

**60 - VERIFICATION OF LUNG VOLUME CAPACITY BEFORE AND AFTER MANIPULATION**

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[wolffgun@hotmail.com](mailto:wolffgun@hotmail.com)**INTRODUCTION**

Recognition of the importance of the musculoskeletal system in the global organization of the body, his predisposition to dysfunction and recovery of such changes and recognition of the ability of therapy for normalization of erectile dysfunction by one or more of several manipulative resources is essential. It is known that a dysfunction of the musculoskeletal system may interfere with respiratory and circulatory function, and few people realize the importance of proper breathing, because this is not only responsible for providing oxygen to the body, but is also an important means of disposal of catabolic. So if the structure is not normal, cannot function normally and its consequences can be very long (CHAITOW, 1982).

To restore or improve the function of the musculoskeletal system, we can predict that all related parties benefited, whether, other musculoskeletal components or areas affected by the nervous and circulatory systems.

This research proposal aims to identify variations in volume and lung capacity after manipulation of the third cervical vertebra and the segment T11-L2 and comparison groups to check for changes on lung volumes.

**DEVELOPMENT**

The lungs can be expanded and contracted by two mechanisms: (1) the movement of ascent and descent of the diaphragm, which extends or shortens the thoracic cavity, (2) by raising and lowering of the ribs to increase and decrease the anteroposterior diameter posterior chest cavity. (Guyton and Hall, 2008)

Normal breathing at rest, occurs almost completely by the first of the above two mechanisms ie by the movement of the diaphragm. During inspiration, contraction of the diaphragm pulls the bottom surfaces of the lungs downward. Then, during breathing, the diaphragm relaxes and simply elastic recoil of the lungs, chest wall and abdominal structures compress the lungs. However, during forced breathing, the elastic forces are not sufficiently strong to cause the expiration and so fast and needed the extra strength required is achieved mainly by the contraction of abdominal muscles, which pushes the abdominal contents up against the bottom surface of diaphragm. (Guyton and Hall, 2008)

Diaphragmatic innervations is present in one of four nerve plexuses which is the cervical plexus that originates from the anterior rami of C1 to C4 and situated deep to the muscle esternocleidomastóideo. The cervical plexus provides sensory information from the base skin of the scalp posterior to the clavicle and supplies the muscles of the neck and diaphragm earlier. The phrenic nerve, whose cell bodies are found in cervical spinal cord (C3 to C5) is the single most important branch of the cervical plexus, because the phrenic nerve is the only supplement the main motor and sensory nerve to the diaphragm. (LUNDY-EKMAN, 2004)

The compression of the nerve roots can occur due to an injury or osteopathic somatic dysfunction represents an absence of three-dimensional mobility of a conjunctive element. This dysfunction is characterized by a somatic mobility restrictions, often painful, being related to various types of sensory receptors as capsuloligamentar, neuromuscular spindle and also linked to spinal cord centers According to Richard (2002). For the release of a joint dysfunction, the technique of Maitland is a resource mobilization and joint manipulation, being divided into five degrees of implementation in order to lengthen or release with some security in order to restore movement and normal range of movement:

Grade I: is characterized by micro-movements in the early range of motion (ROM) and the physiological effect as the entry of neural information through mechanoreceptors, activating the floodgates medullary.

Grade II: large movement in the middle of WMDs, and activate the floodgates spinal cord, stimulates the lymphatic and venous return, causing joint clearance;

Grade III: movement throughout the range of motion, causing the same effects of grade II, increased stress in tissues shortened by adhesion;

Grade IV: micro movements at the end of ADM that promote tissue stress capable of moving slightly fibrotic tissue.

Phase V: This is the joint manipulation, with tiny high-speed movement, which promotes the breakdown of adhesion, activates the Golgi tendon organs, which may drastically alter the conditions of the tissues surrounding the joint.

Using the technique of oscillatory motion with a time of thirty seconds to a minute and thirty seconds are using grades I and II for relief of pain and the level of grade III and IV is used to gain WMD.

The manipulation (thrust) is classified as grade V, and can be used by a local anesthetic effect, because it generates a stimulating mechanoreceptors in intra-articular facet, which is believed to break the spasm-pain cycle by inhibiting presynaptic nociceptive fibers associated structures and inhibition of hypertonic muscles, and repositioning the joint.

To see how this function of the diaphragm is performed spirometry testing is indicated to detect the presence of lung disorder, to quantify the severity of pulmonary disease, monitor the progress of diseases and responses to established treatments, diagnosing and investigating changes extrapulmonary, expert assessment, preoperative evaluation, detection of responsiveness to corticosteroids in patients with chronic obstructive pulmonary disease (COPD). (Soares et. Al, 2006)

**METHODOLOGY**

The survey was conducted by an analytical, comparative, quantitative and qualitative, longitudinal section, being submitted and approved by the ethics committee of the HEI.

The research participant population was composed of students from the Faculty Assis Gurgacz (FAG), the sample of 12 female students, who were divided according to lesion presented in two groups, aged 18 to 24 years of age, Students of physical therapy and somatic dysfunction of the third cervical vertebra and / or the segment T11-L2. Exclusion criteria are those outside of the inclusion criteria and having hypermobility, ligament rupture, fracture, pregnancy, disc prolapse, infectious diseases, patient intolerance, poor general health, neoplasm and other criteria for contraindications for the therapy manual and

with recent acute myocardial infarction, recent pulmonary embolism, pneumothorax, hemoptysis, cardiovascular instability, presence of nausea or vomiting, abdominal or thoracic aneurysm cerebral, thoracic or abdominal surgery eye recently.

First was a statement of informed consent, followed by a brief interview, and then performed the spirometric test that analyzes the volume and flow with the following procedure: using nasal clips, the test starts with the patient breathing normal air flow volume at the end of expiration to achieve maximal expiration total lung capacity. The patient exhales as fast and hard as you can until all air is out, this volume is the forced vital capacity (FVC), and the remaining volume of air is the residual volume (RV). The patient had three times the FVC maneuver until two acceptable curves are obtained (Soares et al., 2006). Before spirometry testing Mitchel made to verify the positioning of the cervical vertebral injury and test with negative results Dekleyn which allows the safe handling of third cervical vertebra and the thoraco-lumbar group performed the test sphinx to check the level of injury.

The first group was held before the pompages cervical manipulation of the third cervical vertebra, after, there was a manipulation of the third cervical vertebra, with the students lying supine, legs extended, positioned behind the academic physiotherapist placing one hand flat on the face of the academic, the other L-shaped under the spinous process of the vertebra with the thumb resting on the jaw and fingers open perpendicular to the neck, where the physiotherapist has maintained a neutral flexion-extension of the neck, tilting to the side of your hand and rotate to the opposite side, decreased tissue tension and has been the thrust (thrust at high speed, low amplitude) or manipulation Grade 5 seconds Maitland (1986). Soon after this, a new spirometry was performed with the same parameters used previously.

In the second group performed the test to verify the sphinx of the vertebrae injury and performed after spirometry was performed and immediately after the manipulation of the vertebrae of the tendon insertion of the diaphragm which is the eleventh (T11) and the twelfth thoracic vertebra (T12), the first lumbar vertebra (L1) and second lumbar vertebra (L2). Dog handling was performed Technic for T11-T12-L1-L2 where the patient is supine, the therapist prior to feint in height level to be manipulated. The patient in her arms crossed, hands resting on the shoulders, elbows superimposed on the epigastric. The therapist makes contact with the patient's elbows through the abdomen, one hand and arm are placed around the back of the patient, the other hand takes a contact for the thenar eminence, the fingers being bent at injured. The therapist, with the help of his abdomen, reduces the slack toward the table and makes a thrust in that direction through a body drop, and after handling spirometry performed again using the same protocol.

The study was conducted in the 1st quarter of 2010 during the night hours with previously established and after data collection, these were tabulated and analyzed statistically using SPSS 15.0 program authorized by the IES.

## RESULTS AND DISCUSSION

This research examined changes in lung volume and capacity after manipulation of the third cervical vertebra and the segment T11-L2 and the comparison of groups with data from lung capacities that were represented in forced vital capacity (FVC), peak expiratory flow (PEF) and forced expiratory volume in first second (FEV1). Through the initial measurement was found to average FVC: 3.63 and after manipulation: 3.62 to 0.95%. Already had initial mean FEV1 of 3.39 progressing to the end of FEV1: 3.55 to 1% and PEF with the average reaching 396 to 413 with 0.96% these results to the thoraco-lumbar manipulation, since the results for manipulation of the third vertebra of FVC results were: 2.95 for FVC: 3.07 to 0.95% after the manipulation with FEV1 above 2.73 to 0.96% and 2.86 after the manipulation and PEF with 275 progressed to the final average of 311 with 0.88% and the final comparison of the mean between the two group 1 and group 2 before handling a percentage of FVC: 0.80%, FEV1 of 0, PEF 75% and 0.70% and after handling FVC: 0.78%, FEV1: 0.82% and 0.73% PEF. The sample showed no statistically insignificant increase in lung volume and capacity with the level of relevance.

The innervation of the main breathing muscle, the diaphragm is controlled mainly by sensory and motor fibers of the phrenic nerve (C3, C4, C5) that are responsible for controlling the frequency, depth, and respiratory pattern (BagatinI, et. Al., S / d), and justifying relationship studied in this research, which sought the effect is achieved thanks to the effect that manipulation has, for each somite is responsible for the innervation of a whole structure that makes up the vertebra.

According to BOSA (2008), who conducted a study on the effects of manipulative treatment of third vertebra in lung volume and capacity, identified an increase in the levels studied, but not statistically significant as those found in this study, a possible explanation for the differences the result of work can be attributed due to the selected sample does not present any type of respiratory disorder.

According to Guiney et. al. (2005), found significant improvement in peak expiratory flow in asthmatic children treated with ninety manual therapy (MT) compared to the control group of fifty children, concluding that TM can improve lung function in these individuals and is considered a safe treatment noninvasive and cost-effectively for children with asthma, confirming the hypothesis that the results were not statistically significant because the sample does not present any kind of respiratory system dysfunction.

Nielsen et. al. (Apud BOCKENHAUER, et. Al., 2002), found significant improvements in bronchial reactivity after manipulation of the thoracic vertebrae, justifying their findings due to normalization of the parasympathetic response that occurs after handling quoted in this study, no changes in lung volumes and capacities because their goals were not in relation to these changes, but compared the physiological responses obtained after the use of manual therapy on the spine.

Richard and Sallé (2002) report that a spasm of the diaphragm significantly limit the mobility of the hinge thoracolumbar (T12-L1), justifying the attempt of this research, which was handling the segment T11-L2 seeking an increase in volumes and capacities lung.

Another study by Stapait et. al. (2004) showed that diaphragmatic influence the mobilization to increase range of motion of the cervical spine, thus showing a connection between the diaphragm and the cervical spine, so if there is commitment to the cervical level, there may be a respiratory dysfunction due to relationship with the main respiratory muscle.

## CONCLUSION

According to the results of spirometry before and after the manipulations it was found that there was no change in lung volume and capacity for the groups.

Therefore it is concluded that for a sample of healthy subjects manipulation techniques in third grade V cervical and thoraco-lumbar spine do not promote statistically significant gains in capacity and lung volumes

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#### VERIFICATION OF LUNG VOLUME CAPACITY BEFORE AND AFTER MANIPULATION

##### Abstract:

The effects of manipulation grade 5 are rarely addressed in literature, but are of great relevance for physiotherapy in order that functional recovery is the main goal in physical therapy. The aim of this study is to investigate the effect of the thrust of skeletal structures in lung volumes before and after handling. The study was longitudinal cause and effect where the population was comprised of academic course of physiotherapy of Assisi School Gurgacz and the criteria for inclusion in the sample were aged 18 to 30 year old female with involvement of the thoracic vertebra and lumbar or cervical. All procedures were conducted in clinically integrated FAG, during the first quarter 2010. Participants were divided into two groups depending on the level of injury, a cervical lesion group and group 2 with thoraco-lumbar injury with concomitant injury. To follow the testing of spinal injury and after spirometry to verify capacity and lung volumes. In the next step was held to evaluate the segment-defining manipulation to be performed for individuals with cervical injury was also performed to test DeKleyn. After correction joint was again held spirometry. The results of pre and post intervention were analyzed with SPSS 15.0 where he found that there was no change in lung volumes for both groups.

**KEYWORDS:** Manipulation. Thrust. Phrenic nerve. Spirometry.

#### VÉRIFICATION DE LA CAPACITÉ VOLUME POU MON AVANT ET APRÈS LA MANIPULATION

##### RÉSUMÉ:

Les effets de la manipulation grade 5 sont rarement abordées dans la littérature, mais sont d'une grande pertinence pour la physiothérapie afin que la récupération fonctionnelle est le principal objectif de la thérapie physique. Le but de cette étude est d'étudier l'effet de la poussée des structures squelettiques du volume pulmonaire avant et après la manipulation. L'étude a été la cause et l'effet longitudinal où la population était composée de cours universitaires de physiothérapie d'Assise Ecole Gurgacz et les critères d'inclusion dans l'échantillon étaient âgés de 18 à 30 ans vieille femelle avec la participation de la vertèbre thoracique et lombaire ou col de l'utérus. Toutes les procédures ont été menées en clinique intégrée FAG, pendant le premier trimestre 2010. Les participants ont été divisés en deux groupes en fonction de la gravité des blessures, un groupe de lésion cervicale et le groupe 2 avec des blessures thoraco-lombaire avec des blessures concomitantes. Pour suivre les essais de traumatisme médullaire et après la spirométrie pour vérifier les volumes des capacités et du poumon. Dans l'étape suivante a eu lieu pour évaluer la manipulation segment définir à effectuer pour les personnes présentant une lésion cervicale a également été réalisée pour tester DeKleyn. Après correction conjointe a été tenue spirométrie. Les résultats de l'intervention avant et après ont été analysées avec SPSS 15.0 où il a trouvé qu'il n'y avait aucun changement dans les volumes pulmonaires pour les deux groupes.

**MOTS-CLÉS:** Manipulation. Poussée. Phrénique nerf. Spirométrie.

#### VERIFICACIÓN DE LA CAPACIDAD DE VOLUMEN PULMONAR ANTES Y DESPUÉS DE MANIPULACIÓN

##### RESUMEN:

Los efectos de la manipulación de 5º grado rara vez se abordan en la literatura, pero son de gran relevancia para la fisioterapia con el fin de que la recuperación funcional es el principal objetivo en la terapia física. El objetivo de este estudio es investigar el efecto del empuje de las estructuras esqueléticas de los volúmenes pulmonares antes y después de manipular. El estudio fue longitudinal causa y efecto en el que se corresponde con la población del curso académico de la fisioterapia de Asís Escuela Gurgacz y los criterios para su inclusión en la muestra fueron de 18 a 30 años de edad con la participación de la vértebra torácica y lumbar o cuello del útero. Todos los procedimientos se llevaron a cabo en la clínica integrada FAG, durante el primer trimestre de 2010. Los participantes fueron divididos en dos grupos dependiendo del nivel de la lesión, un grupo de lesión cervical y el grupo 2 con lesiones toraco-lumbar con lesiones concomitantes. Para seguir la prueba de lesión en la columna y después de la espirometría para verificar los volúmenes y la capacidad pulmonar. En el siguiente paso se llevó a cabo para evaluar la manipulación del segmento que definen a realizar para las personas con lesión cervical también se realizó para probar DeKleyn. Después de la corrección conjunta se celebró de nuevo la espirometría. Los resultados de la intervención pre y post se analizaron con SPSS 15.0, donde se encontró con que no hubo cambios en los volúmenes pulmonares en ambos grupos.

**PALABRAS CLAVE:** manipulación. De empuje. del nervio frénico. La espirometría.

**VERIFICAÇÃO DA CAPACIDADE E VOLUMES PULMONARES ANTES E APÓS MANIPULAÇÃO.****RESUMO:**

Os efeitos da manipulação grau 5 são pouco abordado na literatura, porem são de grande relevância para fisioterapia tendo em vista que a recuperação funcional é o principal objetivo em condutas fisioterapeutas. O objetivo desse estudo é a verificação do efeito do thrust sobre as estruturas esqueléticas nos volumes pulmonares antes e após a manipulação. O estudo realizado foi do tipo longitudinal causa efeito onde a população foi composta por acadêmicas do curso de fisioterapia da Faculdade Assis Gurgacz e os critérios de inclusão na amostra foram ter idade entre 18 até 30 anos do sexo feminino com comprometimento da vértebra toráco-lombar ou cervical. Os procedimentos foram efetuados na clinica integrada FAG, durante o período do primeiro trimestre 2010. Os participantes foram divididos em dois grupos em função do nível da lesão; grupo 1 com lesão cervical e grupo 2 com lesão toraco-lombar com lesão concomitante. A seguir realizou-se a testagem da lesão vertebral e após a espirometria para verificação da capacidade e volumes pulmonares. Na etapa seguinte realizou-se a avaliação do segmento para definição da manipulação a ser executada para os indivíduos com lesão na cervical foi também efetuado o teste DeKleyn. Após a correção articular foi novamente realizado a espirometria. Os resultados do pré e pós intervenção foram tabulados e analisados no programa SPSS 15.0 onde constatou que não houve alteração nos volumes pulmonares para ambos os grupos.

**PALAVRAS-CHAVE:** Manipulação. Thrust. Nervo Frênico. Espirometria.