Protocol in physical activities and health

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Effects of traditional concurrent training and multicomponent training composed by strength training and dance classes on functional and cognitive capacity of older adults: a study protocol

Efeitos do treinamento combinado tradicional e do treinamento multicomponente composto por treinamento de força e aulas de dança na capacidade funcional e cognitiva de idosos: protocolo de estudo

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ABSTRACT

The combination of strength and aerobic training (concurrent training - TG) has been a widely used intervention for improving health outcomes. Also, dance has been well described as a great aerobic activity and can be an interesting option to compose an alternative multicomponent training program. Therefore, the aim of the present protocol study is to describe the methods that will be used in a randomized controlled trial (RCT) design to identify and compare the impacts of traditional TG composed by strength and aerobic training and a multicomponent training consisting of strength training combined with dance classes (DG) on functional and cognitive capacity and quality of life of older people. The sample of RCT will consist of men and women aged between 60 and 75 years. Both interventions will occur twice a week for 12 weeks with progressive intensity and volume. Functional capacity will be assessed by gait, balance, sitting and standing and climbing tests. Strength will be assessed through one repetition maximum test (1RM) in knee extension exercise, and handgrip using a hand dynamometer. Muscle thickness will be assessed using quadriceps ultrasound. Muscle power will be assessed in the knee extension exercise at 30 and 70% of 1RM using an encoder. Aerobic capacity will be assessed using the 6-minute walk test. Quality of life and cognitive performance will be assessed by questionnaires. Comparisons between groups over time will be carried out using Generalized Estimating Equationswith a significance level of $p<0.01$. This protocol follows the recommendations of SPIRIT-2013.

Keywords: Combined training; Strength training; Dancing; Aging; Balance exercises; Physical activity.

RESUMO

A combinação de treinamento de força e aeróbico (treinamento combinado - TC) tem sido uma intervenção amplamente utilizada para melhorar desfechos de saúde. Além disso, a dança tem sido bem descrita na literatura como uma ótima atividade aeróbica e pode ser uma opção interessante para compor um programa alternativo de treinamento multicomponente. Portanto, o objetivo do presente protocolo de estudo é descrever os métodos que serão utilizados em um ensaio clínico randomizado (ECR) que visa identificar e comparar os impactos do TC tradicional composto por treinamento de força e aeróbico e de um treinamento multicomponente composto por treinamento de força combinado com aulas de dança sobre capacidade funcional, cognitiva e qualidade de vida de idosos. A amostra do ECR será composta por homens e mulheres com idade entre 60 e 75 anos. Ambas as intervenções ocorrerão duas vezes por semana durante 12 semanas com intensidade e volume progressivos. A capacidade funcional será avaliada por meio de testes de marcha, equilíbrio, sentar e levantar e subir escadas. A força será avaliada por meio do teste de uma repetição máxima (1RM) no exercício de extensão de joelhos e por meio do teste de preensão palmar com o dinamômetro manual. A espessura muscular será avaliada por meio de ultrassonografia do quadríceps. A potência muscular será avaliada no exercício de extensão de joelhos a 30 e 70% de 1RM por meio de um transdutor linear de posição. A capacidade aeróbica será avaliada por meio do teste de caminhada de 6 minutos. A qualidade de vida e o desempenho cognitivo serão avaliados por meio de questionários. As comparações entre os grupos ao longo do tempo serão realizadas por meio de Equações de Estimativas Generalizadas com nível de significância $p<0,01$. Este protocolo segue as recomendações do SPIRIT-2013.

Palavras-chave: *Treinamento combinado; Treinamento de força; Dança; Envelhecimento; Exercícios de equilíbrio; Atividade física.*

Introduction

The World Health Organization (WHO)[1] asserts that by 2050, 2.1 billion people will be classified as older individuals. Aging is a natural, progressive, and multifactorial process that impacts the entire organism. This process induces muscle alterations that may lead to a decline in functional performance[2].

While the aging process is typically linked to chronic diseases, the concept of healthy aging does not hinge on the absence of diseases. Instead, it emphasizes the opportunities to continue experiencing valuable situations throughout the years[3]. Thus, functional independence becomes one of the most important outcomes for the quality of life maintenance throughout the aging process.

Functional independence can be affected by different factors, such as the presence of diseases, injuries and age-related alterations[3]. In this context, an active lifestyle, particularly through physical activity interventions, not only mitigates the loss of functional independence but also prevents and alleviates chronic diseases, improves mobility, reduces depressive symptoms, and decelerates cognitive declines[2].

Regarding functional performance, low muscle strength is a critical factor due to its strong correlation with sarcopenia and frailty, thereby influencing functional independence. Indeed, strength training emerges as the most effective intervention for enhancing muscle strength and preventing sarcopenia. However, it is worth noting that strength training alone may not yield significant benefits for balance outcomes[4], besides inducing slight effects on cardiorespiratory capacity, especially compared to aerobic training[5] Considering that various physical capabilities, such as muscle strength, cardiorespiratory fitness, and balance, are crucial for preventing falls and maintaining functional independence in older adults[6,7], it is paramount to design exercise interventions that incorporate all these components for older individuals.

In this regard, the combination of strength and aerobic training, known as concurrent training has been widely employed to promote neuromuscular and cardiorespiratory gains[8]. Nonetheless, most of the TG protocols examined in the scientific literature[9,10] do not incorporate exercises for other physical components recommended by WHO[11] for older individuals (i.e., balance exercises).

Dance has been documented in the literature as a physical activity that can provide numerous health benefits, particularly for older individuals. Dance can enhance cardiorespiratory capacity[12], improve dynamic and static balance[13], gait ability and physical performance[14], as well as cognition[15]. Additionally, dance is a enjoyable and widely embraced activity among older adults[16], demonstrating high potential to enhance exercise adherence within this population.

Therefore, integrating dance with strength training seems to be an interesting alternative for an exercise intervention aimed at enhancing neuromuscular, cardiorespiratory, and cognitive performance in older individuals. However, at our best knowledge, studies investigating the combination of these two modalities (i.e., strength training and dance) in older individuals are scarce.

This study describes a protocol for a randomized controlled clinical trial aiming to compare the effects of TG and a multicomponent training consisting of strength training combined with DG on functional performance, cognitive function and quality of life in older individuals. The specific objectives of the randomized controlled clinical trial is to compare the effects of TG and DG on: dynamic and static balance; sit-to-stand and climbing stairs abilities; lower-body and handgrip maximal strength; lower-body muscle power output; quadriceps femoris muscle thickness; cardiorespiratory capacity; quality of life; cognitive performance; affectivity with the intervention; lipid profile; and, depressive symptoms.

Methods

Study type

This study is characterized as an original Protocol for a Randomized Controlled Clinical Trial, and follows the recommendations of SPIRIT 2013[17] (Supplementary material). The clinical trial was registered in ClinicalTrials.gov: NCT05859243 and will follow the CONSORT Statement[18].

Founding

This search is founding by National Council for Scientific and Technological Development (CNPq) and by Coordination for the Improvement of Higher Education Personnel (CAPES). These funding source had no role in the design of this study and will have no role during its execution, analyses, interpretation of the data, or decision to submit results.

Population and sample

The study will be carried out with sedentary older

adults with no neuromuscular disorders. The sample will be voluntary, composed of men and women aged between 60 and 75 years, residents of the metropolitan region of the city of Porto Alegre-Brazil.

Eligibility criteria

Inclusion criteria for participants in this study include being male or female aged between 60 and 75 years, not engaging in regular physical exercises for at least three months before the study (achieving a score of up to 9.11 on the Baecke Physical Activity Questionnaire), having no history of competitive sports, lacking musculoskeletal and neurological diseases or disorders that may impact exercise performance or test results, not having health conditions contraindicating physical exercise and scoring no less than 24 on the Mini-Mental State Examination (MMSE)."

Exclusion criteria for participants in this study include missing more than 20% of training sessions or more than three consecutive workouts and failing to attend any of the scheduled evaluations.

Sample size

The sample calculation was performed for all variables and the highest result, based on the study by Wilhelm *et al.*,[19] for the lower limb maximal power output variable (total n = 63, i.e. n = 21 individuals per group), was adopted. The calculation was performed using the GPOWER version 3.1.9.4 program, in which $\alpha = 0.01$ and power of 99% were adopted.

Recruitment

Participants will be recruited through publicity using posters placed at the University and published on the researchers' social media. The responsible researchers will assess the eligibility criteria and determine if individuals possess the necessary characteristics to participate in the project.

Randomization

Participants will be randomly assigned to groups using computer-generated random numbers from https://www.random.org/, and couples will be randomized together. The individual responsible for randomization will not be one of the researchers conducting evaluations. Concealment of the allocation sequence will be maintained using a color table until interventions are assigned. The same person enrolling participants will also be responsible for assigning them to the intervention. Participants will be informed about their group assignment before commencing the training.

Experimental design

Initially, a telephone interview (or in-person for volunteers without access to this means of communication) will be conducted to provide clarifications about the study and schedule the first visit. The first face-to-face meeting will take place at the University, where participants will be introduced to the responsible researchers, receive the informed consent form, and, if in agreement with all study procedures, will be invited to sign the document in duplicate. Upon acceptance, tests related to inclusion criteria, socioeconomic status, and quality of life questionnaires will be administered. If volunteers meet the required criteria, the second visit will be scheduled, involving blood collection to assess the lipid profile.

Subsequently, participants will be slated for a third visit, during which assessments of quadriceps femoris muscle thickness, anthropometric measurements, and physical tests will be conducted. Following these evaluations, participants will be randomly assigned to one of the two interventions or the control group. At the conclusion of the 12-week training period, participants will undergo a reassessment on all tests (Figure 1).

Arms and Interventions

- Traditional concurrent training (TG): The participants will perform two sessions per week of traditional concurrent training, consisting of strength training followed by aerobic exercise over 12 weeks. Each training session will consist of a specific warm-up performed on upper and lower limb machines with a load less than 30% of the training load. Then, the bench press, low row, leg press, knee extension, and knee flexion exercises will be performed. Participants will be instructed to perform the concentric phase of the movement in one second and the eccentric phase in two seconds. Training intensity will be based on the OMNI perceived exertion scale[20] for strength exercises and the load will be modified according to the predicted score for each stage of the training, progressing from 6 to 9 points. Training volume will start at two sets of 10 to 12 repetitions and progress to four sets of 8 to 6 repetitions. After strength training, aerobic training (walking outdoors or on a treadmill) will be performed at intensities based on the BORG ef-

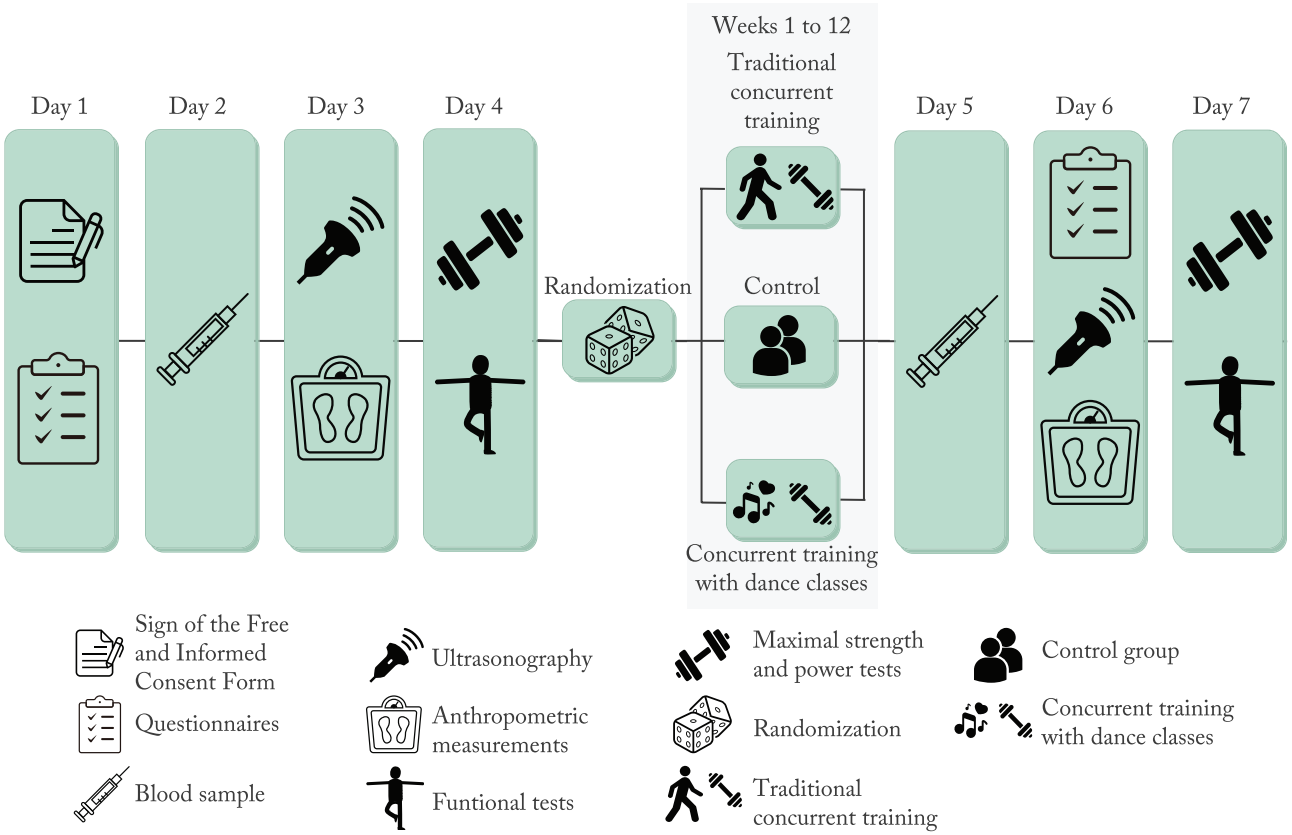

Figure 1 – Experimental design

fort perception scale and will progress from 10 (low effort) to 14 (medium effort), while volume will progress from 20 to 35 minutes.

- Multicomponent training consisting of strength training combined with dance classes (DG): Each DG session will consist of the same strength training as the TG, but the traditional aerobic training will be replaced by a dance class. Each dance class will consist of a 5-minute general warm-up with joint mobility exercises and dynamic stretching. The main part will be performed with the elaboration of choreography, lasting approximately 20 minutes. Finally, there will be a 5-minute cool-down with stretching exercises. Classes will be held in four different dance modalities. The DG will not have prescribed intensity; however, at the end of each class, the Borg Scale will be used to assess the final intensity of the session (for more information about each class and choreography videos, access supplementary material).
- Control (CG): Participants will be instructed to maintain their usual routine during the study period. After the end of the 12 weeks, the participants in the control group will be able to participate in one of the exercise groups according to their preference.

Adherence

The adherence of training sessions will be monitored by recording training days.

Concomitant care

Study participants will not be able to perform other training protocols, other than the proposed one, simultaneously with the study.

Outcome measurements

To ensure data quality, evaluators will be trained by an experienced researcher. The questionnaires and tests will be applied before and after 12 weeks of intervention or participation in control group according to the guidelines below by researchers blinded to the group of participants.

- Dynamic balance: will be measured using the timed-up-and-go test[21], which consists of getting up from a standard chair, walking a distance of 3 meters, go around a cone, walk back to the chair and sit down again.
- Static balance: will be evaluated through the sin-

gle-leg stance test[22], which consists of remaining standing, with unipodal support as long as possible (with a limit of 60 seconds). The participant will be instructed to perform the test with the preferred leg.
- Sit-to-stand ability: will be evaluated through the 30s Chair-stand Test[23], which consists of standing up and sitting on a chair as many times as possible during 30 seconds.
- Climbing stairs: will be assessed using the stair climbing test[24], which consists of climbing a ladder with 10 steps.
- Handgrip strength: will be assessed through the handgrip strength test[25] in a Palmar Dynamometer (Jamar Hydraulic Hand Dynamometer), which consists of squeezing the handle of the dynamometer as hard as possible for 3 seconds.
- Cardiorespiratory capacity: will be evaluated through the 6-minute walk[23], which consists of walking the maximum possible distance in six minutes.
- Lower-body maximal strength: will be evaluated through the one repetition maximal (1-RM) test for the knee extension exercise[4], which consists of performing the knee extension exercise with the highest possible load for one repetition complete.
- Lower-body maximal power output: will be evaluated in the knee extension exercise at 30 and 70% of 1-RM. Individuals will perform 5 repetitions at the maximum possible speed in the concentric phase at each intensity (30 and 70%) of the exercise. The maximum and average power values will be determined through a linear displacement sensor (ChronoJump, Barcelona, Spain), coupled to the equipment.
- Cognitive performance: will be assessed through the MMSE[26]. The MMSE consists of answering a questionnaire with six categories: temporal and spatial orientation, processing, attention, calculation, evocation, language and constructive ability. The participant will be instructed to answer the questions without asking for help.
- Depressive symptoms: will be measured using the Geriatric Depression Scale, that consists of 15 questions with binary answers (yes/no) and easy to understand. It ranges from zero (absence of depressive symptoms) to fifteen points (maximum score of depressive symptoms).
- Quality of life: will be assessed using the WHOQOL bref Questionnaire – General Version in Portuguese[27], which consists of answering a questionnaire about your perception of quality of life. The participant will be guided to answer the questions with reference to the last two weeks. To complete the questionnaire, the individual will be instructed to circle the number that best represents their answer to each question, with 1 being the most negative answer and 5 being the most positive.
- Affectivity through the intervention: will be measured through the Affective Valence Scale[28], which consists of answering a quantified scale from +5 to -5. The participant will be instructed to respond to the scale with reference to their feelings throughout the training session and dance class. The scale has values from +5 to -5 that correspond, respectively, to the feelings "very good" and "very bad". This questionnaire will be used following the conclusion of the intervention period, during the post-evaluation phase.
- Muscle thickness: will be assessed by ultrasonography (Nemio XG, Toshiba, Japan) of the quadriceps. A transducer will be placed on the skin of the thigh of the individual's right leg, perpendicular to the tissue interface, after mapping the measurement site. The measurements will be performed with the participants lying down, after 10 minutes of rest and after 48 hours without vigorous physical activity. A water-based gel will be used to promote acoustic contact between the skin and the transducer. Three images of the rectus femoris, vastus intermedius and vastus lateralis will be digitized and analyzed using Image-J software (National Institute of Health, USA). Measurements of the rectus femoris and vastus intermedius will be taken at the midpoint between the greater trochanter and the lateral epicondyle of the femur, while the vastus lateralis will be at 30% of the distance from the lateral epicondyle of the femur to the greater trochanter. The subcutaneous adipose tissue-muscle interface and the muscle-bone interface will be identified, with the distance from the adipose tissue-muscle interface defined as muscle thickness.
- Lipid profile: plasma concentrations of total cholesterol, HDL and triglycerides will be determined by the colorimetric method with specific kits in an automatic analyzer (Cobas C111, Roche Diagnostics, Basel, Switzerland). In addition, LDL lipoprotein levels will be estimated using the Friedewald equation[29].
- Physical activity level: will be assessed using the questionnaire proposed by Simões[30] which refers to the last 12 months of the elderly person's life and

is divided into 3 domains. The first domain refers to daily life, the second to sports activities and the third to free time activities. The product of the item codes for each activity is added across all activities, the sum of the different domains classifies individuals according to the level of physical activity: sedentary (< 9); active (≥ 9 ≤ 16); and athletes (≥ 17). The cutoff point will be adopted in which individuals who reach a score ≤ 9.11 have a low level of physical activity; between 9.12 and 16.17 will be moderately active and ≥16.18 will be considered very active. This questionnaire will be used only before the intervention to assess the inclusion criteria.

- Socioeconomic characterization: For sample characterization data, the elderly must answer the questionnaire from the Brazilian Association of Research Companies, which contains 15 socioeconomic indicators. The sum of answers generates a classification for the Brazilian population, being classes A, B1, B2, C1, C2, D and E. This questionnaire will be used only before the intervention for sample characterization.
- Anthropometric measurements: Body mass and height will be measured using a stadiometer and scale (0.1 kg resolution) (Urano, Canoas, Brazil). Waist circumference will be measured using a measuring tape (1 mm resolution).

The Data Monitoring Committee (DMC) will be composed of Lead Investigators (Supplementary material) that will be responsible for storing the data and reporting through blind spreadsheets. The DMC is independent of the sponsor and competing interests.

Ethical considerations

The present work was submitted to the Ethics Committee for Research with Human Beings of the Local University (CAAE: 5570222.0.0000.5347). It is noteworthy that the study will offer a greater than minimal risk to participants in compliance with Resolution N°466 of December 12, 2012 of the National Health Council. Finally, all study participants will sign the Free and Informed Consent Form (Supplementary material) having the autonomy to withdraw their participation at any time. Risks and benefits from participation in this study is available on Supplementary material. Confidential research data will be kept in a safe place, at the Exercise Research Laboratory, which the researcher is part of, for a period of 5 years.

Statistical analysis

Results will be present as mean ± standard deviation. We will use both intention-to-treat and analysis by protocol approaches. For comparisons between the effects of the intervention over time between the different groups, Generalized Estimating Equations (GEE) analyzes will be applied, adopting the factors group (3 stratifications) and time (2 stratifications). Pairwise comparisons will be perform using post-hoc Bonferroni testing to identify differences. All statistical analyzes will be perform using SPSS software (version 25.0). Data analysis will be performed by researchers blinded to the group of participants.

Data sharing

After the end of study, a deidentified data set will be available upon request.

Modifications of the Protocol

Any modifications to the protocol which may impact on the conduct of the study, potential benefit of the patient or may affect patient safety, including changes of study objectives, study design, patient population, sample sizes, study procedures, or significant administrative aspects will require a formal amendment to the protocol.

Conflict of interest

The authors declare no conflict of interest.

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Author's contributions

Blanco-Rambo E: Conceptualization; Methodology; Validation; Formal analysis; Resources; Data curation; Project administration; Visualization; Writing – original draft; Writing – review & editing; Approval of the final version. Rubin N: Conceptualization; Methodology; Investigation; Data curation; Project administration; Visualization; Writing – original draft; Writing – review & editing; Approval of the final version. Bandeira-Guimarães M: Investigation; Resources; Visualization; Writing – review & editing; Approval of the final version. Muraro C: Investigation; Resources; Writing – review & editing; Approval of the final version. Marques D: Investigation; Resources; Writing

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Declaration regarding the use of artificial intelligence tools in the article writing process

The manuscript did not use artificial intelligence tools for its preparation.

Availability of research data and other materials

The contents underlying the research text are contained in the manuscript.

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Supplementary material

World Health Organization Trial Registration Data Set

Data category	Information
Primary registry and trial identifying number	ClinicalTrials.gov: NCT05859243
Date of registration in primary registry	
Secondary identifying numbers	
Source(s) of monetary or material support	This project is financiated by Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES).
Primary sponsor	Federal University of Rio Grande do Sul, School of Physical Education, Physiotherapy and Dance
Secondary sponsor(s)	
Contact for public queries	Eduardo L. Cadore, Doctor Federal University of Rio Grande do Sul edcadore@yahoo.com.br
Contact for scientific queries	Eduardo L. Cadore, Doctor Federal University of Rio Grande do Sul edcadore@yahoo.com.br
Public title	Effects of concurrent training on functional and cognitive capacity of older adults: study protocol
Scientific title	Effects of Traditional Concurrent Training and Concurrent Training Composed by Strength Training and Dance Classes in Functional Performance, Cognitive Function and Quality of Life of Older Adults: a Randomized Controlled Clinical Trial
Countries of recruitment	Brazil
Health condition(s) or problem(s) studied	Aging
Intervention(s)	Intervention type: Behavioral Intervention name: Traditional concurrent training Intervention description: The subjects will perform two concurrent training sessions of approximately one hour per week. Composed of strength exercises and aerobic exercises (walking outdoors and/or treadmill). Intervention type: Behavioral Intervention name: Concurrent training consisting of strength training combined with dance classes. Intervention description: The subjects will perform two concurrent training sessions associated with dance classes, of approximately one hour per week. Composed of strength exercises and dance classes. Intervention type: Other Intervention name: Control Intervention description: Subjects will be instructed to maintain their usual routine during the study period.
Key inclusion and exclusion criteria	Age eligibility: 60 years - 75 years Sex eligibility: Both Accepts healthy volunteers: Yes Inclusion criteria: 1. Do not practice regular physical exercises for at least three months 2. No history of competitive sports throughout life 3. Not having musculoskeletal and neurological diseases or disorders that may influence the performance of the exercises or affect the test results 4. Not having health conditions in which physical exercise is contraindicated 5. Achieve a score of no less than 24 on the Mini Mental State Exam 6. Achieve a score of up to 9.11 on the Baecke Physical Activity Questionnaire Exclusion criteria: 1. Miss more than 20% of training sessions 2. Miss more than three workouts in a row 3. Failure to attend any of the evaluations will be excluded from the study
Study type	Study type: Interventional trial Allocation: Randomized Intervention model: Parallel group Primary purpose: Other Phase: N/A
Date of first enrolment	May 2023

Continue…

Continue of World Health Organization Trial Registration Data Set

Data category	Information
Target sample size	63
Recruitment status	Recruiting
Primary outcome(s)	Outcome: Dynamic balance Timeframe: change from baseline Outcome: Static balance Timeframe: change from baseline Outcome: Ability to sit and stand Timeframe: change from baseline Outcome: Ability to climb stairs Timeframe: change from baseline Outcome: Handgrip strength Timeframe: change from baseline Outcome: Cardiorespiratory capacity Timeframe: change from baseline Outcome: Lower limb maximal strength Timeframe: change from baseline Outcome: Lower limb maximal power output Timeframe: change from baseline Outcome: Cognitive performance Timeframe: change from baseline Outcome: Depressive symptoms Timeframe: change from baseline Outcome: Quality of life Timeframe: change from baseline Outcome: Affectivity through the intervention Timeframe: chage from baseline
Key secondary outcomes	Outcome: Muscle thickness Timeframe: change from baseline Outcome: Specific tension Timeframe: change from baseline Outcome: Lipid profile Timeframe: change from baseline

Organizational structure and responsibilities of the authors

- **Senior Investigators** (Pietta-Dias C., Cadore E.): responsible for planning, designing and monitoring the study.
- **Lead Investigators** (Blanco-Rambo E., Rubin N.): responsible for identification, recruitment, follow-up of study patients, and adherence to the study protocol.
- **Data Manager** (Blanco-Rambo E., Rubin N., Bandeira-Guimarães M.): responsible for maintaining the IT system for testing, input and verification of data.
- **Trial Management Committee** (Blanco-Rambo E., Rubin N.): responsible for organization of steering committee meetings, trial master file, data verification, and randomization.
- **Steering Committee** (Blanco-Rambo E., Rubin N., Pietta-Dias C., Cadore E.): responsible for final version of protocol, patient recruitment, and review of study progress and, if necessary, agreeing to changes to the protocol from the investigators to facilitate the smooth running of the study.
- **Principal Investigators** (Rubin N., Bandeira-Guimarães M., Marque D.): responsible for conducting the evaluations.
- **Research Coaches** (Blanco-Rambo E., Muraro C., Dornelles G., Fergutz A.): responsible for conducting the training.

Risks and benefits

The study acknowledges a greater than minimal risk, where participants may experience discomfort, delayed muscle pain, tiredness, or even the possibility of muscle injury during evaluations and/or training due to the intensity of the exercises. To mitigate these risks, participants will be familiarized with exercises, undergo proper warm-up, have access to rest areas and water throughout, and be supervised by qualified researchers. Questionnaire-based assessments may induce embarrassment, but they will be conducted in private to minimize discomfort. Blood collections may cause minor skin lesions, yet they will be performed by trained professionals to minimize this concern.

All procedures may induce physical and mental fatigue, and to address this, participants will be periodically questioned about their well-being during evaluations, with breaks provided when needed. In case of any adverse events, the responsible researcher will ensure necessary assistance and commits to covering any damages resulting from participation.

Participants will receive individual reports on pre and post-intervention results, providing feedback that can support future training and serve as health indicators. They will also benefit from physiological adaptations and improvements in functional aspects like gait speed, balance, muscle strength, and cardiorespiratory fitness. To ensure equitable benefits, participants in the control group will have the opportunity to choose one of the proposed interventions after the 12-week period.

Termo de consentimento livre e esclarecido

Prezado (a) Senhor (a),

Você está sendo convidado (a) a participar, como voluntário (a), da pesquisa "**Efeitos do treinamento concorrente tradicional e treinamento concorrente composto por treinamento de força combinado com aulas de dança no desempenho funcional, função cognitiva e qualidade de vida de idosos**". Caso conceda autorização para participar, favor assinar ao final do documento. A sua participação não é obrigatória e a qualquer momento, você poderá desistir de participar ou retirar seu consentimento.

Pesquisador responsável: Dr. Eduardo Lusa Cadore
Telefone: 51 991193651
Instituição: Universidade Federal do Rio Grande do Sul- UFRGS

Objetivos: Analisar os efeitos do treinamento concorrente tradicional e do treinamento concorrente composto por treinamento de força combinado com aulas de dança no desempenho funcional, função cognitiva e qualidade de vida de idosos.

Procedimentos do estudo: Caso concorde em participar da pesquisa você será aleatoriamente alocado (a) e um dos seguintes grupos:

- Grupo treinamento concorrente tradicional: os participantes deste grupo realizarão 30 minutos de musculação e 30 minutos de caminhada, duas vezes por semana ao longo de 12 semanas (três meses). Todas as sessões de treinamento serão realizadas na ESEFID/UFRGS com acompanhamento de profissionais qualificados.
- Grupo treinamento concorrente composto por treinamento de força combinado com aulas de dança: os participantes deste grupo realizarão 30 minutos de musculação e 30 minutos de aulas de dança, duas vezes por semana ao longo de 12 semanas (três meses). Todas as sessões de treinamento serão realizadas na ESEFID/UFRGS com acompanhamento de profissionais qualificados.
- Grupo controle: os participantes deste grupo deverão manter sua rotina habitual por 12 semanas e, após este período, poderão escolher participar de um dos grupos de exercício físico de acordo com sua preferência.

Além disso você realizará os seguintes procedimentos de avaliação:
(1) um questionário para avaliação do nível de atividade física;
(2) um questionário para avaliação da saúde mental;
(3) um teste para avaliação do desempenho cognitivo;
(4) uma coleta sanguínea para avaliação do perfil lipídico;
(5) um questionário de caracterização sociodemográfica;
(6) um questionário para avaliação da qualidade de vida;
(7) uma avaliação física;
(8) oito testes físicos para avaliação do desempenho funcional;
(9) um questionário para avaliação da afetividade pela intervenção.

As avaliações serão distribuídas em três dias a serem:

- Antes de iniciar o treinamento ou participação no grupo controle:
  Dia 1: serão realizadas as avaliações 1, 2, 3 e 4;
  Dia 2: serão realizadas as avaliações 5, 6 e 7
  Dia 3: serão realizadas as avaliações 8.

- Após 12 semanas de treinamento ou participação no grupo controle:
  Dia 1: serão realizadas as avaliações 2, 3 e 4;
  Dia 2: será realizada a avaliação 6 e 7;
  Dia 3: serão realizadas as avaliações 8 e 9.

Riscos e desconfortos: A pesquisa oferece a você um risco maior do que mínimo. Os testes físicos e treinamento poderão causar algum desconforto, cansaço ou lesão muscular, os quais serão evitados pela realização de familiarização com os exercícios, aquecimento prévio, oferta de descanso e água, bem como acompanhamento de um pesquisador qualificado. As coletas sanguíneas poderão provocar pequenas lesões cutâneas, entretanto, a mesma será realizada por profissional capacitado buscando minimizar este fator. Todos os procedimentos poderão ocasionar fadiga física e mental devido ao grande número de questionários e avaliações realizadas. Neste sentido, para minimizar este risco em todos os procedimentos, você será questionado periodicamente sobre seu estado físico e mental e, caso sinta algum sintoma de desconforto, será realizado um intervalo em

local adequado. Se houver qualquer incidente, o pesquisador responsável se responsabilizará por você e o acompanhará nos atendimentos que forem necessários.

Custo/reembolso para o participante: Informamos que você não terá nenhum gasto decorrente da sua participação e não receberá qualquer espécie de gratificação devido à sua participação na pesquisa.

Benefícios: Você terá acesso a um relatório individual com os resultados de todos os testes que realizar durante o estudo. Estes dados poderão ser utilizados para subsidiar um treinamento físico futuro além de servir como indicador do estado de saúde. Além disso, você será beneficiado através das adaptações fisiológicas e funcionais proporcionadas pelo treinamento.

Demais informações: A qualquer momento você poderá requisitar informações esclarecedoras do estudo por meio dos e-mails: edcadore@yahoo.com.br, eduardarambo@gmail.com ou pelos telefones: 51 991193651 (Prof. Dr. Eduardo Lusa Cadore), 51 999079773 (Prof. Eduarda Blanco Rambo) ou 51 33083738 (Comitê de Ética da Universidade Federal do Rio Grande do Sul).

Assinatura do Participante:

_____

Pesquisador(a):

_____

Orientador(a): _____

Local e data:

____ _____/_____/_____

Protocolo de Dança

Coreografias disponíveis em:
https://drive.google.com/drive/folders/1cA6dM-9SUl-Tz1bgVhamSJwvAHR28sE-R?usp=drive_link

Módulo 1			Módulo 2		
Jazz			Latinas		
Semana 1	Semana 2	Semana 3	Semana 4	Semana 5	Semana 6
Módulo 3			Módulo 4		
Disco			Ritmos		
Semana 7	Semana 8	Semana 9	Semana 10	Semana 11	Semana 12

Módulo 1 - Jazz: Coreografia da música Descobridor dos Sete Mares (Tim Maia)

- **Aula 1**: Início da coreografia, com aprendizado dos passos da primeira parte (passo V e alegorias). Ensaio da primeira parte somente com pernas seguido da inclusão dos movimentos de braço;
- **Aula 2**: Relembrar a coreografia, com aprendizado dos passos da segunda parte (contratempo, deslocamentos com giros e alegorias). Ensaio da música até o primeiro refrão, primeiro somente com a movimentação das pernas, seguido da inclusão dos movimentos de braço;
- **Aula 3**: Relembrar passos da primeira e segunda parte da coreografia (contratempo, passo V, deslocamento com giros e alegorias). Deslocamentos utilizando o *passé*. Ensaio da coreografia inteira.
- **Aula 4**: Aprendizado do deslocamento em *chassé*. Ensaio da coreografia através da marcação dos passos, seguido do show ("apresentação" da coreografia).
- **Aula 5**: Aprendizado do deslocamento com *chassé* e *passé*. Ensaio da coreografia através da marcação dos passos, seguido do show ("apresentação" da coreografia).
- **Aula 6**: Aprendizado do deslocamento com *chassé, passé* e movimentação de braços. Ensaio da coreografia através da marcação dos passos, seguido do show ("apresentação" da coreografia).

Módulo 2 - Latinas: Diferentes músicas de salsa

- **Aula 1**: Deslocamentos utilizando o *passé*. Aprendizado do passo base (frente, trás e lado). Dança livre com os passos aprendidos.
- **Aula 2**: Deslocamentos laterais. Aprendizado do passo base (frente e trás em conjunto). Aprendizado da movimentação base de braços. Dança livre com os passos aprendidos.

- **Aula 3**: Deslocamentos utilizando o *passé*. Aprendizado dos passos bases em duplas (trás, lado, frente e trás). Dança livre com os passos aprendidos.
- **Aula 4**: Deslocamentos laterais. Aprendizado dos giros básicos. Aprendizado da movimentação base de braços durante o giro. Dança livre com os passos aprendidos.
- **Aula 5**: Deslocamentos utilizando o *passé*. Aprendizado dos giros básicos em duplas. Revisão dos passos aprendidos ao longo do módulo. Dança livre com os passos aprendidos.
- **Aula 6**: Dança da coreografia tradicional da música Macarena (Los Del Rio). Dança livre.

Módulo 3 - Disco: Sequências curtas para as músicas Dancing Queen (ABBA), Night Fever (Bee Gees) e That's the Way (I Like It) (KC and the Sunshine Band)

- **Aulas 1 e 2**: Música Dancing Queen – Aprendizado dos passos isolados (chute frontal, contratempo, movimentação de braços), seguido do ensaio da sequência e da brincadeira de Soul Train (Programa de TV americano dos anos 70), na qual os alunos formam duas filas e, em duplas, passos livres são realizados para passar entre elas.
- **Aulas 3 e 4**: Música Night Fever - Aprendizado dos passos isolados (passo característico de dança disco, mini contratempo, deslocamentos), seguido do ensaio da sequência e da brincadeira de Soul Train.
- A**ulas 5 e 6**: Música That's the Way (I Like It) - Aprendizado dos passos isolados (passo característico de dança disco, deslocamentos), seguido do ensaio da sequência em círculo.

Módulo 4 - Ritmos: Diferentes músicas

- **Aulas 1, 2, 3, 4, 5 e 6**: Após um aquecimento com mobilidade articular e alongamentos dinâmicos, três músicas são ensaiadas em sequência. Neste módulo não há o aprendizado específico de passos, para que os alunos possam ter mais tempo em atividade. Dessa forma, a professora realiza a coreografia da música e os alunos copiam de forma simultânea. Nesse módulo, as músicas utilizadas são La Bomba (Braga Boys), Maionese (Gil) e Onda Onda (Thacka Bum), que são músicas populares que possuem coreografias tradicionais e bem difundidas.