22 - THE EFFECTS OF A RESISTANCE TRAINING PROGRAM IN THE HANDGRIP STRENGTH OF OLDER ADULTS

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Introduction

The aging population has been occurring in developing countries in a short space of time. Studies show that by the year 2025, from the 11 countries holders of the largest elderly population, Brazil will be the seventh country in absolute numbers, more than 30 million elderly from 60 to 74 years of age (IBGE, 2000). The Brazilian elderly population has 50% of older people from 60 to 69 years-old, 36% from 70 to 79 years-old and 14% over 80 years-old (Mazo; LOPES; BENEDETTI, 2001).

The perspective of a longer life has increased society's awareness of the need to invest in programs of physical activity that will meet the needs of the elderly, especially their self-independence in activities of daily life, particularly in factors that help soften the effects of aging (Spirduso, 2005).

During the aging process there is some decline in the functional abilities, particularly in muscle strength. Its reduction in the elderly compromises, partially or completely, the execution of their daily activities thus leading to greater dependence and a reduction in their quality of life (GONÇALVES et al. 2007; TRUCCOLO et al.2002).

The regular physical activity is an important factor in reducing the rates of morbidity and mortality from cardiovascular diseases (American Heart Association, 2007). The American College of Sports Medicine recommends that elderly people participate in regular exercise to maintain or develop the main components of physical fitness as cardiorespiratory fitness, muscular strength and endurance, flexibility and body composition (American College of Sports Medicine, 2007).

The improvement in muscle strength, induced by an endurance training, may represent the best way to prevent or reduce the incidence of injury in the elderly, while maintaining their ability to perform tasks of daily life without risk of injury or falls caused by muscle weakness or degenerative illness (FLECK; KRAEMER, 2005).

The purpose of this study was to investigate the effect of a program of resistance training for eight weeks in the handgrip strength in the elderly.

Methodology

This research is characterized as pre-experimental (THOMAS, NELSON 2002). The initial sample consisted of 40 sedentary elderly volunteers, female, aged between 50 and 80 years. All the sample were volunteers and were living in an independent manner in their daily lives. The inclusion criteria were: individuals who did not train in gym and were registered in the project of physical activities for older adults, in the physical education department of Faculty Guairacá. All volunteers were informed about the research and signed the Statement of Free and Informed Consent Term. It was asked to the entire sample to maintain their routine activities of everyday life and not to change their level of physical activity throughout the training program.

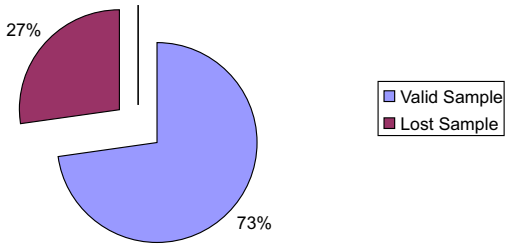
We first performed the evaluation of dynamometry, where the elderly were evaluated placed in standing position, the equipment held comfortably in line with the forearm and parallel to the longitudinal axis of the body (QUEIROGA, 2005). The joint inter-proximal phalanx of the hand was adjusted under the bar, which was tight between the fingers and the region Athens. During the seizure manual, the arm remains immobile, with only the bending of joints and inter-phalanx metacarpus-phalanx. There were three measures is the right hand (GUEDES; GUEDES, 2006). The evaluations were performed before and after endurance training. Soon after the initial assessment the elderly were subjected to an endurance training, which was developed over a period of approximately one hour, three times a week, where individuals initially walked for fifteen minutes in the treadmill for heating, and then starting their endurance training with Leg Press 45, extensor chair, chair flexor, Calf seated, Bench press, Remada Seated, triceps Banking, Direct Threaded and Abdominal Bank, performing in the first four weeks 1 set of each exercise and, in the last four weeks, two sets of 10 to 15 repetitions, in the form of circuit training. In addition to endurance training the elderly participated in other activities such as dance and additional recreation.

The data were presented in the form of mean, standard deviation. A comparison of the strength before and after the program was carried out by "t" test for paired samples, provided that the assumptions of normality and homogeneity of variance were met. The level of significance was 0.05.

Results and Discussion

The purpose of this study was to investigate the effect of a program of resistance training in eight weeks in the handgrip strength in the elderly. Of the 40 elderly people who started the study, 11 withdrew, leaving 29 for reassessment. The percentage of valid samples and lost can be found in Graph 1.

Graph 1 Percentual distribution of the valid and lost samples



The mean and standard deviation of the ages of the subjects who participated in the program was 66.5 ± 5.9 years.

The table shows the average, standard deviation, minimum and maximum strength of handgrip before and after the program of resistance training.

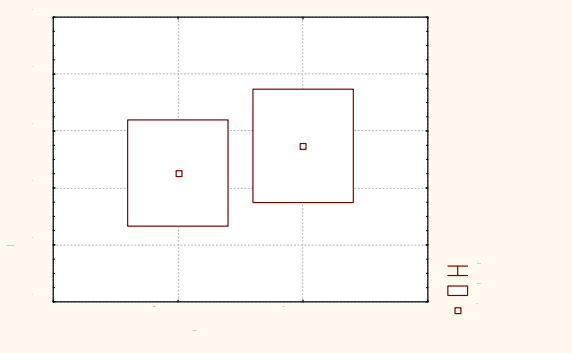
Table Mean and standar deviationof the handgrip strength values before and after the resistance training program

	BEFORE	AFTER
MEAN	25.03	26.96
STANDARD DEVIATION	3.96	3.98
MINIM UM	18.0	20.0
MAXIMUM	20.0	37.0

The values of the strength of handgrip before and after endurance training attended the assumption of normality. The values of the test were normal Shapiro-Wilk W = 0.95, p = 0.25 and W = 0.97, p = 0.47, respectively.

Since the assumption of normality of the data was attended, the t test was used for dependent samples to compare the average of the values before and after endurance training. Graph 2 shows the comparison between the averages in assessing pre and post. There was a significant increase in the subjects' hand-grip strength when comparing the values before and after the resistance training program (p <0.0000). There was an increase of 1.9 kgf, representing an increase of 7.5%, comparing averages.

Gráfico 2 Box plot of the average values of handgrip strength in the evaluations before and after resistance training



The handgrip is a variable that allows important achievements of daily activities of this particular population (Spirduso, 2005). In this study, we found that the initial values of the strength of the elderly was 25.03 kgf. By comparing this result to the normative values of the handgrip strength of the general population proposed by Guedes and Guedes (2006) and Queiroga (2005) it appears that they are in a median level.

With the results achieved, we believe that after eight weeks of resistance training there was a significant increase in handgrip strength. These results corroborate with other studies related to the increase in muscle strength in elderly (FLECK; KRAEMER, 2006; ACSM / AHA, 2007; Mazo; LOPES; BENEDETTI, 2001).

The physiological process of aging is associated with sarcopenia, which is defined as the loss of total body mass and muscle strength related to age. Such changes occur regardless of the presence of diseases, and is also associated with the decline of a variety of stimuli of the nervous and hormonal systems and the environment in the muscular tissue (Wilmore; Costilla, 2001).

A study presented by Westcott and Baechle (2001 cited by Mazo, Lopes; Benedetti, 2001), with 1132 individuals of both genders, who attended a resistance training program, from 61 to 80 years, increased on average 1.09 kilograms of muscle, suggesting a concomitant increase in muscle strength in elderly people.

The most important endogenous cause of the loss of muscle strength with aging is the loss of motor units in the nervous system (ACSM, 2007). Externally, the major cause of sarcopenia is the lack of physical activity (MENDES, 2006). The neuromuscular loss is 10 to 20% in muscle strength, resulting in decreased ability to maintain static force, a higher rate of muscle fatigue, and less ability to hypertrophy, leading to a deterioration in mobility and functional capacity of the elderly (TRIBESS; Virtuoso JÚNIOR, 2005).

Hakkinen et al (1998, cited by Fleck and Kraemer, 2006), found a significant increase of strength after ten weeks of endurance training on 40 and 60% in the elderly.

The aging related to the phase of the elderly has been most studied in recent years, providing more knowledge about this process that more and more people experience (Truccolo et al, 2002). One of the most common ideas is that with aging neuromotor basic variables decrease, based mainly on the decreasing amount of physical activity (FLECK; KRAEMER, 2006; Spirduso, 2005).

Among the different variables of physical fitness, strength and aerobic endurance are the ones show change more clearly, as they directly affect the performance of daily activities, difficulting tasks as simple as getting up from a chair and walking to a point to catch an object (Truccolo et al.2002).

Problems in the joints, stiffness and loss of elasticity can lead to pain. These problems are caused by lack of physical activity. The resistance training also improves the elasticity of the muscles, improving blood circulation and the movement of the joints (OKUMA, 1998).

The American College of Sports Medicine (2007) indicates that senior citizens above 60 years, after twelve weeks of endurance training, can improve from 60 to 100% their levels of muscle strength. Thus, there is a great need to develop a program of resistance training for this population. Mazo, Lopes and Benedetti (2001) emphasized that strengthened muscles protect the joints, decrease the risk of injury and help keep the body posture, alleviating back pain. Therefore, a program that presents these results favors the maintenance of autonomy and resourcefulness for the elderly in carrying out their daily activities (KUHNEN, 2003).

Other important needs are the psychological factors, social and emotional environment that group's physical activity creates (Spirduso, 2005). From the moment when the elderly conquest their information and social space, their representation in respect of themselves changes: the image of a dull old age, suffered, stereotypical loses its strength and fades away (PASCOAL; SANTOS; BROEK, 2006).

The endurance training affects three aspects of life: the social, the psychological and the neurological, by increasing the interaction between individuals of the same age or inserting them back into society, since exercise improves the mood, reduce anxiety, prevent depression, and stimulate learning and memory. Regarding the physical aspect, exercising promotes increased cardiopulmonary capacity and flexibility, increased muscle mass, strength and bone mineral density and also reduces the percentage of fat and cholesterol and controls the glicemia (low blood sugar), among other benefits (RAUCHBACH, 2001).

Conclusion

In this study, there was a significant increase in the handgrip strength in the elderly after a program of resistance training. Thus, it is possible to emphasize that strength training guided by a physical educator ends to play a major role in the prevention, conservation, rehabilitation and functional capacity of the elderly, allowing them to maintain independent lives, without many restrictions or problems resulted from inactivity.

Overall, the results of this study may contribute to the prescription and guidance of a resistance training program aiming the gain of handgrip in the elderly.

It is suggested that some other studies are done in order to look at other functional variables in the elderly, to verify and quantify other improvements arising from a program of resistance training.

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THE EFFECTS OF A RESISTANCE TRAINING PROGRAM IN THE HANDGRIP STRENGTH OF OLDER ADULTS
ABSTRACT

During the process of aging, it is observed that different components of physical aptitude related to health were reduced, such as fitness, strength, muscle resistance and flexibility. Among these components, muscle strength is one of the elements that are mostly reduced with aging, resulting in the reduction of the capacity to do day-by-day activities, like carrying objects, climbing stairs, standing up the sofa, and many others. The purpose of this study was to investigate the effect of an 8-week resistance training program in the hand-grip strength in elderlies. This study is characterized as almost-experimental. The sample was composed by 40 female elderlies, with ages raging from 60 to 75 years, living in Guarapuava-PR. These participants were evaluated before and after the training program. The result of the evaluation before training was 25.05 Kgf. All the subjects increased significantly the hand-grip strength to 26,97 kgf after training, having a modification of 1,9 Kgf an average of 7,5% in the increase of hand-grip strength in elderlies.

Key-words: elderly; physical activity; hand-grip strength.

EFFETS DE L'ENDURANCE DE LA FORCE DE PRéHENSION DES PERSONNES âGéES
RESUMÉ

Au cours du vieillissement ce sont vu les déclines de différentes composantes de la condition physique liés à la santé et de cardio-fitness, la force musculaire et l'endurance et de flexibilité. Parmi ces éléments, la force musculaire est l'un des plus diminué avec l'âge, ce qui réduit la capacité d'accomplir les activités quotidiennes, comme le chargement des objets, monter un escalier, ascenseur le canapé, entre autres. Le but de cette étude était d'étudier l'effet d'un program de la résistance de formation de huit semaines dans la force de préhension des personnes âgées. Cette étude est considérée comme quasi-expérimental. L'échantillon se composait de 40 personnes âgées entre 60 et 75 ans d'âge, de sexe féminin, vivant dans la ville de Guarapuava-Pr. Ces participants ont effectué une pré-évaluation du trainment, par la suite l'objet d'une endurance et après huit semaines, a été menée pour évaluer post-formation. Le résultat de la pré-évaluation a été kgf 25/03, tous les individus presentés la force de préhension sensiblement augmenté, de post-formation à 26,97 kg, avec un changement de 1,9 kgf provoquant une moyenne de 7,5% d'augmentation dans la poignée des personnes âgées.

Mots clés: personnes âgées, l'activité physique, la force de préhension.

EFECTOS DE LA FORMACIóN DE RESISTENCIA EN LA FUERZA DE EMPUñADURA EN ANCIANOS
RESUMEN

Durante el envejecimiento se observan descensos en los diversos componentes de la aptitud física relacionados con la salud y la aptitud cardiorrespiratoria, fuerza muscular y la resistencia y flexibilidad. Entre estos componentes, la fuerza muscular es uno de los más disminuye con la edad, lo que resulta en la reducción de la capacidad para realizar las actividades diarias, tales como la carga de objetos, subir escaleras, levantar el sofá, entre otros. El objetivo de este estudio fue investigar el efecto de un programa de entrenamiento de resistencia durante ocho semanas en la fuerza de la empuñadura en las personas de edad avanzada. Este estudio se caracteriza por ser cuasi-experimental. La muestra consistió de 40 personas mayores entre 60 y 75 años de edad, las mujeres, que viven en la ciudad de Exeter-Pr. Estas participantes realizaron una pre-evaluación de la formación, a los que posteriormente sometidos a un entrenamiento de resistencia y después de ocho semanas, se llevó a cabo para evaluar después de la formación. El resultado de la pre-evaluación fue 25,03 kgf, todos los individuos aumentó significativamente empuñadura, después de la formación para kgf 26,97, con un cambio de 1,9 kgf causando un promedio de 7,5% de aumento en la empuñadura de las personas de edad avanzada.

Palabras clave: edad, actividad física, la fuerza de empuñadura.

EFEITOS DO TREINAMENTO RESISTIDO NA FORÇA DE PREENSÃO MANUAL EM IDOSOS
RESUMO

Durante o envelhecimento são observados declínios nos diferentes componentes da aptidão física relacionada à saúde como aptidão cardiorrespiratória, força e resistência muscular e flexibilidade. Dentre esses componentes, a força muscular é um dos elementos que mais diminui com a idade, acarretando em diminuição da capacidade em realizar atividades cotidianas como carregar objetos, subir escadas, levantar do sofá, entre outras. O propósito do presente estudo foi de investigar o efeito de um programa de treinamento resistido durante oito semanas na força de preensão manual nos idosos. Este estudo se caracteriza como quase-experimental. A amostra foi composta de 40 idosos, entre 60 e 75 anos de idade, de sexo feminino, residentes na cidade de Guarapuava-Pr. Estes participantes realizaram uma avaliação pré-treino, posteriormente submetidos a um treinamento resistido e após oito semanas, foi realizado a avaliação pós-treino. O resultado da pré-avaliação foi de 25,03 kgf, todos os indivíduos aumentaram significativamente a preensão manual, no pós-treino para 26,97 kgf, havendo uma modificação de 1,9 kgf acarretando uma média de 7,5% de aumento na preensão manual do idoso.

Palavras chaves: idoso; atividade física; força de preensão manual.