18 - ANALYSIS OF THE CHANGE OF THE BREATHING STANDARD IN AGED WOMEN THROUGH THE CIRTOMETRY; BEING USED OF BREATHING EXERCISES AND DIAPHRAGM'S STIMULATION.

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INTRODUCTION:

To breath is an automatic and indispensable function for the life. However, it needs to be perfected so that it does not just accomplish its physiologic function, but it also provides ideal conditions for the good sensation for each person. This premise becomes truer in the bearers of breathing pathologies, by virtue of the resulting need to overcome the current alterations of the own disease (RICIERI, 2004).

Basically, the movements of the breathing involves so much the thoracic muscles as the abdominal muscles, and these last ones only enter in activity in discharge situation it demands airing (KENDALL *et al.*, 1995).

The cyclical process of the system of the breathing involves mechanical work on the part of the breathing muscles. The healthy individual at rest breaths without having conscience of the accomplished physical effort. Though, if the muscles are mischievous to increase the work production, he immediately becomes aware of your breathing. The motive pressure of the breathing system, that in your normal conditions is that generates by the muscular contraction during the inspiration, it needs to win elastic forces and of resistence to get to fill the lungs and to move the thoracic wall (IRWIN e TECKLIN, 1994; BETHLEN, 2000).

The diaphragm is obliquely between the thorax and the abdomen under the formula of two domes. It possesses the superior face covered by a parietal pleuris and the inferior face covered by the peritonitis. In the thorax, the diaphragm is in direct contact with the lungs and the heart; in the abdomen, with the liver, stomach, spleen, angle esplenic of the colon, pancreas, kidneys and suprarenal. This muscle is responsible form more than 70% of the vital capacity (TARANTINO, 1997; *LUCE et al.*, 1995). According to Mayor e Mayor (2004), the changes of the thoracic region besides they reduce the indulgence of the thoracic wall, they modify the curvature of the muscle diaphragm, altering its capacity to generate force. Studies accomplished in seniors of 13% of the pressure of the diaphragm in comparison with youths during an inspiration maxim.

The thoracic expansibility can be measured by the method of thoracic cirtometry being used a measuring tape that is placed on the patient's thoracic box in the axillary areas, xifoide and basal. Each measure is obtained after requesting the patient that accomplishes a maximum expiration followed by a maximum inspiration and other maximum expiration. The measures are twice repeated and it is considered the average of this two obtained values (PAULIN *et al.*, 2003; KAKIZAKI *et al.*, 1999).

The efforts muscular inspirate should overcome to the withdraw of the lungs and of the thoracic wall for us to reach the total lung capacity (TLC), that is expressed by the amount of air contained in the lungs at the end of an inspiration maxim (LUCE *et al.*, 1995; SCANLAN *et al.*, 2000).

In agreement with Bethlen (2000), physiologically, the volumes and lung capacity vary in function of several factors, such as: gender, age, surface, physical activity, posture and corporal mass. Because these volumes can be altered by several diseases, being done necessary to know if the are normal in certain person. For so much, they are compared to medium standard values obtained in several persons of the same gender, age and height, measures at rest.

In the breathing functional evaluation is routine the use of methods and traditional techniques as inspection, palpation, percussion and auscultates lung. Through these, the frequency, rhythm, depth and the breathing effort, is observed as the format in the search of possible asymmetries or deformities in the thorax. However the data generated by these techniques are registered by a description, being of a difficult comparison, because they don't supply given the measures. However a resource for measures of the thoracic expansibility is very used by the simplicity and low cost and also supplying given quantitative (CAROMANO *et al.* 2003).

Nowadays, so much the persons that possess several breathing pathologies as the healthy individuals can come to have a reduction of the lung capacity, that will probably result, in a deficit in the life quality. In agreement with these facts becomes necessary to elaborate a program improvement in the activities of daily life (ADLs).

MATERIALS AND METHODS:

The case study was accomplished in the period among August 08,2005 to August 25,2005, using 4 patients institutionalized residents of the Instituto Mauro Alcides Ferreira IMAF, in Barbacena City MG, of the feminine gender, presenting reduction of the lung oxigenate , non smokers, with average of 79,5 years-old age (14,5) and sedentary, It was Characterized as exclusion criterion such diseases like: cardiac, diagnosed cognitive deficit and obesity.

Before accomplishing the Cirtometry measures, the participants were submitted to a breathing evaluation where they consisted vital signs, pathology breathing diagnosis, breathing standard, standard postural and auscultates lung.

The measures was made being used a ribbon anthropometric of the mark Sanny Medical, of two meters and, the exercises were accomplished with aid of a wood stick with 60 cm of length.

All the patients were previously illustrious on the objective and the out line of the study and those that accepted announce and signed a consent term.

The sequence of exercises was elaborated in the following way: exercises of thoracic expasion, fractional inspirations, inspirations sustained maxim, fractional expirations and diaphragm's stimulation, using the wood stick for aid of the proposed exercises and a pause of fifteen seconds was accomplished, for rest, among each exercise. The therapy was accomplished during fourteen sessions of 45 minutes, 5 times a week, being the appraised patients for the method of the thoracic cirtometry, before and after each session. The evaluations were accomplished by the same appraiser in all the sessions and the breathing exercises made by the same therapist.

The evaluation and the exercises of thoracic expansion, fractional inspiration, sustained maximum inspiration and fractional inspiration were accomplished with the patients being in the position orthostatic; the diaphragm's stimulation was

already made with the patients being lied down in back decubitus. All the exercises were repeated 10 times for session.

The measure was not accomplished directly on the patients' skin and it was accomplished on a blouse of cotton mesh, tends the concern of they be using the same clothes everyday during the evaluation.

The therapists were properly for the accomplishment of the breathing exercises and for the application of the evaluation, including the cirtometry, where the patients met at rest in the erect position.

It is important to pint out that the patients didn't find in physiotherapy treatment during the study period.

STATISTICAL ANALYSIS:

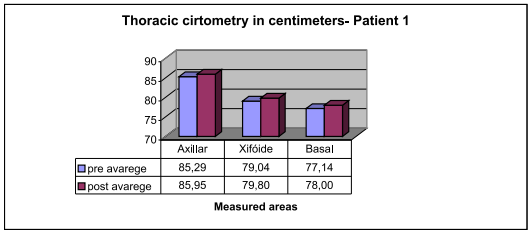
The obtained data are presented in its medium values and standard deviations and the correlation analysis among the numeric variables it was done by the analysis of t-student pareado. They are considered significant statisticaly to the differences with $p < 0,05$.

RESULTS:

It was made the measure in each session pre and post treatment and at the end of the study took place the average of the obtained values so that such results were observed; opting for the presentation of graphs for better attendance of the study.

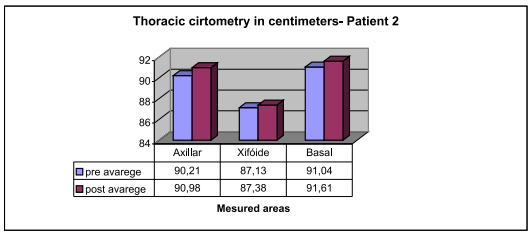
The study had for a purpose to improve the breathing standard being used as method of evaluation of the thoracic expansibility the cirtometry.

The obtained results are willing trough the following graphs:



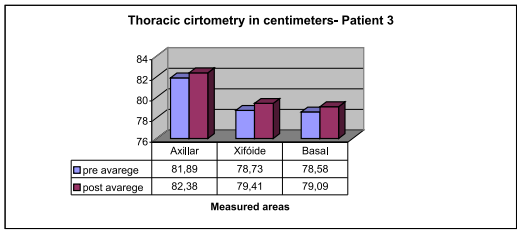
Graph 1: It refers to the averages of the cirtometry in the patient 1 pre and post 14 treatment sessions.

In the graph 1 the values corresponding to the averages of the thoracic cirtometry are represented regarding the axillary areas, xifoide and basal in the patient 1 pre and post treatment; where it is noticed that there was a larger earnings in the cirtometry measure of the base (5,32 > controlled t 1,77) showing like this a larger oxigenate of this area.



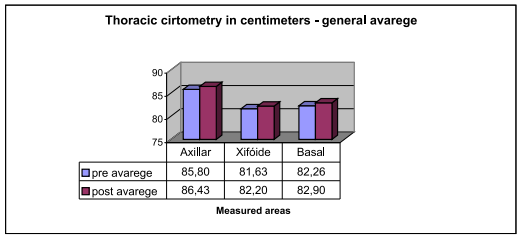
Graph 2: It refers to the averages of the cirtometry thoracic in the patient2 pre and post 14 treatment sessions.

Already in the patient 2 it was noticed that the earnings was larger in the axillary area (5,92> controlled t 1,77), however it didn't have a win significant in the measure of the xifoide area (1,47< controlled t 1,77), showing the area as soon as presented smaller increase in the thoracic expansibility in comparison with the axillary and basal areas (graph 2).



Graph 3: It refers to the measures of he cirtometry thoracic in the patient 3 pre and post 14 treatment sessions.

In agreement with the graph 3 the measure that presented larger evolution in the corresponding patient is related with the area xifoide (6,59> controlled t 1,77) corresponding to the lung medium area. The axillary and basal areas also presented a considerable earnings, however in smaller values compared to the measure of the xifoide area.



Graph 4: It refers to the general averages of the cirtometry thoracic pre and post 14 treatment sessions.

However it was observed that the final result showed an expressive earnings in all areas, standing out the axillary areas (8,15 controlled t 1,68) and basal (7,03 > controlled t 1,68) (graph 4).

DISCUSSION:

The obesity was characterized as an exclusion criterion because it cloud affect the thorax and the diaphragm, certain alterations in the breathing function even when the lungs are normal, because it hinders the descent of the diaphragm directly and it reduces the lung adaptable elastic promoting the increase of the breathing effort and compromising of the system of transport of the gases (RASSLAN *et al.*, 2004; ROSS *et al.*, 1997; DARRYL, 1997).

It is observed in senior persons that the process of aging of the breathing system brings a decrease of the functions biomechanics, mainly for the compromising of the thoracic expansibility (CAROMANO *et al.*, 2003; CARVALHO FILHO e PAPALÉO NETTO, 2000), however TLC doesn't decrease significantly, because the decrease of the complacent of the thoracic wall is balanced for the largest lung streching (MAYOR e MAYOR, 2004). To ventilation per minute is reduced to 60-80 liters at the most; almost corresponding half of the young adult's ventilation (PICKLES *et al.*, 1998). Like this, as described in the graphs the present study through the statistical analysis using the tests t-student pareado it proves an improvement of the thoracic expansibility in all lung levels (axillary, xifoide and basal) of the senior patients submitted to the program of proposed exercise, showing an improvement in the lung oxigenate.

The program of exercises used was elaborated with the purpose of promoting earnings in the thoracic mobility, increase of recruitment of alveolar structures, preservation and it gets better in the lung elastic capacity and consequently it gets better in TLC (POSTIAUX, 2002; GONÇALVES *et al.*, 2003).The diaphragm's stimulation consist of giving ownception in the diaphragm looking for a maximum voluntary contraction possible of the muscle, in the end of the expiration and beginning of the inspiration, promoting an efficient mechanical work of the diaphragm, whit facilitation of the inspiration. The main objective is the reeducation of the breathing diaphragmatic looking for an improvement in the lung ventilation and a smaller muscular effort (COSTA, 2002). Nemer *et al.* (2004) mentions in his study that the muscle diaphragm after being submitted to the stretching reflex has a more effective maximum contraction and as consequence larger inspiration depth and the increase of the avarege volume can also be justified under the point of view neuro physiologic due to the stretching reflex.

Several studies, such as the one of Kakiazaki *et al.* (1999) and Paulin *et al* (2003) they describe the positive effects in the earnings of the thoracic expansibility, they demonstrated the importance of a program of breathing exercises with purpose of promoting improvement of the thoracic mobility in patient bearers of DPOC. Yves *et al.* (1997) they also prove the need of the lung rehabilitation in healthy patients they are still scarce and it is suggested that in this patient type the result is also positive, as presented in the present study.

It can be considered starting from the results obtained that there was an improvement in the accomplishment of the tasks of the which provided physical fatigue, like to go up stairways and even in the improvement of the quality of the sleep, with that a general earnings in the acting of day by day, the patients' second report.

In elapsing of the study there was a patient's cessation due to personal problems, being observed during the 5 days of the accomplishment of the exercises that there was already a small earnings in the thoracic expansibility in agreement with the data obtained in this period.

In agreement with the data obtained by Oliveira *et al.* (2004), the Brazilian senior population is increasing every year and one of the principal mortality causes and morbid they are the breathing pathologies. It is necessary the accomplishment and mainly prevention, in senior persons and you greeted or not, with the objective of reducing this causes.

This study used the thoracic cirtometry as method of evaluation of the expansibility thoracic pre and post-treatment due to the measures easiness and for supplying of the one of the quantitative ones. Caromano *et al.* (2003) in this study also tells that this method is quite useful with relationship to its use, besides being a low cost tool financier for the therapist.

CONCLUSION:

The breathing Physiotherapy had an important evolution in the last decades, with the appearance of new techniques and approaches in the prevention of the breathing system. Tends in view the high index of the growth of the senior population and consequently the physiologic changes happened in the breathing system, This work came to increase options among the therapy techniques and at the same time, to prove its effectiveness through the cirtometry.

It is ended that established by the physiotherapists with the application of the program of breathing exercises, the change of the breathing standard was shown efficient and consequently an improvement in the quality of the studied persons' life. Starting from these results it can take in consideration the thoracic cirtometry as one of the principal evaluation methods for analysis of the breathing standard.

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ANALYSIS OF THE CHANGE OF THE BREATHING STANDARD IN AGED WOMEN THROUGH THE CIRTOMETRY; BEING USED OF BREATHING EXERCISES AND DIAPHRAGM'S STIMULATION.

SUMMARY

Rarely the breathing exercises used in the physiotherapy are gone back to the improvement of the breathing standard looking for to reach the Total Lung Capacity (TLC) and there are few programs that specifically approach the improvement of that pattern. However the physiotherapy is presenting significant evolution bringing benefits and could influence directly in the individuals' breathing standard with reduction of TLC. The objective of this study was to analyze the efficiency of a program of breathing exercises in seniors with reduction of the lung oxigenate, looking for to change the breathing standard and trying to improve the treated patients' capacity lung total. For the accomplishment of this study it was appraised four individuals, with average of 79,5 years-old age (14,5) of the feminine gender, non smokers, sedentary and presenting reduction of TLC. For each exercise of thoracic expansion were accomplished, fractional inspiration, inspiration sustained maxim, fractional expiration and diaphragm's stimulation, during 14 sessions of 45 minutes, 5 times a week. The patients were appraised through the thoracic cirtometry, before and after each session. The data referents to the cirtometry measures were submitted the statistical analysis (tests t-student pareado). At the end of the 14 treatment sessions, it was noticed that all the participants obtained increase in the thoracic expansibility, mainly in the areas apical and basal, providing a good sensation in the patients.

Key words: Cirtometry, Total Lung Capacity, manual breathing exercises.

ANALYSE DE LA MUDANCE DEL STANDARD RESPIRATOIRE ÂGÈS AVEC TRAVE DE LA CIRTOMETRIA ; UTILIZANDOSE DE EXERCICES RESPIRATOIRES Y STIMULATION DIAFRAGMÁTICA

SOMMAIRE

Rare les exercices respiratoires utilisés dans le fisioterapia sont revenus vers l'amélioration de la recherche standard respiratoire pour atteindre le total de Capacidade Pulmonar (CPT) et sont peu les programmes qui approchent spécifiquement l'amélioration de cette norme. Cependant le fisioterapia vient présentant l'évolution significative apportant des avantages et pouvant influencer directement dans le niveau respiratoire des individus avec la réduction du CPT. L'objectif de cette étude était d'analyser l'efficacité d'un programme des exercices respiratoires dedans âgés avec la réduction de l'oxygénation pulmonaire, recherchant pour changer le standard respiratoire et recherchant pour améliorer toute la capacité pulmonaire des patients de festin. Pour l'accomplissement de cette étude 4 des individus n'avaient été évalués, avec la moyenne de l'âge de 79.5 ans (±14,5), de la sorte féminine, pas tabagistas, sédentaire et présentant la réduction du CPT. Pour de tels exercices de torácica l'expansion avait été exécutée, inspiration de fracionada, a soutenu le maximum d'inspiration, l'expiration de fracionada et la stimulation de diafragmática, pendant 14 sessions de 45 minutes, 5 fois par semaine. Les patients avaient été évalués par le cirtometria de torácica, avant et après chaque session. Les données de référence aux cirtométricas mesurent avaient été soumises les statistiques d'analyse (pareado d't-étudiant d'essai). À la fin des 14 sessions du traitement, on l'a noté que tous les participants ont eu l'augmentation de l'expansibilidade de torácica, principalement dans les régions apicales et basiques, fournissant un bien-être aux patients.

Mot-clef : Cirtometria, capacité pulmonaire de total, exercices respiratoires manuels

LA ANÁLISIS DE LA MUDANZA DEL PADRÓN RESPIRATORIO EN IDOSAS POR MEDIO DE LA CIRTOMETRIA: CON LA UTILIZACIÓN DE EJERCICIOS RESPIRATORIOS Y ESTIMULACIÓN DIAFRAGMÁTICA.

Resumen

Raramente los ejercicios respiratorios utilizados en la fisioterapia son vueltados para la mejora del padrón respiratorio buscando atingir la capacidad pulmonar total (CPT) y son pocos los programas que abordan específicamente la mejora de ese padrón. Pero la fisioterapia vien presentando evolución significativa trasciendo beneficios e pudiendo influenciar directamente en lo padrón respiratorio de personas idosas con reducción de la CPT. Lo objetivo de ese estudio fue analizar la eficiencia de un programa de ejercicios respiratorios en idosas con reducción de la oxigenación pulmonar, buscando mudar lo padrón respiratorio y procurando mejorar la capacidad pulmonar total de los pacientes tratados. Para la realización de ese estudio fueran abaleadas cuatro personas, con media de idead de 79,5 años (14,5), del genero femenino,

siendo no tabaquistas, sedentarios e presentando reducción de la CPT. Para tal fueran hechos ejercicios de expansión torácica, inspiración fraccionada, inspiración sustentada máxima, espiración fraccionada y estimulación diafragmática, durante catorce sesiones de 45 minutos, 5 veces por semana. Los pacientes fueran abaleados a través de la cirtometria torácica, adelante e después de cada sesión. Lo dados referentes las medidas cirtométricas fueran submetidos la analices estatísticas (teste t-student pareado). Al final de las 14 secciones de tratamiento, observo use que todas las participantes obtuvieran una ampliación en la espancibilad torácica, principalmente en las regiones apical y basal, proporcionando un bienestar en las pacientes.

Palabras llaves: Cirtometria, capacidad pulmonar total, ejercicios respiratorios manuales.

ANÁLISE DA MUDANÇA DO PADRÃO RESPIRATÓRIO EM IDOSAS ATRAVÉS DA CIRTOMETRIA; UTILIZANDO-SE DE EXERCÍCIOS RESPIRATÓRIOS E ESTIMULAÇÃO DIAFRAGMÁTICA.

Resumo

Raramente os exercícios respiratórios utilizados na fisioterapia são voltados para a melhora do padrão respiratório buscando atingir a Capacidade Pulmonar Total (CPT) e são poucos os programas que abordam especificamente a melhora desse padrão. Porém a fisioterapia vem apresentando evolução significativa trazendo benefícios e podendo influenciar diretamente no padrão respiratório de indivíduos com redução da CPT. O objetivo deste estudo foi analisar a eficiência de um programa de exercícios respiratórios em idosas com redução da oxigenação pulmonar, buscando mudar o padrão respiratório e procurando melhorar a capacidade pulmonar total dos pacientes tratados. Para a realização deste estudo foram avaliados 4 indivíduos, com média de idade de 79,5 anos (14,5), do gênero feminino, não tabagistas, sedentárias e apresentando redução da CPT. Para tal foram realizados exercícios de expansão torácica, inspiração fracionada, inspiração sustentada máxima, expiração fracionada e estimulação diafragmática, durante 14 sessões de 45 minutos, 5 vezes por semana. Os pacientes foram avaliados através da cirtometria torácica, antes e após cada sessão. Os dados referentes às medidas cirtométricas foram submetidos a análise estatística (teste t-student pareado). Ao final das 14 sessões de tratamento, notou-se que todas as participantes obtiveram aumento na expansibilidade torácica, principalmente nas regiões apical e basal, proporcionando um bem estar às pacientes.

Palavras-chave: Cirtometria, Capacidade Pulmonar Total, Exercícios respiratórios manuais.