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Resistance Training as a Health-Promoting Intervention in Adults: A Literature Review

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Abstract (Structured)

Background. Resistance training is a clinically relevant form of physical activity that may improve health beyond gains in muscle strength.

Aim. This review summarizes evidence on resistance training as a health-promoting intervention in adults.

Material and methods. A narrative literature review was conducted using full-text medical articles and current physical activity recommendations, with emphasis on systematic reviews, meta-analyses, randomized trials and clinically oriented reviews concerning adult populations.

Results. The reviewed evidence indicates that resistance training improves muscle strength, lean mass, physical performance and functional independence. Benefits are particularly relevant for older adults at risk of sarcopenia, adults with overweight or obesity, patients with metabolic disorders, and people undergoing rehabilitation. Favorable effects were also reported for body composition, insulin sensitivity, blood pressure, bone and muscle health, quality of life, depressive symptoms, anxiety symptoms and self-efficacy.

Conclusions. Resistance training should be considered an important component of health promotion and disease prevention in adults. Programs should involve major muscle groups at least two days per week and be adapted to health status, training experience and safety needs.

Key words: resistance training, strength training, health promotion, sarcopenia, metabolic health, physical activity.

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1. Introduction

Resistance training, also referred to as strength training or resistance exercise, is a form of physical activity in which skeletal muscles contract against an external load. This load may be provided by free weights, machines, elastic bands, body weight, aquatic resistance, or task-specific functional movements. Historically, resistance training was often associated mainly with athletic performance or body composition goals. However, contemporary medical and sports science literature increasingly frames resistance training as a broadly applicable intervention for health promotion, prevention of disability and adjunctive therapy in chronic disease management (Westcott, 2012; McLeod et al., 2019).

This shift is important because many adult health problems are linked not only to low cardiorespiratory fitness, but also to insufficient muscular strength, reduced muscle power, low lean mass, impaired balance and progressive loss of functional capacity. Sarcopenia, dynapenia, osteoporosis, obesity, type 2 diabetes, cardiovascular disease, chronic pain, cancer-related fatigue, post-stroke disability and frailty are all clinical conditions in which muscular fitness is clinically relevant. Resistance training is therefore not merely a sport-specific activity, but a therapeutic and preventive tool that directly targets a physiological system involved in mobility, independence and metabolic regulation.

International physical activity recommendations support this perspective. The World Health Organization recommends that adults and older adults perform muscle-strengthening activities involving all major muscle groups on at least two days per week, in addition to aerobic physical activity (Bull et al., 2020; World Health Organization, 2020). This recommendation reflects evidence that muscle-strengthening exercise provides additional health benefits beyond those obtained through aerobic activity alone. Nevertheless, population adherence remains limited, especially among older adults, patients with chronic disease and people who associate strength training with gyms, heavy weights or high risk of injury.

The clinical literature reviewed in this paper suggests that the health benefits of resistance training can be obtained through many different methods and levels of load. High-load resistance training is effective for improving strength and muscle hypertrophy, but lower-load approaches, elastic bands, circuit resistance training, home-based programs and blood-flow-restricted low-load training may also be useful in selected populations (Yasuda, 2022; Khadanga et al., 2019). This is particularly relevant for elderly patients, beginners, individuals after illness, and adults with pain, disability or limited access to equipment.

Resistance training is also relevant because it can address several mechanisms simultaneously. At the musculoskeletal level, it stimulates neuromuscular recruitment, increases muscle cross-sectional area, supports tendon and bone loading, and improves balance and gait. At the metabolic level, it increases or preserves metabolically active lean tissue and improves glucose disposal. At the cardiovascular level, appropriately prescribed resistance exercise can improve blood pressure, vascular function and exercise tolerance, and can be incorporated into cardiac rehabilitation. At the psychosocial level, resistance training may improve self-efficacy, body image, mood and health-related quality of life (Westcott, 2012; El-Kotob et al., 2020).

For medical and sports-oriented journals, the topic is especially relevant because it bridges prevention, rehabilitation and exercise prescription. The practical question is no longer whether resistance training can be beneficial, but how it should be prescribed safely and effectively across adult populations. This review therefore summarizes the role of resistance training as a health-promoting intervention in adults, focusing on outcomes most relevant to clinical practice and public health.

Research Objective. The objective of this review was to evaluate the current evidence on resistance training as a health-promoting intervention in adults and to identify the main domains in which resistance exercise may contribute to disease prevention, rehabilitation and improvement of quality of life.

Research Problems. Which health outcomes are most consistently improved by resistance training in adults? Which adult groups may benefit most from resistance training? What safety and prescription considerations should guide the use of resistance training in clinical and health-promoting contexts?

Research Hypotheses. Regular, appropriately prescribed resistance training produces clinically meaningful benefits in musculoskeletal function, cardiometabolic health, rehabilitation outcomes and psychosocial well-being. The benefits outweigh potential risks when programs are individualized, progressive and technically supervised when necessary.

2. Research materials and methods

2.1. Participants.

No participants were recruited for this work because the manuscript is a literature review. The reviewed evidence concerned adult populations, including healthy adults, older adults, adults with overweight or obesity, patients with type 2 diabetes, individuals with cardiovascular disease participating in cardiac rehabilitation, cancer survivors, adults after stroke or burn injury, adults with polycystic ovary syndrome and adults with anxiety-related symptoms.

The conceptual population of interest was adults aged 18 years or older who performed resistance training as a preventive, therapeutic or rehabilitative intervention. Resistance training was understood broadly as structured exercise against external resistance, including free weights, weight machines, elastic bands, body-weight exercises, circuit resistance exercise, progressive resistance training and clinically adapted resistance programs.

2.2. Procedure / Test protocol / Skill test trial / Measure / Instruments.

The review was developed as a narrative synthesis based on full-text medical articles, PubMed-indexed descriptions, open-access scientific sources and current public health recommendations. The material included systematic reviews, meta-analyses, randomized controlled trials, clinical reviews and public health guidelines. Priority was given to publications with direct relevance to resistance training in adult health promotion, disease prevention or rehabilitation.

The reviewed articles were grouped according to the following thematic domains: musculoskeletal health and sarcopenia; functional capacity and mobility; body composition and metabolic health; cardiovascular outcomes and cardiac rehabilitation; mental health, cognition, sleep and quality of life; safety, adherence and practical exercise prescription. Particular attention was paid to whether the reported findings could be translated into practical recommendations for adults with different health status and training experience.

The review did not involve a new experimental test protocol. Instead, the methodological instrument was structured literature synthesis. Extracted information included population characteristics, intervention type, duration, frequency, intensity or load when reported, comparison group, main health outcomes and practical implications for exercise prescription.

2.3. Data collection and analysis / Statistical analysis.

Data were collected from the reviewed publications and summarized qualitatively. The authors did not pool effect sizes and did not perform a new meta-analysis. Results from existing

systematic reviews and meta-analyses were summarized by outcome domain, with attention to consistency of evidence, clinical relevance, safety and limitations.

2.3.1. Statistical Software.

No statistical software was used to calculate new pooled effects because the manuscript is a literature review and not a primary quantitative meta-analysis. Numerical results reported in the manuscript were taken from the reviewed studies and are presented descriptively.

2.3.2. AI.

AI-assisted tools were used only to support language refinement, organization of the manuscript and verification of bibliographic style. All substantive interpretations, selection of clinically relevant conclusions and final wording were reviewed by the authors. The use of AI did not replace human judgment and did not involve generation of new research data.

2.3.3. Statistical Methods.

The manuscript uses narrative synthesis rather than inferential statistical analysis. Findings were compared across systematic reviews, meta-analyses and clinical studies. Where available, effect estimates reported by the original authors were summarized in text. The strength of conclusions was judged according to consistency across studies, clinical plausibility, size of reported effects and relevance to adult health promotion.

3. Research results

The evidence identified in the reviewed literature supports the use of resistance training as a broad health-promoting intervention in adults. The main findings are summarized in Table 1 and discussed by health domain below.

Table 1. Summary of health domains influenced by resistance training in adults. Source: authors' own synthesis based on the reviewed literature.

Health domain	Main evidence-based observations	Practical implication
Musculoskeletal health	Improves muscle strength, lean mass, muscle quality, bone loading and functional performance; important in sarcopenia and frailty prevention.	Include progressive exercises for major muscle groups, with individualized load and adequate recovery.
Metabolic health	Supports body composition, glucose transport, insulin sensitivity and cardiometabolic risk reduction, especially in overweight, obesity and type 2 diabetes.	Combine resistance training with aerobic activity and nutrition when weight loss or glycemic control is a goal.
Cardiovascular health	Can be safely integrated into cardiac rehabilitation and may improve strength, endurance, vascular function and blood pressure when correctly prescribed.	Use moderate, supervised progression in patients with cardiovascular disease; avoid inappropriate breath holding and excessive acute strain.
Rehabilitation	Progressive resistance training can improve strength after stroke, burn injury, cancer treatment and other disabling conditions, although transfer to activity may vary.	Target functional tasks and combine strengthening with balance, mobility and disease-specific rehabilitation.
Psychosocial outcomes	Evidence suggests improvements in self-esteem, depressive and anxiety symptoms, quality of life and perceived independence.	Select enjoyable, achievable exercises and monitor adherence, confidence and symptom response.

3.1. Musculoskeletal health, sarcopenia and functional capacity

The most direct and consistently documented benefit of resistance training is improvement in muscular fitness. Resistance training increases maximal strength, muscular endurance and, under suitable conditions, muscle hypertrophy. These adaptations are clinically meaningful because reduced strength is associated with impaired mobility, lower independence and increased risk of falls or disability in older age. Westcott (2012) described resistance training

as a medical intervention because it can improve physical performance, movement control, walking speed, functional independence and self-esteem.

Older adults are a particularly important population. With aging, skeletal muscle mass and strength decline progressively, and this decline contributes to sarcopenia, frailty and loss of autonomy. Meta-analytic evidence suggests that resistance training is an effective rehabilitation tool for elderly patients with sarcopenia, improving muscle strength and muscle quality (Zhao et al., 2022). Yasuda (2022) emphasized that different resistance training methods may be used in sarcopenia prevention and treatment, including high-load training, low-load training, slow movement training and blood-flow-restricted low-load training. Combined strategies, such as resistance training with aerobic training or nutritional support, may also be useful in selected older adults with sarcopenia (Carcelén-Fraile et al., 2023).

Resistance training also improves functional mobility. Papa et al. (2017) concluded that resistance training can reduce activity limitations in older adults with skeletal muscle function deficits, including improvements in gait speed and mobility. These outcomes are especially relevant for primary care, geriatrics and physiotherapy because small improvements in strength may translate into better chair rise, stair climbing, carrying capacity and confidence in daily activities. However, strength gains do not always fully transfer to complex functional performance unless programs also include balance, coordination, task-specific practice and sufficient training duration.

The reviewed literature indicates that training variables should be adapted to health status and goals. Adults with no prior training may start with low to moderate resistance, body-weight exercises or elastic bands. Progression can be achieved by increasing load, repetitions, sets, range of motion, time under tension or complexity. For older adults, a clinically useful approach is to begin with technically simple multi-joint patterns such as sit-to-stand, supported squat, hip hinge, row, press, step-up and calf raise, then gradually progress intensity and volume. Adequate supervision is particularly important in frail adults, patients with pain and individuals after hospitalization.

Musculoskeletal benefits are not limited to muscle. Resistance training exposes bone, tendon and connective tissue to mechanical loading, which may support bone mineral density and joint stability. Although bone outcomes depend on intensity, site-specific loading and long-term adherence, resistance training is widely considered an important component of osteoporosis and fall prevention strategies. In practice, this means that resistance exercise should be viewed not only as a way to build muscle, but also as a stimulus for the whole locomotor system.

3.2. Body composition and metabolic health

Resistance training has several metabolic effects that make it valuable in adults with overweight, obesity, insulin resistance and type 2 diabetes. Skeletal muscle is a major site of glucose disposal, and resistance exercise increases the demand for glucose uptake during and after training. Chronic training may improve muscle mass, glucose transporter activity, mitochondrial function and insulin sensitivity. Pesta et al. (2017) described resistance training as a feasible lifestyle recommendation for type 2 diabetes because it promotes skeletal muscle adaptations relevant to glycemic control.

Evidence from adults who are overweight or obese supports the functional value of resistance training. Orange et al. (2020) reported that resistance training has a large positive effect on muscle strength and a moderate effect on physical function in adults with overweight or obesity. This is clinically important because weight-loss programs based only on caloric restriction can reduce fat mass but may also reduce lean mass. Resistance training may help preserve or increase lean tissue, which supports mobility, resting energy expenditure and long-term weight

management. Recent interventional evidence also supports the role of resistance and aerobic training models in improving body composition in middle-aged adults with obesity (Hang et al., 2025).

In patients with type 2 diabetes, resistance training has been studied as adjunctive therapy to improve glycemic and cardiometabolic outcomes. Recent reviews have examined dose-response relationships and intensity differences, suggesting that resistance training can reduce HbA1c and fasting blood glucose, although optimal prescription variables may vary across patients (Su et al., 2023; Fan et al., 2023). Because diabetes frequently coexists with obesity, hypertension, dyslipidemia and reduced physical performance, resistance training should be interpreted as part of a broader lifestyle prescription rather than as an isolated intervention. In women with polycystic ovary syndrome, progressive resistance training has also been discussed as a complementary approach because of its potential effects on insulin resistance and functional capacity (Kogure et al., 2017).

Body composition outcomes appear favorable but heterogeneous. Kelley et al. (2023) found that resistance training is associated with improvements in body weight and body composition in older adults with overweight and obesity, although true inter-individual response differences were not clearly demonstrated. This means that group-level benefits may occur while individual responses remain variable. In clinical practice, such variability argues for monitoring multiple outcomes rather than body mass alone. Strength, waist circumference, functional tests, glucose control, medication burden, quality of life and adherence may be more informative than scale weight in isolation.

The metabolic effects of resistance training also support combined exercise strategies. Aerobic training and resistance training influence overlapping but not identical mechanisms. Aerobic activity strongly affects cardiorespiratory fitness and energy expenditure, whereas resistance training directly targets muscle strength, lean mass and functional reserve. Combining both modalities may therefore be particularly beneficial for adults with obesity, cardiometabolic risk or chronic disease, provided recovery and adherence are manageable.

3.3. Cardiovascular outcomes and rehabilitation

Resistance training is sometimes perceived as less cardiovascularly oriented than aerobic training. However, the reviewed literature indicates that appropriately prescribed resistance exercise can contribute to cardiovascular health and can be safely integrated into rehabilitation. Westcott (2012) summarized evidence that resistance training may enhance cardiovascular health through reductions in resting blood pressure, low-density lipoprotein cholesterol and triglycerides. El-Kotob et al. (2020) also identified evidence linking resistance training with reduced cardiovascular disease incidence in adults.

In cardiac rehabilitation, resistance training is particularly relevant for older adults because coronary events and hospitalization often accelerate deconditioning. Khadanga et al. (2019) emphasized that resistance training as part of cardiac rehabilitation improves muscle strength, endurance and physical function. This is important because the ability to perform daily activities after a cardiac event depends not only on aerobic capacity but also on lower-limb strength, upper-limb strength, balance and confidence in movement. In people with heart failure, systematic review evidence also supports resistance training as a potentially beneficial and generally safe component of exercise rehabilitation when appropriately prescribed (Morris et al., 2024).

Circuit resistance training and combined rehabilitation models may be useful for coronary heart disease patients when they are clinically supervised. Wu et al. (2022) reported rehabilitation benefits of circuit resistance training in coronary heart disease patients, adding to evidence that

resistance exercise can be implemented in structured cardiovascular rehabilitation. The practical message is that resistance training should not be excluded from cardiac rehabilitation, but it should be prescribed with attention to symptoms, blood pressure response, medication, breathing technique and appropriate intensity progression.

The effect of resistance training on arterial stiffness is more complex. García-Mateo et al. (2020) reviewed resistance training interventions and arterial stiffness in healthy people and noted that the training effect may depend on program design. Very high intensities, inadequate technique or excessive Valsalva maneuver may produce undesirable acute cardiovascular load in some populations, whereas well-designed programs may contribute to vascular health. Therefore, cardiovascular safety requires appropriate screening, gradual progression and avoidance of breath holding, especially in hypertensive or high-risk adults.

Animal and mechanistic studies suggest that resistance training may induce favorable cardiovascular adaptations, but translation to clinical practice must be cautious (Melo et al., 2018). In humans, the safest conclusion is that resistance training is not a replacement for aerobic exercise in cardiovascular prevention, but an important complementary modality. A complete health-promoting program should ideally include aerobic activity, resistance training, balance or mobility work when indicated, and lifestyle counseling. Resistance training may also produce modest improvements in cardiorespiratory fitness in older adults, although individual responses vary (Kelley et al., 2024).

3.4. Mental health, cognition, sleep and quality of life

Resistance training may also improve psychosocial and neuropsychological outcomes. Several mechanisms are plausible: increased self-efficacy, improved body image, better sleep, reduced inflammation, improved insulin sensitivity, neurotrophic signaling, social support in supervised programs and the psychological effect of regaining control over physical capacity. Westcott (2012) listed cognitive abilities and self-esteem among benefits associated with resistance training, while broader reviews describe neuropsychological outcomes as one of the main health domains influenced by resistance exercise.

Quality of life is a particularly relevant outcome in older adults and clinical populations. Resistance training can improve the ability to perform everyday tasks, and this functional improvement may translate into greater independence and better perceived health. In cardiac rehabilitation, cancer rehabilitation and geriatric care, improved strength can reduce fear of activity and increase participation in social and domestic roles. Evidence summarized in reviews suggests that adult quality-of-life outcomes may improve when resistance training is feasible, progressive and adapted to baseline limitations (El-Kotob et al., 2020).

Mental health effects are clinically important because depression, anxiety, fatigue and sleep disturbance frequently coexist with chronic physical disease. Li et al. (2022) found that resistance training improved autonomic regulation as measured by heart rate variability in anxious female college students. While this study involved a specific population, it supports the broader idea that resistance exercise may influence stress physiology. In practice, resistance training may be especially useful when it is delivered in a non-intimidating way, with achievable goals and visible progress.

Cancer-related rehabilitation provides another example. Hasenoehrl et al. (2020) reviewed resistance exercise in breast cancer-related lymphedema and reported that progressive resistance exercise can be considered in this population when appropriately supervised. This is clinically meaningful because many cancer survivors experience weakness, fatigue, pain, fear of movement and reduced quality of life. Resistance exercise can target these limitations while also supporting autonomy and body confidence.

The relationship between resistance training and cognition remains less certain than the relationship between resistance training and strength. However, the existing literature suggests potential benefits, particularly in older adults and individuals with functional decline. Cognitive outcomes may be mediated indirectly through improved sleep, mood, metabolic control, vascular health and physical independence. More high-quality trials are needed to clarify optimal dose, target populations and long-term effects.

3.5. Safety, adherence and practical prescription

The health value of resistance training depends on safety and adherence. Concerns about injury often prevent adults, older patients and clinicians from adopting resistance exercise. However, the literature generally indicates that resistance training is safe when it is appropriately prescribed, technically supervised and progressed gradually. Serious adverse events appear uncommon in supervised clinical and community programs, although adverse-event reporting is inconsistent across studies (El-Kotob et al., 2020).

Technique is a central safety factor. Inappropriate loading, poor exercise selection, excessive range of motion under load, insufficient warm-up, inadequate recovery and breath holding may increase risk. Conversely, simple exercises, stable positions, slow controlled repetitions and gradual overload can make resistance training accessible even for beginners and patients with chronic conditions. The same exercise can be modified across a wide spectrum: for example, a squat pattern may start as a supported sit-to-stand and progress toward a loaded squat only if appropriate.

Dose should be individualized. For general health promotion, public health guidelines commonly recommend resistance training for major muscle groups at least two days per week. Clinical programs often begin with one to three sets of 8 to 15 repetitions for major movement patterns, using an intensity that allows correct technique and moderate effort. Older or frail adults may benefit from slightly higher repetition ranges, slower progression and closer supervision. More advanced adults may use higher loads, multiple sets and periodized programming to optimize strength and hypertrophy.

Adherence is influenced by perceived competence, access, time, pain, fear and enjoyment. Home-based resistance training with bands or body weight may improve feasibility, but supervision may be needed to ensure technique and progression. Gym-based or rehabilitation-based programs can provide equipment and professional feedback, but may be less accessible for some adults. Practical prescriptions should therefore match the patient's environment, preferences and medical risk. The best program is not necessarily the most complex program, but the one that is safe, progressive and sustainable.

Special populations require clinical judgment. Adults with unstable cardiovascular disease, uncontrolled hypertension, acute injury, severe pain, neurological deficits, advanced frailty or post-operative restrictions should be assessed before training. In these groups, resistance training should be integrated with medical care, physiotherapy or rehabilitation. For stable chronic disease, however, resistance training should generally be viewed as an opportunity rather than a risk. After stroke or burn injury, progressive resistance training may improve strength, but transfer to functional activity should not be assumed and should be supported with task-specific rehabilitation (Dorsch et al., 2018; Gittings et al., 2018).

4. Discussion

The reviewed evidence supports the thesis that resistance training is a multidimensional health-promoting intervention in adults. Its benefits are not limited to muscular strength. Resistance training influences the musculoskeletal system, metabolic regulation, cardiovascular

rehabilitation, psychological well-being and functional independence. This multidomain effect makes it particularly useful in modern medicine, where many adults present with overlapping problems such as obesity, insulin resistance, low muscle mass, chronic pain, sedentary behavior and reduced quality of life.

A key finding is that resistance training directly addresses muscular fitness, which is often underemphasized in public health messaging. Aerobic exercise is essential for cardiovascular health, but it does not fully replace the need for progressive loading of muscle and bone. Adults who meet aerobic recommendations may still have poor strength, low lean mass and limited functional reserve. Conversely, resistance training can improve the ability to perform daily tasks and may enable greater participation in aerobic activity. This supports an integrated model of exercise prescription rather than competition between aerobic and resistance modalities.

The strongest and most clinically consistent evidence concerns strength, muscle mass and physical function. This is expected because resistance training directly challenges the neuromuscular system. In older adults, these adaptations may help delay or reduce disability. In adults with overweight or obesity, strength gains may improve mobility and help preserve functional capacity during lifestyle change. In patients after illness or injury, resistance training can be part of rehabilitation when functional weakness is a barrier to recovery.

The metabolic and cardiovascular findings are also important, although more heterogeneous. Resistance training can improve insulin sensitivity, glucose handling and body composition, especially when combined with aerobic activity and nutrition. Cardiovascular effects depend on program design, baseline risk and supervision. Resistance exercise should be performed with proper breathing, moderate progression and symptom monitoring in patients with cardiovascular disease. The evidence does not support the outdated view that strength training is categorically unsafe for cardiac patients; rather, it supports careful integration into cardiac rehabilitation.

Mental health and quality-of-life outcomes are promising but require nuanced interpretation. Improvements in mood, anxiety symptoms and self-esteem may arise from both biological and behavioral mechanisms. Resistance training can provide measurable progress, which may increase self-efficacy. It can also improve sleep, body image and social engagement when delivered in supportive environments. However, psychological outcomes are influenced by baseline symptoms, program setting, participant expectations and adherence. More standardized trials are needed to identify optimal protocols for mental health outcomes.

Another issue is the variability of individual response. Some adults respond rapidly to resistance training, while others experience slower changes due to age, sex, baseline fitness, disease status, nutrition, sleep, medication, genetics and program adherence. Clinical practice should therefore avoid promising uniform outcomes. Instead, practitioners should track multiple indicators: strength, function, symptoms, confidence, body composition, metabolic markers and quality of life. If progress stalls, the program should be modified rather than abandoned.

Implementation remains a major challenge. Many adults do not perform muscle-strengthening activities despite guideline recommendations. Barriers include lack of knowledge, fear of injury, lack of equipment, embarrassment in gym settings, pain, fatigue and misconceptions that resistance training is only for athletes or young people. Medical professionals can help overcome these barriers by prescribing simple, evidence-based resistance exercises and by referring patients to physiotherapists, exercise physiologists or qualified trainers when necessary.

The present review has limitations. It is a narrative review, not a new systematic review or meta-analysis. The included literature was based on selected full-text articles, PubMed-indexed

descriptions and relevant open-access sources, which may not capture all available evidence. The reviewed studies differ in populations, interventions, intensity, duration and outcome measures. Some areas, such as cognitive outcomes and long-term adherence, remain less certain than musculoskeletal outcomes. Despite these limitations, the convergence of evidence across systematic reviews, clinical populations and public health guidelines supports resistance training as a central component of adult health promotion.

5. Conclusions

Resistance training is a safe and effective health-promoting intervention for adults when appropriately prescribed and progressed. It improves muscular strength, supports lean mass, enhances physical function and may reduce disability risk, especially in older adults and clinical populations at risk of sarcopenia or frailty.

Resistance training also contributes to metabolic and cardiovascular health. It may improve body composition, insulin sensitivity, glycemic control, blood pressure and rehabilitation outcomes. The greatest public health benefit is likely achieved when resistance training is combined with aerobic physical activity, balanced nutrition and reduction of sedentary behavior.

Psychological and quality-of-life benefits are clinically relevant. Resistance training may improve self-esteem, mood, anxiety-related symptoms, sleep quality, autonomy and confidence in movement. These effects strengthen the argument for including resistance exercise in prevention and rehabilitation programs rather than treating it only as a fitness or sports-performance method.

For general adult health promotion, resistance training should involve all major muscle groups at least two days per week. Programs should begin at an appropriate level, prioritize correct technique, progress gradually and be adapted to age, health status, preferences and access to equipment. Clinical supervision is recommended for frail adults, patients with significant comorbidities and individuals in rehabilitation after major illness or injury.

Overall, resistance training should be considered a fundamental part of medical, rehabilitation and public health strategies aimed at healthy aging, chronic disease prevention and improvement of functional independence in adults.

Disclosure

Supplementary Materials

Not applicable.

Author Contributions

Conceptualization: Natalia Drobińska, Yana Lavrenchuk and Hanna Kasprzak; methodology: Natalia Drobińska and Kacper Jaskulski; investigation: Yana Lavrenchuk, Hanna Kasprzak, Kacper Jaskulski and Krzysztof Wichman; writing - original draft preparation: Natalia Drobińska and Yana Lavrenchuk; writing - review and editing: Hanna Kasprzak, Kacper Jaskulski and Krzysztof Wichman; supervision: Natalia Drobińska. All authors have read and agreed to the published version of the manuscript.

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