36 - THE INFLUENCE OF TAPING IN ANKLE´S RANGE OF MOTION OF VOLLEYBALL PLAYERS

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INTRODUCTION

Each sport requires the development of different physical qualities essential to their practice. Volleyball is characterized by a type of mixed character (aerobic and anaerobic) acyclic, in which high intensity requires high levels of strength and power for their specific moves such as cutting, blocking and jumping (TRICOLI; BARBANTI; SHINZATO, 1994).

For Junior Briner and Kacmar (1997) volleyball jumps are responsible for 63% of injuries in adult athletes. Ankle ligament injuries in adults have high prevalence and approximately 80% to 90% of sprains occur in the lateral compartment, resulting from the application of excessive mechanical load involving hindfoot supination combined with external rotation of the tibia at the beginning of foot contact with the ground while walking, running or jumping (MEURER et al., 2010). The ankle injuries occur in 15 to 60% of volleyball, especially when touch the ground after a jump, and may be caused by the instability of the joint sprains from sequential occurred mainly during the drop impact heel (BRINER JUNIOR; KACMAR, 1997, GROSS; MARTINI, 1999).

Although effective for preventing recurrence of sprains (OLMSTED Et al., 2004), the effects of the use of bandages and splints for ankle on physiological, biomechanical and sports performance are unclear. Despite the capacity restriction of motion of the ankle bandages for the tape to be described in the literature (WILKERSON, 2002; HUNT; SHORT, 2006; QUACKENBUSH ET AL., 2008), few studies detailing the type of tape, and if, this procedure can reduce the rates of injury in volleyball athletes. This makes it difficult to understand the stabilizing ability between different adhesives.

It is important, therefore, to know if using adhesive tape for holding bandages (taping), which is an economically viable option especially between clubs and amateur athletes, is capable of adequately restricting the movement of ankle inversion which is the main form of injury in volleyball athletes.

The main hypothesis tested in this study is that the taping is able to adequately restrict the inversion of the ankle, and if this keeps up after a battery of jumps in maximum power with duration of 60 seconds. The objective of this study is to determine whether the application of bandage ankle through tape (taping) can promote isolation restriction of movement of ankle inversion, and if this keeps up after 60 seconds of multiple jumps.

MATERIALS AND METHODS

This study was characterized as semi-experimental (GAYA, 2009) with model design of pre and post-intervention, transversal, crossover and was proved by the Research Ethics Committee of the Universidade Estadual do Oeste do Paraná (UNIOESTE), 118/2012 – CEP.

The sample was recruited intentionally, not probabilistic and composed of nine athletes volleyball female team representing Rondon, aged between 14 and 18 years (mean age of 15.88 ± 1.53 years) , height (cm) of 176 ± 0.08 and mean body mass (kg) of 69.4 ± 11.5.

The sample size, for paired data on the variable range of motion before and after applying the bandage (taping), was determined using the free software version WinPepi 11.18, totaling nine subjects (18 observations) based on the following input data from test pilot: standard deviation for the pre taping = 2.3, SD for the moment bandage post = 2.7; correlation coefficient = 0; difference to be detected = 4 (degrees); significance level = 5% , test power = 80%.

The range of motion (ROM) of the ankle inversion (being considered with supination and adduction), maximal dorsiflexion and maximal plantarflexion were determined by goniometry. These measurements were performed by the same researcher, using a universal goniometer and directed by goniometric procedures described by Marques (2003). Assessments occurred at two times a day with experimental evaluation (banded) for some athletes, and others, assessment control (without application banding) defined as drawing. On the second day of assessment (which occurred one month after the first), the conditions were reversed athletes. Measurements were carried out before applying the bandage, immediately after, and after the jump in the experimental evaluation. In assessing control, these measurements were made before and after the jump.

The Jumping Test of 60s (BOSCO, 1983), consists of a sequence of jumps at full power for one minute, which the volunteer is instructed to begin each jump in 90 ° of hip and knee flexion and performs them with maximum potency.

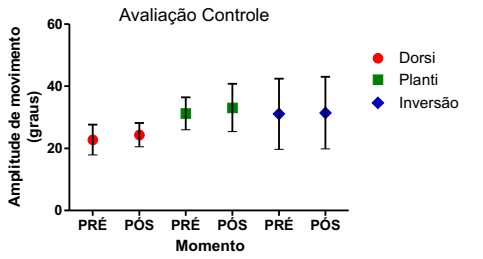
The banding procedure is described by Schur (2007), and were performed by one investigator (Figure 1). Strips of tape inelastic, woven 100% cotton, high adhesiveness and acrylic resin sealer from about 5 cm wide were used. First held volunteer's skin asepsis with hydrated ethyl alcohol 46% and then applied to remove dye benzoin skin oils and to increase adhesiveness. Was asked to volunteer, who was sitting to the application of taping and the foot member to be taping (dominant hand) resting on the thigh of the researcher remained with the semi-flexed knee and foot eversion active. After placement of the anchors on the ankle above the malleoli and midfoot, side strips to stabilize the ankle joint (stirrup straps), starting from the anchor and ankle with tape tension favoring eversion were applied. The strips were applied Horseshoe interspersed with the stirrup, and perpendicular to, leaving the lateral portion of the anchor of the midfoot and finished in the medial portion of the anchor. Still, standard wrap to lock the calcaneus (heel lock) was applied to stabilize the subtalar. The taping was finished repeating the process of anchoring, and was asked to perform voluntary active movement to reverse certification of limitation and was asked if, in their perception, movement was limited.

Figure 1 - Bandage ankle (taping), the technique by Schur (2007)

For statistical analysis was used SPSS 15. Verification of normality was made by the Shapiro-Wilk. For all statistical tests we adopted α = 0.05. Comparisons between the ranges of motion were made by paired t test (pre X post jump) in the evaluation and control by ANOVA - repeated measures (pre taping X immediately after taping X after jump), with Bonferroni post-test in experimental evaluation.

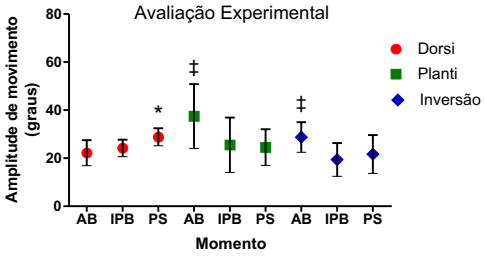
RESULTS

It is observed from Figure 2 that in assessing control, no differences in range of motion. However, taping significantly reduced both plantarflexion and inversion such as the reduction was maintained after the jumps. Also the amplitude of dorsiflexion increased significantly after the jumps in experimental evaluation.



Paired t test
Statistics T

Dorsi
T(8) = -1,368; p = 0,208
Plantar
T(8) = -1,1138; p = 0,287
Inversion
T(8) = -0,110; p = 0,914



ANOVA - repeated measures
Statistics F

Dorsi / Mauchly = 0,681; p = 0,261
F(2, 16) = 7,03; p = 0,01

Plantar / Mauchly = 0,449; p = 0,061
F(2, 16) = 27,39; p < 0,001

Inversion/Mauchly = 0,524; p = 0,104
F(2, 16) = 19,50; p < 0,001

Figure 2 - Values of central tendency for the variable range of motion presented by evaluation (X experimental control), followed by comparative statistics. Dorsiflexion (dorsi); plantarflexion (planti); moment pre jump (PRE) and post jump (POST) in assessing control, just prior to taping (AB), immediately following the taping (IPB), post jump (PS) in the experimental evaluation . * statistical difference regarding AB regarding the IPB; ‡ statistical difference regarding the IPB as the PS.

DISCUSSION

According to Sacco et al. (2004), biomechanical analysis indicates that the bandages can limit range of motion, especially the movements of inversion and eversion of the foot, being directly proportional to the objective of banding. Moreover, the mechanical stability decreases significantly after a short time of exercise, especially in relation to banding compared to orthoses.

Callaghan (1997), in a systematic review, found that the use of orthoses rigid and non-rigid uninjured athletes

significantly reduces ankle movements, especially the inversion. According to the above author, braces least restrict the movements of the ankle wraps, however, its effect is longer lasting after exercise.

In the present study, no significant increase in range of motion of inversion in relation to the condition found immediately after the banding, with a period of 60 seconds of consecutive vertical jumps. Rarick et. al (1962) have studied the efficiency of Rigid taping, and concluded that approximately 21% of the amplitude is increased within a short period of exercise, leaving the ankle joint with limited protection.

One possible explanation for the discrepancy between the findings of other studies regarding the loss of stability after exercise in the present study was not confirmed, may be the use of tincture of benzoin that, at least in theory and based only on empirical experience, can have increased adhesiveness and limited to loss of constraint. Therefore, it is suggested that the contribution of this conduct to be evaluated in future studies.

The increase in dorsiflexion movement can be justified by way of applying the taping, which restricts plantarflexion and inversion leading to ankle dorsiflexion and eversion, and performed the taping from that position. This condition, coupled with the jumping test in 60 seconds, which requires greater movement in this joint, the ankle mobilized towards dorsiflexion. Such justification can be attributed to the significant increase in range of motion in this study, as well as research collaborators and Ricard (2000) that compared the degree of range of motion before and after exercise in individuals with and without taping and concluded that the variation in joint movement, increased in people who plasters applied on the skin, was also possibly due to increased extensibility of the tissue with the heating body and increasing blood flow.

CONCLUSION

It was concluded in this study that the application of an ankle taping using adhesive tape (taping) is capable of promoting restriction of the movement of ankle inversion significantly. But the limitation of range of motion (ROM), promoted by the application of taping is not restricted to movement as well as the inversion plantarflexion. Also there was no loss of the restrictive effect of taping as a result of demand for movement.

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THE INFLUENCE OF TAPING IN ANKLE´S RANGE OF MOTION OF VOLLEYBALL PLAYERS

ABTRACT

Objectives: The aim of this study is to determine if the application of bandage ankle through tape (taping) can promote isolation restriction of movement of ankle inversion, and if this keeps up after 60 seconds of multiple jumps. Methods: A sample of athletes in women's volleyball (n = 9; 15.88 ± 1.53 years; 176 ± 0.08 cm, 69.4 ± 11.5 kg). The evaluations took place in two separate stages, defined by lottery, with an interval of one month: a) experimental evaluation (banded), which became goniometric evaluation for the movements of inversion, dorsiflexion and plantarflexion. Following applied dominant ankle taping and redid the measurements of goniometry. Then we applied the 60 seconds (s) jumping test and remade itself goniometric assessments, b) assessment control (no bandage) became goniometry (inversion, dorsiflexion and plantarflexion). Then we applied the 60s jump test was remade itself measures goniometry. Results: The taping restricted significantly the movements of inversion and plantarflexion and these remained restricted after the jumps. And increased range of motion of dorsiflexion after jumping test. Dorsi / Mauchly = 0.681, p = 0.261, F (2, 16) = 7.03, p = 0.01. Planti / Mauchly = 0.449, p = 0.061, F (2, 16) = 27.39, p <0.001. Inversion / Mauchly = 0.524, p = 0.104, F (2, 16) = 19.50, p <0.001. Conclusion: The application of an ankle bandage by means of adhesive tape (taping) is capable of promoting restriction of the movement of ankle inversion significantly. However, the limitation of range of motion (ROM), promoted by the application of taping is not restricted to movement as well as the inversion plantarflexion. Also there was no loss of the restrictive effect of taping as a result of demand for movement.

KEYWORDS: Physical therapy modalities, volleyball, arthrometry articulate.

L'INFLUENCE DE LA GAMME DE CHEVILLE RUBAN ADHÉSIF MOUVEMENT DE JOUEURS VOLLEYBALL
RÉSUMÉ

Objectifs: L'objectif de cette étude est de déterminer si l'application de la cheville bandage par bande (enregistrement) peut favoriser l'isolement de restriction de mouvement d'inversion de la cheville, et si ça continue comme ça au bout de 60 secondes de sauts multiples. Méthodes: Un échantillon d'athlètes en volleyball féminin (n = 9; 15,88 ± 1,53 ans; 176 ± 0,08 cm, 69,4 ± 11,5 kg). Les évaluations se sont déroulées en deux étapes distinctes, définies par tirage au sort, avec un intervalle d'un mois: a) l'évaluation expérimentale (en bandes), qui est devenu évaluation goniométrique pour les mouvements d'inversion, la flexion dorsale et plantaire. Après appliquée enregistrement cheville dominante et refait les mesures de goniométrie. Puis nous avons appliqué le test de saut de 60 secondes (s) et refait lui-même des évaluations goniométriques, b) évaluation et de contrôle (pas de bandage) est devenu goniométrie (inversion, dorsiflexion plantaire et). Puis nous avons appliqué le test 60-saut a été refaite elle-même mesure de goniométrie. Résultats: L'enregistrement considérablement restreint les mouvements d'inversion et flexion plantaire et celles-ci restent limitées après les sauts. Et l'amplitude du mouvement de flexion dorsale après avoir sauté d'essai. Dorsi / Mauchly = 0,681, p = 0,261, F (2, 16) = 7.03, p = 0,01. Planti / Mauchly = 0,449, p = 0,061, F (2, 16) = 27,39, p <0,001. Inversion / Mauchly = 0,524, p = 0,104, F (2, 16) = 19.50, p <0,001 Conclusion: L'application de la cheville bandage à l'aide de ruban adhésif (ruban adhésif) est en mesure de promouvoir la restriction de mouvement d'inversion de la cheville significative. Toutefois, la limitation de l'amplitude de mouvement (ROM), promu par l'application d'enregistrement n'est pas limité à la circulation ainsi que la flexion plantaire inversion. Il y avait aussi pas de perte de l'effet restrictif de ruban adhésif à la suite de la demande de déplacement.

MOTS-CLÉS: modalités de thérapie physique, volley-ball, arthrometry articuler.

LA INFLUENCIA DE LA GAMA DE MOVIMIENTO DE TOBILLO VENDAJE EM JUGADORES DE VOLEIBOL
RESUMEN

Objetivos: El objetivo de este estudio es determinar si la aplicación del vendaje del tobillo a través de cinta (cinta adhesiva) puede promover el aislamiento restricción de movimiento de inversión de tobillo, y si esto sigue así después de 60 segundos de saltos múltiples. Método: Una muestra de atletas de voleibol femenino (n = 9; 15,88 ± 1,53 años; 176 ± 0,08 cm, 69,4 ± 11,5 kg). Las evaluaciones se realizaron en dos etapas separadas, definidas por sorteo, con un intervalo de un mes: a) evaluación experimental (con banda), que se convirtió en la evaluación goniométrica para los movimientos de inversión, flexión dorsal y flexión plantar. Después de aplicar vendaje de tobillo dominante y rehizo las medidas de goniometría. A continuación, se aplicó la prueba de salto de 60 segundos (s) y rehecha en sí goniométricas evaluaciones, b) el control de la evaluación (sin vendaje) se convirtió en goniometría (inversión, flexión dorsal y flexión plantar). A continuación, se aplicó la prueba de 60-salto fue rehecha se mide goniometría. Resultados: La grabación significativamente restringido los movimientos de inversión y flexión plantar y éstos permanecieron restringidos después de los saltos. Y el aumento de la amplitud de movimiento de la flexión dorsal después de saltar de prueba. Dorsi / Mauchly = 0,681, p = 0,261, F (2, 16) = 7,03, p = 0,01. Planti / Mauchly = 0,449, p = 0,061, F (2, 16) = 27,39, p <0,001. Inversión / Mauchly = 0,524, p = 0,104, F (2, 16) = 19,50, p <0,001 Conclusión: La aplicación de vendaje de tobillo por medio de cinta adhesiva (cinta adhesiva) es capaz de promover la restricción del movimiento de inversión del tobillo significativamente. Sin embargo, la limitación del rango de movimiento (RDM), promovida por la aplicación de grabación no está limitado a movimiento, así como la flexión plantar inversión. Además no había pérdida del efecto restrictivo de la grabación, como resultado de la demanda de movimiento.

PALABRAS CLAVE: modalidades de terapia física, voleibol, artrometría articular.

A INFLUÊNCIA DA ESPARADRAPAGEM NA AMPLITUDE DE MOVIMENTO DE TORNOZELO DE ATLETAS DE VOLEIBOL
RESUMO

Objetivos: O objetivo do presente estudo é averiguar se a aplicação de bandagem de tornozelo por meio de esparadrapo (esparadrapagem) é capaz de promover restrição isoladamente do movimento de inversão do tornozelo, e se esta mantem-se após 60 segundos de saltos múltiplos. Métodos: Amostra composta por atletas de vôlei feminino (n=9; 15,88±1,53 anos; 176±0,08 cm; 69,4±11,5 kg). As avaliações se deram em dois momentos distintos, definidos por sorteio, com intervalo de um mês: a) avaliação experimental (com bandagem), em que se fez avaliação goniométrica para os movimentos de inversão, dorsiflexão e plantiflexão. Na sequência aplicou-se esparadrapagem no tornozelo dominante e refizeram-se as medidas de goniometria. Em seguida aplicou-se o teste de salto de 60 segundos (s) e refizeram-se as avaliações goniométricas; b) avaliação controle (sem bandagem): fez-se goniometria (inversão, dorsiflexão e plantiflexão). Em seguida aplicou-se o teste de salto de 60 s e refizeram-se as medidas de goniometria. Resultados: A esparadrapagem restringiu significativamente os movimentos de inversão e plantiflexão e estes permaneceram restritos após os saltos. E aumentou a amplitude de movimento de dorsiflexão após o teste de salto. Dorsi / Mauchly = 0,681; p = 0,261; F(2, 16) = 7,03; p = 0,01. Planti / Mauchly = 0,449; p = 0,061; F(2, 16) = 27,39; p < 0,001. Inversão/Mauchly = 0,524; p = 0,104; F(2, 16) = 19,50; p < 0,001 Conclusão: A aplicação de bandagem de tornozelo por meio de esparadrapo (esparadrapagem) é capaz de promover restrição do movimento de inversão do tornozelo significativamente. Contudo, a limitação da amplitude de movimento (ADM), promovida pela aplicação de esparadrapagem não se restringe apenas ao movimento de inversão como também à plantiflexão. Também não se observou perda do efeito restritivo da esparadrapagem como consequência da demanda de movimento.

PALAVRAS-CHAVE: Modalidades de fisioterapia, voleibol, artrometria articular.