39 - PHYSICAL EXERCISE PROGRAM IN THE TREATMENT OF OSTEOPOROSIS

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INTRODUCTION

Nowadays, along the life expectation growth, there is a major concerning with the emergence of the chronical degenerative diseases. among the list of these pathologies, osteoporosis has emerged as a disease that promotes a number of limitations, generating significant cost to the public health and has been being a disease more and more diagnosed in women and men worldwide.

A clinical interest has emerged to work with the prevention of this disease due to the continuous increase of the elderly population, and due to the fact that osteoporosis is a systemic disease that has the result of decreasing the bone composition and the loss of the tissue microarchitecture, bringing to the patient, high mechanical weakness and automatically more cases of fractures with minimal trauma (CARVALHO, et all, 2004).

Despite the concept regarding the importance of exercising to prevent and treat osteoporosis, little awareness is noticed about the matter, and little adherence to this therapeutic form of, limiting the treatment to medication and calcium replacement. This way, the aim of this research is to analyze the program of physical exercise in the treatment of osteoporosis.

The aim of this study is, after revising the recommendations of the exercises for the treatment of osteoporosis, verify the change in the bone density in a woman with osteoporosis after the introduction of a physical exercise program on a conventional treatment with medication and diet

THEORETICAL REFERENCE

The skeleton is composed of cancellous and compact bones, the compact, presented in larger quantities, are more resistant while cancellous bone pose greater loss of bone mass (NIENAN, 1999).

The living bone has a structure that is not durable, as it is a structure that is under continuous wearing out and remodeling occurred by mechanical stress placed on the bone (SEGURA, 2007) Among the diseases, osteoporosis has been presented as an ailment that causes a series of limitations on a person, affecting their quality of life, creating a significant cost to the public health, diagnosed in men and women worldwide.

Although there has been much talk of the disability of sex steroids in the pathogenesis of osteoporosis, and the extreme importance of menopause, we also know that lack of physical activity is an important risk factor (Ocarino; Serakides, 2006).

Campos (2008) "it is estimated that 15% of women aged seventy years old, and over half of women aged around eighty will suffer a bone fracture as a result of osteoporosis."

"Family studies suggest osteoporosis as a genetic disease with polygenic character with more than 85% of the variation in bone mass is under genetic control" (FROES et all, 2002, p.52).

About up to 30 years of age is when the skeleton accumulates bone mass, more in men than women. After that point, being a starting point of a loss of 0.3% per year, so women lose more bone mass in the first ten years postmenopausal, reaching up to 3% per year, and it is much worse when women are sedentary (SAFE, 2007).

Peak bone mass occurs at the end of puberty, then physical activity and calcium intake should be inserted in pre pubertal age, which purpose in it is to add bone mineral density (SAFE, 2007).

A lot of clinical interest has been emerging in working on the prevention of this disease, because of the continuous increase in the elderly population, and due to osteoporosis being a systemic disease which results in decreasing bone mass and the micro architectural loss of this tissue, bringing the individual to one increased mechanical weakness and automatically more cases of fractures with minimal trauma (CARVALHO, ET all, 2004).

To Knoplich (1993), the diagnosis today is done quickly because of bone densitometry. The response occurs expressed according to the average bone mass. If the patient has 10% less, computers of bone densitometry already signals that the patient is in danger of fracture zone.

According to Silva (2003), rather than just the exercise itself being good to continue with normal bone mineral density, there are other ways for the effect continues as some types of anti resorptive drug bone encompassed by ANVISA. Thus, according to the studies, physical exercises have been proven effective for the treatment of osteoporosis.

Even direct or indirect, physical activity shows a strong and complex effect on bone tissue, however, it depends on several factors, such as the type, repetition, duration and intensity of exercise (Ocarino; Serakides, 2006).

Not all types of exercise are good for women's skeleton at post-menopause. There are studies that show that exercises with moderate load such as jogging and walking may cause an increase in bone mineral content in these women, unlike the low-load exercises, such as swimming and aerobics, these groups do not have the same content increase the mineral in the bone.

Ocarino and Serakides (2006), suggest that physical exercise affects bone as tissue and also as body, because of its action on cartilage growth. Therefore, physical exercise and health experts have recommended more and more the inclusion of resistive exercise for the treatment and prevention of osteoporosis.

Bodybuilding is essential in the treatment because when the muscle is weak, it increases the risks of falling, thus bringing more chances of fractures that may impair bone fragility.

Bodybuilding can also bring more benefits to people with the disease, such as increased muscle mass, improve bone mass increase (or reduce its loss), better balance, which reduces the risk of falls and fractures because of osteoporosis. The practice of weight training allows a person to have a physical independence to perform activities of daily living and have a population with life quality. (SAILS, et all, 2003).

To increase the osteoblastic activity, testosterone turns into estrogen in peripheral tissues, when they join, this increase happens, aiding in bone mineralization and remodeling, growth hormone, it also helps in increasing bone, tissue and muscle tissue connective (FOURAUX, 2011)

METHODOLOGY

This study features a qualitative research study based on a case study that presents a situation that has been analyzed in more depth from studies similar cases and generalizations. (YIN, 2005). This study was conducted with a woman of 65, which presents a case of primary osteoporosis, type II, with medical clearance for physical exercises and that after a period of three years of treatment with a medication with calcium replacement and sporadic practice exercises without professional guidance just practicing regular walk, starts to undergo an oriented training by of physical education professional with the objective of improving the bone density.

Analysis of eight tests measure bone mineral density were performed using the dual-energy x-ray absormetry (DEXA) practice, the densitometric evaluation done on the appendicular skeleton (proximal femur).

The bone mineral density (BMD) and the percentage of mineral content in relation to the young adult and the percentage of mineral content for age were performed. Annual examinations from 2007 to 2014 were also analyzed, therefore, the program of guided exercises was introduced in September 2010, with a specific and regular three times weekly bodybuilding program.

The fitness program was composed of three series of exercises for every single muscular workout area to be done on Mondays, Wednesdays and Fridays. The load was determined by a repetition test, with a repetition number set of12 times for each exercise with emphasis of increasing the impact on skeletal system.

It was determined that, for each training session, an interval training on the treadmill, alternating walking and jog trot.

RESULTS AND DISCUSSIONS

Osteoporosis is a very frequent metabolic bone pathology. It causes a decrease in the absolute amount of bones and disruption of their microstructure, causing a state of fragility which can cause fractures after minimal trauma. It is a serious public health problem and has reached an estimated 15 million Brazilians. The fracture is the most frequent clinical manifestation. Most people with fractures of the femur, have difficulty in locomotion and about 40% have circulatory complications, respiratory infections and onset of diabetes.

It can be observed in the study case that, from the time the patient sought a professional statement and hence a specific prescription of exercise to combat this disease a significant improvement in their bone mineral density. Reinforcing the position of Ocarina and Serikades (2006), who claim that exercises affect the bone as a tissue as well as an organ, it is recommended the inclusion of resistance exercise in the treatment and prevention of osteoporosis.

In Table 1, we observe three items: BMD (BMD g / cm2), the percentage of mineral content of young people (indicating how much bone mass was lost compared to a young adult), the percentage of mineral content per age group (which makes the correction of the expected values based on the normal loss of age) and classification of the disease into 3 levels: normal, osteopenia and osteoporosis.

Table 1: Bone mineral density of the right femur

Data	BMD (densidade mineral óssea) (g/cm2)	% de conteúdo mineral do jovem	% de conteúdo mineral para faixa etária	Classificação
09/12/2007	0,647	63,5	75,9	Osteoporose
28/09/2008	0,689	66	82	Osteoporose
23/06/2009	0,732	71	89	Osteopenia
15/05/2010	0,758	73	93	Osteopenia
23/08/2011	1,083	92	114	Normal
06/08/2012	1,067	90	114	Normal
17/06/2013	1,077	91	116	Normal
16/07/2014	1,078	92	116	Normal

Source: research data

The results of the individual exams can be analyzed from the year 2007 in which case the percentage of BMD (bone mineral density was g / cm2) 0.0647, the percentage content of the youth was 63.5 and the percentage content of youth was 63.5 and the percentage of mineral content for age group is 75.9%, which had osteoporosis.

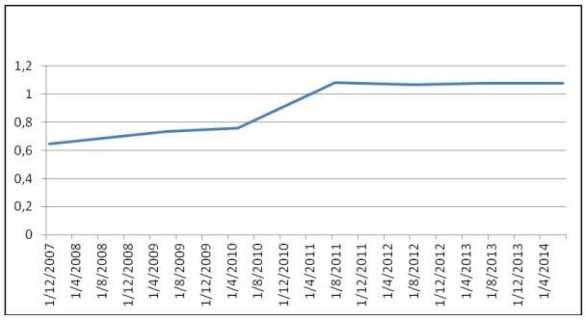
At that moment the standard treatment was started, and the conduction of daily walks under the sun. And in 2008, the percentage of BMD (bone mineral density g / cm2) increased to 0.0689 (g / cm2), with a slight improvement in the percentage of content in relation to young age, 66%, and the percentage of mineral content for age group is 82%, still classified as osteoporosis, without a significant change.

Thus, little progress was noted year after year, keeping the conventional treatment and conducting daily walks. In 2009 the percentage of BMD (bone mineral density g / cm2) 0.732 g / cm2, the percentage of content in relation to the young person was 71% and the percentage of mineral content for age group was 89%, which had a significant change in their living conditions, classified as osteopenia.

From 2009 to 2010, there was little improvement, after the BMD (bone mineral density) 0,758 g/m², the percentage of the mineral contents in relation to the young person increased only 2% reaching 73% and the mineral content to the age group reached between 89% and 93%, without changes in the classification, still having osteopenia.

From September 2010, a routine-oriented exercises with a specific and regular fitness program, three times a week, consisting of three series of exercises for each muscle area in a single training was introduced. The load was determined by repeating the test with a set number of repetitions for each exercise 12 times, increased according to the perception of the student effort, increased whenever she could perform with ease, over 12 repetitions. An interval training on the treadmill was also performed in each training session, alternating walk and trot.

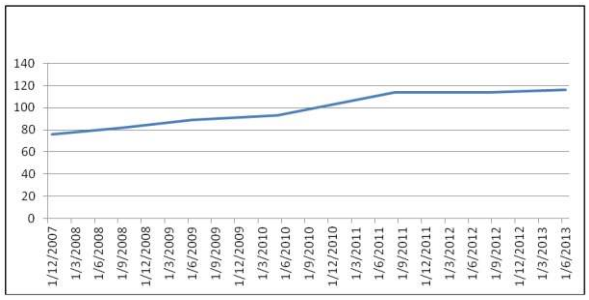
Graph 1: BMD (bone mineral density g / cm2)



Source: research data

We can see that from this moment, the percentage increased significantly. The percentage of BMD increased from 0.758 g / cm2 to 1.083 g / cm2, the percentage content of the young person increased from 73% to 92% and the percentage of mineral content for age group increased from 93% to 114%, exceeding the expectations for the age group, and from then it was classified as normal.

Chart 2: Percentage of mineral content for age group



Source: research data

It draws attention to the fact that after the initiation of a program of targeted exercises to treat osteoporosis. The student recovered her bone mass, exceeding the expected percentage for her age group to up to 16%, a percentage that is well out of osteoporosis classification, she also developed a reserve mass, above the expected values.

Therefore, one can conclude that weight training is essential in the treatment of osteoporosis, confirming the positions of several authors, among them: Navigates all ET (2003), Campos (2008), Fouraux (2014), among others, stressing that the weight lifting can bring further benefits to people osteopenia and osteoporosis as increased muscle mass that can enhance the increase in bone mass, not only reducing their loss as well as giving them a better balance, reducing the risk of falls and fractures, reaffirming that the practice of weight actually allows a person to have a physical independence and thereby safely perform the activities of daily life, enabling the existence of a population with a higher quality of life.

FINAL CONSIDERATIONS

Osteoporosis is a serious public health problem in Brazil and worldwide, being the femur fracture, a more frequent and dramatic occurrence of osteoporosis and which compromises the life quality of a person.

The muscle development upon the bones is an excellent stimulus for maintenance and increase of bone mass. The physical exercises should be performed with professional guidance and providing impact in a controlled manner on a regular basis, at least three times a week, respecting the physical recovery process.

The data do not confirm that the most appropriate exercise to prevent osteoporosis is walking as many believe, because depending on the osteoporosis degree, more specific and directed exercises are necessary, weightlifting is essential to stimulate the bone ????, besides improving the proprioception, in order to decrease the number of falls and of hips fracture.

Therefore, it is observed that the inclusion of a physical education is essential as an important agent of health, which, with integration with other health professionals assess the overall clinical picture and perform the correct, safe and guidelines that can really help the treatment of osteoporosis, as it is considered one of the biggest public health problems due to their degree of bouts with disabilities, mobility and among the elderly.

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PHYSICAL EXERCISE PROGRAM IN THE TREATMENT OF OSTEOPOROSIS

ABSTRACT

This study aims, after reviewing the recommendations about the physical exercise to the treatment of osteoporosis, to verify the changes on the bones density in a woman with posterior osteoporosis to the introduction of a physical exercise program in a conventional treatment of osteoporosis only with medication, diet and walks without professional guidance, whose individual of this research is a woman who will undergo a physical exercise program in the osteoporosis treatment, following the recommendations to this special group. The bone mineral density (BMD) , the percentage of the mineral content related to the young adult and the percentage of the mineral content for the group age were analyzed . The annual exams from 2007 to 2014 were analyzed, therefore the oriented exercise program was introduced in September 2010 and with a specific and regular weightlifting program three times a week. The weightlifting program consisted of three series of exercises to each muscular area, in a single training to be done on Mondays, Wednesdays and Fridays. The load was determined by repetition established in 12 times to each training section with emphasis to the progressive increase on the impact on the Skeletal System. It was determined that in each training section, an interval treadmill training, alternating jog trot and a walk. The pathology picture of the volunteer had relevant results. This way, the results obtained in this study allow the conclusion that the applied physical exercise program was effective to the increase of the bone mineral density and the percentage of the mineral content to the age group, becoming its classification normal.

KEYWORDS: Osteoporosis. Exercise. elderly

PROGRAMME D'EXERCICE PHYSIQUE DANS LE TRAITEMENT DE L'OSTÉOPOROSE

RÉSUMÉ

Cette étude avait pour objectif, après avoir révisé les recommandations relatives à l'activité physique pour le traitement de l'ostéoporose, de vérifier la variation de la densité osseuse chez une femme souffrant d'ostéoporose, ultérieure à l'introduction d'un programme d'exercice physique dans un traitement conventionnel avec seulement des médicaments, de la diète et des marches sans orientation professionnelle, dont le sujet de la recherche est une femme qui sera soumise à un programme d'exercice physique dans le traitement de l'ostéoporose, en suivant les recommandations établies pour ce groupe spécial. Il a été analysé la BMD densité minérale osseuse, le pourcentage de contenu minéral par rapport aux jeunes adultes et le pourcentage de contenu minéral pour la classe d'âge. Les examens annuels de 2007 à 2014 ont été analysés, et le programme d'exercices guidés a été introduit en septembre 2010 avec un programme de musculation spécifique et régulier trois fois par semaine. Le programme de musculation a été composé de trois séries d'exercices pour chaque zone musculaire dans une seule séance d'entraînement à être réalisé le lundi, le mercredi et le vendredi. La charge a été déterminée par des tests de répétition, avec le nombre de répétitions fixé à 12 fois pour chaque exercice, en mettant l'accent sur l'augmentation progressive de l'impact dans le système squelettique. À chaque session de formation , un entraînement avec des intervales sur le tapis roulant a été déterminé, en alternant du trot et de la marche. Le cadre de patologie du sujet volontaire a présenté des résultats significatifs. De cette façon, les résultats obtenus dans cette étude permettent de conclure que le programme d'exercice physique employé avait été efficace dans l'augmentation de la densité minérale osseuse et le pourcentage de contenu minéral pour la classe d'âge, devenant la classification de la même, normale.

MOTS-CLÉS: ostéoporose. L'exercice physique. Personnes âgées.

PROGRAMA DE EJERCICIO FÍSICO EN EL TRATAMIENTO DE LA OSTEOPOROSIS

RESUMEN

Este estudio tuvo por objetivo, después de revisar las recomendaciones a respecto Del ejercicio físico para el tratamiento de la osteoporosis, verificar la alteración de la densidad ósea en una mujer con osteoporosis posterior a la introducción de un programa de ejercicio físico en un tratamiento convencional apenas con medicación, dieta y caminatas sin orientación profesional, cuyo sujeto de estudio es una mujer que será sometida a um programa de ejercicio físico en el tratamiento de la osteoporosis, siguiendo lãs recomendaciones para ese grupo específico. Fue analizada la densidad mineral ósea (BMD), el porcentual de contenido mineral en relación al adulto joven y el porcentual de contenido mineral para la franja de edad. Se analizaron los exámenes anuales, de 2.007 a 2.014, siendo que el plan de ejercicios orientados fue introducido en septiembre de 2.010, con um programa de musculación específico y regular, tres veces por semana. El programa de musculación fue compuesto por tres series de ejercicios para cada área muscular, em entrenamiento único a ser realizado los lunes, miércoles y viernes. La carga fue determinada por test por repetición, con número de repetición establecido en 12 veces

para cada ejercicio con énfasis en el aumento progresivo del impacto en el sistema esquelético. Fue determinado en cada sesión de entrenamiento, un entrenamiento a intervalos en la cinta para correr, alternando carrera a ritmo suave y caminata. El cuadro de patología del sujeto voluntario de estudio presentó resultados significativos. De esta manera, los resultados obtenidos en este estudio permiten concluir que el programa de ejercicio utilizado, fue eficaz para el aumento de la densidad mineral ósea y el porcentaje de contenido mineral para el rango de edad, convirtiéndose la clasificación de la misma en normal.

PALABRAS-CLAVE: Osteoporosis. Ejercicio Físico. Persona Mayor.

PROGRAMA DE EXERCÍCIO FÍSICO NO TRATAMENTO DE OSTEOPOROSE

RESUMO

Este estudo teve por objetivo, após revisar as recomendações sobre o exercício físico para o tratamento da osteoporose, verificar a alteração da densidade óssea em uma mulher com osteoporose posterior a introdução de um programa de exercício físico num tratamento convencional apenas com medicação, dieta e caminhadas sem orientação profissional, cujo sujeito da pesquisa é uma mulher que será submetida a um programa de exercício físico no tratamento da osteoporose, seguindo as recomendações para esse grupo especial. Foi analisado a BMD densidade mineral óssea, o percentual de conteúdo mineral em relação ao adulto jovem e o percentual de conteúdo mineral para faixa etária. Foram analisados os exames anuais, de 2007 a 2014, sendo que o programa de exercícios orientado foi introduzido em setembro de 2010 e com um programa de musculação especifico e regular três vezes por semana. O programa de musculação foi composto de três séries de exercícios para cada área muscular, em treino único a ser realizada na segunda-feira, quarta- feira e sexta-feira. A carga foi determinada por teste por repetição, com número de repetição estabelecida em 12 vezes para cada exercício com ênfase ao aumento progressivo no impacto no sistema esquelético. Foi determinado em cada sessão de treino, um treino intervalado na esteira, alternando trote e caminhada. O quadro de patologia da sujeita voluntária apresentou resultados significativos. Dessa forma, os resultados obtidos neste estudo permitem concluir que o programa de exercício físico empregado, foi eficaz para o aumento de densidade mineral ósseo e a porcentagem de conteúdo mineral para a faixa etária, tornando-se a classificação da mesma, normal.

PALAVRAS–CHAVE: Osteoporose. Exercício Físico. Idoso.