate load vs low load: 5 (186)	High load vs low load: SMD: 1.03; 95% CI: 0.37, 1.69; P=0.006 (high load favoured) High load vs moderate load: SMD: 0.60; 95% CI: 0.17, 1.03; P=0.012 (high load favoured) Moderate load vs low load: SMD: 0.83; 95% CI: 0.01, 1.65; P=0.048 (moderate load favoured)	When the volume load is similar, RT with higher loads increases 1RM strength more than lighter loads	Sufficient evidence in favour	5	3
Refalo 2021	Y	Dynamic 1RM: 36 (1187) Isometric MVIC: 14 (302) Isokinetic strength: 10 (264)	1RM: SMD: 0.34; 95% CI: 0.15, 0.52; P=0.0003; I2=55% (high-load favoured) Isometric MVC: SMD: 0.41; 95% CI: 0.07, 0.76; P=0.02; I2=49% (high-load favoured) Isokinetic: SMD: 0.19; 95% CI: -0.10, 0.49; P=0.20; I2=23% (neither condition favoured)	Higher-load RT is superior for improving dynamic 1RM and isometric strength but comparable [to low-load RT] for improvements in isokinetic strength	Sufficient evidence in favour	6	3
Lopez 2020	Y	23 (582)	High-load vs low load: SMD: 0.60; 95%CI: 0.38, 0.82; P<0.001 (favours high-load group) Moderate-load vs low-load: SMD: 0.34;	Higher loads result in greater strength gains	Sufficient evidence in favour	8	4

			95% CI: 0.05, 0.62; P<0.003 (favours moderate-load group) High-load vs moderate-load: SMD: 0.26; 95%CI: -0.02, 0.54; P=0.068 (does not favour either group)				
Schoenfeld 2017	Y	1RM: 14 (492) Isometric: 8 (179) Isokinetic: 4 (114)	1RM: SMD: -0.37; 95% CI: -0.59, -0.16; P=0.003 (High load favoured) Isometric: SMD: -0.09; 95% CI: -0.34, 0.17; P=0.43 (neither condition favoured) Isokinetic: NS	Gains in 1RM strength were significantly greater with high- vs. low-load training, whereas no significant differences were found for isometric strength	Sufficient evidence in favour	5	3
Csapo 2016	Y	15 (448)	ES: 0.430; 95% CI: -0.020, 0.735; P=0.06 (neither condition favoured)	Moderate loads may suffice to induce substantial gains in muscle strength in elderly cohorts	Some evidence in favour of no effect	5	3
Schoenfeld 2016	Y	9 (286)	SMD: 1.07; 95% CI: -0.18, 2.32; P=0.09 (neither condition favoured)	No significant differences in strength gain were found between high- and low-load RT	Some evidence in favour of no effect	3	2
Steib 2010	Y	High vs low load: 6 (167) High vs moderate load: 4 (99)	High vs low load: SMD: 0.88; 95% CI: 0.21, 1.55; P=0.010; I2=74% (high load favoured) High vs moderate load: SMD: 0.62; 95% CI: 0.22, 1.03; P=0.003; I2=0% (high load favoured)	Higher training intensities are superior to lower and moderate intensities for improving maximal strength in older adults	Some evidence in favour	6	3
Intensity Fatigue/failure							
Mcleod and Currier 2023	N	2 (593)	2/2 found no impact of RT to failure	Failure did not impact strength change with RT	Insufficient evidence in favour	8	3
Grgic 2022	Y	15 (394)	SMD: -0.09; 95% CI: -0.22, 0.05; P=0.198 (neither condition favoured)	RT to or not to muscle failure may produce similar increases in muscular strength, though there was favoring of non-failure training when volume was not equated	Insufficient evidence in favour	6	3
Vieira 2021	Y	13 (384)	SMD: -0.08; 95% CI: -0.42, 0.26; P=0.642; I2=67.3% (neither condition favoured)	RT not to failure and RT to failure may induce comparable improvements in maximal dynamic strength	Some evidence in favour of no effect	9	4
Davies 2016	Y	8 (199)	SMD: 0.34; 95% CI: 0.06, 0.62; P=0.02; I2=0% (non-failure RT favoured)	Despite statistically significant effects on muscular strength being found for non-failure compared with failure training, the small percentage of improvement shown	Some evidence in favour	7	3

				for non-failure training is unlikely to be meaningful.			
Type Blood Flow Restriction RT vs Standard RT							
Rodrigo-Mallorca 2021	Y	1RM: 4 (148) MVC: 3 (246)	1RM: SMD: 0.07; 95% CI: -0.25, 0.40; P=0.66; I2=0% (neither condition favoured) MVC: SMD: 0.61; 95% CI: 0.10, 1.11; P=0.02; I2=71% (BFR-RT favoured)	BFR-RT may increase muscular strength in non-active older adults, at least at a similar extent as traditional RT	Insufficient evidence to determine	5	3
Centner 2019	Y	High-load vs low-load BFR: 6 (118) Low-load vs low-load BFR: 2 (60)	High-load vs low-load BFR: SMD: -0.42; 95% CI: -0.70, -0.14; P=0.003; I2=18% (traditional high-load RT favoured) Low-load vs low-load BFR: SMD: 0.86; 95% CI: 0.42, 1.30; P<0.01; I2=64% (low-load BFR favoured)	Low-load RT with BFR might increase strength more than low-load RT without BFR, but traditional high-load RT was most effective to increase strength	Insufficient evidence to determine	8	4
Lixandrao 2018	Y	12 (460)	SMD: 0.63; 95% CI: 0.43, 0.80; I2=25.62% (high load RT favoured)	High-load RT seems superior to low-load RT with BFR for maximal strength gains	Sufficient evidence in favour	5	3
Type Flywheel RT vs Standard RT							
Maroto-Izquierdoa 2017	Y	9 (332)	SMD: 0.66; 95% CI: 0.44, 0.89; P<0.00001; I2=21% (Flywheel eccentric overload training favoured)	Eccentric overload induced by flywheel devices are associated with greater improvements in muscle strength than traditional RT/CTRL	Some evidence in favour	4	3
Type Machine RT vs Free-weight RT							
Haugen 2023	Y	Dynamic Strength: 12 (683) Dynamic Strength (tested with machine): 6 (155) Dynamic Strength (tested with free-weight): 8 (549)	Dynamic Strength: SMD: 0.084; 95% CI: -0.106, 0.273; P=0.387 (neither condition favoured) Dynamic Strength (tested with machine): SMD: 0.291; 95% CI: -0.017, 0.600; P=0.064 (neither condition favoured) Dynamic Strength (tested with free-weight): SMD: -0.210; 95% CI: -0.391, -0.029; P=0.023 (free-weights favoured)	RT with machines and free-weights did not differentially impact overall maximal strength, though strength changes might be specific to the training modality	Insufficient evidence in favour	7	3
Type Unstable vs Stable Surface RT							

Behm 2015	Y	16 (438)	SMD: 0.15; 95% CI: -0.20, 0.50; P=0.41; I2=68% (neither condition favoured)	RT on an unstable surface does not appear to confer additional benefits compared to RT on a stable surface	Some evidence in favour of no effect	6	3
Time Time of Day							
Mcleod and Currier 2023	N	1 (221)	1/1 review found no effect	RT time of day did not impact strength development	Some evidence in favour of no effect	8	3
Grgic 2019	Y	8 (209)	SMD: 0.04; 95% CI: -0.24, 0.32; I2=0% (neither condition favoured)	Training in the morning compared to the evening does not appear to impact strength gains, regardless of the time-of-day strength is assessed	Some evidence in favour of no effect	7	3
Time Time Under Tension							
Mcleod and Currier 2023	N	2 (140)	2/2 reviews could not determine the effect	It was unclear if RT contraction velocity/time under tension impacted strength development	Insufficient evidence to determine	8	3
Davies 2017	Y	15 (509)	SMD: 0.07; 95% CI: -0.13, 0.27; P=0.48 (neither condition favoured)	Fast and moderate-slow RT produce similar gains in muscular strength	Some evidence in favour of no effect	7	3
Rest interval							
Mcleod and Currier 2023	N	2 (491)	1/2 reviews found no impact; 1/2 reviews could not determine the effect	Inter-set rest did not impact strength development with RT	Insufficient evidence in favour	8	3
Grgic 2018	N	23 (491)	22/23 studies found all measures of strength increased	RT with short rest intervals (<60 seconds) can substantially increase muscular strength, though longer rest intervals (>2 minutes) are required to maximize strength gains in resistance-trained individuals	Insufficient evidence in favour	7	2
Technique Contraction Type							
Mcleod and Currier 2023	N	5 (1051)	1/5 reviews found contraction type impacted strength; 2/5 reviews found no effect; 2/5 reviews could not determine the effect	RT contraction type did not impact strength development	Insufficient evidence in favour	8	3
Roig 2009	Y	Higher eccentric vs concentric intensity: 2 (38) Comparable eccentric vs concentric intensity: 2 (34)	Higher eccentric vs concentric intensity: MD (kg): 1.80; 95% CI: 0.50, 3.10; P=0.007; I2=% (higher eccentric favoured) Comparable eccentric vs concentric intensity: MD (kg): -1.84; 95% CI: -8.45, 4.78; P=0.59; I2=% (neither condition favoured)	Strength gains from eccentric RT are highly specific to the testing movement	Insufficient evidence to determine	6	3

Technique Olympic Weightlifting vs Standard RT							
Morris 2022	Y	8 (215)	SMD: 0.19; 95% CI: -0.31, 0.69; P=0.46; I2=67% (neither condition favoured)	Olympic weightlifting and traditional RT appear to confer similar benefits for strength	Some evidence in favour of no effect	7	3
Technique Power training RT vs Standard RT							
Pearson 2022	Y	8 (237)	SMD: -0.13; 95% CI: -0.89, 0.64; P=0.74; I2=87% (neither condition favoured)	RT with contractions performed as fast as possible did not impact strength gains compared to traditional RT	Some evidence in favour of no effect	4	3
Balachandran 2022	Y	15 (433)	SMD: 0.01; 95% CI: -0.14, 0.16; I2=25% (neither condition favoured)	Power training and traditional RT did not differentially to increase strength	Insufficient evidence in favour	7	3
Steib 2010	Y	5 (140)	SMD: -0.23; 95% CI: -1.42, 0.96; P=0.70; I2=89% (neither condition favoured)	RT with concentric phase performed as quickly as possible and progressive RT appear to comparably improve maximal strength in older adults	Insufficient evidence to determine	6	3
Technique Range of Motion							
Pallarés 2021	Y	15 (549)	SMD: 0.56; 95% CI: 0.20, 0.91; P=0.004; I2=77.6% (Full ROM favoured)	RT with full ROM produced significantly greater improvements in muscle strength	Sufficient evidence in favour	6	3
Oranchuk 2018	N	14 (713)	14/14 studies found maximal isometric force significantly increased with isometric RT	Isometric RT caused substantial improvements in maximal force production	Some evidence in favour	2	1
Volume							
Rocha 2024	Y	Upper limb: 14 (745) Lower limb: 21 (954)	Upper limb: SMD: 0.36; 95% CI: 0.11, 0.61; P<0.01; I2=48% (higher volume favoured) Lower limb: SMD: 0.50; 95% CI: 0.37, 0.63; P<0.01; I2=0% (higher volume favoured)	Higher volume RT promoted greater strength gain than lower volume RT	Sufficient evidence in favour	7	3
Mcleod and Currier 2023	N	7 (2358)	3/7 reviews found sets impacted strength; 4/7 reviews could not determine the effect	RT volume (sets) impacted strength development	Sufficient evidence in favour	8	3
Ralston 2019	Y	12 (393)	SMD: 0.93; 95% CI: 0.41, 1.45; P=0.0005; I2=92% (multiple sets favoured)	Three-set protocols should be included to maximize strength development. However, single-set programs also produce considerable increases in muscular strength.	Some evidence in favour	8	4
Ralston 2017	Y	9 (223)	SMD: 0.18; 95% CI: 0.06, 0.30; P=0.003; I2=45% (higher weekly set volume favoured)	Higher weekly set volume appeared to promote larger strength improvement than lower weekly set volume	Some evidence in favour	4	3

Krieger 2009	Y	14 (NR)	Full model: SMD: 0.26; 95% CI: 0.15, 0.37; P<0.0001 (multiple sets favoured) Dose-response model: 2-3 sets vs 1 set: SMD: 0.25; 95% CI: 0.14, 0.37; P=0.0001 (2-3 sets favoured) 1 set vs 4-6 sets: SMD: 0.35; 95% CI: -0.05, 0.74; P=0.17 (neither condition favoured) 2-3 sets vs 4-6 sets: SMD: 0.09; 95% CI: -0.31, 0.50; P=0.64 (neither condition favoured)	Two-to-three sets per exercise are associated with 46% greater strength gains than 1 set in both trained and untrained subjects	Sufficient evidence in favour	6	3
Bågenhammar 2007	N	26 (1084)	12 studies found multiple-set RT was better than single-set RT; 13 studies found single- and multiple-set RT were equally effective	Multiple-set RT seems most appropriate to maximize strength gains, though single-set training is sufficient to remain physically active and fit	Some evidence in favour	4	2
Wolfe 2004	N	16 (621)	Significant interactions were found for training status and program duration and number of sets (single vs. multiple). Trained individuals performing multiple sets generated significantly greater strength increases (P<0.001), and multiple sets were superior to single sets for longer-duration programs.	Single-set programs for an initial short training period in untrained individuals result in similar strength gains as multiple-set programs. However, as progression occurs and higher gains are desired, multiple-set programs are more effective.	Some evidence in favour	5	2
Set structure							
Mcleod and Currier 2023	N	2 (764)	2/2 reviews found no impact	RT set configuration did not impact strength development	Insufficient evidence in favour	8	3
Marshall 2021	Y	Overall: 11 (199) Cluster: 4 (43) Complex: 2 (19) Contrast: 5 (44) Traditional: 8 (93)	Overall: SMD: 1.02; 95% CI: 0.76, 1.63; P<0.00001; I2=5% Cluster: SMD: 0.68; 95% CI: 0.24, 1.12; P=0.002; I2=0% Complex: SMD: 0.93; 95% CI: 0.24, 1.60; P=0.007; I2=0% Contrast: SMD: 1.16; 95% CI: 0.70, 1.62; P<0.00001; I2=0% Traditional: SMD: 1.19; 95% CI: 0.76, 1.63; P<0.00001; I2=44%	All set structures significantly increase strength compared to baseline with no difference between subgroups	Insufficient evidence to determine	6	3

			Test for subgroup differences: P=0.35 (no condition favoured)				
Davies 2021	Y	26 (738)	SMD: -0.05; 95% CI: -0.21, 0.11; P=0.56; I2=11.03% (neither condition favoured)	Both cluster and traditional set configurations demonstrate equal effectiveness to increase muscular strength	Insufficient evidence in favour	7	3
Jukic 2021	Y	13 (335)	SMD: -0.06; 95% CI: -0.16, 0.05; P=0.291; I2=32% (neither condition favoured)	Set structure manipulation has a negligible impact on muscular strength	Insufficient evidence in favour	8	4
Progression Intrasession Autoregulation vs Standard RT							
Larsen 2021	N	14 (356)	Objective autoregulation: 9/9 studies found strength increased Subjective autoregulation: 6/6 studies found strength increased	Both subjective and objective autoregulation methods are effective for enhancing maximal strength	Some evidence in favour of no effect	2	1
Hickmott 2022	Y	Autoregulated vs Standardized load: 6 (133) Volume autoregulation: 9 (308)	Autoregulated vs Standardized load: MD (kg): 2.07; 95% CI: -0.32, 4.46; P=0.09; I2=0% (neither condition favoured) Volume autoregulation: MD (kg): 2.32; 95% CI: 0.33, 4.31; P=0.02; I2=0% (velocity loss threshold <25% favoured)	Autoregulated and standardized load prescription demonstrated similar improvements in 1RM strength. When sets and relative intensity were equated, velocity loss thresholds <25% were superior for promoting strength.	Some evidence in favour	6	3
Progression Varied Exercise Selection vs Standard RT							
Kassiano 2022	N	6 (198)	5/6 studies found no difference in strength gains between varied and constant exercise selections	Varying exercise selection did not appear to impact muscle strength gains compared to fixed exercise selection	Insufficient evidence to determine	5	2
Progression Periodization							
Mcleod and Currier 2023	N	2 (612)	1/2 reviews found periodization impacted strength; 1/2 reviews could not determine the effect	It was unclear if RT periodization impacted strength development	Some evidence in favour of no effect	8	3
Moesgaard 2022	Y	Periodized vs non-periodized: 15 (616) Undulating periodization vs linear periodization: 14 (612)	Periodized vs non-periodized: SMD: 0.31; 95% CI: 0.04, 0.57; P=0.02; I2=73% (periodized RT favoured) Undulating periodization vs linear periodization: SMD: 0.31; 95% CI: 0.02, 0.61; P=0.04; I2=70% (undulating periodization favoured)	When volume is equated between conditions, periodized RT has a greater effect on 1RM strength compared to non-periodized RT, and undulating periodization resulted in greater increases in 1RM compared to linear periodization.	Sufficient evidence in favour	5	3

Harries 2015	Y	Bench Press: 16 (463) Leg Press: 7 (190) Squat: 6 (173)	Bench Press: MD: 1.71 kg; 95% CI: -2.05, 5.47; P=0.37; I2=55% (neither condition favoured) Leg Press: MD: 25.93 kg; 95% CI: -2.48, 54.35; P=0.07; I2=64% (neither condition favoured) Squat: MD: -1.67 kg; 95% CI: -10.88, 7.54; P=0.72; I2= (neither condition favoured)	Linear and undulating periodization did not differentially impact upper-body and lower-body strength development	Some evidence in favour of no effect	5	3
Rhea 2004	Y	11 (39^)	SMD: 0.84; standard deviation: 1.41; P<0.01 (periodized RT favoured)	Periodized RT was more effective than non-periodized RT to increase strength	Insufficient evidence to determine	1	2
Exercise order							
Mcleod and Currier 2023	N	1 (207)	1/1 review found exercise order impacted strength	RT exercise order impacted strength development	Some evidence in favour	8	3
Nunes 2021	Y	8 (189)	SMD: 0.45; 95% CI: 0.09, 0.81; P=0.014; I2=37.4 (exercise performed first favoured)	Strength gains are greatest in exercises performed at the beginning of a training session	Some evidence in favour	9	4
Eddens and van Someren 2018	Y	Dynamic strength: 9 (227) Static strength: 6 (155)	Dynamic strength: MD (%): 6.91; 95% CI: 1.96, 11.87; P=0.006; I2=66% (RT before AE favoured) Static strength: MD (%): -0.04; 95% CI: -3.19, 3.11; P=0.98; I2=17% (neither condition favoured)	Performing RT before AE is beneficial for lower-body dynamic strength	Some evidence in favour	8	4
Murlasits 2018	Y	9 (318)	MD (kg): 3.96; 95% CI: 0.81, 7.10; I2=0% (RT before AE favoured)	RT before AE is superior to AE before RT for 1RM strength development	Some evidence in favour	7	3
Concurrent training							
Huiberts 2023	Y	21 (407)	SMD: -0.32; 95% CI: -0.51, -0.14; P=0.0008; I2=0% (RT favoured)	RT was favoured to increase strength compared to combined RT and aerobic training	Sufficient evidence in favour	7	3
Petré 2021	Y	Untrained: 7 (151) Moderately Trained: 10 (318) Trained: 10 (281)	Untrained: SMD: 0.03; 95% CI: -0.29, 0.35; P=0.87; I2=0% (neither condition favoured) Moderately Trained: SMD: -0.20; 95% CI: -0.59, 0.02; P=0.08; I2=0% (neither condition favoured) Trained: SMD: -0.35; 95% CI: -0.59, -0.11; P<0.01; I2=2% (RT alone favoured)	Adding endurance training to RT appeared to negatively impact lower-body strength development in trained individuals, but not in moderately trained or untrained individuals	Some evidence in favour	5	3

Trowell 2020	Y	Knee Flexion Strength: 6 (111) Knee Extension Strength: 6 (119) Squat Strength: 6 (101)	Knee Flexion Strength: SMD: 0.89; 95% CI: 0.48, 1.30; P<0.0001; I2=2% (RT+AE favoured) Knee Extension Strength: SMD: 0.69; 95% CI: 0.29, 1.09; P=0.0006; I2=4% (RT+AE favoured) Squat Strength: SMD: 0.63; 95% CI: 0.13, 1.12; P=0.01; I2=28% (RT+AE favoured)	The addition of RT significantly improved knee flexion, knee extension and squat strength more than endurance training alone	Some evidence in favour of no effect	6	3
Sabag 2018	Y	Upper body: 7 (111) Lower body: 12 (235)	Upper body: SMD: 0.016; 95% CI: -0.319, 0.351; P=0.927 (neither condition favoured) Lower body: SMD: -0.248; 95% CI: -0.495, -0.001; P=0.049 (RT alone favoured)	Combining high-intensity interval training and RT did not appear to impact strength development compared to RT alone	Some evidence in favour of no effect	4	3
Cadore 2013	N	4 (NR)	3/4 studies found no difference in strength gains between concurrent training and RT; 1/4 studies found RT was superior to concurrent training	Strength gains do not appear to be impacted with concurrent training, especially if RT is performed before endurance training and/or RT frequency does not exceed twice per week	Insufficient evidence to determine	2	1
Wilson 2012	Y	AE: 25^ (NR) AE+RT: 26^ (NR)	AE: SMD: 0.78; 95% CI: 0.36, 1.19 AE+RT: SMD: 1.44; 95% CI: 1.03, 1.84 Significant difference between AE and AE+RT for lower body strength (P<0.05) but not upper body strength	Combining RT and AE seems to yield greater strength than AE alone	Some evidence in favour of no effect	1	2

AMSTAR, A Measurement Tool to Assess Systematic Reviews (total scores); 1RM, one-repetition maximum; 95% CI, 95% confidence interval; AE, endurance training; BFR, blood flow restriction; CTRL, non-exercise control; kg, kilograms; MA, meta analysis (Y, yes; N, no); NR, not reported; NS, not synthesized; QoE, Quality of evidence; RT, resistance training; SES, standardized effectiveness statement; SMD, standardized mean difference; *, value only reported for entire review; **, number of groups included in analysis; ^, value reported as effect sizes.

Supplementary Appendix 12: Details of included reviews assessing muscle hypertrophy.

Reference	MA	No. of studies (participants)	Synthesized Outcome	Bottom-line statement	SES	AMSTAR	QoE
Standard RT vs CTRL							
Chen 2023	Y	ASMI: NR (913) Leg muscle mass: NR (369) Skeletal muscle mass: NR (953)	ASMI: MD: 0.19; 95% CrI: 0.08, 0.3 (RT favoured) Leg muscle mass: MD: 0.465; 95% CrI: -0.010, 0.974 (neither condition favoured) Skeletal muscle mass: MD: 0.584; 95% CrI: 0.106, 1.04 (RT favoured)	RT promoted muscle hypertrophy compared to CTRL	Sufficient evidence in favour	8	4
de Souza Cordeiro 2023	Y	5 (140)	SMD: 0.12; 95% CI: 0.07, 0.16; P<0.000001; I2=0% (RT favoured)	RT appeared to promote hypertrophy vs CTRL, but the results should be interpreted with caution due to the low number of included studies	Insufficient evidence to determine	8	4
Currier and Mcleod 2023	Y	119 (3364)	7/10 resistance training prescriptions significantly increased hypertrophy versus CTRL, with SMDs ranging from 0.10 to 0.66 (RT favoured)	All resistance training prescription promoted hypertrophy compared to CTRL. The highest-ranked prescriptions for hypertrophy included multiple sets.	Sufficient evidence in favour	9	4
Geng and Zhai 2023	Y	2 (89)	MD: 0.90; 95% CI: 0.11, 1.75 (RT favoured)	There was insufficient evidence to determine impact of RT on appendicular skeletal muscle mass	Insufficient evidence to determine	6	3
Mcleod and Currier 2023	N	4 (2955)	4/4 reviews found RT promoted hypertrophy versus CTRL	RT promoted hypertrophy versus CTRL	Sufficient evidence in favour	8	3
González-Rocha 2022	Y	7 (276)	MD: 1.03 kg; 95% CI: 0.35, 1.72; P=0.003; I2=0% (RT favoured)	RT increased total muscle mass compared to CTRL	Some evidence in favour	8	4
Zhao 2022	Y	6 (267)	SMD: 0.52; 95% CI: 0.27, 0.76; P<0.01; I2=3% (RT favoured)	RT increased skeletal muscle index compared to CTRL	Some evidence in favour	6	3
Yagiz 2022	Y	17 (711)	All studies found a positive effect of resistance training on the cross-sectional area of the pectoralis major, triceps brachii, and biceps brachii.	Most exercise interventions showed large effect sizes for increasing the size of individual upper extremity muscles	Some evidence in favour	7	3
Chen 2021	Y	Skeletal muscle mass: 4 (185) Leg lean mass: 2 (101) Appendicular skeletal muscle	Skeletal muscle mass: SMD: 0.27; 95% CI: -0.02, 0.56; P=0.07; I2=0% (neither condition favoured) Leg lean mass: SMD: 0.12; 95% CI: -0.25, 0.50; P=0.52; I2=0% (neither condition favoured) Appendicular skeletal muscle mass index:	Resistance training does not seem to increase indices of skeletal muscle mass	Insufficient evidence to determine	7	3

		mass index: 5 (208)	SMD: 0.25; 95% CI: -0.27, 0.78; P=0.35; I2=68% (neither condition favoured)				
Polito 2021	Y	Young adults: 96 (182) Older adults: 85 (657)	Young adults: SMD: 0.54; 95% CI: 1.23, 1.63; I2=70.44% (RT favoured) Older adults: SMD: 0.38; 95% CI: 0.25, 0.50; I2=57.92% (RT favoured)	Different combinations of RT variables improved muscle mass in young and older adults. In older adults, this was favoured by greater frequency and duration, although hampered by excessive volume	Sufficient evidence in favour	6	3
Grgic 2020	Y	Whole muscle: 6 (203) Muscle fiber: 3 (39)	Whole muscle: SMD: 0.30; 95% CI: 0.10, 0.50; P=0.013 (RT favoured) Muscle fiber: SMD: 0.33; 95% CI: -0.67, 1.33; P=0.266 (neither condition favoured)	RT caused muscle hypertrophy at the whole-muscle level in very elderly	Some evidence in favour	8	4
Hagstrom 2020	Y	15 (609)	SMD: 0.52; 95% CI: 0.25, 0.78; P=0.000; I2=0% (RT favoured)	RT increases muscle hypertrophy in adult females	Sufficient evidence in favour	7	3
Bandeira de Mello 2019	N	5 (300)	1/5 studies found RT gained almost 1 kg of appendicular muscle mass compared to CTRL; 4/5 studies found no difference in muscle mass compared to CTRL.	RT does not seem to increase muscle mass in older adults, but scarcity of and heterogeneity between trials limit conclusions.	Insufficient evidence in favour	5	2
Beckwée 2019	N	5 (2049)	4/5 included reviews found RT increased muscle mass	RT is recommended to improve muscle mass in older people	Sufficient evidence in favour	4	2
Moreira 2019	Y	14 (475)	SMD: 0.26; 95% CI: -0.08, 0.60; P=0.13; I2=68% (neither condition favoured)	Short term strength training does not seem to impact muscle mass in older adults	Insufficient evidence in favour	6	3
Beaudart 2017	N	34 (2597)	27/34 studies found muscle mass increased with exercise	Physical exercise has a beneficial impact on muscle mass in healthy subjects aged 60 years and older	Sufficient evidence in favour	5	2
Borde 2015	Y	9 (283)	SMD: 0.42; 95% CI: 0.18, 0.66; P=0.0006; I2=0% (RT favoured)	RT significantly increases muscle mass, though the effect is small	Some evidence in favour	6	3
Special RT vs CTRL Circuit RT							
Ramos-Campo 2022	Y	5 (190)	SMD: 0.29; 95% CI: -0.00, 0.57; P=0.05; I2=0% (RT favoured)	Circuit RT appears to increase muscle mass	Insufficient evidence to determine	8	4
Ramos-Campo 2021	Y	8 (236)	SMD: 1.41; 95% CI: 0.27, 2.55; P=0.02; I2=0% (RT favoured)	Circuit RT is an effective method to increase muscle mass	Some evidence in favour	9	4
Special RT vs CTRL Elastic Band RT							
Tsai 2022	Y	2 (133)	MD: 0.14 kg; 95% CI: 0.03, 0.26; P=0.01; I2=0% (elastic band RT favoured)	RT with elastic bands appeared to promote hypertrophy compared to CTRL	Insufficient evidence to determine	6	3
Colado 2020	N	Middle-aged adults: 5 (226) Older adults: 7 (236)	Middle-aged adults: 5/5 studies found significant improvements in measures of skeletal muscle mass. Older adults: 4/7 studies found significant	Free-weight and elastic band training seem to promote muscle hypertrophy	Some evidence in favour	4	2

			improvements in measures of skeletal muscle mass.				
Special RT vs CTRL Flywheel RT							
Nunez Sanchez 2017	Y	5 (104)	The SMD in the experimental group (0.75) was significantly higher (P<0.05) than the SMD in CTRL (0.39) (RT favoured)	RT with flywheel systems increased muscle volume during short periods of training.	Insufficient evidence to determine	3	2
Frequency							
Mcleod and Currier 2023	N	4 (1070)	1/4 reviews found an effect; 2/4 reviews found not effect; 1/4 reviews could not determine the effect	RT frequency did not impact hypertrophy	Insufficient evidence in favour	8	3
Bernárdez-Vázquez 2022	N	1 (836)	1/1 reviews found frequency does not impact hypertrophy when volume is equated, but higher frequencies are favoured when volume is not equated.	Frequency (when volume equated) did not influence the magnitude of muscle mass gains.	Insufficient evidence in favour	6	2
Kessinger 2020	N	4 (81)	2/4 studies found similar effects of low- and high-frequency RT; 1/4 studies favoured high-frequency; 1/4 studies favoured low-frequency.	There is moderate-to-strong evidence to suggest that lower-frequency RT, when volume is equated, will produce equal to greater amounts of hypertrophy in comparison to higher-frequency RT	Insufficient evidence to determine	7	2
Kneffel 2020	N	11 (435)	SMD: 0.02; 95% CI: -0.04, 0.07; P=0.51 (neither condition favoured)	No significant effect of frequency was found for muscle hypertrophy	Some evidence in favour of no effect	5	2
Raya-González 2019	N	4 (85)	2/4 studies found no difference between 1 versus 2 days per week and 3 versus 6 days per week. 2/4 studies found greater gains in muscle mass with 5 and 3 versus 1 day per week (comparable when >2 days per week).	Available evidence suggests frequency does not impact hypertrophy gains.	Insufficient evidence to determine	3	1
Schoenfeld 2019	Y	25 (836)	Volume-equated: SMD: 0.07; 95% CI: -0.02, 0.17; P=0.11 (neither condition favoured) Non-volume equated: 1 d/wk: SMD: -0.03; 95% CI: -0.18, 0.13 2 d/wk: SMD: 0.08; 95% CI: -0.04, 0.20 3+ d/wk: SMD: 0.15; 95% CI: -0.04, 0.34	There is strong evidence that resistance training frequency does not significantly or meaningfully impact muscle hypertrophy when volume is equated	Insufficient evidence in favour	4	3
Schoenfeld 2016	Y	7 (200)	SMD: 0.19; 95% CI: 0.11, 0.28 (Higher frequency favoured)	RT twice a week promotes superior hypertrophic gains compared to RT once a week	Some evidence in favour	3	2
Intensity Load							
Mcleod and Currier 2023	N	8 (2578)	1/8 reviews found an effect; 4/8 reviews found no effect; 3/8 reviews could not determine the effect	RT load did not impact hypertrophy	Insufficient evidence in favour	8	3
Bernárdez-Vázquez 2022	N	3 (941)	3/3 reviews found load does not impact hypertrophy	Intensity (load) did not influence the magnitude of muscle mass gains.	Insufficient evidence in favour	6	2

Carvalho 2021	Y	High load vs low load: 6 (162) High load vs moderate load: 6 (170) Moderate load vs low load: 2 (62) Low load vs very low load: NR (NR)	High load vs low load: SMD: 0.01; 95% CI: -0.30, 0.32; P=0.938 (neither condition favoured) High load vs moderate load: SMD: 0.04; 95% CI: -0.12, 0.20; P=0.559 (neither condition favoured) Moderate load vs low load: SMD: 0.17; 95% CI: -2.51, 2.84; P=0.571 (neither condition favoured) Low load vs very low load: SMD: 0.28; 95% CI: -5.09, 5.65; P=0.626 (neither condition favoured)	Regardless of the magnitude of load, RT induced similar hypertrophy under volume-matched conditions	Some evidence in favour of no effect	5	3
Refalo 2021	Y	Whole muscle size: 20 (533) Muscle fiber CSA: 5 (138) LBM/FFM: 9 (267) Muscle thickness: 8 (198) Whole muscle CSA: 13 (313)	Whole muscle size: SMD: 0.06; 95% CI: -0.11, 0.24; P=0.47; I2=0% (neither condition favoured) Muscle fiber CSA: SMD: 0.29; 95% CI: -0.09, 0.66; P=0.13; I2=10% (neither condition favoured) LBM/FFM: SMD: 0.05; 95% CI: -0.20, 0.29; P=0.70; I2=0% (neither condition favoured) Muscle thickness: 7/8 studies found no difference. Whole muscle CSA: 9/13 studies found no difference.	High- and low-load RT induce comparable skeletal muscle hypertrophy	Insufficient evidence in favour	6	3
Grgic 2020	Y	Type I fibers: 5 (108) Type II fibers: 5 (108)	Type I fibers: SMD: 0.28; 95% CI: -0.27, 0.82; P=0.316 (neither condition favoured) Type II fibers: SMD: 0.30; 95% CI: -0.05, 0.66; P=0.089 (neither condition favoured)	No significant differences between low-load vs. high-load RT on type I or type II muscle fiber hypertrophy.	Insufficient evidence to determine	5	3
Lopez 2020	Y	24 (604)	High-load vs low-load: SMD: 0.12; 95%CI: -0.06, 0.29; P=0.241 (neither condition favoured) Moderate-load vs low-load: SMD: 0.20;	Muscle hypertrophy improvements seem to be load independent	Insufficient evidence in favour	8	4

			95%CI: -0.04, 0.44; P=0.113 (neither condition favoured) High-load vs moderate-load: SMD: 0.09; 95%CI:-0.33, 0.16; P=0.469 (neither condition favoured)				
Raya-González 2019	N	4 (92)	3/4 studies found no difference in muscle mass gains between high and low load RT	Available evidence suggests load does not impact hypertrophy gains.	Some evidence in favour of no effect	3	1
Schoenfeld 2017	Y	10 (231)	SMD: 0.03; 95% CI: -0.16, 0.22 (neither condition favoured)	Load does not appear to impact muscle hypertrophy	Insufficient evidence in favour	5	3
Csapo 2016	Y	7 (231)	SMD: 0.136; 95% CI: 0.009, 0.259; P=0.036 (heavy load RT favoured)	RT with higher loads caused marginally larger gains in muscle size	Some evidence in favour	5	3
Schoenfeld 2016	Y	8 (191)	SMD: 0.43; 95% CI: -0.05, 0.92; P=0.076 (neither condition favoured)	There were no significant differences between high- and low-load RT for muscle hypertrophy	Some evidence in favour of no effect	3	2
Intensity Fatigue/failure							
Mcleod and Currier 2023	N	1 (219)	1/1 review found no effect	RT to failure did not impact hypertrophy	Some evidence in favour of no effect	8	3
Refalo 2023	Y	9 (284)	SMD: 0.19; 95% CI: 0.00, 0.37; P=0.045; I2=0% (failure RT favoured)	While RT to failure was statistically superior for promoting hypertrophy compared to non-failure RT, the effect size was trivial, suggesting RT performed to failure is not superior to non-failure RT.	Some evidence in favour of no effect	8	4
Grgic 2022	Y	7 (219)	SMD: 0.22; 95% CI: -0.11, 0.55; P=0.152 (neither condition favoured)	Training to or not to muscle failure may produce similar increases in muscle size, though training to failure was favoured in resistance-trained individuals.	Some evidence in favour of no effect	6	3
Vieira 2021	Y	4 (189)	SMD: 0.75; 95% CI: 0.22, 1.28; P=0.005; I2=63.8% (RT to failure favoured)	RT to failure seems to promote significantly more hypertrophy that RT not to failure	Some evidence in favour	9	4
Raya-González 2019	N	3 (78)	3/3 studies found similar gains in muscle mass between failure and non-failure RT	Available evidence suggests training to, or not to, failure does not impact hypertrophy gains.	Some evidence in favour of no effect	3	1
Type Blood flow restriction RT vs Standard RT							
Rodrigo-Mallorca 2021	Y	3 (219)	SMD: 0.62; 95% CI: -0.09, 1.34; P=0.09; I2=59% (neither condition favoured)	Strength training with BFR may induce muscle hypertrophy in non-active older adults, at least at a similar extent as traditional RT	Some evidence in favour of no effect	5	3
Centner 2019	Y	4 (72)	SMD: 0.21; 95% CI: -0.14, 0.56; P=0.86; I2=0% (neither condition favoured)	Due to insufficient data availability, no conclusion could be drawn about the effects of low-load BFR RT on	Insufficient evidence to determine	8	4

				muscle mass compared to low-load RT nor high-load RT			
Lixandrao 2018	Y	10 (368)	SMD: 0.10; 95% CI: -0.10, 0.30 (neither condition favoured)	High-load RT induced comparable increases in muscle mass compared to BFR-RT, regardless of absolute occlusion pressure, cuff width, and occlusion pressure prescription method.	Insufficient evidence in favour	5	3
Type Flywheel RT vs Standard RT							
Maroto-Izquierdoa 2017	Y	7 (160)	SMD: 0.57; 95% CI: 0.25, 0.90; P=0.0005; I2=0% (Flywheel eccentric overload training favoured)	Eccentric overload induced by flywheel devices are associated with greater improvements in muscle hypertrophy than traditional RT/CTRL	Some evidence in favour	4	3
Type Machine RT vs Free-weight RT							
Haugen 2023	Y	5 (123)	SMD: -0.055; 95% CI: -0.397, 0.287; P=0.751 (neither condition favoured)	RT with machines and free-weights did not differentially impact hypertrophy	Insufficient evidence to determine	7	3
Type Single-joint RT Exercises vs Multi-joint RT Exercises							
Rosa 2023	Y	7 (193)	SMD: 0.07; 95% CI: -0.09, 0.23; I2=0% (neither condition favoured)	Single- and multi-joint RT did not differentially impact muscle hypertrophy.	Some evidence in favour of no effect	9	4
Raya-González 2019	N	2 (65)	2/2 studies found no difference in gains in muscle mass between single- and multi-joint exercises.	Available evidence suggests single- and multi-joint exercises comparably promote hypertrophy.	Insufficient evidence to determine	3	1
Type Variable Load RT vs Standard RT							
Fuentes-García 2023	N	12 (408)	11/12 studies found no difference between variable resistance training and traditional resistance training.	Variable RT did not produce greater muscle mass gain compared to traditional RT.	Insufficient evidence in favour	4	2
Time Time Under Tension							
Mcleod and Currier 2023	N	2 (363)	1/2 reviews found no effect; 1/2 reviews could not determine the effect	RT contraction velocity/time under tension did not impact hypertrophy	Insufficient evidence in favour	8	3
Bernárdez-Vázquez 2022	N	1 (239)	1/1 reviews found repetition duration did not impact hypertrophy	Repetition duration did not influence the magnitude of muscle mass gains.	Some evidence in favour of no effect	6	2
Hackett 2018	N	Lower body: 5 (107) Upper body: 2 (50)	Lower body: 3/5 studies favoured moderate-slow RT versus fast RT; 1/5 studies found no difference; 1/5 studies favoured fast RT versus moderate-slow RT Upper body: 2/2 studies favoured fast versus moderate-slow training	Moderate-slow RT seems more effective for hypertrophy of the quadriceps and fast training seems more effective for hypertrophy of the biceps brachii.	Insufficient evidence to determine	6	2

Schoenfeld 2015	Y	8 (204)	Fast/heavy duration: SMD: 0.67; 95% CI: 0.22, 1.13 Fast/light duration: SMD: 0.79; 95% CI: 0.095, 1.67 Medium duration: SMD: 0.27; 95% CI: -0.22, 0.75 Slow duration: SMD: 0.29; 95% CI: -0.34, 0.92 No significant differences between any of the tempo categories (Hochberg-adjusted P value = 0.94)	Hypertrophic outcomes appear to be similar when training with repetition durations ranging from 0.5 to 8 seconds to concentric muscular failure, suggesting that a fairly wide range of repetition durations can maximize muscle growth	Some evidence in favour of no effect	3	2
Time Time of Day							
Mcleod and Currier 2023	N	1 (112)	1/1 review found no effect	RT time of day did not impact hypertrophy	Insufficient evidence to determine	8	3
Bernárdez-Vázquez 2022	N	1 (112)	1/1 review found time of day did not impact hypertrophy	RT time of day did not appear to influence the magnitude of muscle mass gains.	Insufficient evidence to determine	6	2
Grgic 2019	Y	5 (112)	SMD: 0.20; 95% CI: -0.40, 0.40; P=0.958; I2=0% (neither condition favoured)	RT-induced muscle hypertrophy is similar irrespective of the time of day at which the training is performed	Insufficient evidence to determine	7	3
Rest interval							
Mcleod and Currier 2023	N	2 (115)	2/2 reviews could not determine the effect	It was not possible to determine the impact of RT inter-set rest on hypertrophy	Insufficient evidence to determine	8	3
Raya-González 2019	N	2 (35)	2/2 studies found greater gain in muscle mass with longer (2.5 or 3 minutes) versus shorter (1 minute) rest between sets.	Available evidence suggests rest interval length might impact hypertrophy gains.	Insufficient evidence to determine	3	1
Grgic 2017	N	6 (115)	All studies observed increased hypertrophy in both short and long rest interval groups (range = 0.5-13.3%)	Both short and long inter-set rest intervals seem to effectively promote muscle hypertrophy, though longer rest intervals may be advantageous for trained individuals	Insufficient evidence to determine	7	2
Henselmans 2014	N	6 (NR)	5/6 studies observed no difference in muscle hypertrophy between longer and shorter rest intervals	Muscle hypertrophy does not seem to be influenced by rest interval length	Insufficient evidence to determine	0	1
Technique Contraction Type							
Mcleod and Currier 2023	N	3 (868)	2/3 reviews found an effect; 1/3 reviews could not determine the effect	RT contraction type impacted hypertrophy	Sufficient evidence in favour	8	3

Raya-González 2019	N	2 (19)	1/1 study found no difference between eccentric-concentric and eccentric-only training.	Available evidence suggests contraction type might not impact hypertrophy gains.	Insufficient evidence to determine	3	1
Schoenfeld 2017	Y	15 (356)	SMD: -0.27; 95% CI: -0.56, 0.01; P=0.057 (neither condition favoured)	Eccentric-only training likely provides a small advantage over concentric-only training for promoting a hypertrophic response; notwithstanding, both contraction modes can promote significant muscular hypertrophy	Insufficient evidence in favour	4	3
Roig 2009	Y	3 (73)	MD (cm2): 1.49; 95% CI: -1.32, 4.31; P=0.30; I2=28% (neither condition favoured)	Eccentric or concentric training performed separately can promote increases in muscle mass, but eccentric training performed at high intensities might be more effective to promote hypertrophy	Insufficient evidence to determine	6	3
Technique Range of Motion							
Pallarés 2021	Y	4 (90)	SMD: 0.88; 95% CI: 0.19, 1.57; P=0.027; I2=80.3% (Full ROM RT favoured)	Full ROM RT produced significantly greater lower-limb muscle hypertrophy	Some evidence in favour	6	3
Schoenfeld 2020	N	Lower body: 4 (61) Upper body: 2 (74)	Lower body: 3/4 studies favoured full ROM training versus partial ROM Upper body: 1/2 studies found similar improvements between full ROM and partial ROM; 1/2 studies found a benefit of partial ROM	Performing RT through a full ROM is favoured for hypertrophy of the lower body musculature, but the effects of ROM for the upper limbs is limited and conflicting	Insufficient evidence to determine	4	2
Raya-González 2019	N	1 (26)	1/1 study found greater hypertrophy with complete range of motion versus partial range of motion	Available evidence suggests range of motion might impact hypertrophy gains.	Insufficient evidence to determine	3	1
Oranchuk 2018	N	9 (176)	RT with joint angles ≤70º: SMD: 0.045; SD: 0.034 RT with joint angles >70º: SMD: 0.046; SD: 0.027	Inconclusive impact of joint angle on hypertrophy	Insufficient evidence to determine	2	1
Technique Power Training RT vs Standard RT							
Balachandran 2022	Y	10 (336)	SMD: 0.0004; 95% CI: -0.08, 0.08; I2=0% (neither condition favoured)	Power training did not differentially impact hypertrophy compared to traditional RT	Insufficient evidence in favour	7	3
Volume							
Rocha 2024	Y	14 (555)	SMD: 0.06; 95% CI: -0.10, 0.23; P=0.46; I2=0% (neither condition favoured)	High volume and low volume RT did not differentially impact changes in lean mass.	Insufficient evidence in favour	7	3

Mcleod and Currier 2023	N	3 (812)	2/3 reviews found an effect; 1/3 reviews could not determine the effect	RT volume (sets) impacted hypertrophy	Sufficient evidence in favour	8	3
Bernárdez-Vázquez 2022	N	2 (712)	2/2 reviews found a positive dose-response relationship between volume and hypertrophy	Volume impacted muscle hypertrophy in a dose-dependent manner.	Sufficient evidence in favour	6	2
Baz-Valle 2022	Y	Quadriceps: 8 (181) Biceps brachii: 6 (143) Triceps brachii: 5 (111)	Quadriceps: SMD: -0.20; 95% CI: -0.49, 0.10; P=0.19; I2=0% (neither condition favoured) Biceps brachii: SMD: -0.10; 95% CI: -0.46, 0.26; P=0.59; I2=14% (neither condition favoured) Triceps brachii: SMD: -0.50; 95% CI: -0.88, -0.11; P=0.01; I2=0% (High volume favoured)	A range of 12-20 weekly sets per muscle group may be optimal for increasing muscle hypertrophy in young, trained men	Insufficient evidence to determine	7	3
Raya-González 2019	N	3 (90)	3/3 studies found greater hypertrophy with greater RT volume	Available evidence suggests volume impacts hypertrophy gains.	Some evidence in favour	3	1
Schoenfeld 2017	Y	15 (418)	Higher vs lower volume: SMD: 0.24; 95% CI: 0.04, 0.44; P=0.03 (Higher volume favoured) Each additional weekly set: SMD: 0.023; 95% CI: 0.010, 0.036; P=0.002 (positive dose-response relationship)	Substantial hypertrophic gains can be made using low-volume protocols (<4 weekly sets per muscle group); however, the present analysis shows that high volume protocols produce significantly greater increases in muscle growth than low volume. It appears that at least 10 weekly sets per muscle group is necessary to maximise increases in muscle mass	Sufficient evidence in favour	3	2
Krieger 2010	Y	8 (235)	SMD: 0.11; 95% CI: 0.02, 0.19; P=0.016 (multiple sets favoured)	Multiple sets per exercise were associated with significantly greater changes in muscle size than a single set per exercise	Some evidence in favour	3	2
Set structure							
Mcleod and Currier 2023	N	2 (195)	1/2 reviews found no effect; 1/2 reviews could not determine the effect	RT set configuration did not appear to impact hypertrophy	Insufficient evidence to determine	8	3
Sødal 2023	Y	5 (101)	SMD: 0.155; 95% CI: -0.199, 0.509; P=0.392; I2=0% (neither condition favoured)	There was insufficient data to determine if drop sets differentially impact hypertrophy compared to traditional sets	Insufficient evidence to determine	6	3
Davies 2021	Y	8 (189)	SMD: -0.05; 95% CI: -0.32, 0.23; P=0.73; I2=0% (neither condition favoured)	Cluster and traditional set configurations demonstrated equal effectiveness to positively induce muscle hypertrophy	Some evidence in favour of no effect	7	3
Jukic 2021	Y	Alternative (cluster and rest redistribution)	Alternative (cluster and rest redistribution) vs traditional: SMD: -0.03; 95% CI: -0.20,	Set structure manipulation has a negligible impact on hypertrophy	Insufficient evidence to determine	8	4

		vs traditional: 5 (105) Cluster vs traditional: 2 (34) Rest redistribution vs traditional: 3 (71)	0.13; P=0.708; I2=52% (neither condition favoured) Cluster vs traditional: SMD: -0.93; 95% CI: -3.24, 1.38; P=0.429; I2=87% (neither condition favoured) Rest redistribution vs traditional: SMD: -0.06; 95% CI: -0.26, 0.14; P=0.543; I2=0% (neither condition favoured)				
Progression Intrasession Load Regulation vs Standard RT							
Hickmott 2022	Y	Autoregulated vs Standardized load: 1 (21) Volume autoregulation: 3 (243)	Autoregulated vs Standardized load: NS Volume autoregulation: MD (cm2): 0.61; 95% CI: 0.05, 1.16; P=0.03; I2=0% (velocity loss threshold >25% favoured)	Moderate-high velocity loss thresholds (>25%) were optimal for muscle hypertrophy	Insufficient evidence to determine	6	3
Progression Varied Exercise Selection vs Standard RT							
Kassiano 2022	N	7 (218)	5/7 studies found no difference in hypertrophy between varied and constant exercise selections	Varying exercise selection did not appear to impact muscle hypertrophy compared to constant exercise selection	Some evidence in favour of no effect	5	2
Raya-González 2019	N	2 (95)	2/2 studies found varied exercise selection or strength/power training increased hypertrophy.	Available evidence suggests exercise type might impact hypertrophy gains.	Insufficient evidence to determine	3	1
Progression Periodization							
Mcleod and Currier 2023	N	2 (417)	2/2 reviews found no effect	RT periodization did not impact hypertrophy	Insufficient evidence in favour	8	3
Bernárdez-Vázquez 2022	N	1 (303)	1/1 reviews found periodization schemes (linear and undulating) did not differentially impact hypertrophy	Periodization (linear and undulating) did not influence the magnitude of muscle mass gains.	Insufficient evidence in favour	6	2
Moesgaard 2022	Y	Periodized vs non-periodized: 10 (294) Undulating vs linear periodization: 11 (361)	Periodized vs non-periodized: SMD: 0.13; 95% CI: -0.10, 0.36; P=0.27; I2=0% (neither condition favoured) Undulating vs linear periodization: SMD: 0.05; 95% CI: -0.20, 0.29; P=0.72; I2=0% (neither condition favoured)	No differences were found in muscle hypertrophy between periodized and non-periodized RT, along with no differences between different periodization models.	Insufficient evidence in favour	5	3

Grgic 2018	N	12 (333)	12/12 studies observed hypertrophy in periodized (range [% change]: 0, 8.7%) and non-periodized (-3.0,10.3) groups	Both periodized and non-periodized RT may induce similar muscle hypertrophy	Insufficient evidence in favour	4	2
Exercise order							
Mcleod and Currier 2023	N	1 (177)	1/1 review found no effect	RT exercise order did not impact hypertrophy	Some evidence in favour of no effect	8	3
Bernárdez-Vázquez 2022	N	1 (268)	1/1 reviews found exercise order did not impact hypertrophy	Exercise order did not influence the magnitude of muscle mass gains.	Some evidence in favour of no effect	6	2
Nunes 2021	Y	7 (177)	SMD: 0.03; 95% CI: -0.26, 0.31; P=0.862; I2=0% (neither condition favoured)	Exercise order does not seem to impact muscle hypertrophy	Some evidence in favour of no effect	9	4
Raya-González 2019	N	1 (71)	2/2 studies found no difference in hypertrophy based on exercise order.	Available evidence suggests exercise order might not impact hypertrophy gains.	Insufficient evidence to determine	3	1
Eddens and van Someren 2018	Y	5 (137)	MD: 1.15%; 95% CI: -1.56, 3.87; P=0.40; I2=72% (neither condition favoured)	The order of RT exercises within a training session does not seem to impact muscle hypertrophy	Some evidence in favour of no effect	8	4
Concurrent training							
Huiberts 2023	Y	5 (112)	SMD: 0.24; 95% CI: -0.29, 0.77; P=0.37; I2=48% (neither condition favoured)	RT alone did not differentially impact hypertrophy compared to RT combined with and aerobic training	Insufficient evidence to determine	7	3
Sabag 2018	Y	7 (128)	SMD: 0.106; 95% CI: -0.224, 0.435; P=0.529 (neither condition favoured)	Combining high-intensity interval training and RT did not appear to impact hypertrophy compared to RT alone	Insufficient evidence to determine	4	3
Alcaraz-Ibañez 2017	N	6 (111)	1/6 studies found significant improvements in proxy measures of muscle mass	While RT increased endurance runners' strength, these improvements were rarely accompanied by muscle hypertrophy	Insufficient evidence to determine	4	2
Cadore 2013	N	6 (NR)	5/6 studies found no difference between RT alone and concurrent training; 1/6 studies favoured the RT alone group	Endurance training does not impair RT-induced hypertrophy when both types of training are performed simultaneously	Some evidence in favour of no effect	2	1
Wilson 2012	Y	RT: 23^ (NR) AE: 20^ (NR) AE+RT: 29^ (NR)	RT: SMD: 1.23; 95% CI: 0.92, 1.53 AE: SMD: 0.27; 95% CI: -0.53, 0.60 AE+RT: SMD: 0.85; 95% CI: 0.57, 1.2 Significant difference between AE and AE+RT (P<0.05) and between AE and RT (P<0.05)	Combining RT and AE seems to yield greater hypertrophy than AE alone	Some evidence in favour	1	2

95% CI, 95% confidence interval; AMSTAR, A Measurement Tool to Assess Systematic Reviews (total scores); ASMI, Appendicular skeletal muscle index; BFR, blood flow restriction; CSA, cross-sectional area; CTRL, non-exercise control; kg, kilograms; MA, meta analysis (Y, yes; N, no); NR, not reported; NS, not synthesized; QoE, Quality of evidence; RT, resistance training; SES, standardized effectiveness statement; SD, standard deviation; SMD, standardized mean difference; *, value only reported for entire review; ^ effect sizes.

Supplementary Appendix 13: Details of included reviews assessing power.

Reference	MA	No. of studies (participants)	Synthesized Outcome	Bottom-line statement	SES	AMSTAR	QoE
Standard RT vs CTRL							
Andrews 2019	Y	2 (NR)	SMD: 1.02; 95% CI: 0.52, 1.52 (RT favoured)	Training had a positive effect on power.	Some evidence in favour	3	2
de Queiroz Miranda 2019	N	6 (152)	5/6 studies found improvement in lower limb explosive strength.	RT in combination with exercises designed specifically for the sport (tennis drills) were the most efficient	Insufficient evidence to determine	3	1
Moreira 2019	Y	6 (214)	SMD: 0.79; 95% CI: 0.16; 1.41 (RT favoured)	Short term strength training has a moderate to large effect in improving muscle strength and functional capacity.	Some evidence in favour	6	3
Guizelini 2018	Y	10 (333)	MD (%): 26.68%; 95% CI: 14.41, 35.52; P<0.001 (RT favoured)	Explosive training and heavy strength training are effective methods aiming to improve rate of force development	Sufficient evidence in favour	3	2
Straight 2015	Y	12 (454)	SMD: 0.34; 95% CI: 0.21, 0.47; P<0.0001; I2=45.9% (RT favoured)	RT is an effective exercise intervention for improving lower-extremity muscle power in middle-aged and older adults	Sufficient evidence in favour	5	3
Special RT vs CTRL Home-based RT							
Chaabene 2021	Y	4 (88)	SMD: 0.43; 95% CI: 0.01, 0.85; P=0.04 (Home-based RT favoured)	Home-based exercise appears to improve components of muscle power	Insufficient evidence to determine	7	3
Special RT vs CTRL Olympic Weightlifting							
Morris 2022	Y	CM jump: 5 (112) Jump squat: 3 (61)	Countermovement jump: SMD: 0.66; 95% CI: 0.19, 1.13; P=0.006 (Olympic weightlifting favoured) Jump squat: SMD: 1.34; 95% CI: 0.74, 1.95; P<0.001 (Olympic weightlifting favoured)	Olympic weightlifting appears to improve power jumping performance compared to control	Some evidence in favour	7	3
Intensity Load							
Bandeira-Guimarães 2023	Y	3 (151)	SMD: 0.13; 95% CI: -0.19, 0.45; P= 0.496; I2=0% (neither condition favoured)	Power training intensity did not influence changes in muscle power, but cautious interpretation is warranted considering the inclusion of only three studies.	Insufficient evidence to determine	8	4

Soriano 2017	Y	Moderate-load vs light-load: 4 (204) Light-load vs heavy-load: 4 (204) Moderate-load vs heavy-load: 4 (204)	Moderate-load vs light-load: SMD: 0.31; 95% CI: 0.03, 0.60; P=0.030 (moderate load favoured) Light-load vs heavy-load: SMD: -2.04; 95% CI: -2.86, -1.21; P=0.001 (light load favoured) Moderate-load vs heavy-load: SMD: -2.13; 95% CI: -2.75, -1.51; P=0.001 (moderate load favoured)	Moderate loads (30-70% 1RM) appear to provide the optimal loading range for peak power during the bench press	Some evidence in favour	6	3
Soriano 2015	Y	*Squat exercise* Moderate-load vs low-load: 5 (403) Low-load vs high-load: 5 (403) Moderate-load vs high load: 6 (366) *Jump Squat* Moderate-load vs low-load: 19 (1368) Low-load vs high-load: 10 (750) Moderate-load vs high load: 9 (574) *Power clean* Moderate-load vs low-load: 5 (360) Low-load vs high-load: 5	*Squat exercise* Moderate-load vs low-load: SMD: 0.47; 95% CI: 0.24, 0.70, P=0.001 (moderate load favoured) Low-load vs high-load: SMD: 0.03; 95% CI: -0.44, 0.51, P=0.89 (neither condition favoured) Moderate-load vs high load: SMD: -0.344; 95% CI: -0.56, -0.13, P=0.002 (moderate load favoured) *Jump Squat* Moderate-load vs low-load: SMD: -1.246; 95% CI: -1.70, -0.79, P=0.001 (low load favoured) Low-load vs high-load: SMD: -2.99; 95% CI: -4.02, -1.959, P=0.89 (low load favoured) Moderate-load vs high load: SMD: -1.52; 95% CI: -2.16, -0.89, P=0.001 (moderate load favoured) *Power clean* Moderate-load vs low-load: SMD: 1.19; 95% CI: -1.12, 0.49, P=0.225 (neither condition favoured) Low-load vs high-load: SMD: 0.637; 95% CI: 0.41, 0.87, P=0.001 (high load favoured)	The optimal load for power production appears to be moderate (30-70% 1RM) for the squat exercise, lighter (<30% 1RM) for the jump squat, and heavier (>70% 1RM) for the power clean and hang power clean.	Sufficient evidence in favour	5	3

		(361) Moderate-load vs high load: 6 (555) *Hang power clean* Moderate-load vs low-load: 4 (201) Low-load vs high-load: 4 (170) Moderate-load vs high load: 4 (255)	Moderate-load vs high load: SMD: 0.49; 95% CI: 0.32, 0.66, P=0.001 (high load favoured) *Hang power clean* Moderate-load vs low-load: SMD: 0.52; 95% CI: 0.06, 0.99, P=0.028 (moderate load favoured) Low-load vs high-load: SMD: 0.85; 95% CI: -0.12, 1.83, P=0.087 (neither condition favoured) Moderate-load vs high load: SMD: 0.31; 95% CI: -0.17, 0.79, P=0.206 (neither condition favoured)				
Intensity Failure							
Vieira 2021	Y	5 (150)	SMD: -0.20; 95% CI: -0.53, 0.13; P=0.239; I2: 32.7% (neither condition favoured)	Resistance training not to failure may induce comparable or even greater improvements in power output	Insufficient evidence to determine	9	4
Type Flywheel RT vs Standard RT							
Maroto-Izquierdoa 2017	Y	4 (235)	SMD: 0.80; 95% CI: 0.53, 1.07; P<0.00001; I2=0% (Flywheel-EOT favoured)	Eccentric overload induced by flywheel devices induces greater improvements in muscle power than traditional RT	Some evidence in favour	4	3
Type Unstable vs Stable Surface RT							
Behm 2015	Y	7 (145)	SMD: -0.53; 95% CI: -1.07, 0.01; P=0.05; I2=62% (neither condition favoured)	RT on unstable compared with stable surfaces has limited extra effects on muscle power in healthy young adults	Insufficient evidence to determine	6	3
Technique Olympic Weightlifting vs Standard RT							
Morris 2022	Y	CM jump: 9 (233)	Countermovement jump: SMD: 0.95; 95% CI: 0.04, 1.87; P=0.00 (olympic weightlifting favoured)	Olympic weightlifting can elicit additional benefits compared to traditional RT	Some evidence in favour	7	3

		Jump squat: 5 (103)	Jump squat: SMD: 0.36; 95% CI: -0.38, 1.09l P=0.34 (neither condition favoured)				
Technique Power training RT vs Standard RT							
Balachandran 2022	Y	15 (409)	SMD: 0.44; 95% CI: 0.21, 0.66; I2=47% (power training favoured)	Power training appeared to increase power more than traditional RT, but larger high-quality RCTs are required to draw more definitive conclusions	Sufficient evidence in favour	7	3
Straight 2015	Y	12 (454)	High-velocity/power RT: SMD: 0.62; 95% CI: 0.42, 0.82 Traditional RT: SMD: 0.20; 95% CI: 0.04, 0.35 (High-velocity/power RT favoured)	Power training is more effective than traditional RT for improving muscle power in middle-aged and older adults	Sufficient evidence in favour	5	3
Steib 2010	Y	4 (99)	SMD: 1.66; 95% CI: 0.08, 3.24; P=0.04; I2 = 89% (Power training favoured vs progressive RT)	Power training (concentric phase performed as quickly as possible) appears to be particularly effective method for enhancing muscle power	Insufficient evidence to determine	6	3
Volume							
Straight 2015	Y	12 (454)	High training volume: SMD: 0.18; 95% CI: -0.14, 0.40 Moderate training volume: SMD: 0.41; 95% CI: 0.24, 0.58 Low training volume: SMD: 0.40; 95% CI: 0.10, 0.70	Training volume appears to influence the magnitude of power development	Some evidence in favour	5	3
Set structure							
Davies 2021	Y	17 (445)	SMD: 0.02; 95% CI: -0.17, 0.20; P=0.86 (neither condition favoured)	Both cluster and traditional set configurations demonstrate equal effectiveness to positively induce muscular power	Some evidence in favour of no effect	7	3
Jukic 2021	Y	5 (142)	SMD: 0.18; 95% CI: 0.04, 0.31; P=0.011; I2=27% (alternative set structures favoured)	Alternative set structures (cluster sets, rest redistribution) might be more effective to maximize power (and velocity) outputs at submaximal loads	Insufficient evidence to determine	8	4
Concurrent training							
Trowell 2020	Y	Single-jump peak power: 1 (18) Continuous-jump peak power: 1 (15)	Single-jump peak power: SMD: -0.24; 95% CI: -1.17, 0.69 (neither RT nor CT favoured) Continuous-jump peak power: SMD: 0.25; 95% CI: -0.86, 1.37 (neither RT nor CT favoured)	Compared to only running, concurrent RT and running does not improve power production in endurance runners	Insufficient evidence to determine	6	3

Berryman 2017	Y	3 (NR)	SMD: 0.50; 95% CI: 0.34, 0.67; I2= 6% (RT+ET favoured vs ET)	The implementation of a strength-training mesocycle in running, cycling, cross-country skiing, and swimming was associated with a moderate increase in maximal power	Sufficient evidence in favour	3	2
Wilson 2012	Y	RT: 15^ (NR) ET: 14^ (NR) RT+ET: 17^ (NR)	RT: SMD: 0.91; 95% CI: 0.65, 0.13 ET: SMD: 0.11; 95% CI: -0.15, 0.38 RT+ET: SMD: 0.55; 95% CI: 0.31, 0.79 Significant differences between RT, ET, and CT (P<0.05)	Concurrent training appears to yield smaller power increases than RT	Some evidence in favour	1	2

95% CI, 95% confidence interval; AMSTAR, A Measurement Tool to Assess Systematic Reviews (total scores); CT, concurrent training; CTRL, non-exercise control; EOT, eccentric overload training; ES, effect sizes; ET, endurance training; MA, meta analysis (Y, yes; N, no); MD, mean difference; NR, not reported; QoE, Quality of evidence; RT, resistance training; SES, standardized effectiveness statement; SMD, standardized mean difference; *, value only reported for entire review; ^, value reported as effect sizes.

Supplementary Appendix 14: Details of included reviews assessing muscular endurance.

Reference	MA	No. of studies (participants)	Synthesized Outcome	Bottom-line statement	SES	AMSTAR	QoE
Standard RT vs CTRL							
Andrews 2019	Y	3 (NR)	SMD: 2.79; 95% CI: 1.48, 4.09; P<0.001 (RT favoured)	RT positively impacts endurance	Insufficient evidence to determine	3	2
Ferreira 2012	Y	6 (357)	SMD: 0.73; 95% CI: 0.50, 0.96; P<0.001, I2=65% (RT favoured)	Physical activity improves endurance in people aged 40-65 years.	Sufficient evidence in favour	6	3
Special RT vs CTRL Home-based RT							
Chaabene 2021	Y	4 (734)	SMD: 0.28; 95% CI: 0.14, 0.42; P<0.01; I2=92% (RT favoured)	Home-based exercise resulted in small effects on muscular endurance	Sufficient evidence in favour	7	3
Special RT vs CTRL Unstable Surface RT							
Behm 2015	Y	Young adults: 2 (60) Old adults: 1 (78)	Young adults: SMD: 1.42; 95% CI: 0.32, 2.52; P=0.01; I2=65% (RT favoured) Old adults: SMD: 0.18 (RT favoured)	RT on an unstable surface improves strength endurance in young adults and old adults compared to CTRL.	Insufficient evidence to determine	6	3
Special RT vs CTRL Velocity-based RT							
Zhang 2022	Y	4 (145)	SMD: 1.19; 95% CI: 0.93, 1.45; P<0.001; I2=2% (velocity-based RT favoured)	Velocity-based RT improved muscular endurance compared to CTRL	Insufficient evidence to determine	5	3
Intensity Load							
Steib 2010	N	1 (46)	SMD: 3.30; 95% CI: -9.86, 16.46 (neither condition favoured)	No substantial conclusions can be made about the most adequate intensity (high or low) to improve endurance	Insufficient evidence to determine	6	2
Type Unstable Surface RT vs Stable Surface RT							
Behm 2015	Y	4 (145)	SMD: 0.41; 95% CI: -0.12, 0.94; P=0.13; I2=58% (neither condition favoured)	RT on an unstable surface has limited extra effects on strength endurance in young adults compared to RT on a stable surface	Insufficient evidence to determine	6	3
Technique Power Training RT							
Steib 2010	N	1 (38)	SMD: -2.24; 95% CI: -3.07, -1.41 (progressive resistance training favoured)	No substantial conclusions can be made about the efficacy of progressive resistance training versus power training to improve endurance	Insufficient evidence to determine	6	2
Volume							

Steib 2010	N	1 (32)	SMD: 1.02; 95% CI: 0.22, 1.82 (higher volume favoured)	No substantial conclusions can be made about the most adequate volume to improve endurance	Insufficient evidence to determine	6	2
Set structure							
Davies 2021	Y	8 (237)	SMD: -0.07; 95% CI: -0.43, 0.29; P=0.70 (neither condition favoured)	Both cluster and traditional set configurations positively improved muscular endurance	Some evidence in favour of no effect	7	3
Jukic 2021	Y	Traditional VS cluster and rest redistribution: 4 (133) Rest redistribution VS traditional: 3 (115)	Traditional VS cluster and rest redistribution: SMD: -0.38; 95% CI: -0.69, -0.07 (Traditional favoured) Rest redistribution VS traditional: SMD: -0.37; 95% CI: -0.72, -0.02 (Traditional favoured)	Traditional set structure is more effective at promoting muscular endurance gains.	Insufficient evidence to determine	8	4

95% CI, 95% confidence interval; AMSTAR, A Measurement Tool to Assess Systematic Reviews (total scores); CTRL, non-exercise control; MA, meta-analysis (Y, yes; N, no); NR, not reported; QoE, Quality of evidence; RT, resistance training; SES, standardized effectiveness statement; SMD, standardized mean difference; *, value only reported for entire review.

Supplementary Appendix 15: Details of included reviews assessing gait speed.

Reference	MA	No. of studies (participants)	Synthesized Outcome	Bottom-line statement	SES	AMSTAR	QoE
Standard RT vs CTRL							
Geng and Zhai 2023	Y	3 (115)	MD: 0.28; 95% CI: 0.15, 0.41 (RT favoured)	RT improved gait speed compared to CTRL	Insufficient evidence to determine	6	3
Chen 2023	Y	NR (1021)	MD: 0.041 m/s; 95% CrI: -0.048, 0.125 (neither condition favoured)	RT did not improve gait speed compared to CTRL	Insufficient evidence in favour	8	4
Currier and Mcleod 2023	Y	15 (488)	3/4 resistance training prescriptions significantly improved gait speed versus CRTL, with SMDs ranging from 0.21 to 0.88 (RT favoured)	RT appeared to improve gait speed compared to CTRL	Sufficient evidence in favour	9	4
Zeng and Ling 2023	Y	17 (639)	SMD: -1.06; 95% CI: -7.17, 4.61 (neither condition favoured)	RT did not appear to impact gait speed	Insufficient evidence in favour	9	4
Zhao 2022	Y	8 (355)	SMD: 1.50; 95% CI: 0.59, 2.40; P<0.01; I2=93% (RT favoured)	RT increased gait speed compared to CTRL	Sufficient evidence in favour	6	3
González-Rocha 2022	Y	5 (296)	MD: 0.22 m/s; 95% CI: 0.09, 0.36; P<0.00001; I2=86% (RT favoured)	RT improved gait speed compared to CTRL	Some evidence in favour	8	4
Chen 2021	Y	6 (241)	SMD: 1.28; 95% CI: 0.36, 2.19; P=0.006; I2=89% (RT favoured to increase gait speed)	RT improved gait speed	Some evidence in favour	7	3
Almeida 2020	N	NR	Unable to determine effects of RT variables on functional performance	We cannot state, with a reasonable degree of certainty, that RT improves functional parameters in the elderly	Insufficient evidence to determine	4	2
Bandeira de Mello 2019	N	4 (267)	2/4 studies found RT significantly improved gait speed	RT protocols can improve physical performance in elders, but its effect size and clinical impact are barely relevant.	Some evidence in favour	5	2
Abbema 2015	Y	5 (239)	MD (m/s): 0.13; 95% CI: 0.09, 0.16 (RT favoured)	Progressive resistance and balance training improves preferred gait speed in older adults	Sufficient evidence in favour	7	3
Hortobagyi 2015	Y	24 (1,146)	SMD: 0.84 (MD: 0.11m/s); 95% CI: 0.52, 1.16; P<0.00001; I2=84% (RT favoured)	RT can functionally and clinically increase habitual and fast gait speed	Sufficient evidence in favour	6	3
Beijersbergen 2013	N	4 (NR)	2/4 studies found training improved gait speed	There is limited biomechanical evidence to explain how strength and power training improve walking speed in old adults	Insufficient evidence to determine	2	1
Howe 2012	Y	8 (375)	SMD: 0.25; 95% CI: 0.05, 0.46 (RT favoured)	Exercise programmes involving muscle strengthening exercise appear to improve gait speed.	Sufficient evidence in favour	9	4
Special RT vs CTRL Elastic Band RT							
Tsai 2022	Y	3 (160)	MD: -0.04 m/s; 95% CI: -0.07, -0.02; P=0.0008; I2=0% (elastic band RT favoured)	RT with elastic bands appeared to improve gait speed compared to CTRL	Insufficient evidence to determine	6	3

Special RT vs CTRL Power Training RT							
Martins 2022	Y	5 (165)	SMD: 0.46; 95% CI: -0.05, 0.97; P=0.08; I2=61% (neither condition favoured)	There was insufficient data to form meaningful conclusions on the impact of high-speed RT on gait speed	Insufficient evidence to determine	7	3
Intensity Load							
Steib 2010	Y	High vs low load: 1 (38) High vs moderate load: 1 (23)	High vs low load: SMD: 0.05; 95% CI: -0.59, 0.68; P=0.89; I2=NA (neither condition favoured) High vs moderate load: SMD: 0.12; 95% CI: -0.70, 0.94; P=0.77; I2=NA (neither condition favoured)	Robust conclusions are not possible given the lack of data	Insufficient evidence to determine	6	3
Technique Power Training RT							
Steib 2010	Y	2 (79)	SMD: -0.62; 95% CI: -1.85, 0.62; P=0.33; I2=86% (neither condition favoured)	Power training and progressive RT did not differentially improve gait speed.	Insufficient evidence to determine	6	3

AMSTAR, A Measurement Tool to Assess Systematic Reviews (total scores); 95% CI, 95% confidence interval; CTRL, non-exercise control; MA, meta-analysis (Y, yes; N, no); m/s, meters per second; MD, mean difference; QoE, Quality of evidence; RT, resistance training; SES, standardized effectiveness statement; SMD, standardized mean difference.

Supplementary Appendix 16: Details of included reviews assessing timed up-and-go.

Reference	MA	No. of studies (participants)	Synthesized Outcome	Bottom-line statement	SES	AMSTAR	QoE
Standard RT vs CTRL							
Geng and Zhai 2023	Y	2 (111)	MD: -1.69; 95% CI: -3.10, -0.38 (RT favoured)	RT improved TUG performance compared to CTRL	Insufficient evidence to determine	6	3
Chen 2023	Y	NR (337)	MD: -0.85 seconds; 95% CrI: -1.69, -0.1 (RT favoured)	RT improved TUG performance compared to CTRL	Sufficient evidence in favour	8	4
Zeng and Ling 2023	Y	17 (678)	SMD: 1.99; 95% CI: 1.12, 2.83 (RT favoured)	RT improved TUG performance compared to CTRL	Sufficient evidence in favour	9	4
Martins 2022	Y	2 (66)	SMD: -0.59; 95% CI: -1.27, 0.08; P=0.09; I2=35% (neither condition favoured)	There was insufficient data to form meaningful conclusions on the impact of high-speed RT on TUG performance	Insufficient evidence to determine	7	3
González-Rocha 2022	Y	5 (210)	MD: -2.06 seconds; 95% CI: -2.61, -1.51; P<0.00001; I2=0% (RT favoured)	RT improved TUG performance compared to CTRL	Some evidence in favour	8	4
Chen 2021	Y	3 (167)	SMD: -0.93; 95% CI: -1.30, -0.56; P<0.0001; I2=23% (RT favoured to decrease time)	RT improved TUG performance	Some evidence in favour	7	3
Almeida 2020	N	2 (75)	Unable to determine effects of RT variables on functional performance	We cannot state, with a reasonable degree of certainty, that RT improved functional capacity in the elderly	Insufficient evidence to determine	4	2
Bandeira de Mello 2019	N	3 (189)	1/3 studies found RT significantly improved TUG performance	RT protocols can improve physical performance in elders, but its effect size and clinical impact are barely relevant.	Insufficient evidence to determine	5	2
Moreira 2019	Y	5 (176)	SMD: 1.01; 95% CI: 0.47, 1.56; P=0.0003; I2=64% (RT favoured)	Short term RT (<12 weeks) improves functional capacity in older adults	Some evidence in favour	6	3
Howe 2012	Y	3 (71)	MD: -4.30 seconds; 95% CI: -7.60, -1.00 (RT favoured)	Exercise programmes involving muscle strengthening exercise appear to improve TUG performance.	Insufficient evidence to determine	9	4
Special RT vs CTRL							
Elastic Band RT							
Tsai 2022	Y	3 (154)	MD: -2.17 seconds; 95% CI: -2.93, -1.41; P<0.00001; I2=57% (elastic band RT favoured)	RT with elastic bands appeared to improve TUG performance compared to CTRL	Some evidence in favour	6	3
Intensity							
Load							
Steib 2010	Y	High vs low load: 1 (38)	High vs low load: SMD: 0.07; 95% CI: -0.57, 0.70; P=0.84; I2=NA (neither condition favoured)	Robust conclusions are not possible given the lack of data	Insufficient evidence to determine	6	3
Technique							
Power Training RT							

Pearson 2022	Y	4 (99)	SMD: -1.74; 95% CI: -2.79, -0.69; P=0.004; I2=77% (fast contraction velocity favoured)	There was not enough data to comment on how RT contraction velocity impacts TUG performance	Insufficient evidence to determine	4	3
da Rosa Orssatto 2019	Y	7 (227)	SMD: 0.43; 95%CI: -0.07, 0.94 (neither condition favoured)	There is inconclusive evidence to support a particular RT contraction velocity	Some evidence in favour of no effect	8	4
Steib 2010	Y	1 (20)	SMD: 0.03; 95% CI: -0.85, 0.91; P=0.95; I2=NA (neither condition favoured)	Robust conclusions are not possible given the lack of data	Insufficient evidence to determine	6	3

AMSTAR, A Measurement Tool to Assess Systematic Reviews (total scores); 95% CI, 95% confidence interval; CTRL, non-exercise control; MA, meta-analysis (Y, yes; N, no); MD, mean difference; NR, not reported; QoE, Quality of evidence; RT, resistance training; SES, standardized effectiveness statement; SMD, standardized mean difference; TUG, timed up-and-go.

Supplementary Appendix 17: Details of included reviews assessing chair stand test performance.

Reference	MA	No. of studies (participants)	Synthesized Outcome	Bottom-line statement	SES	AMSTAR	QoE
Standard RT vs CTRL							
Geng and Zhai 2023	Y	2 (121)	MD: -2.26; 95% CI: -4.40, -0.42 (RT favoured)	RT improved chair stand performance compared to CTRL	Insufficient evidence to determine	6	3
Chen 2023	Y	5-times sit-to-stand: NR (630) 30-s chair stand: NR (188)	5-times sit-to-stand: MD: -1.59; 95% CrI: -2.78, -0.437 (RT favoured) 30-s chair stand: MD: 3.72; 95% CrI: 1.23, 7.31 (RT favoured)	RT improved chair stand performance compared to CTRL	Sufficient evidence in favour	8	4
Zeng and Ling 2023	Y	17 (657)	SMD: -0.23; 95% CI: -0.47, 0.01 (neither condition favoured)	RT did not appear to impact chair stand performance	Insufficient evidence in favour	9	4
González-Rocha 2022	Y	3 (125)	MD: 5.41 repetitions; 95% CI: 4.16, 6.66; P<0.0001; I2=0% (RT favoured)	RT appeared to improve chair stand performance compared to CTRL	Insufficient evidence to determine	8	4
Almeida 2020	N	2 (45)	Unable to determine effects of RT variables on functional performance	We cannot state, with a reasonable degree of certainty, that RT improves functional parameters in the elderly	Insufficient evidence to determine	4	2
Moreira 2019	Y	8 (324)	SMD: 1.07; 95% CI: 0.79, 1.34; P<0.00001; I2=40% (RT favoured)	Short term strength training (<12 weeks) improves functional capacity in older adults	Sufficient evidence in favour	6	3
Intensity Load							
Steib 2010	Y	High vs moderate load: 1 (23)	High vs moderate load: SMD: -0.13; 95% CI: -0.95, 0.69; P=0.75; I2=NA (neither condition favoured)	Robust conclusions are not possible given the lack of data	Insufficient evidence to determine	6	3
Technique Power Training RT							
Pearson 2022	Y	3 (80)	SMD: 3.10; 95% CI: 0.07, 6.14; P<0.00001; I2=95% (traditional RT favoured)	There was not enough data to comment on how RT contraction velocity impacts 30-second chair stand performance	Insufficient evidence to determine	4	3
da Rosa Orssatto 2019	Y	30-second chair stand: 5 (204) 5-repetition chair stand: 3 (117)	30-second chair stand: SMD: 0.58; 95% CI: -0.24, 1.39 (neither condition favoured) 5-repetition chair stand: SMD: -0.18; 95% CI: -1.63, 1.27 (neither condition favoured)	There is inconclusive evidence to support the superiority of fast-intended-velocity resistance training to improve functional capacity compared to moderate-velocity resistance training	Insufficient evidence to determine	8	4
Steib 2010	Y	3 (158)	SMD: 1.74; 95% CI: 0.39, 3.1; P=0.01; I2=87% (Power training favoured)	Low and moderate intensity RT seem to improve physical function, but robust conclusions are not possible given the lack of data	Insufficient evidence to determine	6	3

AMSTAR, A Measurement Tool to Assess Systematic Reviews (total scores); 95% CI, 95% confidence interval; CTRL, non-exercise control; MA, meta-analysis (Y, yes; N, no); QoE, Quality of evidence; RT, resistance training; SES, standardized effectiveness statement; SMD, standardized mean difference.

Supplementary Appendix 18: Details of included reviews assessing balance.

Reference	MA	No. of studies (participants)	Synthesized Outcome	Bottom-line statement	SES	AMSTAR	QoE
Standard RT vs CTRL							
Ferreira 2012	Y	6 (406)	SMD: 0.52; 95% CI: 0.24, 0.79; I2=51% (RT favoured)	Balance can be improved by physical activity in people aged 40-65 years.	Sufficient evidence in favour	6	3
Howe 2012	Y	Single-leg stance with eyes closed: 3 (120) Single-leg stance with eyes open: 3 (187) Berg Balance Score: 1 (20)	Single-leg stance with eyes closed: MD (seconds) 1.64; 95% CI 0.97 to 2.31 (RT favoured) Single-leg stance with eyes open: MD 3.88 seconds 95%CI -0.52 to 8.28 seconds (Neither condition favoured) Berg Balance Score: MD -5.50 95% CI -20.72 to 9.72) (Neither condition favoured)	Exercise programmes involving muscle strengthening exercise appear to have the greatest impact on at least some measures of balance.	Insufficient evidence to determine	9	4
Asikainen 2004	N	3 (40)	Balance and coordination improved in 3/3 studies	Based on limited evidence, RT might improve balance and coordination	Insufficient evidence to determine	3	1
Special RT vs CTRL Home-based RT							
Chaabene 2021	Y	14 (1484)	SMD: 0.28; 95% CI: 0.07, 0.48; P<0.01 (RT favoured)	Home-based exercise appears to improve balance	Sufficient evidence in favour	7	3
Special RT vs CTRL Unstable Surface RT							
Behm 2015	Y	3 (138)	SMD: 1.18; 95% CI: 0.22, 2.14; P=0.02; I2=82% (unstable RT favoured vs CTRL)	RT on an unstable surface improves balance compared to CTRL	Insufficient evidence to determine	6	3
Type Unstable Surface RT vs Stable Surface RT							
Behm 2015	Y	5 (142)	SMD: 0.09; 95% CI: -0.24, 0.43; P=0.59; I2=0% (neither condition favoured)	RT on unstable, compared to stable, surfaces has limited extra effects on balance in healthy young adults	Insufficient evidence to determine	6	3
Concurrent training							
Thomas 2019	N	2 (45)	2/2 studies showed RT+ET improves balance more than ET alone	Additive balance benefits are possible when RT is added to aerobic training programs.	Insufficient evidence to determine	4	2

AMSTAR, A Measurement Tool to Assess Systematic Reviews (total scores); 95% CI, 95% confidence interval; CTRL, non-exercise control; ET, endurance training; MA, meta-analysis (Y, yes; N, no); MD, mean difference; QoE, Quality of evidence; RT, resistance training; SES, standardized effectiveness statement; SMD, standardized mean difference.

Supplementary Appendix 19: Details of included reviews assessing stair climbing.

Reference	MA	No. of studies (participants)	Synthesized Outcome	Bottom-line statement	SES	AMSTAR	QoE
Intensity Load							
Steib 2010	Y	High vs low load: 2 (84) High vs moderate load: 1 (23)	High vs low load: SMD: 0.39; 95% CI: -0.05, 0.82; P=0.08; I2=0% (neither condition favoured) High vs moderate load: SMD: 0.34; 95% CI: -0.49, 1.16; P=0.42; I2=NA (neither condition favoured)	Robust conclusions are not possible given the lack of data	Insufficient evidence to determine	6	3
Technique Power Training RT							
da Rosa Orssatto 2019	Y	2 (63)	SMD: 0.46; 95%CI: -1.89, 2.01 (neither condition favoured)	There is inconclusive evidence to support the superiority of a particular contraction velocity	Insufficient evidence to determine	8	4
Steib 2010	Y	2 (79)	SMD: 1.27; 95% CI: -0.06, 2.60; P=0.33; I2=86% (neither condition favoured)	Robust conclusions are not possible given the lack of data	Insufficient evidence to determine	6	3

AMSTAR, A Measurement Tool to Assess Systematic Reviews (total scores); 95% CI, 95% confidence interval; CTRL, non-exercise control; MA, meta-analysis (Y, yes; N, no); NR, not reported; QoE, Quality of evidence; RT, resistance training; SES, standardized effectiveness statement; SMD, standardized mean difference.

Supplementary Appendix 20: Details of included reviews assessing multicomponent function.

Reference	MA	No. of studies (participants)	Synthesized Outcome	Bottom-line statement	SES	AMSTAR	QoE
Standard RT vs CTRL							
Mcleod and Currier 2023	N	1 (404)	1/1 review found RT improved physical function versus CTRL	RT improved physical function versus CTRL	Sufficient evidence in favour	8	3
Currier and Mcleod 2023	Y	25 (859)	3/6 resistance training prescriptions significantly improved mobility versus CTRL, with SMDs ranging from 0.28 to 1.04 (RT favoured)	RT appeared to improve physical function compared to CTRL	Sufficient evidence in favour	9	4
Beckwée 2019	N	3 (404)	2/3 included reviews found RT improved physical function	RT recommended to improve physical performance in older people	Some evidence in favour	4	2
DiPietro 2019	N	34 (NR)	9 systematic reviews/meta-analyses provided strong to moderate evidence that physical activity benefits physical function	Strong evidence demonstrates that physical activity improves physical function	Sufficient evidence in favour	9	3
Beaudart 2017	N	28 (NR)	26/28 studies showed physical performance improved following exercise	Physical exercise has a beneficial impact on physical performance in healthy older adults	Sufficient evidence in favour	5	2
Special RT vs CTRL Home-based RT							
Thiebaud 2014	N	8 (631)	7/8 studies found a significant improvement in functional ability.	Home-based resistance exercise can improve functional ability	Sufficient evidence in favour	3	1
Special RT vs CTRL Elastic Band RT							
Colado 2020	N	Middle-aged adults: 3 (107) Older adults: 16 (1,074)	Middle-aged adults: 3/3 studies found improved physical function. Older adults: Physical function improved 20-25%	Training with elastic resistance improves functional capacity across the lifespan	Some evidence in favour	4	2
de Oliveira 2017	Y	4 (217)	MD (reps): 7.39; 95% CI: 5.02, 9.76; P<0.00001; I2=0% (RT favoured)	RT with elastic bands is better than CTRL for improving functional capacity in healthy adults.	Some evidence in favour	6	3
Intensity Load							
Mcleod and Currier 2023	N	1 (168)	1/1 review could not determine the effect of RT load on physical function	The effect of RT load on physical function could not be determined	Insufficient evidence to determine	8	3
Type Elastic Band RT vs Standard RT							
de Oliveira 2017	Y	4 (411)	MD (reps): -3.10; 95% CI: -5.27, -0.93; P=0.005; I2=87% (traditional RT favoured)	Traditional RT might be superior to RT with elastic bands for improving overall functional capacity	Some evidence in favour	6	3
Time Time Under Tension							
Mcleod and Currier 2023	N	2 (692)	2/2 reviews could not determine the effect of RT time under tension on physical function	The effect of RT contraction velocity/time under tension on	Insufficient evidence in favour	8	3

				physical function could not be determined			
Technique Power Training RT vs Standard RT							
Balachandran 2022	Y	13 (383)	SMD: 0.30; 95% CI: 0.05, 0.54; I2=48% (power training favoured)	Based on low-certainty evidence, power training was better than traditional RT to improve physical function (measured) and self-reported function	Sufficient evidence in favour	7	3
da Rosa Orssatto 2019	Y	14 (603)	SMD: 0.41; 95% CI: 0.18, 0.65; P=0.04; I2=45% (fast-intended velocity RT favoured)	Fast-intended-velocity RT appears superior to moderate-velocity RT to improve overall functional capacity	Sufficient evidence in favour	8	4
Tschopp 2011	Y	6 (240)	SMD: 0.32; 95% CI: 0.06, 0.57; P=0.016; I2=0% (power training favoured)	Power training appeared to improve physical function more than traditional RT	Some evidence in favour	5	3
Technique Range of Motion							
Pallarés 2021	Y	5 (194)	SMD: 0.44; 95% CI: -0.32, 1.20; P=0.186; I2=63.1% (neither condition favoured)	Although not statistically significant, these results suggest that full ROM exercises improve functional performance more than partial ROM exercises	Some evidence in favour of no effect	6	3
Volume							
Rocha 2024	Y	10 (290)	SMD: -0.39; 95% CI: -0.79, 0.01; P=0.05; I2=62% (neither condition favoured)	High volume and low volume RT did not differentially impact changes in physical function	Some evidence in favour of no effect	7	3
Concurrent training							
Cadore 2013	N	2 (NR)	1/2 studies favoured RT+ET, compared to ET alone, to improve functional capacity	The combination of RT and endurance training in the elderly is the optimum strategy to improve functional capacity	Insufficient evidence to determine	2	1

6MWT, 6-minute walk test; AMSTAR, A Measurement Tool to Assess Systematic Reviews (total scores); 95% CI, 95% confidence interval; CTRL, non-exercise control; MA, meta analysis (Y, yes; N, no); MD, mean difference; NR, not reported; QoE, Quality of evidence; ROM, range of motion; RT, resistance training; SES, standardized effectiveness statement; SMD, standardized mean difference; TUG, timed up-and-go.

Supplementary Appendix 21: Details of included reviews assessing Short Physical Performance Battery.

Reference	MA	No. of studies (participants)	Synthesized Outcome	Bottom-line statement	SES	AMSTAR	QoE
Standard RT vs CTRL							
Chen 2023	Y	NR (420)	MD: 0.077; 95% CrI: -0.0754, 0.908 (neither condition favoured)	RT did not improve SPPB performance compared to CTRL	Insufficient evidence in favour	8	4
Standard RT vs CTRL Power Training RT							
Martins 2022	Y	2 (66)	SMD: 1.01; 95% CI: -1.16, 3.18; P=0.36; I2=91% (neither condition favoured)	There was insufficient data to form meaningful conclusions on the impact of high-speed RT on SPPB performance	Insufficient evidence to determine	7	3
Technique Power Training RT							
Pearson 2022	Y	2 (68)	SMD: 0.39; 95% CI: -0.99, 1.76; P=0.58; I2=84% (neither condition favoured)	There was not enough data to comment on how RT contraction velocity impacts SPPB performance	Insufficient evidence to determine	4	3
da Rosa Orssatto 2019	Y	5 (241)	SMD: 0.52; 95%CI: 0.10, 0.94 (fast-intended velocity RT favoured)	Fast-intended-velocity RT appears superior to moderate-velocity RT to improve functional capacity	Some evidence in favour	8	4

AMSTAR, A Measurement Tool to Assess Systematic Reviews (total scores); 95% CI, 95% confidence interval; CTRL, non-exercise control; MA, meta-analysis (Y, yes; N, no); NR, not reported; QoE, Quality of evidence; RT, resistance training; SES, standardized effectiveness statement; SMD, standardized mean difference.

Su**pplementary Appendix 22:** Details of included reviews assessing walking performance.

Reference	MA	No. of studies (participants)	Synthesized Outcome	Bottom-line statement	SES	AMSTAR	QoE
Standard RT vs CTRL							
Chen 2023	Y	NR (199)	MD: 28.5 meters; 95% CrI: -8.35, 64.9 (neither condition favoured)	RT did not appear to improve 6MWT performance compared to CTRL	Some evidence in favour of no effect	8	4
Special RT vs CTRL Elastic Band RT							
Tsai 2022	Y	3 (175)	MD: 8.00 m; 95% CI: -11.00, 27.00; P=0.41; I2=47% (neither condition favoured)	RT with elastic bands did not appear to improve 6MWT performance compared to CTRL	Insufficient evidence to determine	6	3
Technique Power Training RT							
Pearson 2022	Y	6MWT: 4 (87) 400m walk: 2 (79)	6MWT: SMD: 0.06; 95% CI: -2.37, 2.50; P=0.96; I2=95% (neither condition favoured) 400m walk: SMD: -20.84; 95% CI: -52.29, 10.60; P<0.19; I2=98% (neither condition favoured)	There was not enough data to determine how RT contraction velocity impacts walking performance	Insufficient evidence to determine	4	3
da Rosa Orssatto 2019	Y	Short walk: 3 (142) Long walk: 4 (139)	Short walk: SMD: -0.02; 95% CI: -0.99, 0.96 (neither condition favoured) Long walk: SMD: 0.21; 95% CI: -0.21, 0.63 (neither condition favoured)	There is inconclusive evidence to support the superiority of a particular RT contraction velocity	Insufficient evidence to determine	8	4

AMSTAR, A Measurement Tool to Assess Systematic Reviews (total scores); 6MWT, 6-minute walk test; 95% CI, 95% confidence interval; CrI, credible interval; CTRL, non-exercise control; MA, meta-analysis (Y, yes; N, no); NR, not reported; QoE, Quality of evidence; RT, resistance training; SES, standardized effectiveness statement; SMD, standardized mean difference

Supplementary Appendix 23: Details of included reviews assessing running performance.

Reference	MA	No. of studies (participants)	Synthesized Outcome	Bottom-line statement	SES	AMSTAR	QoE
Standard RT vs CTRL							
Morris 2022	Y	3 (78)	SMD: 0.66; 95% CI: 0.05, 1.27; P=0.03; I2=39% (RT favoured)	Supplementary weightlifting might improve running speed	Insufficient evidence to determine	7	3
de Queiroz Miranda 2019	N	2 (76)	2/2 studies reported increased acceleration (Training favoured)	Muscle building workout and plyometrics in combination with exercises designed specifically for the sport (tennis drills) were the most efficient RT methods to increase acceleration	Insufficient evidence to determine	3	1
Seitz 2014	Y	15 (NR)	RT (Mean [SD]): 3.11% (2.27) CTRL (Mean [SD]): 0.05% (2.13) Between group difference: P<0.001	RT appears to improve sprinting performance	Some evidence in favour	6	3
Special RT vs CTRL Flywheel RT							
Raya-González 2021	Y	5 (134)	SMD: 1.33; 95% CI: 0.39, 2.28; P=0.0002; I2=82% (flywheel RT favoured)	Flywheel resistance training seems to improve sprinting performance	Some evidence in favour	6	3
Special RT vs CTRL Velocity-based RT							
Zhang 2022	Y	7 (166)	SMD: -0.40; 95% CI: -0.57, -0.23; P<0.001; I2=0% (velocity-based RT favoured)	Velocity-based RT improved sprint performance compared to CTRL	Insufficient evidence to determine	5	3
Type Flywheel RT							
Maroto-Izquierdoa 2017	Y	3 (92)	SMD: 0.41; 95% CI: 0.00, 0.82; P=0.05; I2=0% (neither condition favoured)	Eccentric overload training appeared to be more effective than traditional resistance exercise for improving running speed	Insufficient evidence to determine	4	3
Technique Olympic Weightlifting							
Morris 2022	Y	4 (127)	SMD: 1.04; 95% CI: -0.30, 2.39; P=0.13; I2=90% (neither condition favoured)	Olympic weightlifting does not confer additional improvements in sprint speed, compared to traditional RT	Insufficient evidence to determine	7	3
Technique Velocity-based RT							
Baena-Marin 2022	N	15 (406)	8/15 studies found VBRT has positive or superior effects on sprinting performance	VBRT is an effective method to improve sprint performance	Sufficient evidence in favour	3	1
Set structure							
Marshall 2021	Y	Overall: 7 (122)	Overall: SMD: -0.91; 95% CI: -1.49, -0.32; P<0.00001; I2=77%	RT seems to improve sprint time, and contrast set structure might confer larger improvements	Insufficient evidence to determine	6	3

		Contrast: 4 (39) Traditional: 7 (83)	Contrast: SMD: -2.10; 95% CI: -2.67, -1.53; P<0.00001; I2=0% Traditional: SMD: -0.45; 95% CI: -1.49, 0.05; P=0.08; I2=58% Test for subgroup differences: P<0.0001 (Contrast set structure favoured)				
Concurrent training							
Trowell 2020	Y	3 (50)	SMD: 0.14; 95% CI: -0.33, 0.62; P=0.55; I2=0% (neither condition favoured)	Strength training does not improve running speed of endurance runners	Insufficient evidence to determine	6	3

AMSTAR, A Measurement Tool to Assess Systematic Reviews (total scores); 95% CI, 95% confidence interval; CTRL, non-exercise control; ET, endurance training; MA, meta-analysis (Y, yes; N, no); NR, not reported; QoE, Quality of evidence; RT, resistance training; SES, standardized effectiveness statement; SMD, standardized mean difference

Supplementary Appendix 24: Details of included reviews assessing jumping performance.

Reference	MA	No. of studies (participants)	Synthesized Outcome	Bottom-line statement	SES	AMSTAR	QoE
Special RT vs CTRL Flywheel RT							
Raya-González 2021	Y	7 (235)	SMD: 0.65; 95% CI: 0.11, 1.19; P=0.02; I2=73% (RT favoured)	Flywheel resistance training seems to improve jumping performance	Some evidence in favour	6	3
Special RT vs CTRL Velocity-based RT							
Zhang 2022	Y	7 (186)	SMD: 0.53; 95% CI: 0.33, 0.73; P<0.001; I2=0% (velocity-based RT favoured)	Velocity-based RT improved counter-movement jump performance compared to CTRL	Some evidence in favour	5	3
Intensity Load							
Refalo 2021	N	2 (52)	1/2 studies found similar improvements in jump performance with high- and low-load RT; 1/2 studies found no improvements in jump performance with either high-load or low-load RT (neither condition favoured)	It remains unclear whether high- or low-load RT confer greater improvements in jumping performance	Insufficient evidence to determine	6	2
Type Flywheel RT							
Maroto-Izquierdoa 2017	Y	4 (120)	SMD: 0.46; 95% CI: 0.09, 0.83; P=0.01; I2=0% (Eccentric overload flywheel training favoured)	Eccentric overload training appeared to be more effective than traditional resistance exercise for improving vertical jump height	Insufficient evidence to determine	4	3
Type Machine RT vs Free-weight RT							
Haugen 2023	Y	5 (164)	SMD: -0.209; 95% CI: -0.597, 0.179; P=0.290 (neither condition favoured)	RT with machines and free-weights did not differentially impact jump height	Insufficient evidence to determine	7	3
Technique Velocity-based RT							
Baena-Marin 2022	N	19 (363)	Velocity-based RT positively affects athletes' counter movement jump, and the most efficient velocity-based RT program appears to involve a lower percentage of velocity loss in the set and repetitions performed at maximum intended velocity	Velocity-based RT is an efficacious method to improve vertical jump	Sufficient evidence in favour	3	1
Set structure							
Marshall 2021	Y	Overall: 10 (212) Cluster: 2 (33)	Overall: SMD: 0.62; 95% CI: 0.36, 0.87; P<0.00001; I2=38%	RT seems to improve jump height performance, but limited data prevents insight to the best set structure	Insufficient evidence to determine	6	3

		Complex: 2 (17) Contrast: 6 (66) Traditional: 10 (96)	Cluster: SMD: 0.39; 95% CI: -0.10, 0.88; P=0.12; I2=0% Complex: SMD: 0.61; 95% CI: -0.08, 1.31; P=0.08; I2=0% Contrast: SMD: 1.10; 95% CI: 0.40, 1.80; P=0.005; I2=70% Traditional: SMD: 0.41; 95% CI: 0.12, 0.70; P=0.006; I2=0% Test for subgroup differences: P=0.32 (no condition favoured)				
Jukic 2021	Y	5 (142)	SMD: 0.13; 95% CI: -0.07, 0.33 (Neither condition favoured)	Alternative set structures (cluster sets, rest redistribution) do not appear to differentially improve vertical jump performance.	Insufficient evidence to determine	8	4

AMSTAR, A Measurement Tool to Assess Systematic Reviews (total scores); 95% CI, 95% confidence interval; CTRL, non-exercise control; MA, meta-analysis (Y, yes; N, no); NR, not reported; QoE, Quality of evidence; RT, resistance training; SES, standardized effectiveness statement; SMD, standardized mean difference.

Supplementary Appendix 25: Details of included reviews assessing contraction velocity.

Reference	MA	No. of studies (participants)	Synthesized Outcome	Bottom-line statement	SES	AMSTAR	QoE
Standard RT vs CTRL							
Blazevich 2020	Y	20 (988)	SMD: 0.31; 95% CI: 0.12, 0.50; P=0.001; I2=50% (RT favoured)	RT increases maximum rate of force development compared to CTRL	Sufficient evidence in favour	7	3
Set structure							
Davies 2021	Y	8 (225)	SMD: 0.15; 95% CI: -0.10, 0.41; P=0.24; I2=0% (neither condition favoured)	Both cluster and traditional set configurations similarly improved muscular velocity	Some evidence in favour of no effect	7	3
Jukic 2021	Y	5 (142)	SMD: 0.18; 95% CI: 0.04, 0.31; P=0.011; I2=27% (alternative set structures favoured)	Alternative set structures (cluster sets, rest redistribution) might be more effective to maximize velocity at submaximal loads	Insufficient evidence to determine	8	4

95% CI, 95% confidence interval; AMSTAR, A Measurement Tool to Assess Systematic Reviews (total scores); CTRL, non-exercise control; MA, meta-analysis (Y, yes; N, no); QoE, Quality of evidence; RT, resistance training; SES, standardized effectiveness statement; SMD, standardized mean difference.

Supplementary Appendix 26: Details of included reviews assessing agility.

Reference	MA	No. of studies (participants)	Synthesized Outcome	Bottom-line statement	SES	AMSTAR	QoE
Standard RT vs CTRL							
Morris 2022	Y	3 (78)	SMD: 0.67; 95% CI: -0.27, 1.62; P=0.16; I2=73% (neither condition favoured)	Weightlifting does not appear to improve change of direction	Insufficient evidence to determine	7	3
Special RT vs CTRL Flywheel RT							
Raya-González 2021	Y	3 (71)	SMD: 1.36; 95% CI: 0.58, 2.14; P=0.0006; I2=52% (RT favoured)	Flywheel RT seems to improve change of direction ability	Insufficient evidence to determine	6	3
Technique Olympic Weightlifting							
Morris 2022	Y	2 (42)	SMD: 1.21; 95% CI: -1.41, 3.83; P=0.36; I2=92% (neither condition favoured)	Olympic weightlifting does not confer additional improvements in change of direction, compared to traditional RT	Insufficient evidence to determine	7	3

AMSTAR, A Measurement Tool to Assess Systematic Reviews (total scores); 95% CI, 95% confidence interval; CTRL, non-exercise control; MA, meta-analysis (Y, yes; N, no); QoE, Quality of evidence; RT, resistance training; SES, standardized effectiveness statement; SMD, standardized mean difference.

Supplementary Appendix 27: Details of included reviews assessing functional reach test.

Reference	Functional task	MA	No. of studies (participants)	Synthesized Outcome	Bottom-line statement	SES	AMSTAR	QoE
Standard RT vs CTRL								
Howe 2012	Functional reach test	Y	3 (98)	MD: 3.27 cm; 95% CI: 1.39, 5.15 cm (RT favoured)	RT seems to improve functional reach test performance	Insufficient evidence to determine	9	4

AMSTAR, A Measurement Tool to Assess Systematic Reviews (total scores); 6MWT, 6-minute walk test; 95% CI, 95% confidence interval; CTRL, non-exercise control; MA, meta-analysis (Y, yes; N, no); NR, not reported; QoE, Quality of evidence; RT, resistance training; SES, standardized effectiveness statement; SMD, standardized mean difference.