

Supplementary Table S1. Evidence corpus and inferential role

Ref	Source	Domain	Synthesis type	Core contribution	Principal caveat
1	Artz et al., 2015	Post-TKA rehabilitation	Systematic review/meta-analysis	Short-term function and pain improve; no clear long-term benefit; home and outpatient broadly similar.	Durability and underpowered component comparisons.
2	Ayala et al., 2024	Youth team-sport injury prevention	Systematic review/network meta-analysis	Lower-body strength/eccentric, core, mechanics, and stability components reduce several injury outcomes.	Mostly indirect comparisons; anatomical outcomes differ.
3	Beckwee et al., 2019	Sarcopenia	Systematic umbrella review	Resistance training improves muscle mass, strength, and physical performance; added nutrition often limited.	Baseline sarcopenia status inconsistently reported across source reviews.
4	Borde et al., 2015	Healthy older adults	Systematic review/meta-analysis/meta-regression	RT strongly improves strength; training period, intensity, time under tension and other dose variables matter.	High heterogeneity; poor-to-moderate study quality; morphology evidence sparse.
5	Campos et al., 2022	Post-revascularization cardiac rehabilitation	Systematic review/meta-analysis	Exercise-based rehabilitation improves physical performance; aerobic/combined and 8-12 week programs favorable.	Protocol heterogeneity.
6	Chang et al., 2025	Lower-limb amputation	Systematic review/meta-analysis	Mobility and physical-performance outcomes improve; QoL remains uncertain.	Heterogeneous modalities, anatomy, and outcome tools.
7	Chen et al., 2024	COPD respiratory support during exercise	Systematic review/network meta-analysis	NPPV ranks highest for exercise capacity/tolerance in stable severe COPD.	Sparse direct comparisons; device and training parameters unclear.
8	Cheng et al., 2024	Secondary sarcopenia	Systematic review/meta-analysis	RT improves strength and muscle mass; physical-function benefit less certain; comorbidity modifies response.	High heterogeneity and limited long-term data.
9	Contreras-Osorio et al., 2022	Depression and executive function	Systematic review/meta-analysis	Small improvement in working memory; inhibition and flexibility not clearly improved.	Only seven studies; heterogeneous interventions and cognition outcomes.
10	Cuthbert et al., 2020	Nordic hamstring exercise	Systematic review/meta-analysis	Low- and high-volume NHE produce large eccentric-strength and architectural adaptations.	Moderate/high heterogeneity; compliance inferred rather than directly tested as causal mediator.
11	Cuyul-Vasquez et al., 2023	Sarcopenia + whey protein	Systematic review/meta-analysis	Whey added to RET modestly improves muscle mass and grip strength.	Low/very-low GRADE; grip change below minimal clinical importance.
12	Ding et al., 2025	COPD cognition	Systematic review/meta-analysis	Exercise may improve global cognition and several domains.	Only nine studies; high heterogeneity and limited follow-up.
13	Ding et al., 2025	Metabolic syndrome lipids	Pairwise/network/dose-response meta-analysis	CAREX and HIIT promising; modeled lipid benefits show thresholds and plateau behavior.	Dose clustering; some rankings fragile or trial-sensitive.
14	Dirito et al., 2024	Chronic neck pain	Systematic review/meta-analysis	Neck exercise induces neuromuscular adaptation; task specificity is important.	Small samples, heterogeneous EMG tasks and exercise dose.
15	Feng et al., 2021	Asthma pulmonary rehabilitation	Systematic review/meta-analysis	Exercise-based PR improves QoL, exercise tolerance and some pulmonary outcomes.	Small evidence base; asthma control depends on program details.
16	Folkerts et al., 2024	Parkinson disease cognition	Systematic review/meta-analysis	Possible small global-cognition benefit.	Very uncertain evidence; small samples and heterogeneous exercise/cognitive measures.

17	Gao et al., 2025	Coronary artery disease	Systematic review/meta-analysis	HIIT improves PeakVO2 and 6MWT more than MICT, but not all cardiac/hemodynamic outcomes.	Outcome-specific superiority; protocol variation.
18	Gejl & Nybo, 2021	Endurance athletes + carbohydrate periodization	Systematic review/meta-analysis	Periodized CHO restriction does not reliably improve endurance performance.	Small number of studies and heterogeneous train-low strategies.
19	Gosselink et al., 2011	COPD inspiratory muscle training	Systematic review/meta-analysis	IMT improves inspiratory strength, dyspnea and functional capacity; weakness predicts larger value.	Older evidence base; modality and combination effects vary.
20	Grgic et al., 2022	Resistance training to failure	Systematic review/meta-analysis	Failure is not required for overall strength or hypertrophy gains.	Mostly young adults; trained/older populations underrepresented.
21	Llanos-Lagos et al., 2024	Running economy	Systematic review/meta-analysis	High-load, plyometric and combined strength methods improve economy; effects depend on running speed/fitness.	Moderate-to-low certainty by method; heterogeneous runners and tests.
22	Ma et al., 2025	Vertical jump in athletes	Systematic review/meta-analysis	Plyometric, resistance and complex training improve jump outcomes with task-specific differences.	Small number of included studies and variable protocols.
23	Molmen et al., 2025	Mitochondrial/capillary adaptation	Systematic review/meta-regression	ET, HIT and SIT similarly raise mitochondrial content; efficiency and capillary patterns differ; initial fitness is a major modifier.	Meta-regression cannot fully remove between-study confounding.
24	Morton et al., 2018	Protein + resistance training	Systematic review/meta-analysis/meta-regression	Protein modestly augments strength/FFM; no further FFM benefit above ~1.6 g/kg/day in pooled healthy-adult data.	Age/training status modify response; breakpoint is not a universal ceiling.
25	Pan et al., 2018	Type 2 diabetes	Systematic review/network meta-analysis	Combined exercise more favorable for HbA1c; modes differ across risk-factor outcomes.	Network comparisons and supervision differences complicate ranking.
26	Pashayee-Khamene et al., 2024	Creatine and body composition	Systematic review/dose-response meta-analysis	Small increases in body mass/FFM, clearest with training; no simple protocol-dose optimization.	Hydration can influence FFM; body composition often secondary outcome.
27	Ralston et al., 2017	Weekly set volume and strength	Meta-analysis	Medium/high weekly set volumes yield somewhat greater strength gains than low volume.	Only nine studies; population/training-status evidence uneven.
28	Ran et al., 2025	Primary sarcopenia RT dose-response	Systematic review/meta-analysis/meta-regression	RT improves grip strength and SPPB; frequency/intensity predict selected outcomes; SMI uncertain.	Small number of trials and population-specific estimates.
29	Schumann et al., 2022	Concurrent aerobic + strength training	Systematic review/meta-analysis	No clear interference for hypertrophy/maximal strength; explosive strength attenuated, especially same-session.	Moderate study quality; subgroup power limited.
30	Sepehri et al., 2024	Upper-crossed syndrome/posture	Systematic review/meta-analysis	Therapeutic exercise improves forward head, rounded shoulders and kyphosis.	Exercise categories and participant characteristics heterogeneous.
31	Wei et al., 2024	TKA active resistance rehabilitation	Systematic review/meta-analysis	Improves knee power, maximal walking speed, TUG, flexion ROM and pain; not all mobility/function tests improve.	Low certainty; protocol heterogeneity; little long-term evidence.
32	Xie et al., 2025	Parkinson gait dose-response	Bayesian network meta-analysis	Exercise modalities show distinct modeled optimal doses for walking velocity.	No analyzed dose achieved estimated MCID; MET-based dose approximations.
33	Yang et al., 2022	Parkinson multi-outcome exercise	Systematic review/network meta-analysis	Best-ranked modality differs by motor, gait, mood, cognition, sleep and strength outcome.	Overall low certainty; many small trials and heterogeneous dosing.
34	Yang et al., 2025	Alzheimer disease aerobic exercise	Systematic review/meta-analysis	Aerobic exercise improves pooled cognition and QoL; longer programs often more favorable.	Very-low cognitive evidence, high heterogeneity, publication-bias concerns for some outcomes.