145 - BIOPHYSICS VARIABLES IN ELDERS SUBMITTED TO INDIVIDUALIZED PHYSICAL TRAINING

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Introduction: The natural process named aging has been increased over the last years. We have considered an old person who is more than 60 year old. Forecasting for the next 20 years show us that the number of elders could reach or passing 30 million people, representing 13% of Brazilian's population (IBGE 2000). One of the mainly responsible factors for this increase is the falling of the born rate and the raising of the mortality rate.

During aging many physiologic changing occur, and this occurrence has as endogenous (genetic characteristic) as exogenous (life style) aspects. In these cases we also can comment the chronicle disease aspects (ACSM, 1998).

This process comes with by several modifications in different organism's systems. This can be at anthropometric, muscular, cardiovascular, pulmonary, and neural or others organics functions levels which suffer deleterious effects, besides the falling of the functional capability and the modifications in the physiologic functioning (MCARDLE, KATCH & KATCH, 2001).

Although this natural process be associated to social, cognitive and physiologic losses capable of compromising the elder's life quality, it can be existing on a healthy manner but having some changes over the life style, among them there is the regular physical activity (MAZZEO et al., 1998; OLIVEIRA et al., 2001).

The body composition is considered a physical component related to the health. When related to the body chemical composition, bones, muscles, fat and other tissues are part of it (McARDLE, at al. 1990) and in the biochemical aspect, water, proteins, minerals and lipids are also part of it (MALINA & BOUCHARD, 2002).

The body composition allows us to know, precisely, if corporal fat, muscular weight and bone weight are inside the normal pattern.

Robert & Roberts (2002) tell us that the modification in the body composition can dramatically increase with aging and the elder, about 75 years old would have a typical composition with 8% bone, 15% muscles, 40% fat tissue, and all of that can compromise a lot the functional autonomy.

Through this information about the corporal composition components, we can offer a help and give us a base to the prescription of many different programs related to the health promotion and physical training, showing, bellow, the following possibilities: identifying the health risk associated with excessive level, high or low, of total body fat; identifying the health risk associated with excessive store of intra-abdominal fat; monitoring possible changes in body composition, all related to some kind of diseases; following the increasing, developing, maturation and alterations of the corporal composition related to health; and giving dietetics recommendations, prescription exercises and effectively evaluation of health promotion and physical training.

There are many types of corporal composition evaluation, and there are also three methods (direct, indirect and double indirect).

There is only one evaluation technique on the direct method. Each corporal component is separated and weight separated, but this is only possible if you work with dead body dissection.

In the indirect method, there is no separated weight, but start from the chemical and physical aiming the thin fat and mass quantity. The techniques associated with this method are classified in physical-chemical, images and densitometry (GUEDES, 2003).

When faced with the hard work at doing a corporal evaluation on a huge number of people (an entire population) using the methods above, the most common alternative are the techniques associated with the double indirect method.

In this procedure are involved regressions equations due to predict the associated variables to the indirect procedures that will estimate the corporal composition parameters. We can stand out from the double indirect method the Bio impedance (BIA) a really practical method. BIA is efficient when showing fat percentage because has as a base the body total resistance to an electrical current. This technique is recommended for elders.

In accordance to MAZZEO et al (1998), the associated aging with sedentary leads to the falling of the functions related to the physical conditioning. A 50% reduce on the aerobically capacity due to the cardiovascular changing and the rising of body fat (MORENO, 2003).

The cardiovascular function ($VO_{2máx}$) suffers a 5% and 15% decrease per decade of life, beginning from 25 years old. There are others cardiovascular changing related to aging as: cardio debit reduction, cardio frequency reduction, systolic volume reduction, tissue O2 intake reduction, arterial pressure rises, O2 arteryovenosys difference rises, lactic acid concentration rises, lower capacity of adaptation and recovery from exercises (MATSUDO, 1999, OLIVEIRA, et. al., 2001).

The cardio frequency (FC) stand out as the main parameter that gives the cardio information, and reflect the work quantity that the heart must do when satisfying the rising demand from the body during an activity(MAIOR, 2003).

During aging, the cardio changing are inevitable, where the aorta and the big artery showing a very elastic wall, but during this process, they are going to loose their natural elasticity. The vase elasticity maintains the systolic pressure in its normal state, and the loss of this elasticity contributes to a rise of the pressure level at older ages (FERRIER, 2001, LUNA, 2002).

In accordance to the IV Diretrizes Brasileiras de Hipertensão Arterial, 2002, the normal systolic pressure levels are: systolic value of 130 mmHg and diastolic value 90 mmHg. The arterial hypertension occurs in at least 36% of the elder population.

During aging there is a muscular mass loss, and this loss is related to the low level of activity of the muscular-skeletal system, and this is related direct to the loss of strength (MATSUDO, 2000).

Aging and sedentary contributes to the rising of the effects in muscular mass, including changing in the motor unit, fibers intervention, growing factors reduction and the muscular protein changes, making individuals more vulnerable to falls and fractures(REBELATTO, 2006).

The ACSM, 2000 confirm that there is a falling about 15% per decade till 70 years old, and after that a 30% loss are estimated.

The fact that the muscular strength be important for elders consist in the association between daily amounts of activity, such as: dressing, showering, walking on the street, downing, preparing their own meal, and others (BARBOSA et. al., 2000). Besides these factors, the strength training has a direct benefit as: osteoporosis and cardio disease prevention, increase in the corporal static, strength, power, reduce the muscular mass loss and increase the elder's self-worth (Fleck e Kramer, 1999, Matsudo, 2001 e Monnerat, 2002).

Whit the life quality evaluation it's possible to see a direct interference in the disease modification and the medication adverse action and reaction (BECH, 1995). This is an individual perception of physical, social and materials necessities (DANTAS, 2005).

The body maintenance through physical activities has been fundamental to preserve the vitals functions in a good functioning, and also allows the corporal composition reducing an inevitable modification in the fat percentage (rising) and muscular mass (falling). Reducing or even reverting cardio and pulmonary changing, rising the physical capacity, the elasticity and balance, reducing the risk of falls. These days that is clear tell that the elders' participation in regular exercises is a good way to reduce or even so prevent the number of changing related with aging (ACMS, 2000).

Methodology:

To give an answer to the study's objective a descriptive statistic has been used, because its valor are supported by the premise that the problems can be resolved and the practice updated by the observation, analysis and complete and objective description. Being the study a longitudinal type, the searches follow the same subject throughout the time (TOMAS e NELSON, 2002).

This study is in the accordance with the 196/96 Resolution, related to searches in human being. With the free willing of the people involved all the sample subjects has signed a free willing term giving a authorization to publicity the outcome results.

The study's sample was composed by 18 elders (n=18), all volunteers, with minimum age of 60 indeed. These elders are part of the physical program training which has been doing exercises of muscular strength and cardio training. The exercise's prescriptions are given by high specialized professionals and are followed by the students of physical education and physiotherapy from University of Grande Rio (UNIGRANRIO).

Were investigated the arterial pressure variable, cardio frequency, fat percentage, corporal mass index, arms muscular strength level and life quality.

For the measure of the corporal mass and height the following instruments were used:- Filizola® balance with 150Kg full capacity and 100Kg sensibility. The individual was without any shoes and with only underwear. The anthropometric scale fixed on the balance, with the individual stand still on your feet, eyes fixed on a horizontal axis parallel to the ground (Frankfurt line).

For the fat percentage measure a corporal composition analysts machine by bipolar bio impedance mark Omreon® (USA) has been utilized.

To measure the arterial pressure a sphygmomanometers Becton Dicnson; stethoscopes Rappaport - Premium has been utilized.

To measure the muscular strength a manual digital dynamometer TAKEL (Japan) has been utilized.

To measure the quality of life a questionnaire made by the World Health Organization (WHO) - WHOQOL-OLD- year 2007- has been utilized.

The individuals has been received an individualized physical training with concentric muscular work and eccentric for the arms and legs, through cardio and muscular strength exercises. The training program was 1 year and 2 months long, with 2 sections per week with 60 minutes long each.

The individuals have begun initially with stretching and warming, and after that have started the circuit with 7 different exercises: chest, shoulders, biceps, triceps and thigh (anterior and posterior). At the end of the circuit the individuals have realized a “cool down”

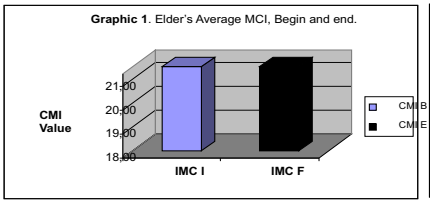
Individual data has been discovered through an anamnesis. In this formulary has been discovered too: clinical file/history (patient mainly complains and actual disease file/history), regress pathologic file/history (patient's case of surgery, medicaments use and another types of disease as: bronchitis, asthma, labyrinthine, cardio disease, arterial hypertension, diabetes, cerebral vascular accident and osteoporosis), life stile (smoke, alcohol, sport or some kind of regular activity) and a physical evaluation (dynamic and static balance).

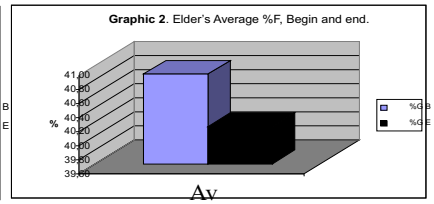
All the anthropometrical measures, fat percentage measure, corporal mass index, manual pressure level and anamnesis all has been collected on the same day. Data as the cardio frequency measure and pressured levels has been collected daily at the begin and the end of each physical training.

Results and Comments

The sample (n=18) shows an average of 70,07±5,16 years, classifieds as “elders” (WHO, 2007). In the beginning of the individualize physical training program, these people were with an average of corporal mass (CM) of 66,64±8,03(Kg) and after 12 months this average came to 65,82±6,82(Kg).

Graphics 1 and 2 shows, respectively, the group average values of Corporal Mass Index (CMI) and Fat Percentage (%F). Maintained de CMI variable and a fall for the %F.





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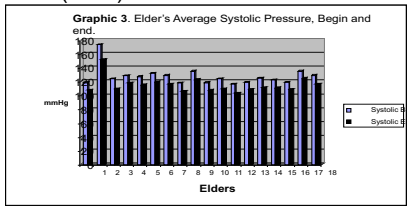
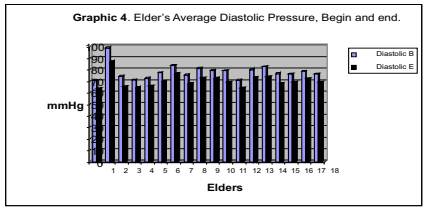
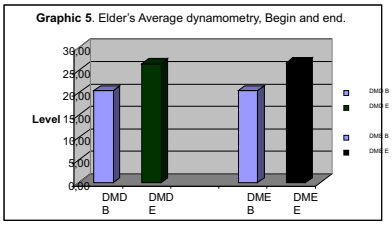
Graphics 3 and 4 shows the individual average for pressures levels, respectively, Systolic Arterial Pressure (SAP) and Diastolic Arterial Pressure (DAP).

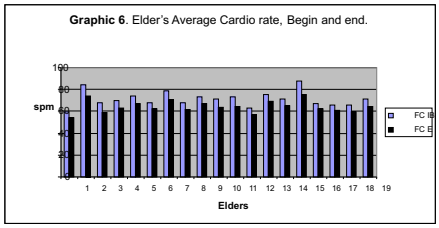




A reduction in the average of these levels for all investigated individuals is verified.

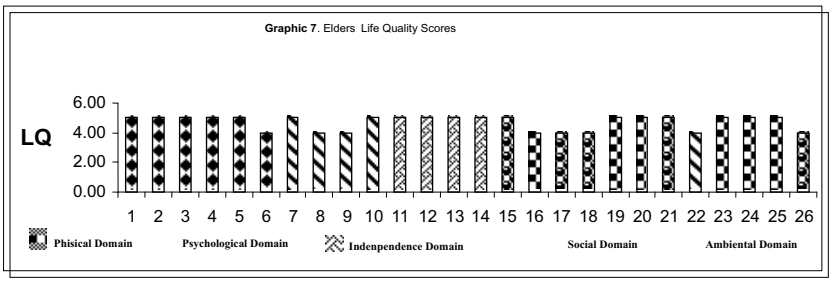
With the objective of showing of the elder's manual apprehension, the described outcome values from dynamometry are showed in Graphic 5 where there is an average rise of 7 Kgf.





The Graphic 6 shows the average value of the Cardio Frequency, considering the first ten measures (October 2006) and the last ten measures (October 2007) from each individual and from the group average. In this case, there is a fall of 5spm in the group average, where a 12spm-repose cardio frequency falls in the 15th individual can be see.

The Graphic 7 shows the modal quantitative score or, the value that correspond to the number which more times have been showed in each answer from "WHOQOL-OLD-2007", considering its use after 12 months of individualized physical training program.



Conclusion

After describing the results from all investigated variables in this study, we can conclude that a better performance has been occurred in 86% of the investigated variables. Only one CMI has not been modified. This group has received a "VERY BAD" classification on %F (FERNANDES FILHO, 2003) and the CMI as "NORMAL" (WHO, 2007).

The pressure levels also got better and has obtained a fall of almost 10mmHg of SAP and DAP, being that a great importance for reduce the cardio disease risk classified as NORMOTENSES (ACSM, 2007).

The cardio frequency average has obtained a fall of 12spm and this was good for the better physical conditioning to do exercises and for the life normal activities.

Even the right arm so in the left, the group has obtained an average manual strength gain of 7Kgf, showing muscular strength gain.

The group was classified as "SATISFACTORY" when related to the life quality (WHO, 2007).

Its possible to observe that after 12 months of individual physical exercise program a better performance has occurred on the following aspects: cardiovascular, pulmonary, muscular and life quality, all related to a better functional autonomy for elders.

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BIOPHYSICS VARIABLES IN ELDERS SUBMITTED TO INDIVIDUALIZED PHYSICAL TRAINING

ABSTRACT:

Introduction: The natural process named aging has been increased over the last years. We have considered an old person who is more than 60 year old. Objective: The objective this study was evaluated variables in elders submitted to individualized physical training. Methodology: The study's sample was composed by 18 elders (n=18), all volunteers, with minimum age of 60 indeed. For the measure of the corporal mass and height the following instruments were used: Filizola® balance with 150Kg full capacity and 100Kg sensibility. The individual was without any shoes and with only underwear. The anthropometric scale fixed on the balance, with the individual stand still on your feet, eyes fixed on a horizontal axis parallel to the ground (Frankfurt line). For the fat percentage measure a corporal composition analysts machine by bipolar bio impedance mark Omreon® (USA) has been utilized. To measure the arterial pressure a sphygmomanometers Becton Dicnson; stethoscopes Rappaport - Premium has been utilized. To measure the muscular strength a manual digital dynamometer TAKEL (Japan) has been utilized. To measure the quality of life a questionnaire made by the World Health Organization (WHO) - WHOQOL-OLD-year 2007- has been utilized. The individuals has been received an individualized physical training with concentric muscular work and eccentric for the arms and legs, through cardio and muscular strength exercises. The training program was 1 year and 2 months long, with 2 sections per week with 60 minutes long each. Resultados e Conclusão: De todas as variáveis investigadas neste estudo, concluiu-se que houveram melhoras em 86% das variáveis investigadas, sendo que somente uma (IMC) não houve modificação. O %G do grupo foi classificado como“MUITO RUIM” (FERNANDES FILHO, 2003) e o IMC como “NORMAL” (OMS, 2007). Houveram melhoras nos níveis pressóricos, pois obteve uma queda de quase 10 mmHg da PAS e PAD, sendo de grande importância para a diminuição dos riscos de doenças cardiovasculares, sendo classificados como NORMOTENSOS (A.H.A, 2003). Nas médias de freqüência cardíaca tiveram uma queda de 12 bpm, colaborando com isso para a melhoria na disposição física para executar exercícios e nos afazeres da vida diária. Tanto nos membros superiores direito quanto esquerdo o grupo obteve um ganho de apreensão manual médio de 7Kgf, demonstrando ganho de força muscular. Quanto a variável qualidade de vida, o grupo esta classificado como “SATISFATÓRIO” (OMS, 2007). Constatando assim que após 12 meses, de programa de exercício físico individualizado, houve melhoria nos aspectos cardiovascular, pulmonar, muscular, e na qualidade de vida desses idosos melhorando sua autonomia funcional.

VARIATIONS BIOPHYSIQUES DES PERSONNES AGEES AU COURS D'UN ENTRAîNEMENT PHYSIQUE PRéCIS

RESUMÉ:

Introduction: Le procès naturel appelé vieillissement;sa longévité a augmenté de façon considerable au cours des dèrnières années,d'ailleurs une personne est considèrée agée à partir de 60 ans.L' Objectif de cette étude était de verifier les alterations occasionnés dans leurs possibles variations biophysiquese : l'indice de masse corporele,pourcentage de gras,niveaux de la pression artérielle,la force de pression manuelle et qualité de vie des personnes agées soumis a un entraînement physique donné par une periode de 12 mois. Méthodologie pour individualiser la Masse Corporelle et la Taille ont été utilisé les instruments suivants: Pésè Personne Medical de la marque Filizola avec une capacité de poids total de 150k et 100g d' écart possible. Pour la mensuration du pourcentage adipeux à été utilisée un instrument de la marque Omreon(USA). Pour la pression artérielle un appareil Becton Dicnson ainsi qu' un stéthoscope Rappaport-Premium. Pour la force manuelle à été utilisée un appareil japonais de la marque Takel. Pour la qualité de vie à été utlise le questionnaire établi par l' Organisation Mondiale de la Santé (OMS), WHOQOL-OLD de l'année 2007.Les personnes était soumises a un etraînement physique précis avec exercices musculaires concentriques et excentriques pour les membres inferieurs et superieurs.Pour l'instant ce programme à duré 1 an et 2 mois, au rytmo de 2 séances de 60 minutes chacune par semaine.Resultat et Conclusion:De toutes les variantes analysée, on constate une amelioration en 86% des toutes variantes confondues,a part une ,(IMC) ou il ny a pas eu modification Le % G ? (o que é isso) du groupe à été classe" TRES MAUVAIS" (FERNANDES FILHO /2003) e o IMC comme "NORMALE" (OMS,2007).Ilya eu amélioration au niveau artériel, avec une chute de presque 10mmHg PAS et PAD confondues, étant un élement primordial de diminution dans les risques des maladies cardiovasculaires,étant classée comme NORMALE (ACSM, 2007).Ily a eu une chute de 12bpm dans la moyenne cardiaque, ce que a comme consequence une amelioration physique dans le quotidien.Aussi bien dans les membres superieurs gauche et droit, le groupe a acquis ainsi un gain de tension manuel moyen de 7Kgf.En ce qui concerne la qualité de vie, le groupe est classe SATISFAISANT".Force est de constater qu' aprés 12 mois d' exercices physiques avec un programme individualisé, ilya eu réel progrés cardiovasculaire, respiratoire, musculaire et dans leur qualité de vie qui se trouve ainsi aidé par une autonomie fonctionnel plus à même de les aider dans le quotidien.

VARIABLES BIOFíSICAS DE LOS ANCIANOS SOMETIDOS A UN ENTRENAMIENTO FíSICO PERSONALIZADO

RESUMEN:

Introducción: El proceso natural llamado envejecimiento he tenido un crecimiento durante el pasar de los últimos años. La edad que considera una persona anciana es de más de 60 años inclusive. El Objetivo de este estudio ha sido verificar las alteraciones en las variables biofísicas: índice de la masa corpórea, porcentaje de grasa, niveles de presión, fuerza de presión manual e la calidad de vida de ancianos sometidos a un entrenamiento físico personalizado en un período de 12 meses. Metodología: Para la mensuración de la masa corpórea e altura han sido utilizados los instrumentos: Balanza Clínica de la marca Filizola® con 150kg de capacidad total de 100g de sensibilidad. Para la medida de porcentaje de grasa ha sido utilizado un analizador de composición corpórea por bioimpedancia de la marca Omreon® (USA). Para la aferición de la presión arterial ha sido utilizado un esfigmomanómetro Becton Dicnson; estetoscopio Rappaport - Premium. Para la avaluación de la fuerza muscular ha sido utilizado un dinamómetro digital manual TAKEL (Japón). Para la avaluación de la calidad de vida ha sido

utilizado un cuestionario elaborado por la Organización Mundial de Salud (OMS), WHOQOL-OLD del año de 2007. Los individuos han sido sometidos a un entrenamiento físico personalizado con trabajo muscular concéntrico e excéntrico para los miembros superiores e inferiores, a través de ejercicios de fuerza muscular e cardiovascular. El programa de entrenamiento hasta ahora ha tenido una duración de 1 año e 2 meses, hecho 2 veces por semana con duración de 60 minutos. Resultado e Conclusión: De todas las variables investigadas en este estudio, concluyese que han tenido mejoras en 86% de las variables investigadas, siendo que solamente una (IMC) no hubo modificación. El % G de lo grupo ha sido clasificado como “MUY RUIN” (FERNANDES FILHO, 2003) y el IMC como “NORMAL” (OMS, 2007). Hubieron mejoras en los niveles de presión, pues una reducción de casi 10 mmHg de la PAS y PAD, siendo de gran importancia para la reducción de los riesgos de enfermedades cardiovasculares, siendo clasificados como NORMOTENSOS (ACSM, 2007). Las medias de frecuencia cardiaca han tenido una reducción de 12 bpm, colaborando con eso para la mejora en la disposición física para ejecutar ejercicios y en las actividades diarias. Tanto los miembros superiores derecho como lo izquierdo han tenido un gano de fuerza manual media de 7 Kgf, demostrando gano de fuerza muscular. Con relación a la variable calidad de vida, el grupo se encuentra clasificado como “SATISFACTORIO” (O.M.S., 2007). Constatase así que después de 12 meses de programa de ejercicio físico individualizado, hubo una mejora en los aspectos cardiovascular, pulmonar, muscular y la calidad de vida de los ancianos mejorando su autonomía funcional.

VARIÁVEIS BIOFÍSICAS DE IDOSOS SUBMETIDOS A TREINAMENTO FÍSICO INDIVIDUALIZADO

RESUMO:

Introdução:O processo natural chamado envelhecimento, tem tido um aumento durante o passar dos últimos anos, a idade que considera uma pessoa idosa é de mais de 60 anos, inclusive. O Objetivo deste estudo foi verificar as alterações nas variáveis biofísicas: índice de massa corporal, percentual de gordura, níveis pressóricos, força de preensão manual e qualidade de vida de idosos submetidos a um treinamento físico individualizado no período de 12 meses. Metodologia Para a mensuração do Massa Corporal e Estatura foram utilizados os seguintes instrumentos: Balança Clínica da marca Filizola® com 150kg de capacidade total e 100g de sensibilidade, Para a medida de percentual de gordura foi utilizado; um analisador de composição corporal por bioimpedância bipolar da marca Omreon® (USA).Para a aferição de pressão arterial foi utilizado: esfignomanômetro Becton Dicnson; estetoscópio Rappaport - Premium. Para a avaliação da força muscular foi utilizado:Dinamômetro Digital Manual TAKEL (Japão). Para a avaliação da qualidade de vida foi utilizado o questionário elaborado pela Organização Mundial de Saúde (OMS), WHOQOL-OLD do ano de 2007. Os indivíduos forma submetidos a um treinamento físico individualizado com trabalho muscular concêntrico e excêntrico para os membros superiores e inferiores, através de exercícios de força muscular e cardiovascular. O Programa de treinamento até o momento teve uma duração de 1 ano e 2 meses, realizado 2 vezes por semana, com duração de 60 minutos. Resultados e Conclusão: De todas as variáveis investigadas neste estudo, concluiu-se que houveram melhoras em 86% das variáveis investigadas, sendo que somente uma (IMC) não houve modificação. O %G do grupo foi classificado como“MUITO RUIM” (FERNANDES FILHO, 2003) e o IMC como “NORMAL” (OMS, 2007). Houveram melhoras nos níveis pressóricos, pois obteve uma queda de quase 10 mmHg da PAS e PAD, sendo de grande importância para a diminuição dos riscos de doenças cardiovasculares, sendo classificados como NORMOTENSOS (A.H.A, 2003). Nas médias de freqüência cardíaca tiveram uma queda de 12 bpm, colaborando com isso para a melhoria na disposição física para executar exercícios e nos afazeres da vida diária. Tanto nos membros superiores direito quanto esquerdo o grupo obteve um ganho de apreensão manual médio de 7Kgf, demonstrando ganho de força muscular. Quanto a variável qualidade de vida, o grupo esta classificado como “SATISFATÓRIO” (OMS, 2007). Constatando assim que após 12 meses, de programa de exercício físico individualizado, houve melhoria nos aspectos cardiovascular, pulmonar, muscular, e na qualidade de vida desses idosos melhorando sua autonomia funcional.