Training protocol characteristics in studies comparing functional versus traditional training: systematic review of controlled trials

Características del protocolo de entrenamiento en estudios que comparan el entrenamiento funcional con el tradicional: revisión sistemática de ensayos controlados

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Abstract

Introduction: Functional training and traditional training are widely used in rehabilitation and strength training, but their methodological differences remain debated.
Objective: To assess the characteristics of training protocols in studies comparing functional training and traditional training interventions in clinical trials, through a systematic review.
Methodology: A literature search was conducted in the CINAHL, EMBASE, PubMed, SCOPUS, SPORTDiscus, and Web of Science databases.
Results: In traditional training protocols, most studies used machine-based exercises, mainly uniaxial, such as Smith machine squats, leg curls, and seated rows, along with treadmill warm-ups. In contrast, functional training protocols primarily included multi-joint exercises using free weights, resistance bands, kettlebells, and suspension straps.
Discussion: This review highlights the methodological overlap between FT and TT, making it difficult to clearly distinguish these approaches. While FT originates in rehabilitation and aims to improve movement patterns relevant to daily life, TT follows structured load manipulation principles to enhance muscular strength. Instead of rigid classifications, the effectiveness of an intervention should be determined by individual needs, incorporating different training modalities as appropriate. Future research should clarify definitions or acknowledge this convergence while emphasizing individualized training prescriptions.
Conclusions: Understanding the distinctions and overlaps between functional training and traditional training can help practitioners design evidence-based, adaptable programs. By integrating both approaches when necessary, fitness professionals can optimize training outcomes and promote long-term adherence.

Keywords

Functional training; rehabilitation; strength training; traditional training.

Resumen

Introducción: El entrenamiento funcional y el entrenamiento tradicional se utilizan ampliamente en rehabilitación y entrenamiento de fuerza, pero sus diferencias metodológicas siguen en debate.
Objetivo: Evaluar las características de los protocolos de entrenamiento en estudios que comparan intervenciones de entrenamiento funcional y tradicional en ensayos clínicos.
Metodología: Se realizó una búsqueda bibliográfica en las bases de datos CINAHL, EMBASE, PubMed, SCOPUS, SPORTDiscus y Web of Science.
Resultados: En los protocolos de entrenamiento tradicional, la mayoría de los estudios utilizaron ejercicios en máquinas, principalmente uniaxiales, como sentadillas en máquina Smith, flexiones de piernas y remos sentados, junto con calentamientos en cinta. En cambio, los protocolos de entrenamiento funcional incluyeron ejercicios multiarticulares con pesas libres, bandas de resistencia, pesas rusas y correas de suspensión.
Discusión: Esta revisión destaca la superposición metodológica entre entrenamiento funcional y entrenamiento tradicional, dificultando su distinción. Mientras que el entrenamiento funcional surge de la rehabilitación y busca mejorar los patrones de movimiento relevantes para la vida diaria, el entrenamiento físico sigue principios estructurados de carga para desarrollar fuerza. En lugar de clasificaciones rígidas, la eficacia debe determinarse según las necesidades individuales, integrando distintas modalidades según corresponda. Futuras investigaciones deben clarificar definiciones o reconocer esta convergencia, priorizando prescripciones individualizadas.
Conclusiones: Comprender las distinciones y superposiciones entre el entrenamiento funcional y el entrenamiento tradicional puede ayudar a los profesionales a diseñar programas adaptables basados en evidencia. Al integrar ambos enfoques cuando sea necesario, los profesionales del fitness pueden optimizar los resultados del entrenamiento y promover la adherencia a largo plazo.

Palabras clave

Entrenamiento de fuerza; entrenamiento funcional; entrenamiento tradicional; rehabilitación.

Introduction

Traditional Training (TT) has historically been employed to induce neuromuscular adaptations, such as increased strength and hypertrophy. This method is characterized by its focus on isolated muscle groups and the use of resistance machines with gradually progressive loads. (DiStefano et al., 2013). Conversely, Functional Training (FT) is a training modality that emphasizes the integration of muscle groups and focuses on joint movement. FT incorporates free-body exercises to enhance performance in daily activities and sports. (Newsome et al., 2023).

The use of the term FT in health sciences emerged in the early 20th century, with studies published in physiotherapy journals during the 1940s(Buchwald, 1949; Mcnees, 1946). At that time, FT was exclusively applied in rehabilitation settings, aiming to improve daily life activities across different populations, including children, adults, and the elderly, in various health conditions (Cress et al., 1996; Goist & Loudon, 1998; Inaba et al., 1973; Loughnan, 1952; Mitchell, 1963; Schubert, 1985). The success of FT in rehabilitation eventually sparked interest in its application within strength and conditioning in recent years, FT has gained significant popularity, consistently ranking as a fitness trend according to the American College of Sports Medicine, as well as broader health-related research, particularly from the 2000s onward(Thompson, 2016, 2018, 2019, 2021b), occupying top positions in some countries (Kercher et al., 2020)

These interventions aimed to mimic specific physiological demands of real-life activities and sports-specific movements. (Ives & Shelley, 2003; C. J. T. Thompson et al., 2007), however, FT is not limited to exercises or movements that mimic the postures and movements of sports, performed with overload or instability (Liebenson, 2015; Wallden, 2015), but rather exercises designed to improve a specific function (balance, strength, coordination, agility, flexibility) to meet a practical objective or a specific task (gait speed, sprint, jump, sit, and stand).

When FT and TT are compared, they seem to present different protocols in experimental studies, with little information and details, which can make it difficult to replicate protocols in practice. Recently guidelines on how to report interventions were proposed to improve the reproducibility of interventions (Hoffmann et al., 2014; Slade et al., 2016; Toigo & Boutellier, 2006). FT and TT encompasses a wide variety of exercises that can be prescribed, information such how a training session is designed and other programming variables such as volume, intensity, time under tension, and rest intervals, for example, are fundamental parameters that influence the physiological responses and the success of the intervention (ACSM, 2009; Garber et al., 2011; Toigo & Boutellier, 2006).

The objective of this systematic review is to analyze and compare the specific characteristics of training protocols used in clinical trials that evaluate functional training (FT) versus traditional training (TT). This includes key resistance training variables based on the descriptors proposed by Toigo and Boutellier (2006), as well as exercise selection, progression criteria, and methodological design. Therapists, strength and conditioning coaches, and physical education professionals with clearer guidance on how these training approaches have been structured in the literature, supporting more evidence-based decisions in practice and future research.

Method

Protocol and registration

This systematic review was conducted according to the recommendations from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement (Page et al., 2021a). The PRISMA checklist is provided in Figure 1. The review was recorded in the International Prospective Register of Systematic Review (PROSPERO) registered (registration number CRD42022322651).

Search strategy

Studies were searched using the following electronic databases: CINAHL via EBSCO, EMBASE, PubMed (National Library of Medicine and National Institutes of Health), SCOPUS (Elsevier), SPORTDiscus via EBSCO, and Web of Science Main collection – Thomson Reuters Scientific. In order to identify possible studies published in journals not indexed in these databases, a search for gray literature was also performed in Google Scholar. The following search terms were included in the search strategies: functional training AND traditional training.

This strategy was conducted in all databases, with integrated searches in the title AND abstract. The final literature search was conducted on February 26, 2025. We prioritized the duplicate articles in the Web of Science database, with the searches carried out in the Main Collection with the search terms.

Eligibility criteria

We adopted the following inclusion criteria to select studies: 1) Published randomized controlled trials (randomized or nonrandomized) with two or more groups, showing pre-test and post-test design using original data, 2) Studies reporting interventions with functional training, we used the definition of functional training according to (Liu et al., 2014): "Functional training was defined as motions or exercises that incorporate movement patterns which are commonly used in activities of daily living, such as walking, getting out of bed or dressing. Functional training utilizes a combination of motions rather than isolated movements of individual muscle groups or body function".; 3) In orthopedic rehabilitation or training to improve physical fitness settings; 4) English, Spanish, or Portuguese language; 5) Abstract and text available in full online until February 26, 2025.

We excluded review articles, cross-sectional studies, case-control studies, cohort studies, case studies, conference papers, editorials, and letters. Studies were excluded if were related to functional fitness (e.g. CrossFit®) (Dominski et al., 2022).

We did not restrict the search by starting date due to perform a temporal analysis of scientific production. Eligibility criteria for this systematic review were based on the Population, Intervention, Comparator, Outcome, Study design (PICOS) statement and can be seen in Table 1.

Table 1. PICOS strategy

		Inclusion	Exclusion
P	Participate	Participant of functional or traditional training	Participants in other types of exercise
I	Intervention	Functional training vs Traditional training	All studies did not compare Functional with traditional training.
C	Comparison	Traditional training	-
O	Outcome	Specific details on how/what was prescribed	-
S	Study design	Randomized and Non-Randomized	Case studies, Reviews, Meta-analysis

Data analysis

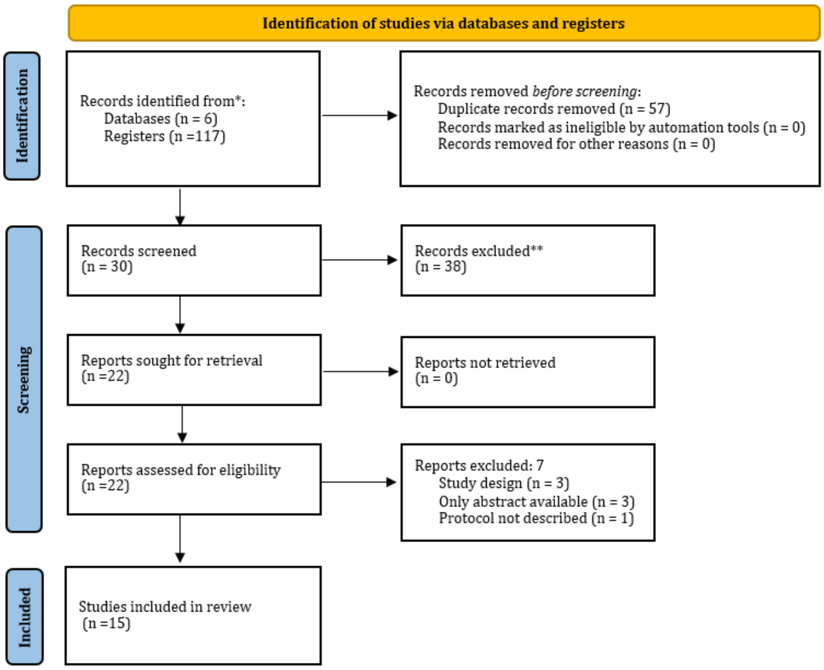
The reporting of items of protocols of interventions was made according to the Toigo and Boutellier (Toigo & Boutellier, 2006) exercise descriptors outlined key fundamental resistance exercise determinants that influence molecular and cellular muscle adaptations. These determinants include: a) Loading intensity: The magnitude of resistance used in training; b) Volume: The total amount of work performed, considering sets, repetitions, and load; c) Repetition duration and movement velocity: The time taken to complete each repetition and the speed of movement; d) Rest intervals: The recovery time between sets and exercises; e) Contraction type: The specific nature of muscle contractions, including concentric, eccentric, and isometric actions; f) Range of motion: The extent of joint movement during exercise execution; g) Muscle action mode: The way force is applied, whether in dynamic or static conditions; h) Training frequency: The number of sessions per unit of time. These determinants interact to shape the muscle's adaptive response, emphasizing the importance of training variables in resistance exercise prescription.

Results

Literature search results

Our search identified 117 articles; the full texts of 22 were reviewed, and 15 were selected and included in the systematic review. Figure 1 shows the flow chart of the selection process of the studies (Page et al., 2021b).

Figure 1. PRISMA 2020 flow diagram.



Source: prepared by the authors.

Overview of the research

The studies were published between 2011 and 2024. The impact factor of scientific journals was on average 2.22. In total, the sample of studies included 612 participants (425 women and 187 men). The average age of the participants ranged from 9.6 to 71 years, and most of the studies were carried out with the elderly (Aragão-Santos et al., 2019; L. M. D. S. Chaves et al., 2018; Da Silva-Grigoletto, Mesquita, Aragão-Santos, Santos, Resende-Neto, de Santana, et al., 2019; De Resende Neto et al., 2016, 2018; de Resende Neto, Do Nascimento, et al., 2019; Vasconcelos et al., 2020). The other studies investigated moderately trained students (Tomljanović et al., 2011), untrained young men (Zuo et al., 2022), and sports, such as children playing tennis (Yildiz et al., 2019) young football players (Keiner et al., 2020), and taekwondo athletes (Khazaei; Parnow; Amani-Shalamzari, 2023). The protocols used in study interventions, considering variables, instruments, and duration of intervention of both functional and traditional training were shown in Table 2.

Table 2. Characteristics of protocols used in selected studies

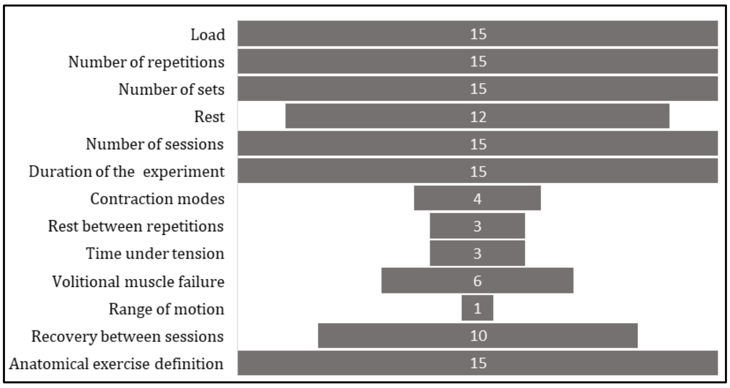
Authors (year)	Investigated variables	Instruments	Duration	Traditional training protocol	Functional training protocol
Chaves et al. (2018)	Muscle power (push and pull), quality of movement, quality of life, and cognitive parameters.	Muscle Lab linear encoder, FMS, Mini-Mental State Examination (MMSE), WHOQOL-Bref,	12 weeks	Squatting (Smith), vertical pull (articulated row), knee extension (Leg press 45 °), vertical push-up (vertical supine), knee flexion (flexor table), front row, bilateral standing calf, and stiff (bar and weights).	Ground lifting (kettlebells), horizontal pull (suspension strap), sit and stand up from the bench, vertical push-up (elastic), farmers walk (kettlebells), vertical row (elastic), pelvic elevation, and front plate (40 cm bench).
Grigoletto et al. (2019)	Strength and rate of force development trunk muscles.	Digital load cell connected to Muscle Lab system.	12 weeks	Smith squat, seated row leg press 45°, chest press, knee flexion with the leg curl device, Lat pull down, standing calf raise e Stiff leg deadlift.	Deadlift with a kettlebell, rowing with suspension tape, sit and lift the bench 40cm, adduction of upper limbs with elastic, farmer's walk (kettlebells), rowing with elastic bands, bilateral pelvic elevation,

					front plank on the bench 40cm.
Khazaei et al (2023)	Aerobic/ anaerobic power, speed, reaction time, agility, muscle power, dynamic balance, flexibility, upper and lower body muscle strength, and blood lactate level.	Sit and reach test, the Y balance test (YBT), Wingate test, 30 m sprint, jump test, agility T-test.	8 weeks	Smith squat, barbell chest press, leg extension, lat pull-down, lying leg curl, machine shoulder press, and cable lateral raise.	burpees, barbell squats+standing calf raise, alternate push up on a medicine ball, snatch, clean and jerk, lunge+holding medicine ball, and kettlebell single-leg deadlift.
Keiner et al. (2020)	Strength, sprint, and jump.	Linear sprint (LS 20 m), change of direction, squat jump, and squat maximum strength	10 months	Parallel back squats, deadlifts, bench press, pull-ups, sit-ups, standing rows, neck press, and crunches with additional weight.	Mini band exercises: lateral walk, forward-backward zig-zag walk, leg kicks, or body mass exercises: prone kneeling exercise, bridging with 1 leg to lift the pelvis, planks while alternating lifting one foot from the ground, and push-ups in a TRX-Band
Pagan et al. 2024	Functional performance, five-repetition maximum strength, isometric knee extensor force, and quadriceps muscle size.	Skeletal muscle size, isometric force, gait speed, TUG, Sit to Stand, Hell-rise test e 5RM.	6 weeks	Trap-bar deadlift, leg press, leg extension, and leg curl	Chair stands, TUG, heel rises, and 4-m gait with a weighted vest
Resende-Neto et al. (2016)	Balance/ agility, flexibility, lower /higher limb strength, and cardiorespiratory capacity.	Senior Fitness test	12 weeks	Smith Squat, seated row leg press 45°, chest press, knee flexion with the leg curl device, Lat pull down, standing calf raise e Stiff leg deadlift.	Deadlift with a kettlebell, rowing with suspension tape, sit and lift the bench 40cm, adduction of upper limbs with elastic, farmer's walk (kettlebells), rowing with elastic bands, bilateral pelvic elevation, front plank on the bench 40cm.
Resende-Neto et al. (2019)	Joint mobility, dynamic balance/agility, muscle strength and power, and cardiorespiratory capacity	Ankle mobility test, three tests of Senior Fitness Test battery (Reach behind the back, Rise and Walk, 6-min walk test), 1RM test, and power on the bench press and leg press 45°.	12 weeks	Smith Squat, seated row, leg press 45°, chest press, knee flexion with the leg curl device, Lat pull down, standing calf raise e Stiff leg deadlift.	Deadlift with a kettlebell, rowing with suspension tape, sit and lift the bench 40cm, horizontal adduction with elastic, farmers walk (kettlebells), rowing with elastic, bilateral pelvic elevation, front plank on the bench 40cm.
Resende-Neto et al. (2019)	Anthropometry and body composition, maximal dynamic strength and muscle power, maximal isometric strength,	Horizontal pull handle and 45° leg press RM tests, muscle power the same exercises, Hand Grip Test, Isometric Deadlift Test.	34 weeks	Smith squatting, horizontal articulated rowing, leg press 45°, vertical supine, knee flexion at the flexion table, pulled forward, bilateral standing calf, and stiff.	Kettlebell lifting, rowing with suspension tape, sit and lift the bench 40cm, adduction of upper limbs with elastic, farmer's walk (kettlebells), rowing with elastic bands, bilateral pelvic elevation, front plank on the bench 40cm.
Resende-Neto et al. (2019)	Quality of life, pain, blood chemistry, physical fitness, maximum dynamic force, isometric and muscular power.	WHOQOLBref, Numeric Rating Scale, algometry, Senior Fitness Test, power test (horizontal pull/push and ½ squat) Isometric Deadlift Test.	12 weeks	Smith squatting, horizontal articulated rowing, leg press 45°, vertical supine, knee flexion at the flexion table, pulled forward, bilateral standing calf, and stiff.	Deadlift (Kettlebell), rowing with suspension tape, sit and lift from the bench (40 cm), push-ups on the bench (60 cm), farmer walk (Kettlebell), rowing (Elastic band), pelvic elevation, front plank (bench with 40 cm)
Santos et al. (2019)	Maximum dynamic strength, isometric strength, muscle power, and	RM and power test in chest press, leg press 45°, and seated row exercises, hand grip teste, deadlift	12 weeks	Squat (Smith machine), seated row leg press 45°, chest press, hamstrings curl, front pull down, calf raise e Stiff.	Deadlift (Kettlebell), rowing with suspension tape, sit and lift from the bench (40 cm), push-ups on the bench (60 cm), farmer walk (Kettlebell), rowing (Elastic

	muscle endurance.	isometric test, arm curl test, and thirty-second chair stand.			band), pelvic elevation, front plank (bench with 40 cm).
Seiler et al. (2013)	Muscle strength and power.	Leg-Press Force (1RM), leg-Press Power (80% of 1RM), Bench-Press Force (1RM), Bench-Press Power (80% of 1RM), Isometric Deadlift Test, Sit-to-Stand Power, and Box-Lift Power.	11 weeks	Seated row, lat pull-down, shoulder press, leg press, and multipower bench press on a smith machine.	Stair climbing using a backpack weight, box lifting using 2.25kg bottles filled with sand, shoulder press and one-arm flies using dumbbells, and “rubber band rowing” using three different-resistance rubber bands.
Tomljanović et al. (2011)	Anthropometric measures, two agility variables, explosive strength variables and sprinting ability variables	Bioelectrical Impedance, AG 5-10-5 and Hexagon agility test, sprint test 10 and 20 meters, explosive strength throwing, countermovement jump.	5 weeks	Free-weight squats, T-bar rowing, bench press, leg flexion, free-weight lunges, deadlifts, lat pulldowns, and leg extensions.	One-leg TRX-squats, TRX suspension rowing, TRX push-ups, power-wheel leg flexion, flow-in lunges, and One-leg good morning.
Vasconcelos et al. (2020)	Muscle power and inflammatory	Power test of pushing and squatting, stand up (five repetitions), countermovement jump, and hand grip test.	24 weeks	Smith squatting, horizontal articulated rowing, leg press 45°, vertical supine, knee flexion at the flexion table, pulled forward, bilateral standing calf, and stiff.	Kettlebell lifting, rowing with suspension tape, sit and lift the bench 40cm, adduction of upper limbs with elastic, farmer's walk (kettlebells), rowing with elastic bands, bilateral pelvic elevation, front plank on the bench 40cm.
Yildiz; Pinar; Gelen (2019)	Quality of movement, balance, jumping, acceleration, and flexibility.	FMS, Y balance test, and The Balance Error Scoring System (BESS) jumping (countermovement jump), acceleration (10-m sprint), flexibility (sit and reach), agility (T-test),	8 weeks	Chest press, shoulder press, lateral pulldown, biceps curl, triceps pushdown, seated leg extension, leg curl, standing calf raise, modified pushups, and sit-ups.	Squat, dead bug, climbing man, plank, bridge, chop, lift, push up, pull up, and medicine ball throw.
Zuo et al. 2022	Upper and lower limb muscular endurance and performance	1RM test, (squat, bench press, deadlift, and right leg flexion), throwing ability, jumping ability, 30-m sprint, and pull-ups.	6 weeks	Barbell Squat, bench press, deadlift, reverse arm curl, and leg flexion.	Barbell Squat & BOSU, bench Press & Swiss ball, deadlift & BOSU, kettlebell Swing & BOSU, and Bulgarian Split Squats & BOSU

Figure 2 shows the number of studies that were clearly described in publications regarding items rated for the Toigo and Boutellier exercise descriptors. No study provided complete information for all of the items. However, all studies described the load, number of repetitions, number of sets, number of sessions, and duration of the experiment. Only one study reported the range of motion used in the exercises.

Figure 2. Reporting of items according to the Toigo and Boutellier exercise descriptors.



Source: prepared by the authors.

Discussion

The current study aimed to analyze characteristics of training protocols in studies that compared FT and TT, through a systematic review. We found that when comparing these training methods, the exercises used, control variables, and organization of the training session differ greatly between them. When comparing FT and TT, we did not find a pattern for the exercises used in each intervention. Regarding TT, the vast majority of studies use machine exercises, single and multi-joint exercises, however uniaxial, such as smith machine squats, knee flexion with the leg curl and seated row, and treadmill warm-up. On the other hand, studies showed that FT protocols were predominantly based on free weights, and multi-joint exercises, using suspension straps (e.g. TRX suspension), elastic bands, and kettlebells.

For example, when (Keiner et al., 2020) compared the effects of TT vs FT, they found that TT protocol consisted of the following exercises: parallel back squats, deadlifts, bench press, pull-ups, sit-ups, and standing rows. However, the exercises performed by the FT group were performed with mini band and body weight only. According to some studies included in this review, exercises performed with bodyweight and mini bands are part of the Functional Training session, with additional blocks designed to develop other physical capacities (Aragão-Santos et al., 2019; L. M. D. S. Chaves et al., 2018; Da Silva-Grigoletto, Mesquita, Aragão-Santos, Santos, Resende-Neto, de Santana, et al., 2019; de Resende Neto et al., 2021). They can be incorporated before the basic lifts, if there is an intention to improve neuromuscular activation, as well as correct any movement pattern disorder or decrease the risk of injuries (Crossley et al., 2019; De Resende-Neto, 2019; Manojlović et al., 2021; Payne et al., 2020).

Another notable distinction in functional training is the incorporation of movement preparation blocks, where joint mobility, agility, power, and coordination exercises are performed at the beginning of the training session (Aragão-Santos et al., 2019; L. M. D. S. Chaves et al., 2018; Da Silva-Grigoletto, Mesquita, Aragão-Santos, Santos, Resende-Neto, de Santana, et al., 2019; de Resende Neto, Oliveira Andrade, et al., 2019; La Scala Teixeira et al., 2017). The most recent studies have included similar mobility drills targeting the shoulders, thoracic spine, hips, and ankles for both intervention groups (FT and TT), showing that it is no longer exclusive to functional training

In his study (Zuo et al., 2022), compared FT with TT in untrained young men and the functional protocol was all performed with instability, with the following exercises: Barbell Squat & BOSU, bench Press & Swiss ball, deadlift & BOSU, kettlebell Swing & BOSU and bulgarian Split Squats & BOSU with 40% RM. In the same study the TT protocol contained the same exercises without instability and with 70% RM. The exercises with instability aims to changes in proprioception and neuromuscular control with the intention of reducing the risk of injury (Riva et al., 2016), but again, not being the full programs, a combination of balance, power, strength, plyometric, agility, must be incorporated to achieve functional performance, because proprioceptive training is not sufficient as the only training component in preventing injuries. This is a misunderstanding commonly observed in research and in practice is the use of only instability accessories, such as the BOSU® or swiss ball as being essential in the FT.

The search for new training methods continues to expand, with functional training emerging as an approach that develops integrated actions of various physiological systems necessary for performing functional tasks (La Scala Teixeira et al., 2017; Tomoko Okada, Kellie C. Huxel, 2011). Coordination, balance, and agility are essential physical capabilities for human performance, yet they have traditionally been underemphasized in endurance training and muscle-strengthening exercises (Rinne et al., 2010).

Among the fifteen selected studies, ten focused on the effects of training in the elderly. Evidence suggests that while TT enhances muscle strength, it has limited transfer to Activities of Daily Living (ADLs) in this population (Cadore et al., 2013). In contrast, multi-component exercise interventions that integrate strength, endurance, and balance training appear to be the most effective strategy to improve functional parameters such as gait ability, balance, and overall strength while reducing fall risk (Fragala et al., 2019a).

The National Strength and Conditioning Association (NSCA) supports this approach by incorporating FT into its exercise recommendations for older adults, advocating for interventions based on functional movements that replicate ADLs (Fragala et al., 2019a). Moreover, power development, rate of strength development, and functional capacity are essential aspects of exercise prescription for this population (Da Rosa Orssatto et al., 2019; Fragala et al., 2019b; Lopes et al., 2015; Sklivas et al., 2022), reinforcing the principle of training specificity as a key programming component (Pagan et al., 2024). These elements were analyzed in multiple studies, including that of Chaves et al., (2017) which examined the effects of functional and traditional training on muscle power, movement quality, and quality of life. Although both approaches improved muscle power and movement quality, functional training demonstrated greater benefits in terms of quality of life.

Some studies included in this review used an initial part of the training session to develop different physical capacities, dividing into blocks of Mobility (ankles, hips, thoracic spine, and shoulders), Neuromuscular 1 (agility, power, coordination, and balance) Neuromuscular 2 (muscular strength and endurance)).(Aragão-Santos et al., 2019; L. M. D. S. Chaves et al., 2018; Da Silva-Grigoletto, Mesquita, Aragão-Santos, Santos, Resende-Neto, de Santana, et al., 2019; de Resende Neto et al., 2021). Da Silva-Grigoletto et al., (2019b) demonstrated that FT led to greater magnitude changes and had a more positive impact on multiple variables compared to TT. This training advantage is likely due to the broader range of movements, velocities, and stability demands inherent to FT exercises. This training design suggested above could serve as a model for further studies., as it includes several physical capacities that are believed to develop functionality.

No study reported their exercise program in enough detail to allow full replication, according to the Toigo and Boutellier criteria, which relate specifically to resistance training interventions, all studies described their intervention load, number of repetitions, number of sets, number of sessions, and duration of experiment, but only four contraction modes (time in excentric and concentric contraction), three rest between repetitions and time under tension (set duration), these parameters constitute the exercise stimulus, and the physiological mechanisms underpinning skeletal muscle adaptation to exercise are highly dependent on and distinct to this stimulus (Coffey & Hawley, 2007).

Currently, the distinction between Functional Training (FT) and Traditional Training (TT) has become increasingly difficult, especially due to the overlap of methods and exercises used in both approaches. According to the latest definition by the American College of Sports Medicine (ACSM), TT focuses on proper movement mechanics and lifting techniques using barbells, dumbbells, and kettlebells, with structured manipulation of repetitions, sets, tempo, and load to achieve different muscular fitness goals (Newsome et al., 2023). However, many of the studies included in this review classified protocols with these characteristics as FT, highlighting the lack of a clear consensus on what differentiates these training approaches.

Future research should prioritize establishing clearer conceptual and operational definitions of Functional Training and Traditional Training. The considerable overlap in how these terms are applied highlights the need for consensus among researchers and professionals. Additionally, future clinical trials should adopt standardized reporting practices, including detailed descriptions of training variables such as those proposed by Toigo and Boutellier (2006), along with exercise selection, progression criteria, and methodological design. This would enhance reproducibility, allow for more accurate comparisons between studies, and strengthen the evidence base for prescribing resistance training interventions across different populations and goals.

Limitations

There was heterogeneity between the included studies regarding the training programs, target population, and outcome measures. Furthermore, the literature on functional training lacks a clear and consistent operational definition, which can make it challenging to reliably differentiate functional training protocols from traditional training approaches in certain cases. The present study was limited to analyzing the exercise protocols and not the results of their outcomes.

Conclusions

This review highlights the methodological overlap between functional and traditional training, emphasizing the difficulty in clearly distinguishing between these approaches. While functional training has origins in rehabilitation and focuses on enhancing movement patterns relevant to daily life, traditional strength training follows structured principles of load manipulation to develop muscular fitness. Instead of rigid classifications, the effectiveness of an intervention should be determined by the individual's needs, incorporating machines or free weights, mobility drills, or activation exercises as appropriate. To advance the field, future research must establish clearer definitions or acknowledge this convergence while focusing on individualization as the cornerstone of training prescription. For fitness professionals, maintaining a critical perspective and integrating evidence-based methodologies is essential to optimizing client outcomes. Given the low levels of physical activity in the general population, designing engaging, adaptable programs that develop multiple physical capacities remains a key strategy for promoting long-term adherence and enhancing overall health and performance.

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