93 - ACUTE INFLUENCES OF VERTEBRAL MANIPULATION OF THE DORSAL SIMPATHETIC TRUNK IN THE AUTONOMOUS NERVOUS SYSTEM, ANALYZED BY THE BIO-EXPRESS

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INTRODUCTION

The chronic pain constitutes serious problems of public and social health, being responsible for 80% of the consultations to the professionals of the health [1]. When the pain persists beyond the expected time and becomes chronic, there is an incorporation of some biological, psychological and social aspects [3].

According to Brandão in 1993, we comprehend that chronic and nociceptiva pain, alterations in the neural function, neuropathic chronic pain, that are injuries of the nociceptive ways, and psychogenic chronic pain, caused for psychological factors. Chronic pain is not just a symptom, when it is transformed into illness [2].

The incapacity generated by the chronic pain induces the individual to the loss of its identities in a work environment, in the family and the society [1].

The diagnosis and treatment of sick patients with chronic pain must be precocious and can provide complete resolution of the nosologica condition; the more precocious, better the result of the therapeutic intervention [1].

The techniques of vertebral manipulation can be used through soft, slow and gradual mobilizations, or direct structural manipulation of high speed and low amplitude, also known as mobilization with impulse. Within the technique objectives, we have to stimulate the sympathetic and parasympathetic centers to get the rupture of pathological neurovegetative reflex arc.

The ANS regulates the frequency and force of the cardiac beatings, as well as the diameter of the blood vessels, controlling the blood pressure and the tissue irrigation as well according with the necessity of each moment. The Bio-Express is a not invasive method of evaluation, that identifies from data of the cardiac electrophysiology the ideal levels of the sympathetic and parasympathetic nervous system, which composes the autonomous nervous system.

CASUISTIC AND METHODS

This study was done according to directions and norms of resolution 196 of 10 of October of 1996, of the National Advice of Health. All the individuals analyzed in the study had participated as volunteers and had been clarified of the disposal of the study through an assent term.

12 individuals with history of chronic pain (for more than three months) in the extremities of the body and/or in segments of the spine and head had participated, with age between 23 and 61 years, with age average of 39,08 years, being 10 females and 2 males. Each individual went through an evaluation of the ANS with the Bio-Express software (the USA 2002, Heart Rhythm Instruments Incorporation the USA, 173 Essex Avenue Metuchen NJ 08840), as shown in the figure 1, 2 and 3 composed by two basic standards: the "Nerve Express", analyzes the emotional tensions, physiologic and stress levels; e the "Health Express", that evaluates the level of the physical performance and the organic reserves.

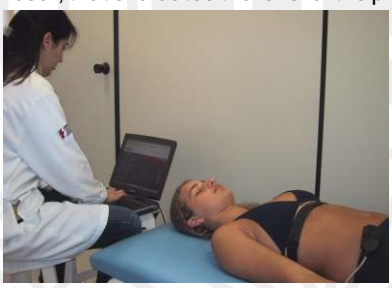




Fig 1 and 2- Bio- Express analysis

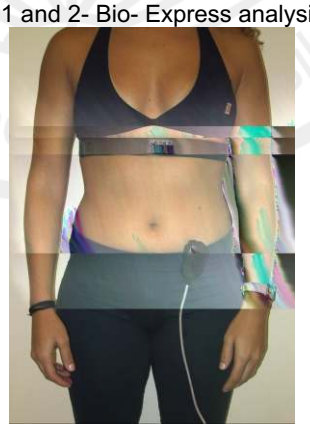


Fig 3. Analysis in the orthostatic position

The Bio-Express is installed to a computer notebook Toshiba, Pentium 4, with CPU of 1.60GHz, 256 Mb of RAM, in the program Professional Windows XP, version 2002.

The procedures had been carried through in the Clínica de Fisioterapia Salgado, Clinique du Sport - Londrina-PR, in a private sterile in an electric table.

A polar was installed at the xifóide process of the patient and a sensor in the waist region, connected to the computer to catch the information of the polar one.

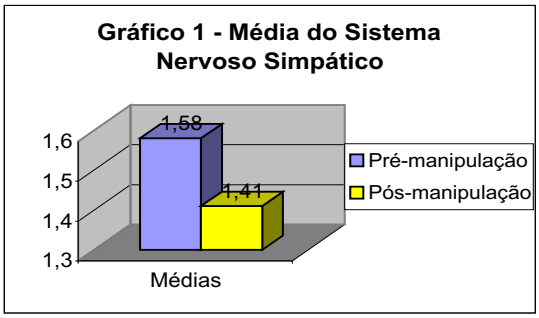
In the evaluation, at a first moment, the patient is in supine with eyes closed eyes for a period of 192 beatings (approximately 3 minutes) and, at a second moment, the patient is standing, with opened eyes for another 192 beatings. After that, the patients had been submitted to a vertebral manipulation on a painful thoracic vertebra, with the patient in supine lying on a electric table, using one direct technique, of high speed and small amplitude, known for the osteopatas as "DOG" technique.

After the manipulation, a new evaluation through the Bio-express was made, with the same previous parameters; to analyze the alterations occurred in the autonomous nervous system.

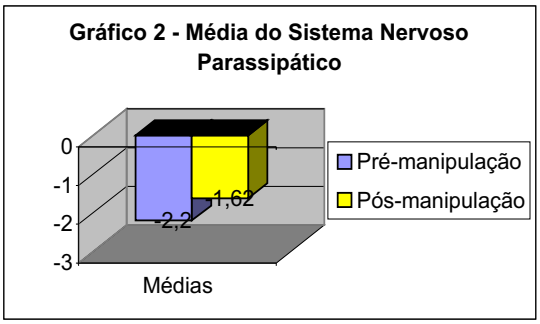
All the bibliographical data had been searched and gotten through books, articles and magazines. The statistical data had been analyzed through program EXCEL 2000, where the analysis was carried through statistics through test T of Student, with level of significance statistics of $P < 0,05$.

ANALYSIS OF THE RESULTS

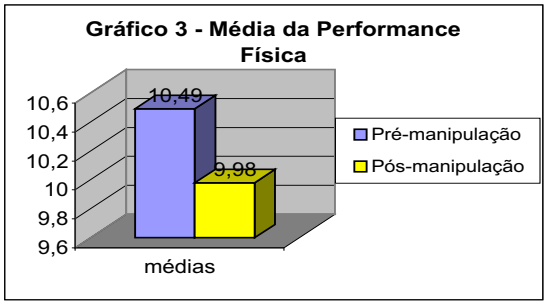
The results presented immediate alterations of the ANS after-manipulation, causing alterations mainly in the SNS, PNS and heart beat. In graph 1, it is observed that the average of the SNS before the manipulation was of 1,58 and after-manipulation had a reduction for 1,41, getting a probability statistics of $P = 0,166087$.



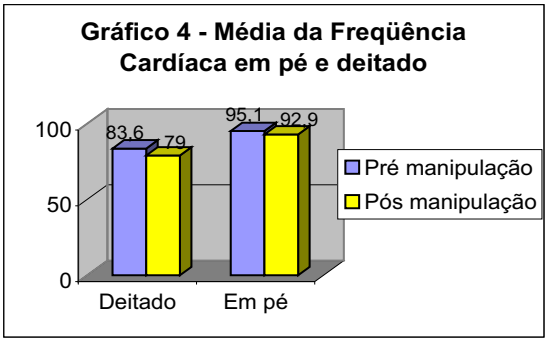
In graph 2, it is observed that the average of the PNS before-manipulation was of -2,20 and after-manipulation got an increase for -1,62, reaching the statistics probability with $P = 0,04129$.



In graph 3, it shows that the average of the index of physical performance before-manipulation was 10,49 and the average after-manipulation fell to 9,98, being that in the Bio-Express, the lesser the value of this index, better is the physical performance of the individual. The statistic probability was of $P=0,164$.



In graph 4, we can observe the average of the heart rate with the individual lying down, that was 83,66 bpm, and with the individual standing, that was of 95,16 bpm; and the heart rate after-manipulation with the lying individual, that fell for 78,08 bpm, and with the individual standing, that also lowered to 92,91 bpm, reaching the probability statistics of 0,000255 P = lying and $P = 0,061548$ standing.



DISCUSSION

The autonomous nervous system congregates a set of situated neurons in the spinal cord and in the cephalic trunk, which through peripheral ganglion controls the smooth muscles of the blood vessels and other organs.

Traditionally, the ANS is divided in two great subsystems, the sympathetic and parasympathetic nervous system. These subsystems act in opposing ways, being that the sympathetic acts "to activate" the body and the parasympathetic acts "to calm it". The current conception is that both continuously interact in the regulation of organic functions. The great

majority of the human sympathetic pre-ganglion neurons are located in the called lateral inter medium column of the spinal cord bilaterally in between the segments of T1 and L2.

The parasympathetic nervous system encloses the cranial nerves III, VII, VIII, IX and X, and the levels of S2, S3 and S4 of the spinal cord, while the sympathetic includes the cervical superior ganglion, medium and inferior.

The primary task of the sympathetic nervous system is to keep adequate blood supply; the increase of the sympathetic activities constringe even more the blood vessels, while the reduction of the sympathetic activity allows vasodilatation. The sympathetic nervous system also has influence in the temperature regulation, therefore it controls the sweat and the blood flow; and still controls the muscular activity, because the specific vasodilatations cholinergic of the muscles are stimulated by the SNS. Therefore, the SNS can increase the capacity of the body to carry through rigorous muscular activity in diverse ways, as example, increases the sanguine flow for the active muscles, causing an increase of the cellular metabolism, increasing the glucose concentration in the blood, thus increasing muscular force.

On the other hand, the PNS acts more in the antagonistic mechanism (in relaxation of sphincters, vasodilatation of some sanguine vases and storage of glycogen in the liver).

The Bio-Express is a computer system, non invasive and entirely automatic that supplies a quantitative evaluation of the ANS (sympathetic and parasympathetic) and of physical aptitude (physical performance).

It evaluates the ANS from the cardiac electrophysiology, having as base the measurement of the rhythm, identifying if the physical/psychological capacity of the individual intervenes with the ANS, causing a loss or gain of the performance. It is through the peaks of high and low frequency of the variability of the cardiac frequency that they correspond to the activity of the sympathetic and the parasympathetic that applied to the quadrants of the Bio-Express, shows the state of ANS.

Being that an individual in good conditions will present a balance between these two levels of the sympathetic and parasympathetic nervous system. The osteopathic technique "DOG" (maneuver of high speed and small amplitude, thrust) is carried through in the dorsal region. The disposition of the sympathetic chain that are found parallel to the vertebral column, where it is anterior in the cervical spine, posterior in the lumbar thoracic and anterior once again in the sacrum. And the ganglions of the lateral chain in the dorsal region are firmly connected through the fascia to the posterior thoracic wall and coat the head of ribs.

We know that osteopathic adjustments cause changes in the stabilometry, or either, the osteopathic techniques cause postural effects in plans of body.

Consequently, the techniques and procedures used in this study had produced acute effects (immediate) in the ANS, as much in the sympathetic one as in the parasympathetic.

CONCLUSION

The study demonstrates that the vertebral manipulation of the sympathetic dorsal trunk cause acute changes (immediate) in the autonomous nervous system. The cardiac frequency also had alteration, with reduction of the cardiac beatings per minute, thus showing that after the vertebral manipulation of the dorsal sympathetic trunk had a reduction of the values of the SNS and an increase of the PNS.

Concluding that after the vertebral manipulation there was a inhibition of the sympathetic system. It is suggested in the continuity of this study to verify the duration of the effect of the vertebral manipulation in the ANS, as well as using one bigger sample of individuals.

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ACUTE INFLUENCES OF VERTEBRAL MANIPULATION OF THE DORSAL SIMPATHETIC TRUNK IN THE AUTONOMOUS NERVOUS SYSTEM, ANALYZED BY THE BIO-EXPRESS

The chronic pain is becoming day by day a problem that affects individuals of both sex, causing physical, psychological and social disturbs that invariably affect the quality of life of the individual. Causing disarrangements in the whole nervous system. The vertebral manipulation can intervene with the regulation of the autonomous nervous system (ANS), which is divided in sympathetic nervous system (SNS) and parasympathetic nervous system (PNS). The goal of the present study was to observe the alterations caused in the autonomous nervous system after the vertebral manipulation of the dorsal sympathetic trunk in patients with chronic pain, all being analyzed by the Bio-Express. The study was carried through with 12 individuals of both sexes who presented chronic pain (for more than three months). The procedures had been carried through in the Clínica de Fisioterapia Salgado, Clinique du Sport, in Londrina-PR, using a private and sterile room for the accomplishment of the study. In the analysis of the results we observed that the PNS suffered an increase after the vertebral

manipulation, going from an average of -2,20 to -1,62. The SNS suffered a reduction after the vertebral manipulation going from an average of 1,50 to 1,41. The cardiac frequency had a reduction after the vertebral manipulation going from an average of 83,6 to 79,0 with the patient lying down and an average of 95.1 to 92.9 with the patient standing. We can conclude that the vertebral manipulation of the sympathetic dorsal trunk can cause an influence on the ANS.

Key-Words: Autonomous nervous system, sympathetic nervous system, parasympathetic nervous system, Nerve-Express.

INFLUENCES AIGUËS DE MANIPULATION VERTÉBRALES DU TRONC AGRÉABLE DORSAL DANS LE SYSTÈME NERVEUX INDÉPENDANT, ANALYSÉ POUR LE BIO-EXPRESS

La douleur cronique ateint avec une grande frequence individus de deux sexes, afectant aspects physiques, psicologiques et sociales generant des trobles dans la qualité de vie. Mettant en jeu des disfonctions sur le systeme nerveux. La manipulation vertebrale peut influencier lê systeme nerveux autonome, formé par le systeme nerveux sympatique et parasimpatique. Le but de cet etude á été de verifier l'influence de la manipulation vertebrale sur le systeme nerveux autonome directement sur le tronc sympatique dans la colonne dorsal, les données analisés par le software Bioexpress (USA). L'étude á été fait avec 12 individus des deux sexes qui avaient douleur cronique (plus de trois mois).

Les actions de recherche ont été realisé dans une clinique prive Fisioterapia Salgado, dans la ville de Londrina-Pr Brésil, avec temperature controlée et action individuel. Les analyses des données á verifié que le systeme parasimpatique a augmenté aprés manipulation vertebrale du tronc sympatique dorsal ,de -2,20 vers 1,62 . Lê systeme sympatique a diminué de 1,50 vers 1,41 . A frequence cardiaque a diminué de moyenne de 83,6 vers 79,0 avec le patient couché dorsal et une moyenne de 95,1 vers 92,9 avec le patient debout.

Conclusion, la manipulation vertebrale dorsal sur le tronc sympatique a une influence sur le systeme nerveux autonome.

Mot-clef : le système nerveux indépendant, système nerveux agréable, système nerveux de parassimpático, Nerf-Expriment

INFLUENCIAS AGUDAS DE LA MANIPULACIÓN VERTEBRALES DEL TRONCO AGRADABLE DORSAL EN EL SISTEMA NERVIOSO INDEPENDIENTE, ANALIZADO PARA EL BIO-EXPRESS

El dolor cronique ateint con una gran frecuencia individuos de dos sexos, afectant aspectos físicos, psicologiques y sociales generant de los trobles en la calidad de vida. Poniendo en juego de los disfonctions sobre el sistema nervioso. La manipulación vertebrale puede a influencier el sistema nervioso autónomo, formado por el sistema nervioso sympatique y parasimpatique. El objetivo de este estudio verano de verifier la influencia de la manipulación vertebrale sobre el sistema nervioso autónomo directamente sobre el tronco sympatique en la columna dorsal, los datos analisés por el programa informático Bioexpress (los EE.UU). El estudio verano hecho con 12 individuos de los dos sexos que tenían dolor cronique (más de tres meses).

Las acciones de investigación realisé en una clínica privado Fisioterapia Salgado, en la ciudad de Londrina-Pr Brasil, con temperature controlée y acción individual. Los análisis de los datos verifié que el sistema parasimpatique aumentó aprés manipulación vertebrale del tronco sympatique dorsal,de -2,20 hacia - 1,62. El sistema sympatique disminuyó en 1,50 hacia 1,41. A frecuencia cardíaca disminuyó de media de 83,6 hacia 79,0 con el paciente acostado dorsal y una media de 95,1 hacia 92,9 con el paciente de pie.

Conclusión, la manipulación vertebrale dorsal sobre el tronco sympatique tiene una influencia sobre el sistema nervioso autónomo.

Palabra-llave: el sistema nervioso independiente, sistema nervioso agradable, sistema nervioso del parassimpático, Nervio-Expresa

INFLUÊNCIAS AGUDAS DA MANIPULAÇÃO VERTEBRAL DO TRONCO SIMPÁTICO DORSAL NO SISTEMA NERVOSO AUTÔNOMO, ANALISADO PELO BIO-EXPRESS

A dor crônica cada vez mais vem se tornando um problema que afeta indivíduos de ambos os sexos, causando transtornos físicos, psicológicos e sociais que invariavelmente afetam a qualidade de vida do indivíduo. Causando assim desequilíbrios em todo sistema nervoso. A manipulação vertebral pode interferir na regulação do sistema nervoso autônomo (SNA), sendo ele dividido em sistema nervoso simpático (SNS) e sistema nervoso parassimpático (SNP). O objetivo do presente estudo foi de observar as alterações causadas no sistema nervoso autônomo após a manipulação vertebral do tronco simpático dorsal em pacientes com dor crônica, todos sendo analisados pelo Bio-Express. O estudo foi realizado com 12 indivíduos de ambos os sexos que apresentavam dor crônica (há mais de três meses). Os procedimentos foram realizados na clínica de Fisioterapia Salgado, Clinique du Sport, em Londrina-PR, usando uma sala climatizada e individual para a realização do estudo. Na análise dos resultados observamos que o SNP sofreu um aumento após a manipulação vertebral, passando de uma média 2,20 para 1,62. O SNS sofreu uma diminuição após a manipulação vertebral passando de uma média 1,50 para 1,41. A freqüência cardíaca teve uma diminuição após a manipulação vertebral passando de uma média 83,6 para 79,0 com o paciente deitado e uma média 95,1 para 92.9com o paciente em pé. Concluindo assim que a manipulação vertebral do tronco simpático dorsal causa influência sobre o SNA.

Palavras-chave: sistema nervoso autônomo, sistema nervoso simpático, sistema nervoso parassimpático, Nerve-Express.