146 - COMPARISON OF TWO TECHNIQUES HAMSTRING MUSCLE STRETCHING NO GAIN FLEXIBILITY ARTICULAR

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INTRODUCTION

Flexibility can be defined as the ability of a muscle-tendon unit to stretch (MALLMANN et al. May 2011), while a hinge moves in its range of motion (ROM) in a comfortable way, without pain and restrictions (TIRLONI et al., 2008).

There are several factors that affect the flexibility, as the inmates, genetics, gender, age, muscle and adipose volume, and external training, temperature and environment (Wilhelms et al., 2010).

When there is even slight reduction of muscle tendon length while remaining in good condition, but it results in limitations in joint mobility is called shortening or shrinkage. The muscle can shortened can be fully extended, the less the extremes of its range (POLACHINI et al. 2005). The shortening and hence the reduction of ROM can be caused by prolonged immobilisation, restricted mobility, connective tissue diseases or neuromuscular disorders, pathological processes due to tissue trauma and congenital bone deformities acquired (BONVINICE et al. 2005).

To reverse the problem of shortening or retraction, a variety of techniques have been developed to increase ROM, repeatedly uses the stretching to enhance the scope of work of muscles related to certain joint (MALLMANN et al., 2011). Stretching is a therapeutic maneuver used to increase the length of soft tissue structures pathologically shortened in order to increase ROM (BONVINICE et al. 2005).

One of the technique is stretching the muscle energy, which combines static stretching, isometric contraction and relaxation, followed by another static stretching and the other is active stretching technique, which removes the source of muscular insertion (MALLMANN et al. 2011).

The muscles chosen to be performed the two techniques mentioned above was the hamstring muscles, due to the fact that the action of this muscle group be complex because they are biarticular structures. This muscle is composed of the biceps femoris, semitendinosus and semimembranosus (POLACHINI et al., 2005).

Therefore, the objective of this research was to compare the immediate and late effects of two stretching techniques (active stretching and muscle energy) hamstring regarding your joint flexibility.

MATERIALS AND METHODS

This is a clinical trial and randomized cross, which was used in a sample group comprising 19 patients, of which 18 are women and one is male, aged 18-25 years, who were referred to the Clinic of Rehabilitation Physical Therapy from the “Universidade Estadual do Oeste do Paraná (UNIOESTE)”, Cascavel campus.

Patients underwent a screening in which we used the criterion of inclusion and exclusion. In addition, younger individuals (18-25 years), without pain and / or musculoskeletal injuries, sedentary (young people not practicing exercise 3 times a week for 1 year), while the non-inclusion and exclusion, they do not appear in the subject reassessment, do any other method of physical therapy concomitant to this, patients with a history of surgery and lower limbs, patients feels lightheaded and dizzy and carrying out some sort of physical exercise.

After it was explained to each volunteer about the intentions and procedures of the research, which also signed the consent form.

To measure joint flexibility of the hamstrings was used a wooden plank attached to the goniometer. The patient was placed supine on a stretcher, with the right hip at 90 ° of flexion and the left leg extended. Then the patient underwent passive knee extension to the extent that it recounting resistance to stretching. The same was done with the left hip. After this 1st measuring the patient was referred to be done stretching.

In the stretch, patients were randomly assigned and the examiner had no knowledge about which technique would be applied to each individual. The subjects were divided into two groups, one group comprised 10 patients (mean 20.6 years), who received muscle energy technique and the other group consisting of 9 patients (mean 20.0 years), who received the active stretching technique.

In muscle energy technique, the patient is supine on a stretcher, then the therapist positions the patient's right leg hip extension on the left shoulder of the examiner, a hand therapist is positioned in the patient's knee and the other on plantar region, which helps in the position of dorsiflexion and also performs a resistance. This resistance is sustained for 7 seconds, then there is a relaxation for 3 seconds, then the examiner moves the elongation of the patient's limb, this procedure is performed for 2 more times while it remains in the left limb extending over the stretcher. The same held with the left leg.

In active stretching, the patient is standing, static, then the right leg crossed over left leg, then the therapist asks the patient to perform anterior flexion of the trunk with arms outstretched over the legs until you feel a stretching discomfort in the back thereof. This position was maintained for 30 seconds. The same was done with the left side. After the completion of the techniques was done the 2nd measurement of flexibility and this will also be done after a week (3rd measurement). All participants were in comfortable and appropriate clothes.

Data were analyzed using ANOVA with repeated measures (for intragroup comparison) and unpaired t test (for comparison between groups). In all cases, the accepted level of significance was $p < 0.05$.

RESULTS

The results obtained with the technique muscle energy showed an increase in ROM compared to 1st evaluation with the 2nd compared to 1st assessment with the 3rd, there was a decrease in ROM, but was not significant and compared the 2nd assessment with the 3rd ROM returned to levels achieved in the 1st evaluation.

With the technique active stretching, there was an increase in ROM of the 1st evaluation for 2nd since the 1st evaluation compared with the 3rd, there was a significant increase in the 2nd assessment with the 3rd, there was a decrease in ROM, however values remained higher relative to 1 st evaluation.

Comparing muscle power with active stretching, the 1st and 3rd assessment no significant difference in both techniques. In the 2nd evaluation, active stretching technique was significant, an increase in motion in relation to muscle power.

Comparison of immediate and late effects of two stretching techniques of the hamstring muscles.

	Muscle power			Active stretching		
	1AV	2AV	3AV	1AV	2AV	3AV
Average	# +141,6	# *148,3	+ *144,8	$ &148,2	$ **157,7	& **152,8
Standard Deviation	10,63	@ 9,565	11,54	11,80	@ 11,46	13,00

Increase in ROM.
+ Decrease in ROM but not significant.
* ROM returned to levels achieved in the 1st evaluation.
$ Increase in ROM.
& Significant increase in ROM.
** Values obtained in ROM remained higher compared to those obtained in the 1st assessment.
@ Significant increase in ROM, for the active stretching.

DISCUSSION

Perform maintenance on the joint flexibility have been recommended as an important component of motor function, because the benefits in functional activities, injury prevention, muscle relaxation, increase in ROM and even improves performance in athletes (MALLMANN et al. , 2011).

Therefore, the objective of this study was to compare the immediate and late effects of two stretching techniques (active stretching and muscle energy) hamstring regarding your joint flexibility.

Then, the results verified according to the study variables that despite the techniques used to differentiate the form of application, since the muscle power was done passively, while the active stretching was carried out with active participation of the subject, both are effective in immediate effect,in other words ,increased joint flexibility, shortly after implementation. This gain must be immediately viscoelastic properties of the muscle-tendon unit (Taylor et al. 1990, DE DEYNE, 2001).

Already in the late effect active stretching, which had been staying in the increase of ROM, this may be due to the fact constant stretches occur in the muscles, thus activates muscle spindles (ANDERSEN, 2005).

Regarding the loss of gain hamstring flexibility can be attributed to changes in the elastic region of the tissue (viscoelastic properties) due to the tension stretching maneuver (Taylor et al., 1990) and also to influence the properties of thixotropy, which is the property of a fabric become more liquid after the movement and return to the rigidity gel state with the rest of the muscle relaxing promoted by favoring the shortening (SPERNOGA et al. 2001).

In active stretching, in the study by Rose et al. 2,006, stretching performed were kept for 30 seconds and observed flexibility gain in all muscle groups that coincides with the study results, since the length of elongation was also 30 seconds.

In the study by Salvador et al., 2005, we performed the stretching of muscle power to the paraspinal muscles in this study were asked the patient to perform a force against resistance for 10 seconds and relax for 10 seconds, then the therapist stretching performed passively in the patient and the technique was repeated two more times, prompting contraction by 15 and 20 seconds in the second and third replicates respectively, maintaining the same relaxation time. The result found was increasing joint mobility.

In the present study, the same stretching was performed in the hamstring muscles, resistance was sustained for 7 seconds and the relaxation was 3 seconds, the technique was also repeated twice more, and the finding study was similar to Salvador, since there was also ADM increased muscle.

The stretching methods differ in their effectiveness, so clarify what methods may be more effective, contributes to the effectiveness of treatment in patients with muscle shortening.

CONCLUSION

The immediate effect of elongation on two techniques was the increase in joint flexibility. However, after one week of application techniques, it is concluded that only the active stretching was effective in the long run, remaining increased ROM

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COMPARISON OF TWO TECHNIQUES HAMSTRING MUSCLE STRETCHING ON GAIN FLEXIBILITY ARTICULAR

ABSTRACT

The flexibility is the ability of a muscle-tendon unit to stretch, while a hinge moves in its range of motion (ROM) in a comfortable, painless and non constrained way. A stretching technique is the muscle energy that combines static stretching, isometric contraction and relaxation, followed by another static stretching; and the other one is the active stretching technique, which moves away from the source of muscle insertion. The aim of this study was to compare the effect of two immediate and acute stretching techniques (active stretching and muscle energy) of the hamstring muscles regarding the articular flexibility. The sample consisted of 19 people, aged 18-25 years, who were randomly divided into two groups, one of them performed the muscle energy technique and the other one performed the active stretching. The data were analyzed using ANOVA with repeated measures (for intragroup comparison) and unpaired t test (for comparison between groups). In all cases, the accepted level of significance was $p < 0.05$. The results showed that both active stretching technique and the muscle energy technique are effective immediately after they are implemented, however the active stretching was more effective in late effect (after one week)

KEYWORDS: Stretching exercises muscle, flexibility.

COMPARAISON DES DEUX TECHNIQUES MUSCLES ISCHIO-JAMBIERS ETIREMEN GAIN SOUPLESSE ARTICULAIRE

RÉSUMÉ

La flexibilité est la capacité d'une unité muscle-tendon de s'étirer, pendant que la chanière se déplace dans son amplitude de mouvement (ROM) confortablement, sans douleur et contrainte. Une technique d'étirement s'agit de l'énergie musculaire qui combine des étirements statiques, des contractions isométriques et de détente, suivie d'un autre étirement statique. L'autre technique s'agit de la technique activete d'étirement, ce qui s'eloigne de la source de l'insertion des muscles. Le but de cette étude a visé de comparer l'effet de deux techniques d'étirement immédiats et aiguës (étirement actif et de l'énergie musculaire) ischio-jambiers en concernant la souplesse des articulations. L'échantillon était composé de 19 personne, âgés de 18-25 ans, qui ont été aléatoirement partagés en deux groupes, dans un groupe on appliqué la technique de l'énergie musculaire et dans l'autre on a appliqué l'étirement actif. Les données ont été analysées par ANOVA avec mesures répétées (à titre de comparaison intragroupe) et le test t non apparié (par comparaison entre lês groupes). Dans tous les cas, le niveau accepté de significativité était $p < 0,05$. Les résultats ont montré qu'aussi la technique d'étirement actif que de l'énergie musculaire sont efficaces immédiatement après leur mise en œuvre, toutefois l'étirement actif était plus efficace pour effet tardif (après unes emaine).

MOTS-CLÉS: Étirement musculaire exercices, souplesse.

COMPARACIÓN DE DOS TECNICAS DE ALONGAMENTO DE LOS MUSCULOS ISQUIOTIBIAIS EN LA GANANCIA DE FLEXIBILIDAD ARTICULAR

RESUMEN

La flexibilidad es la capacidad de una unidad músculo-tendón de estirar, mientras una articulación se mueve en su amplitud de movimiento (ROM) de una forma confortable, indolora y sin limitaciones. Una técnica de estiramiento es la energía muscular que combina contracción estática estiramiento, isométrica y relajación, seguido de outro estiramiento estático y la otra es la técnica de estiramiento activo, que aleja la fuente de la inserción del músculo. El objetivo de este estudio fue comparar el efecto de dos técnicas de estiramiento inmediato y agudo (estiramiento activo y la energía muscular) isquiotibiales de acuerdo com la fexibilidad de las articulaciones. La muestra estuvo constituida por 19 personas, con edades entre 18-25 años, que fueron divididos aleatoriamente en dos grupos, a un grupo se aplico la técnica de la energía muscular y al otro la técnica del estiramiento activo. Los datos fueron analizados mediante ANOVA con medidas repetidas (para la comparación intragrupo) y la prueba t no apareada (para lacomparación entre grupos). En todos los casos, el nível aceptado de significación fue de $p < 0,05$. Los resultados mostraron que tanto la técnica de estiramiento activo como la de la energía muscular son eficaces inmediatamente después de su aplicación, pero el estiramiento activofue más eficaz em efecto tardío (después de una semana).

PALABRAS CLAVE: Estiramientos ejercicios muscular, flexibilidad.

COMPARAÇÃO DE DUAS TÉCNICAS DE ALONGAMENTO DOS MÚSCULOS ISQUIOTIBIAIS NO GANHO DE FLEXIBILIDADE ARTICULAR

RESUMO

A flexibilidade é a capacidade de uma unidade musculotendínea em alongar-se, enquanto uma articulação se move na sua amplitude de movimento (ADM), de forma confortável, sem dores e restrições. Uma técnica de alongamento é a músculo energia que combina alongamento estático, contração e relaxamento isométrico, seguido de outro alongamento estático e, a outra técnica é o alongamento ativo, o qual afasta a origem da inserção muscular. O objetivo desta pesquisa foi comparar o efeito imediato e agudo de duas técnicas de alongamentos (músculo energia e alongamento ativo) dos músculos isquiotibiais em relação a sua flexibilidade articular. A amostra foi composta por 19 indivíduos, com idade entre 18-25 anos, os quais foram divididos de forma aleatória em dois grupos, em um grupo aplicou-se a técnica de músculo energia e no outro a técnica de alongamento ativo. Os dados foram analisados com uso de ANOVA medidas repetidas (para comparação intragrupo) e teste t não pareado (para comparação entre os grupos). Em todos os casos o nível de significância aceito foi $p < 0,05$. Os resultados mostraram que a técnica de alongamento ativo e músculo energia são eficazes imediatamente após a aplicação das mesmas, porém o alongamento ativo foi mais eficiente no efeito tardio (após uma semana).

PALAVRAS-CHAVE: Exercícios de alongamento muscular, flexibilidade.