38 - IMMEDIATE EFFECTS OF MANIPULATION OF TALUS ON BALANCE IN YOUNG ADULTS WITH ASYMPTOMATIC ANTERIOR TALUS

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INTRODUCTION

The ankle joint is classified as a synovial joint in hinge, with single axis and oblique. It has only one degree of freedom, however, owing to small movements of the talus in the frontal (talar tilt) and transverse (rotation talar) has a pivot mobile. This axis is not positioned exactly perpendicular to the sagittal plane thus leads to small movements of abduction and eversion accompanying dorsiflexion, and small movements of adduction and inversion accompanying plantar flexion (hertel, 2002). The ankle joint together with the subtalar joint is responsible for transferring load from the leg to the foot, thus influencing the orientation of intimately with the soil (deny, miller, 2002; hertel, 2002).

In normal operation, it takes about 10 ° of dorsiflexion and 20 ° to 25 ° of plantar flexion. The unilateral limitation of motion of dorsiflexion may cause a reduction in stride length and thus reduce the step length ankle unaffected (crosbie, green and refshauge, 1999). To perform functional activities such as running, climbing and descending stairs, getting up from a chair and squat, is a fundamental range of motion (rom) of full dorsiflexion (bennell et al., 1998).

Body balance is a complex process involving reception and integration of sensory input, the planning and execution of movements to control the center of gravity over the base of support. This is accomplished by the postural control system, which has the ability to integrate information from the vestibular, visual receptor and the somatosensory system (aikawa, braccialli and padula, 2006).

The walk, through their joint and muscle sensors, enables the system to postural adjustment and the adjustment of the information segment of the leg towards him, and so is considered a factor proprioceptive (villeneuve, 1990).

Several techniques are used in manual therapy aimed at restoring mobility of a segment, which include indirect maneuvers, which are softer and direct the maneuvers, known as mobilization techniques to boost high-speed and low amplitude ("thrust"). Manipulation techniques are a safe form of treatment, and an increasing number of patients are treated with these resources, because most expressed a high degree of acceptance and satisfaction with such procedures (jr et al, 2010).

In 1993, he published the first study on manipulation of the ankle dorsiflexors, which showed no statistically significant difference in dorsiflexion (nield et al., 1993). Other researchers have found similar results, in which no significant differences were observed. Some studies were performed in healthy subjects (fryer et al. 2002; sendin et al., 2009) and others with sprain (nield et al. 1993; andersen et al. 2003). Yet another study, which examined the effects of three manipulation techniques showed significant differences in increased dorsiflexion (dananberg et al., 2000).

Although there are few studies documenting the effects of manipulating peripheral structures such as the ankles and the results of existing studies are inconclusive about the effectiveness of the technique (menz, 1998).

Therefore, this study aimed to assess the immediate effects of manipulation by mobilizing and repositioning the talus on postural balance determined by analysis of center of pressure in young adults who have asymptomatic anterior talus.

METHODOLOGY

The procedures in this study were conducted in the period august-september 2011 and performed at the laboratory and research and analysis of the balance of the movement (lapem). Used by the study group of injuries and physical therapy - gelrf of physiotherapy unioeste / campusde rattlesnake. This study was approved by the ethics in research - unioeste under number 312/2011.

A total of 18 volunteers, young people between 18 and 30 years, of both sexes. The selected subjects were randomly divided into three groups: intervention 1 (i1): n = 06 - where underwent manipulation to mobilize the ankle (talus impaction); intervention 2 (i2): n = 06 - where underwent repositioning the manipulation of the talus (anterior talus to thrust); placebo (ip): n = 06 - position in which it occurred only manipulation mobilization ankle (appendix 01).

To implement the study, the volunteers were selected who met the inclusion criteria: biomechanical dysfunction in asymptomatic unilateral prior talus and aged between 18 and 30 years.

After the initial assessment, were not included volunteers who were: inability to understand the tasks proposed; pain in the ankles and feet in acute or subacute stage; vestibular disorders, orthopedic and neurological dysfunctions that prevented the testing, metabolic disorders, impacting on the systems of balance and use of medications affecting balance.

To conduct the research, firstly, clarifications were made on the assessment for the individuals involved, that being aware, signed the consent form in duplicate (annex 02). Then the interview was done through the existing questionnaire on the evaluation form (appendix 01), with the following items: age, sex, weight, height and about whether or not the injury in ankles and feet, leg and anthropometric dimensions walk test in mobility anteroposterior talus and evaluation of active dorsiflexion.

The mobility test anteroposterior talus was performed with the subject on a stretcher in the supine position. The assessor placed a hand on the talus and the calcaneus supported the other to then mobilize the anteroposterior structures in order to determine whether there was sliding to the talus and anterior to posterior. The test is positive when there is no previous talus sliding rear (ricard; salle, 2003).

The test evaluated the active dorsiflexion range of motion of ankle dorsiflexion at the time and was performed with the subject supine on a stretcher, with his heels out. Then they were asked to perform the individual maximum active dorsiflexion of both ankles simultaneously. The evaluator bilateral dorsiflexion compared visually, in order to determine changes in range of motion of the ankles (ricard; salle, 2003).

Then tests were performed postural balance. The data center of pressure (cop) were obtained from a force platform (amti, model or6-6, usa) with a sampling frequency of 200hz. During the assessment, the subjects had the task to remain in standing position on the force platform for 60 seconds, bipedal support, with feet parallel and aligned to the hip joint, with arms along the body. Subjects were asked to do two tasks with eyes open and two tasks with eyes closed, randomly. This procedure was repeated with an interval of two minutes between tasks. The indices stabilometry based cop were: area of the ellipse

approximately 95% of the points, average speed and variability anteroposterior cop.

After evaluating the balance maneuver was performed for impaction of the talus for the intervention group 1; maneuver thrust to the talus previous intervention group 2 and only the positioning (simulation) for carrying out the maneuver to the placebo group. The valuation techniques and maneuvers used in this work are applied by osteopathy (ricard; salle, 2003).

The maneuver impaction of the talus was performed by a single therapist who placed both hands on the instep of the subject being evaluated, that he lay on a stretcher, with his ankles out. Then, the therapist placed the hypothenar eminence of the hand on the talus, above, and exerted a push (draw) in the caudal to increase dorsiflexion. The impulse was applied at high speed and low amplitude.

The thrust maneuver for anterior talus was performed by the same therapist that evaluated the subject positioned supine on the bed, with triple flexion of the limb with injury plantar dorsiflexion of 45 ° on a wedge. The therapist came into contact with his hand (hypothenar eminence) dominant over the talus and with the other hand increased the contact. Then, the therapist made a direct pressure to the talus for later and when he felt more joint motion, gave a boost of low amplitude and high speed toward the ground.

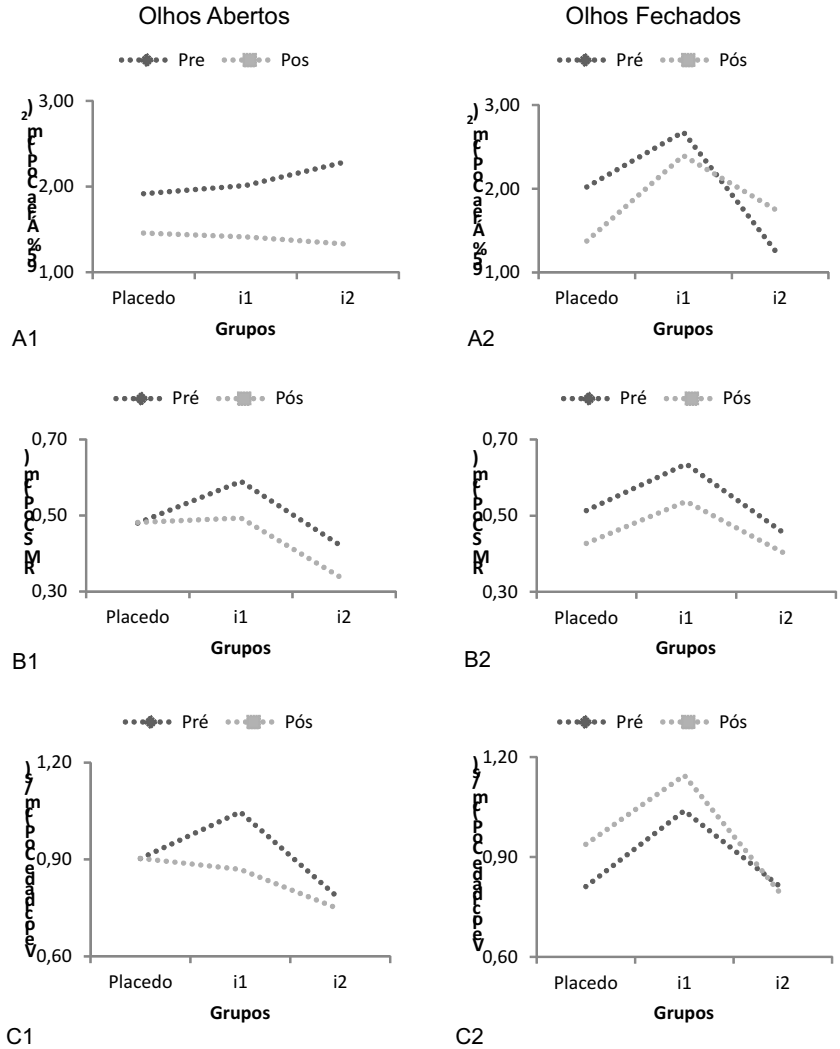
After performing the procedures described above, data were collected again stabilometry for comparison and evaluation of data.

The results were analyzed in statistical application spss (version 15). Statistical analysis was performed using anova test, considering three groups (placebo, i1 and i2) and two assessments: pre-and post-tests as repeated measures. The analysis aimed to determine the importance of intervention in each group and the eyes open and closed conditions, separately. The level of significance was set at 5%.

RESULTS

Comparisons pre-and post-intervention showed to the rms (root mean square) of the cop, provided eye open (oa), a value of p = 0.058 between groups, p = 0.252 between assessments, while the interaction between group and evaluation showed p = 0.638 (figure 01 (a1)). In comparison, the closed eye condition (of), p = 0.066 was found between the groups, p = 0.221 between assessments ep = 0.848 for group interaction and evaluation (figure 01 (a2)). Comparisons pre-and post-intervention showed to the average speed of the cop, provided oa, p = 0.358 for groups, while for reviews, op was 0.332 and for group interaction and evaluation was 0.571 (figure 01 (b1)). Provided of, p = 0.355 was found for groups, for assessments, and p = 0.113 for interaction, p was 0.391 (figure 01 (b2)).

Comparisons of pre-and post-intervention area with 95% of the points in the cop had oa in response, p = 0.852 for groups, while for the reviews, and op was 0.970 for interaction, p = 0.775 (figure 01 (c1)). Provided of, was found in response to groups p = 0.656, while for the reviews, op was 0.090 and interaction, p was equal to 0.052 (figure 01 (c2)).



Graph 01 - stabilometry values found in groups assessed for visual conditions eyes open (left) and eyes closed (right). (Pre, the pre-intervention, post, post-intervention time; Placebo group who received no intervention; i1, the group that received the intervention maneuver impaction of the talus and i2 - the group that received the thrust maneuver for anterior talus). A1, ellipse approximately 95% of the points in the eyes open condition, A2, ellipse approximately 95% of the points in the eyes closed condition; B1, variability anteroposterior CoP in the eyes open condition; B2, variability anteroposterior CoP in eyes closed condition; C1, the average speed of the CoP eyes open condition; C2, the average speed of the CoP condition eyes closed.

DISCUSSION

This study aimed to evaluate the effects of manipulation of the talus from the analysis stabilometry. Therefore, variables were selected from the center of pressure representing global displacement (area and speed) and variability (rms) only the anterior-posterior (ap), because the positioning of the feet (and aligned parallel to the hip joint) may have increased fluctuations in this direction.

A study in patients with asymptomatic ankle sprain, with a torque controlled method to perform pre-and post-test dorsiflexion, showed no significant differences in range of motion for dorsiflexion after manipulations of high speed and low amplitude in the talus. Pictures were used to record the data and the opposite leg was used as control (nield et al. 1993). The use of an objective methodology favors the analysis of the effects of manipulation, but the fact that no differences in these data demonstrates the difficulty in documenting changes in joint mobility promoted by manipulation.

The only manipulation of impaction of the talus was tested to evaluate changes in passive dorsiflexion rom in healthy subjects. Two groups, one handled bilaterally (n = 20) and another named as intact control (n = 21) were evaluated by a hand dynamometer to measure torque during dorsiflexion. The subjects remained supine, with the leg in triple flexion to 90 ° dorsiflexion favor (fryer et al. 2002). No differences were found before and after the manipulation in the torque required to move the joint passively to the same amplitude. Verification of the passive dorsiflexion can also be applied as a method of analyzing the mobility of the talus. In this work, after the manipulation applied on individuals of intervention groups, we used a scanning passive mobility of the talus.

The analysis of postural balance through platform baropodometric (plantar pressure distribution) and force plate (the area of the ellipse points, average speed, variability anterior-posterior and medial-lateral cop) was used to investigate the immediate effects of manipulation talocrural bilateral stability of the foot in healthy subjects. The study had a sample of 62 subjects, divided into two groups: assessed pre-and post-intervention. In these analyzes, manipulation of bilateral talar joint in healthy subjects did not change the standing stability nor the behavior of the projection of the center of pressure (sendin et al., 2009). This work is distinguished by bilateral manipulation, but the findings are in agreement with the study presented here in its conclusions.

Two manipulation techniques (high speed and low amplitude) and a traction maneuver sustained ankle, applied the same subjects with unilateral restriction of dorsiflexion, showed significant differences in the increase of adm dorsiflexion. The dorsiflexion was measured by goniometry performed in an active assisted wherein one tissue was used to assist the movement (dananberg et al. 2000).

Given the degree of error in this type of instrument and the fact that the subjects may have been influenced by the enthusiasm post-manipulation (pulled the cord tissue harder), significant results are questionable. Traction sustained ankle may have caused changes in the viscoelastic ligaments in the ankles and triceps surae, and thus more effective than a single maneuver at high speed handling and low amplitude for adm ankle (andersen; fryer; mclaughlin, 2003). They may also have been related to learning effects and neurological factors from repeat testing.

In this study, the analyzes conducted under conditions of open and closed eyes showed no differences in the results of post-intervention. The purpose of the analysis, the condition eyes closed, was to highlight the importance of sensory information, from the feet to maintain postural balance without the aid of vision. Research in force platform whose purpose is to evaluate the influence on visual static posture as to the extent of displacement of the center of pressure conclude that vision is important information, because its absence significantly affects the displacement amplitude and mean displacement in the anteroposterior direction (chiari; bertani; capello, 2000; newell et al. 1997; teixeira et al. 2007).

The adoption of a parameter estimated from a test stabilometric can induce erroneous classifications, particularly as the postural balance can be maintained under different strategies, and more consistent results are based on duplicate tests from different strategies support (chiari et al. 2002). In repeated tests, should be annulled their effect through randomization, so in this work, the conditions eyes open and eyes closed were random.

In the present study, the evaluation of foot agrees with clinical practice and may be a factor in the study of conflict by subjectivity. Another limiting factor may be the sample size.

The initial hypothesis of this study questioned the handling capacity of the anterior talar modify the static postural balance, however, this hypothesis was not confirmed. The manipulations demonstrated that the techniques used do not cause disturbances in balance and that the change ankle mobility or repositioning the anterior talus, postural adjustments occur to the individual to remain in balance.

Osteopathy is a technique used worldwide and recognized for its effectiveness and accuracy. It is based on the following principles: structure governs function, the unity of body, self-healing and the law artery. Thus, the influence of the manipulation of a single structure can provide insight required to change postural balance, but its effects may not be evident immediately.

CONCLUSION

The immediate effects of manipulation by impaction and thrust maneuver for anterior talus, not altering postural balance in young asymptomatic presenting talus earlier.

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IMMEDIATE EFFECTS OF MANIPULATION OF TALUS ON BALANCE IN YOUNG ADULTS WITH ASYMPTOMATIC ANTERIOR TALUS

ABSTRACT

Introduction: The ankle joint has an important role in the adjustment of postural balance in bipedal support because of its sensorimotor functions. It is believed that modifications of the talus bone biomechanics may lead to amendments in postural balance. Full range motion of dorsiflexion is essential to perform functional activities. Objective: To evaluate the immediate effects of the manipulation by mobilization and relocation of the talus on balance determined by analysis of postural center of pressure in young asymptomatic adults who have anterior talus. Methods: Male and female volunteers (n = 18) with biomechanical dysfunction in the talus were divided into three groups, intervention 1, intervention 2 and placebo. The diagnosis of dysfunction of the talus was performed by active dorsiflexion. A force plate was used to evaluate stabilometry and center of pressure data were analyzed. Impaction of the talus was the maneuver done in intervention 1, while anterior talus thrust was the maneuver done in intervention 2. The technique of impaction of the talus was only simulated in the placebo group. Both groups were evaluated by stabilometry before and after intervention. The tests were conducted under conditions of open and closed eyes. Results: The stabilometry rates showed no statistical differences between assessments. Conclusion: The manipulation through mobilization of the ankle (impaction of the talus) and relocation of the talus (anterior talus thrust) did not affect postural balance in young asymptomatic patients who have anterior talus.

KEYWORDS: balance; ankle; osteopathic manipulation.

RESUME

Introduction: L'articulation de la cheville a un rôle important à régler l'équilibre postural en appui bipède en raison de leurs fonctions sensori-motrices. On croit que les changements les biomécanique de l'os astragale peut entraîner des changements dans l'équilibre postural. Pour effectuer des activités fonctionnelles est impératif qu'une gamme complète de mouvement pour la flexion dorsale. Objectif: évaluer les effets immédiats de la manipulation de la mobilisation et le repositionnement de l'astragale sur l'équilibre postural déterminée par l'analyse du centre de pression chez les jeunes adultes qui ont asymptomatiques talus antérieures. Méthodologie: Les volontaires de sexe féminin et de sexe masculin (n = 18), avec une dysfonction biomécanique dans le talus, ont été divisés en trois groupes: intervenção1, 2 et intervention placebo. Le diagnostic d'un dysfonctionnement de l'astragale a été réalisée par la dorsiflexion active. Une plate-forme de force a été utilisée pour évaluer les données et stabilométrie le centre de pression ont été analysés. Le groupe a traversé intervenção1 impaction manœuvre de l'astragale et l'intervention de deux franchi la manœuvre de poussée pour talus antérieures. Dans le groupe placebo, la technique d'impaction de l'astragale était que simulé. Tous les groupes ont été évalués par stabilométrie avant et après l'intervention. Les tests ont été menés dans des conditions ouvertes et les yeux fermés. Résultats: Les taux de stabilométrie montré aucune différence statistique entre l'avaliações.Conclusão: Manipulations par la mobilisation de la cheville (talus l'impaction) et le repositionnement de l'astragale (talus poussée plus haut) n'a pas altéré l'équilibre postural chez les jeunes asymptomatiques présentant talus antérieures .

MOTS-CLÉS: équilibre postural, la manipulation orthopédique; cheville.

RESUMEN

Introducción: La articulación del tobillo tiene una importante función para ajustar el equilibrio postural en apoyo bípedo gracias a sus funciones sensoriomotoras. Se cree que los cambios en la biomecánica del hueso astrágalo puede conducir a cambios en el equilibrio postural. Para llevar a cabo las actividades funcionales es imprescindible que un rango completo de movimiento de la dorsiflexión. Objetivo: Evaluar los efectos inmediatos de la manipulación de la movilización y el reposicionamiento del astrágalo en el equilibrio postural determinado por análisis de centro de presión en los adultos jóvenes que tienen asintomáticos astrágalo anteriores. Metodología: Los voluntarios de hembras y machos (n = 18), con disfunción biomecánica en el astrágalo, se dividieron en tres grupos: intervenção1, 2 y la intervención placebo. El diagnóstico de la disfunción del astrágalo se realizó mediante la dorsiflexión activa. Una plataforma de fuerza se utilizó para evaluar los datos y se analizaron estabilometría el centro de presión. El grupo pasó por impactación maniobra intervenção1 del astrágalo y la intervención de dos cruzaron maniobra de empuje para el astrágalo anteriores. En placebo, la técnica de la impactación del astrágalo era sólo simulada. Todos los grupos se evaluaron mediante estabilometría antes y después de la intervención. Las pruebas se realizaron en condiciones abiertas y los ojos cerrados. Resultados: Las tasas estabilometría no mostró diferencias estadísticamente significativas entre el avaliações.Conclusão: Manipulaciones de movilización del tobillo (astrágalo la retención) y de reposicionamiento del astrágalo (empuje a talar antes) no alteró el equilibrio postural en jóvenes asintomáticos astrágalo anterior presentan .

PALABRAS CLAVE: equilibrio postural, la manipulación ortopédica; tobillo.

EFEITOS IMEDIATOS DA MANIPULAÇÃO DO TÁLUS SOBRE O EQUILÍBRIO POSTURAL EM ADULTOS JOVENS COM TÁLUS ANTERIOR ASSINTOMÁTICOS

RESUMO

Introdução: A articulação do tornozelo tem um importante papel para ajustar o equilíbrio postural no apoio bipodal devido às suas funções sensório-motoras. Acredita-se que alterações da biomecânica do osso tálus possam levar a alterações do equilíbrio postural. Para realizar atividades funcionais é fundamental uma amplitude íntegra de movimento de dorsiflexão. Objetivo:avaliar os efeitos imediatos da manipulação a partir da mobilização e do reposicionamento do tálus sobre o equilíbrio postural determinado pela análise do centro de pressão em adultos jovens assintomáticos que apresentam tálus anterior. Metodologia: Voluntários dos sexos feminino e masculino (n=18), com disfunção biomecânica no tálus, foram divididos em três grupos: intervenção1, intervenção 2 e placebo. O diagnóstico da disfunção do tálus foi realizado pela dorsiflexão ativa. Uma plataforma de força foi utilizada na avaliação da estabilometria e os dados do centro de pressão foram analisados. O grupo intervenção1 passou pela manobra de impactação do tálus e o da intervenção 2 passou pela manobra de thrust para tálus anterior. No placebo, a técnica de impactação do tálus foi apenas simulada. Todos os grupos foram avaliados pela estabilometria antes e após as intervenções. Os testes foram realizados nas condições olhos abertos e fechados. Resultados: os índices de estabilometria não mostraram diferenças estatísticas entre as avaliações.Conclusão: As manipulações pela mobilização do tornozelo (impactação do tálus) e do reposicionamento do tálus (thrust para tálus anterior) não alteraram o equilíbrio postural em jovens assintomáticos que apresentam tálus anterior.

PALAVRAS-CHAVE: equilíbrio postural; manipulação ortopédica; tornozelo.