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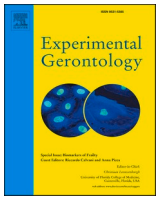

Review

Optimizing outdoor fitness equipment training for older adults: Benefits and future directions for healthy aging

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ABSTRACT

Regular physical activity is vital for the health and disease prevention of older adults. Outdoor fitness equipment has gained popularity for natural exercise spaces among middle-aged and older individuals.

This narrative review demonstrates that these programs have the potential to improve cardiovascular health, muscle strength, flexibility, balance, and reduce falls, while also enhancing quality of life, alleviating depression and anxiety, and boosting self-esteem. However, our understanding is hindered by limited rigorous experimental studies.

Future directions include implementing standardized measurements, conducting long-term studies, and addressing equipment limitations to enable better adjustment of training intensity and promote correct postures on machines.

New, more rigorous research is needed to comprehensively understand the psychophysiological and social effects on health. Additionally, suggested modifications could render the machines more effective and safer. The primary objective is to enhance this type of machinery to encourage its use in outdoor spaces, thus aiding adults and older individuals in achieving overall health and enjoying a healthy aging process.

1. Introduction

For more than 20 years, we have had scientific evidence of the role of physical activity in the primary prevention of cardiovascular disease, diabetes and some types of cancer (Brown et al., 2007). According to the World Health Organization (WHO), physical activity can reduce the risk of developing chronic diseases such as heart disease, stroke, diabetes, and some cancers by as much as 30–40 % in older adults (World Health Organization, 2015). Regular physical activity is essential for maintaining good health and preventing chronic diseases among older adults, different studies have been demonstrated to decrease morbidity and mortality by reducing the risk of heart disease, diabetes, high blood pressure, colon cancer, depression/anxiety, and weight gain while promoting and maintaining healthy bones, muscles, and joints (Anderson and Durstine, 2019; Paluch et al., 2022; Thacker et al., 2005; Warburton et al., 2006). Physical activity is advised to attain cardiometabolic advantages and to safeguard or enhance bone health, particularly for older adults with an elevated risk of fractures (Wherry et al., 2022). Consistent

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involvement in resistance training programs is a significant factor in the process of aging and could potentially serve as both a preventative measure and treatment option for numerous musculoskeletal disorders (Ciolac and Rodrigues-da-Silva, 2016). The decline in skeletal muscle mass, decrease in motor unit discharge rate, and diminished function are mainly linked with the process of aging. This can be classified as either sarcopenia, which refers to the age-related loss of skeletal muscle mass and function, or dynapenia, which is characterized by the age-associated reduction in muscle strength that is not caused by neurological or muscular diseases (Maestroni et al., 2020). Mobility and physical activity of the upper and lower extremities decrease with age (Tatangelo et al., 2022), leading to sarcopenia and loss of muscle strength, so strength training is very important.

As a result of the growing number of sedentary jobs and increased reliance on motorized transportation, leisure-time physical activity has become a crucial factor in achieving recommended levels of physical activity worldwide. Participation in leisure-time physical activity can occur in various community settings, such as nearby parks, which are often available to the public at little or no cost (Edwards and Tsouros, 2006).

Public spaces are optimal for promoting physical activity as they comprise green spaces and structures (e.g., playgrounds and outdoor fitness equipment) that are purpose-built to foster physical activity (Bedimo-Rung et al., 2005; García de Jalón et al., 2021; McKenzie et al., 2006). Physical activity in the outdoors spaces can provide benefits for pulmonary, cardiovascular, cognitive, and systemic health (Giles and Koehle, 2014). Few studies have examined the benefits of outdoor fitness equipment training for older adults (Grigoletto et al., 2021; Jansson et al., 2019b). Thus, this narrative review aimed to contextualize the psychophysiological and social advantages of such training. Then, our primary objective was to understand how outdoor fitness equipment can enhance the health of older people. The secondary objective was to analyze the limitations of the machines and suggest modifications for safer and more effective training.

2. Methods

2.1. Eligibility criteria

The selection of scientific studies was based on the following inclusion criteria: a) experimental or quasi-experimental designs, systematic reviews, study protocols or observational studies; b) intervention based on the systematic performance of outdoor fitness equipment. We applied the exclusion criteria established in previous reviews (Bustamante-Sanchez et al., 2022; Clemente-Suárez et al., 2021c; Clemente-Suárez et al., 2021a): a. Analysis conducted outside of the designated time frame; b. Topics covered that were not within the scope of the review; c. Utilized unpublished materials such as conference proceedings, abstracts, and PhD dissertations.

2.2. Search methods and strategies for research identification

In order to achieve our research goal, we carried out a comprehensive evaluation and analysis by scrutinizing primary sources like scholarly research and secondary sources including databases, web pages, and bibliographic indexes, using the same procedures as those applied in previous critical narrative reviews. (Bustamante-Sanchez et al., 2022; Clemente-Suárez et al., 2021c; Clemente-Suárez et al., 2021a; Clemente-Suárez et al., 2021b). Peer-reviewed articles published in the English language were acquired via online data base searches of the following data bases: EBSCO, SPORT discus, Medline, PsycINFO, Web of Science and Scopus searching for MeSH-compliant keywords such as: (outdoor fitness equipment OR outdoor gyms OR bio-healthy parks OR outdoor exercise equipment OR outdoor green spaces OR senior exercise park OR outdoor exercise park OR outdoor gyms OR outdoor fitness equipment in parks OR fitness equipment in public parks OR outdoor playground equipment OR outdoor gym resistance training OR fitness parks). The search encompassed time frames from 2000 to June 2023. Research endeavors that documented the effectiveness of utilizing outdoor fitness equipment use for physical activity, fitness, or health-related results, as well as portrayals of outdoor gyms and their users, met the criteria for inclusion.

2.3. Study selection and data extraction

We included studies that met rigorous scientific methodological standards and were relevant to the subsections addressed in this review. Data analysis was carried out by the review's four authors. The principal investigator assessed the eligibility of the studies according to their title and abstract in a first review, with an assistant in a second review to jointly verify these criteria and the results obtained. In this second review, the full text of the articles was reviewed. Research that did not meet the inclusion and exclusion criteria was excluded.

3. Why did outdoor fitness equipment spaces emerge?

The idea of creating outdoor fitness equipment spaces began to gain popularity in the 1990s and 2000s, as more research was conducted on the health benefits of physical activity and the importance of access to green spaces (Takano et al., 2002). In 2009, Europe introduced this new type of exercise space which was designed specifically to improve muscular strength, flexibility, coordination, and balance in a fun and engaging way. It was built with the intention of encouraging physical activity among older adults by providing an accessible and enjoyable environment for exercise (Sales et al., 2015).

Outdoor fitness equipment spaces have emerged as a response to the growing interest in promoting physical activity and healthy lifestyles. Green spaces, such as parks or public gardens, are safe, accessible, and attractive environments that generally allow people to be physically active (Gladwell et al., 2013; Mytton et al., 2012; Vich et al., 2021). In particular, the concept of “green exercise” emerged, which refers to physical activity undertaken in natural environments, such as parks or forests (Barton and Pretty, 2010; Pretty et al., 2007; Pretty et al., 2005). Outdoor fitness equipment spaces typically feature a range of exercise equipment that is designed to be used in an outdoor setting, such as resistance machines, ellipticals, and other cardio machines.

Outdoor fitness equipment is usually installed in municipal and public parks and places, residential complexes, resorts, schools, and beaches and should even be installed in health centers, at the doors of hospitals, women's social centers, old people's homes, and geriatric residences. Outdoor spaces and parks are ideal places to promote physical activity, they are freely accessible, and most of the users observed in the studies in this review performed with moderate to vigorous intensity (Joseph and Maddock, 2016).

Creating an age-friendly environment is a crucial approach towards promoting healthy aging. The WHO Global Network for Age-friendly Cities and Communities Network (https://extranet.who.int/agefriendlyworld/) is a clear example of this. As a response to global population aging and rapid urbanization, this Network focuses on action at the local level that fosters the full participation of older people in community life and promotes healthy and active aging. Despite this, this recent study affirms the scarcity of studies that measure the impact of training with outdoor fitness equipment and the use of an outdoor multi-sports court on physical activity with different age groups, and also evidences the need to improve these spaces and this equipment (Veitch et al., 2021).

To achieve this, it is necessary to encourage people of all ages to engage in outdoor community activities. This can be done by designing public or urban spaces that are friendly to older adults, making them more accessible and accommodating for people of all ages to participate in physical activities (Levinger et al., 2018; Pleson et al., 2014). Research has shown that older adults perceive outdoor fitness

equipment in parks to contribute to their overall health promotion, providing not only physical but also social and psychological benefits (Chow, 2013). Furthermore, in addition to physical activity, it's important to recognize other essential benefits of park use, including psychological, social, economic, and environmental aspects (Bedimo-Rung et al., 2005).

This "outdoor fitness equipment" (Abelleira-Lamela et al., 2021; Chow and Ho, 2018; Chow, 2013; Chow et al., 2021; Chow et al., 2017; Chow and Wu, 2019; Liu et al., 2020) is also known as "bio-healthy parks" (Arufe et al., 2013), "outdoor exercise equipment" (Leavy et al., 2022; Sami et al., 2020), "outdoor green spaces" (Czembrowski et al., 2019; Pleson et al., 2014; Takano et al., 2002), "senior exercise park" (Levinger et al., 2018; Ng et al., 2023), "outdoor exercise park" (Ng et al., 2020), "outdoor fitness equipment in parks" (Chow, 2013; Liu et al., 2020), "outdoor gyms" (Cranney et al., 2018; Lee et al., 2018; Stride et al., 2017), "fitness equipment in public parks" (Copeland et al., 2017), "outdoor playground equipment" (Grozdanovic et al., 2014), "outdoor gym resistance training" (Plotnikoff et al., 2023) or simply "fitness parks" (Copeland et al., 2017).

Outdoor fitness equipment, such as exercise equipment is becoming increasingly popular as a way for older adults to be physically active in natural settings. These programs have the potential to provide older adults with a fun, free and accessible way to improve their health. However, there is still a lack of research on the effects of outdoor fitness equipment programs on psychophysiological and social health in older adults. (Ng et al., 2020) A strategic objective of public health policies should be to prevent the diseases that cause the most deaths, identifying the main diseases that shorten the lives of older people, their geographical variability, and the associated factors. Promoting healthy aging would save inappropriate polymedication and its risks, as well as considerable drug costs to the healthcare system (Mangin et al., 2018; Rambhade et al., 2012). Thus, a recent study, highlights the use of a smartphone application with standardized workouts adapted to 12 outdoor gyms and an introductory session, where participants are informed of the importance of performing at least 2 workouts per week in outdoor fitness parks to obtain health benefits (Plotnikoff et al., 2023).

Outdoor fitness equipment spaces are a public solution to promote the wellness and health of adults, middle-aged and older adults, and other age groups through exercise. In addition, they are a way for institutions to meet their objectives, raise awareness of the importance of care for health and maintenance of physical fitness, improve quality of life, provide meeting places and fun for all, and help preserve municipal green areas, all free of charge.

4. Physiological health benefits of training with outdoor fitness equipment

Training with outdoor fitness equipment has become increasingly popular, particularly among older adults. There is growing interest in understanding the physiological health benefits of this training, including improvements in cardiovascular health, muscle strength, flexibility, and balance. In this subtopic, we will explore some of the various physiological health benefits associated with outdoor fitness equipment training.

- Improved muscle mass and strength: Studies have shown that outdoor fitness equipment training can lead to improvements in muscle mass and strength in older adults (Chow et al., 2021; Chow et al., 2017; Grigoletto et al., 2021; Jansson et al., 2019b; Jansson et al., 2019a; Kim et al., 2018; Sales et al., 2018; Sales et al., 2015).
- Improved balance, coordination, and physical function: Regular participation in outdoor fitness equipment training can help older adults improve balance and coordination, which can reduce the risk of falls (Chow et al., 2017; Jansson et al., 2019b; Sales et al., 2018; Sales et al., 2016; Sales et al., 2015).
- Improved cardiovascular health: Studies have found that participating in outdoor fitness equipment training can lead to improved cardiovascular health (Chow and Ho, 2018; Chow et al., 2021; Grigoletto et al., 2021; Jansson et al., 2019b; Kim et al., 2018; Sales et al., 2015).
- Improved flexibility: Studies have found that participating in outdoor fitness equipment training can lead to improved flexibility (Chow et al., 2021; Chow et al., 2017; Sales et al., 2018).

Table 1 shows the characteristics of the different studies.

In Addition, in this recent study, resistance training intervention with outdoor fitness equipment resulted in improved self-assessment and training self-efficacy. Although conducted primarily during a global pandemic, this study shows the population health potential of using mhealth technology and utilizing outdoor fitness training spaces for the general population (Plotnikoff et al., 2023).

It is important to note that the effects of resistance training with outdoor fitness equipment may be influenced by a variety of factors, such as the specific type of equipment used, the intensity and frequency of the program, and the characteristics of the older adults participating. More research is needed to fully understand the benefits and challenges of these types of programs, particularly their long-term effects.

5. Psychological and social health benefits of training with outdoor fitness equipment

Despite the scarcity of studies on the subject, there is also evidence of psychological and social health benefits associated with outdoor fitness equipment training. The social aspect of exercising in a community setting can lead to increased socialization and a sense of belonging (Davis et al., 2021; Komatsu et al., 2017; Suragarn et al., 2021). In this subtopic, we will explore the psychological and social health benefits of training with outdoor fitness equipment.

- Reduced symptoms of depression and anxiety: Older adults who participate in outdoor fitness equipment training have reported reduced symptoms of depression and anxiety (Sales et al., 2018).
- Reduced fear of falling and improved self-perception: A study has also shown that participation in outdoor fitness equipment training can lead to reducing fear of falling and improved self-perception (Sales et al., 2015).
- Increased social participation: Studies have shown that participation in outdoor fitness equipment training can improve social relations (Chow et al., 2017; Furber et al., 2014; Sales et al., 2018; Sales et al., 2015; Stride et al., 2017).
- Increased mood and self-esteem and self-efficacy: A study has also shown that participation in outdoor fitness equipment training can lead to increased self-esteem and self-efficacy among older adults (Vancampfort et al., 2011).
- Improved positive impacts on well-being: A study has also shown that participation in outdoor fitness equipment training can lead to an increased sense of well-being (Bowler et al., 2010; Sales et al., 2015).
- Improved quality of life: Other studies have shown that participation in outdoor fitness equipment training can lead to improved quality of life perception (Sales et al., 2015).

Table 1 shows the characteristics of the different studies.

6. Discussion and future directions

Recent studies indicate that current outdoor fitness equipment is mostly used by the older population (Chow et al., 2017; Veitch et al., 2021). Another recent systematic review indicates that there is inconclusive evidence of the benefits of longitudinal outdoor versus indoor exercise, due to a high risk of bias in most articles and a need for more

Table 1
Characteristics of the different studies.

Studies	Type	Variables	Frequency	Exercise prescription	Duration	Instruments/tests
Bowler et al. (2010)	Systematic review	–	–	–	–	–
Chow et al. (2021)	Intervention study	Cardiorespiratory	5 days/ week	Operation tempo 60 bpm	40 min.	-2 min. Step test
		Muscle strength	2 days/ week	Week 1–6, 8 reps 3 sets/ Week 7–12, 12 reps 3 sets	10 min.	-Hand grip test and 30 s chair stand -Back scratch
		Flexibility		Per stretching time for 30 s/ Operation tempo 60 bpm	10 min. 10 min.	-Single leg stand −8 ft up and go
		Balance	2 days/ week 2 days/ week	Week 1–4, 2 ft for 10 min Week 5–8, 2 ft for 10 min, 1 ft for 2 min Week 6–12, 2 ft for 6 min, 1 ft for 4 min		
Chow et al. (2017)	Observational study	–	–	–	–	-Observing Play and Recreation in Communities (SOPARC questionnaire) -Peak Hour Observation Using Video Camera
Furber et al. (2014)	Intervention study	–	–	–	–	-Face-to-face questionnaire
Grigoletto et al. (2021)	Systematic review	–	–	–	–	–
Jansson et al. (2019a)	Observational study	–	–	–		-Observing Play and Recreation in Communities (SOPARC questionnaire)
Jansson et al. (2019b)	Systematic review	–	–	–	–	–
Sales et al. (2015)	Study protocol	Muscle strength Balance Coordination Flexibility	2 days/ week	Level 1 to 9 Level 1 to 13 Level 1 to 3 Level 1 to 11 The intensity of each level is explained in the document. Week number 1 to 18/ set time 60 s to 90 s/ rest time 60 s to change over and rest to 30 s change over and rest	60–90 min.	-Functional Reach Test -Static Balance Standing -Step test -Timed Up and Go test -Hand grip strength test −2 min. Walk test -Lower limb strength -Strength of the knee extensor muscles -Spatio-Temporal Gait Parameters -Short Form (12) Health Survey Version 2 (SF-12v2™) -The Incidental and Planned Activity Questionnaire (IPAQ) -The falls efficacy scale (Short FES—I) questionnaire -Falls and physical activity calendar
Sales et al. (2016)	Intervention study	Muscle strength Balance Coordination Flexibility	2 days/ week	5 to 10 min of warm-up exercises 45 to 75 min on the equipment stations 5 to10 min of cool-down exercises The exercise classes were circuit based with the warm-up and cool-down exercises being performed in a group and the core part of the session being carried out in training pairs. The intensity of each level is explained in the document.	60–90 min.	-The Balance Outcome Measure for Elder Rehabilitation (BOOMER) -Single leg stance test standing on the dominant leg with eyes open was used to measure static balance -Hand grip strength test - 2 min. Walk test −30-s sit-to-stand test -Knee extensor muscles test -Gait speed test -Short Form (12) Health Survey Version 2 (SF-12v2™) -Falls and physical activity calendar
Sales et al. (2018)	Intervention study	Muscle strength Balance Coordination Flexibility	2 days/ week	5 to 10 min of warm-up exercises 45 to 75 min on the equipment stations 5 to10 min of cool-down exercises The exercise classes were circuit based with the warm-up and cool-down exercises being performed in a group and the core part of the session being carried out in training pairs. The intensity of each level is explained in the document.	60–90 min.	- Face-to-face interview about confidence and well-being, depression symptom, social interaction, supervision, frequency, duration, progression of exercises, level of difficulty of exercises, changes to their life in general, and general level of satisfaction
Stride et al. (2017)	Observational study	Cardiorrespiratory Strength Balance Flexibility	–	12 separate equipment pieces on a soft-fall rubber surface providing aerobic, strength, balance and flexibility exercise. Park users were free to use the outdoor fitness machines.	–	Interview questions included: place of usual exercise; frequency and purpose of park use; frequency and purpose of outdoor gym use; preferred equipment pieces; enablers and barriers to outdoor gym use; physical activity (using the validated 3Q-PA) and demographics
Vancampfort et al. (2011)	Systematic review	–	–	–	–	–

rigorous trials and more complete reporting (Noseworthy et al., 2023). This review with meta-analysis shows that older adults value the health and social interaction benefits of using outdoor exercise parks, but the findings should be interpreted with caution due to small sample sizes and a limited number of studies (Ng et al., 2020). In addition, quality of life and life satisfaction are very important aspects in the older people, one of the important determinants for to improve the quality of life is the adoption of sports practice, as well as the creation of a conducive social environment and the promotion of conviviality, which have a significant influence on the adoption of a healthy lifestyle, particularly in terms of commitment to physical activity and sports (Parra-Rizo et al., 2022). Therefore, training in outdoor fitness equipment can promote engagement in the practice and socialization, which can lead to the creation of a healthy lifestyle. Also, it is essential to consider several variables that affect the perception of self-satisfaction with health in the older population, such as well-developed functional, physical and psychological capacities, along with the regular practice of physical activity (Agustí et al., 2023), and properly designed training programs with outdoor fitness equipment can favor the improvement of functional, physical and psychological capacity.

A rigorous randomized controlled trial study indicates that there were no significant changes between the experimental group that trained with outdoor fitness equipment and the control group and that the possible reasons for the limited training effects could be the lack of resistance components and the diversity of the design of this equipment (Liu et al., 2020), this study, in contrast to the studies included in Table 1 that show physical, psychological or social health benefits of training with outdoor fitness equipment, supports the need for more rigorous studies with a better protocol to control the intensity of training and where a progression in the intensity of training loads is planned. These findings suggest the need for further research and improvements in outdoor fitness equipment design to optimize training outcomes. One approach could be to conduct studies comparing the effectiveness of different types of outdoor fitness equipment and their impact on training outcomes. Additionally, feedback from older adults who regularly use outdoor fitness equipment could be collected to identify specific design features that are most beneficial and areas for improvement. This approach can help ensure that the new designs are more effective, user-friendly, and enjoyable for older adults, leading to greater adherence and long-term benefits. Another study presents tangible proof suggesting that the way numerous individuals utilize outdoor fitness equipment may pose potential hazards to safety, potentially resulting in accidents and injuries that could lead to liability concerns for manufacturers or relevant authorities (Chow and Wu, 2019).

Also, in order to optimize the utilization of outdoor fitness areas by older adults, we propose the installation of a diverse range of apparatuses that cater to cardiovascular fitness, muscular strength, balance, and flexibility. These installations should be positioned in convenient and visually pleasing spots, in proximity to other centers for physical pursuits and conveniences. A strategic promotional approach, encompassing informative workout sessions and guidance, could effectively encourage secure and enduring engagement with the outdoor gym facilities (Scott et al., 2014).

Middle-aged and older adults have spinal misalignments when using outdoor fitness equipment to train in the standing position, so these machines should be able to be adapted to allow for safe and effective training (Abelleira-Lamela et al., 2021). This study concludes that the biomechanical characteristics of adults and older adults must be considered in the design of outdoor fitness equipment programs, specifically to minimize the risk of falls and injuries, as well as to maximize the benefits of exercise. Another study measuring the ergonomic properties of outdoor leg press, chest press and pull chair fitness machines indicates that they could play an important role in the occurrence of musculoskeletal injuries among users of these machines and highlights the need to follow ergonomic standards in the design and production of these types of outdoor fitness equipment (Sanchooli et al., 2021). In addition, current outdoor fitness equipment only provides resistance through the individual's own body weight, which may not be sufficient for some and may be injurious to others. The lack of ability to increase the resistance provided by the machines may limit the potential for older adults to increase their training loads and generate improvements in muscle mass and strength.

Also, outdoor fitness equipment should have clear, easy-to-understand instructions and labels. Older adults may have difficulty understanding complex instructions and labels on outdoor training machines, which can lead to improper use and increased risk of injury. Manufacturers should provide clear user manuals (or demonstration videos) on the correct use of their equipment and warning labels on risky behaviors. Manufacturers can design and develop equipment that meets certain principles of safety, ergonomics, and ease of maintenance. Park authorities can organize sessions to provide useful guidelines to the public in the community and implement effective promotional strategies. Manufacturers can place a label on equipment with a quick response (QR) code linking to a video demonstrating how to properly use each piece of equipment. Park managers can post warning signs to prevent children from using the equipment and regularly monitor and manage equipment areas. Companies should offer a training app that provides information for their equipment's safe and effective use. In addition, training courses should be held for physical exercise and health professionals for the correct use of the machinery and for them to learn how to plan training programs adapted to the characteristics of the user.

Older adults have a higher risk of falling and therefore need greater stability and safety on the outdoor fitness equipment. That is why they should have non-slip surfaces and handrails for greater stability and safety for them. In summary, outdoor fitness equipment for use by older people should have adjustable resistance levels, clear and easy-to-understand instructions and labels, non-slip surfaces and handrails for added stability and safety.

Outdoor fitness equipment presents some challenges and limitations that should be considered in the development of new, safer, and more effective machines. Table 2 shows a series of recommendations for improvement outdoor fitness equipment.

Therefore, to design feasible interventions and improve physical activity levels in parks, effective collaboration among various professionals is essential. This includes public health experts, of parks and recreational facility planners and managers, sociologists, psychologists, economists, urban planners, architects, landscapers, trainers, researchers, and public safety officers (Bedimo-Rung et al., 2005). In addition, health training should always be under the prescription of a medical professional and a sports physical educator.

7. Conclusions

To our knowledge, this is the first narrative review that updates the psychophysiological and social effects of training with outdoor fitness equipment. At present, there are limited experimental studies, probably due to the limitations of current outdoor fitness equipment. Outdoor fitness equipment programs have the potential for improve psychophysiological and social health in older adults, but further research is required to understand the benefits and challenges of their use. More rigorous and randomized clinical trial studies are needed to investigate the optimal frequency, intensity, and duration of training with this equipment for older adults. Barriers to outdoor fitness equipment programs use among older adults, lack of standardized measurement of outcomes and limited studies on long-term effects are challenges that must be overcome to fully understand the benefits and challenges of their use. Current outdoor fitness equipment requires several modifications such as those suggested in this study to maximize the effectiveness and safety of training on it.

The present study has certain limitations. As already indicated, there are few rigorous studies with outdoor fitness equipment. In addition, the

Table 2
Recommendations for improvement new outdoor fitness equipment:

Aspects	Recommendations
Ergonomics	Equipment should be designed to be adjustable to different body sizes and to allow for spinal alignment that preserves physiological curves during execution. It is advisable to include comfortable handles and grips that reduce stress on hands and wrists.
Biomechanics	The lever system should provide a resistance that can be regulated according to the strength and capacity of the user, allowing movement patterns and muscle activation, reducing the risk of injury and increasing the effectiveness of the exercise. Current machines are not adaptable for older adults to improve their psychophysiological and social health.
Effectiveness	Equipment should be designed with multiple resistance levels and allow for progression. It is advisable to use machines that train polyarticular exercises and that involve large muscle groups involved in the activities of daily living and the functionality of the person.
Standardization	The diversity of brands, designs and functions hinders the correct use of outdoor fitness equipment, which underlines the importance of standardization and uniformity of outdoor fitness equipment to ensure homogeneous usability and user experience. In addition, this equipment should be supported by previous studies, and its manufacturers can offer this information to users through a website, Qr codes etc.
Safety	To ensure the safety and effectiveness of outdoor fitness equipment, testing, validation and maintenance service is very important. This includes testing and validating equipment to meet safety and quality standards, incorporating safety features such as non-slip surfaces, cushioned areas and clear instructions for use. Safety features can improve the overall user experience and make the equipment more attractive so that more users become engaged and adhere to training with it.
Accessibility	To promote inclusion and accessibility, outdoor fitness equipment can be adapted for people with disabilities, including those with mobility impairments. This includes the ability to perform seated or supported exercises and equipment with low initial resistance and that allows for progression. However, current outdoor fitness equipment in public parks is not accessible to people with mobility impairments, such as those who use wheelchairs or walkers. Therefore, it is critical that parks consider accessibility when installing outdoor fitness equipment to ensure that everyone has the opportunity to enjoy the benefits of physical activity.
Maintenance	The safety and longevity of outdoor fitness equipment in public parks depends on regular maintenance and cleaning. This ensures that the equipment is safe for use and can provide effective workouts for users. In addition, it is crucial to include instructions for proper use and furthermore, for users to promptly report any broken or malfunctioning equipment.
Education	To maximize the effectiveness of this equipment, it is crucial to educate and inform the public about its benefits and how they can train safely and effectively. Therefore, educational programs are important to inform the public about the benefits of training on outdoor fitness equipment. Companies that manufacture this equipment can install information boards with instructions for safe and effective use. Alternatively, QR codes can be placed on equipment that direct users to mobile apps or a website that provide workout information and allow for feedback, including notification of malfunctions or other problems. This can help improve the user experience and encourage safe and effective use of outdoor fitness equipment.

machines may differ between manufacturers and not activate the same musculature, as well as affect the person differently. A systematic review with meta-analysis was not possible due to the limited number of studies and their low methodological quality. Therefore, our review provides valuable information regarding the importance of outdoor fitness equipment and a series of recommendations for improvement in the manufacturing of this equipment. There is a need for public health experts, local municipal authorities, and public health agencies to invest in safe and effective outdoor fitness equipment in open spaces.

The study also highlights the need for further research to examine the effectiveness of training in populations with special needs and to compare current outdoor fitness equipment with new equipment that allows for increased load and is safer and more effective. Future research should also examine ways to increase the long-term use of outdoor fitness equipment, assess long-term efficacy, and include measures of how impacts the health status of participants.

In the older people it is not enough to just go for a walk, we need other physical exercise interventions to help prevent muscle wasting, sarcopenia, dinapenia and other diseases and this is where the outdoor spaces and outdoor fitness equipment can help.

Furthermore, as a strength, to highlight that this study proposes this series of recommendations, based on the review carried out and on the experience gained in the experimental studies that have been conducted within the projects led by the principal investigator (PJMP): reference CFE/CO/05-17 and reference RTC-2017-6145-1, 2017 and which are in the process of publication.

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Not applicable.

Consent for publication

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CRediT authorship contribution statement

P.J.M.-P. conceived the design, obtained the grant, analyzed the literature, wrote, and critically edited the manuscript; A.E.-G; T.A.-L. and D.R.L.M. analyzed the literature and provided critical comments for the manuscript; P.J.M.-P; A.E.-G. and D.R.L.M. prepared the final manuscript.

All authors have read and agreed to the published version of the manuscript.

Declaration of competing interest

The authors declare that they have no competing interests. The funders had no role in the design of the study; in the analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

Data availability

No data was used for the research described in the article.

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