140 - MUSCLE STRETCHING X DELAYED MUSCULAR PAIN: TRUTH OR MYTH?

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INTRODUCTION

The last decades had been marked by important transformations and advances in the knowledge area. Subjects that long time ago were unquestioned, today are studied with the had scientific severity.

In this environment of the practical esporting, where diverse effect are waited with the training of different forms of exercises, the delayed muscle pain, strongly present in the routine of the athletes and eventual practitioners, it occupies a place of prominence in the cast study of this problems on this area. Strategies that can come to minimize and/or to prevent the appearance of this bad effect starting objective theoretician of interest for new research. According to Vries (1966), the stretching can significantly reduce the electric activity of the muscle to bring symptomatic relief of the muscle suffering. The use of the exercises of muscle stretching to reduce the delayed muscle pain. Although, exist a certain discordance about it, what it justifies this research about the efects that it will be important to be investigated and disponibilized to the professionals of the area. In this study, we will approach colon controversial topics of the Physical Education: The delayed muscle pain and the muscle stretching, as well as the other benefits of the exercises of muscle stretching. This direct research has the objective to verify the effect of the use of the muscle stretching before and the intense to reduce the delayed muscle pain. The research is delimited to a sample students from basic schools and average education with aproximated 16 years affected for delayed muscular pain presented tests after neuromuscles tests in Physical Education classes.

The Delayed muscle pain

The delayed muscle pain is known for the practitioners of physical activities. Also treated for Alter (1999), by muscle, manifest suffering as a pain or bother that persist on approximately seven days.

The mechanisms that involve the delayed muscle pain or muscle suffering are complex and contradictory. Studies on the subject still are made in everybody to be able to get the answers on the true causes of the muscle suffering. The intensity of the exercises seems to be more directly on to the appearance of the pain and his duration. The eccentric contractions also have presented great relevance in the appearance of pain. During the eccentric contractions, the amount of developed force is approximately, two times superior to the force developed during isometric contractions; however, the total number of crossed bridges active is only 10% greater, resulting in a tension raised in the muscular structure and an exercise of high intensity. Some invasive tests had also been facts, where they had evidenced the substance presence in the blood as, for example, the creatina cinase (CK), that it is a pointer of training overload (BALNAVE and THOMPSON, 1993).

Etiology of delayed muscular pain

As mentioned previously, the causes of the sprouting the delayed muscle pain still do not seem to be clear, however, Alter (1999), presents five hypotheses to explain the sprouting of the muscle suffering of the delayed effect: Muscle damaged or breached, fabric conjunctive damaged, accumulation of metabolic, acid latic and located problems of motor units

Some examinations biochemists have been used to survey these injuries. The creatina cinase (CK), is an enzyme that has been studied in the last years with the great tenacity. Its appearance in great ratios in the sanguineous chain can mean an strange state, being an indicative of muscle injury. However, the CK does not seem to be proportional to the sprouting of the delayed muscle pain (NEWHAM, 1988).

Another possible cause of metabolic the muscular suffering is the accumulation of other muscle ones. These metabolic ones would attract H2O (water), what it would cause edemas and pressure on the sensorial nerves causing pains, however, exist some problems with this hypothesis: The muscle suffering is generally, greater after eccentric contractions, however, some research had evidenced greater eletromiografic activity during the concentrical contractions and this seems to demystify a little this affirmation (ALTER, 1999).

The idea of the acid latic to be the causer of the delayed pain is one of the oldest and also one of the most questioned in the current days. Some research has demonstrated that the acid latic does not remain during some time in the place. However, the delayed muscle pain appears 24-hour after the intense effort. Beyond the muscle, some phisiologist believe that the fabric conjunctive also can be become damaged. The hidroxiprolina (HPO) perhaps is associated with the delayed pain (ABRAHAM, 1979). The HPO is a marker of a product of interruption of the fabric conjunctive and a pointer of the metabolism of the colágeno.

Preventing pains, Alter (1999), tells that if it knows on muscle physiology, tends to support the idea of the execution of stretchings, heating and cooling with the purpose to prevent and/or to prevent pains after-I strengthen, corroborating with the objective of this research.

Muscle stretching

According to Dantas, the muscle exercises of stretching aim at the maintenance the levels of flexibility long ago gotten and the movements must be carried through in normal amplitude and with some restrictions.

For the related author, three types of muscle stretching exist: stretching, suspension and acquittal. The stretching is as allonge. The allonge in suspension is as the proper name says, to be suspended, and has as example the suspension in the fixed bar. In this type of allonge it does not have movement to articulate, but a small traction for account of the gravitational force. The third type, that is of the acquittal, is an excellent relaxing and consists of balancing the members with a light traction. According to Dantas (2005), these exercises durate eight seconds.

Some authors, point diverse indications of the exercises of muscle stretching. According to Anderson (1998), during many years, it he could observe some rewarding benefits and results. Research indicates exercises of muscle stretching to be carried through inside of the automobile to reduce algicas complaints told by 75% of the interviewed taxi drivers. According to Hall and Brody (2001), these exercises reduce the expense of global energy, diminish the possibility to exceed the tecidual extensibility and diminish the possibility to cause pain. According to Sobieraysky (2004), the stretching promotes the reduction of the muscular tensions and preventing injuries. Allsen (1999), corroborates with this affirmative one when it points that, among others advantages, the exercises of static stretching contribute to relief of muscle pains. In view of as many recommendations, it fits to stand out that the exercises of muscle stretching are indicated in many routines of labor gymnastics with great pointed benefits (BITTENCOURT, 2006; BRITO 2006; QUINTANILHA, 1999).

Benefits of the stretching

According to Anderson (1998), the stretching diminishes the muscle tension, improves the sanguine circulation, reduces the anxiety, improves the mental promptitude, diminishes the risk of injuries, facilitates its work, develops the corporal conscience, sensation of pleasure.

Anderson published some books, however, the benefits pointed for it seems to be being overestimated. An example of this is the affirmation of that the stretching exercises could acutely improve the sanguine circulation. According to Rubini (2005), it does not have scientific evidences for such affirmation.

By the way, it seems that the stretching exercises could until obstructing a little the ticket of the blood. Regarding the improvement of the mental promptitude and prevention of injuries, also scientific evidences do not exist that they corroborate with the affirmation of Anderson. How it could improve such promptitude? In the reality, the muscle stretching and its benefits still have much that to be studied and to be searched cientificamente. In short, the benefit of the stretching is probably the less contested, to relax the body. The controversy about prevent this injuries and the delayed muscle pain is very old and she is argued in the present time. Herbert and Gabriel (2002), after Conclude research of literature revision, that such exercises of stretching could not brighten up "pains of the following day", exactly being carried through before and after the exercises, beyond not preventing injuries and still not to improve the income of the athlete.

MATERIALS AND METHODS

Sample

The group of volunteers was composed for 46 individuals students from schools of the cities of Gonçalo and Itaboraí - Rio De Janeiro. The searched individuals had the average age of aproximated 16 years old, 28 are male and 18 are female. One becomes important to stand out that it did not have election of the students for level of physical activity, neither, for its motor abilities or physical valences.

Materials

The tests had been carried through in square covered in ambient temperature of 30 degrees. 30 long cushions with thickness of two centimeters for accomplishment of the exercises of abdominal flexão had been used. A table of subjective perception of pain (BORG, 2000), together was used to a figure of the human body with the main affected regions, where the individuals pointed the places and the perception of pain according to the agreement number and orientation of the author.

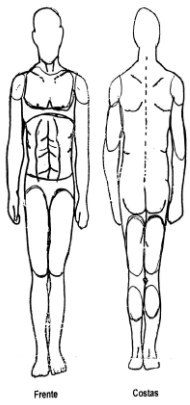


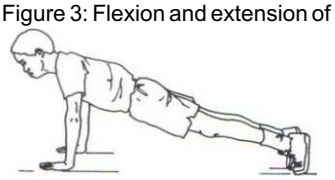
Tabela adaptada de Borg (2000).

0	nothing	"without pain
0,3		
0,5	Extremally weak	Only perceptive
1	Very weak	
1,5		
2	weak	light
2,5		
3	moderate	
4		
5	strong	intensive
6		
7	Very strong	
8		
9		
10	Extremelly strong	Maxim pain
11		
*	absolutely	The most intesive possibel

To the left we have a drawing of a body in the previous and posterior vision with delimitations of the regions. To the right, we have the scale of subjective Borg of pain.

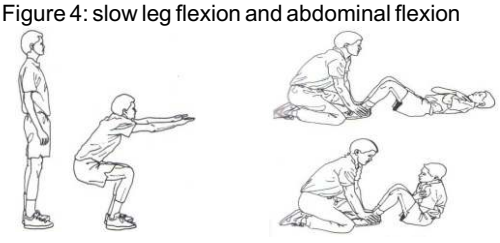
On the exercises, the test of flexion and extension of elbows was carried through with maximum of possible repetitions until the concentrical imperfection, or the execution of the movement of the incorrect form (figure 3). The legs flexion, as well as the exercises of abdominal flexions, was carried for approximately 1 minute, according to described protocol for Dantas for tests of located muscular resistance (DANTAS, 2003), (figure 4). Although the tests to be used for evaluation of the located muscular resistance, were not considered scale of punctuation, in view of that the objective age to only evaluate the perception of pain told by people

Figure 3: Flexion and extension of arms



Fonte: Fleck e Kraemer (1999, p.194)

Figure 4: slow leg flexion and abdominal flexion



Methodology of the accomplishment of the tests

First, the group carried through the tests without the application of exercises of muscle stretching. After 30 hours, the individuals had been interviewed with the objective to evaluate the complaints of referring pain to the exercised muscles. The group carried through same the exercises seven days after, being practised exercises of muscle stretching before and after the tests. Procedure as the rest and the application of the interview was become fullfilled the same, using itself it scale of subjective perception of pain of Borg (2000) to verify the intensity of pains told by the proper people.

Statistical treatment to try to demonstrate the possible relevance of the exercises of muscle stretching to reduce the delayed muscle pain, applied the non parametric test of Willcoxon. The test revealed significant ($p < 0,05$), with p - valor = 0,0006.

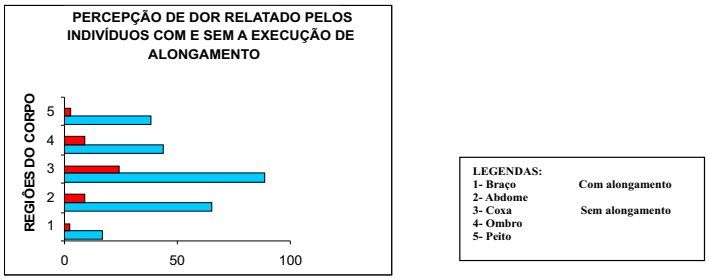
RESULTS And DISCUSSÔES

After the interviews with the students, They were made a table where it contained the searched individual, the regions where it revealed pain with and without the execution of stretching exercises and the result in relative numbers to the scale of Borg (pain perception). To leave of these results, the second table was created containing the new results, however, in a simplified form.

Tabela 1: Related pains results

PART OF HUMAN BODY	WITHOUT STRETCHING	WITH STRETCHING
ARM	17	2
LEG	89	24
CHEST	38	3
ABDOMEN	65	9
ELBOW	44	3
RESULT	253	51

To better views of datas, it was expressed a kind of grafic



Perception about related pains by volunteers with and without the stretching

FINAL CONCLUSIONS AND CONSIDERATIONS

Despite the great contradictions pointed in the revision of literature, the vast number of research that approaches the subject, and even though they point resulted opposing to the presented ones in this study, we conclude all after the inquiry that the exercises of muscle stretching can brighten up the delayed muscle pain perceived by students with average age approximately 16 years old when displayed the RML exercises intense.

The literature revision is ample and points diverse resulted and this was of extreme relevance so that this research was concluded. In this research the positive intervention of the exercises of muscle stretching was clear to after brighten up these pains when carried through before and the intense exercises. One another point important to be argued is related to the time of duration of the execution of the movements. We got great difficulty in finding research less involving executed exercises of allonge being with than fifteen seconds, therefore it seems that the stretching exercises are carried through with the objective of profit in the amplified to articulate (flexibility), and this was not the objective of this research. Despite the limitations of the research, for not launching hand of data of invasive origin, for if dealing with daily pay-pubescent and pubescent students the gotten results they had been very significant. We suggest new studies using different populations, with invasive examinations and more minute control of the existing variable.

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MUSCLE STRETCHING X DELAYED MUSCULAR PAIN: TRUTH OR MYTH?

ABSTRACT

This research had as focus the influence of the exercises of muscle stretching to reduce delayed muscle pain (DMT) when carried through before and tests located muscle resistance (RML). The present study aimed to verify if the exercises of muscle stretching would reduce the muscle suffering noticed by students during the physical education class. The sample is compounded by a group of 46 students from schools of the Gonçalo and Itaboraí - RIO DE JANEIRO. The volunteers are separeted as follow: 28 are male and 18 are female, under the aproximated age of 16. The students performed the DML tests of going down exercises, flexion and extension, of elbows and abdomen flexion without the previous and after accomplishment of muscle stretching exercises. A after 30 hours the individuals were interviewed about the intensity of pains and noticed regions. It was uses an instrument for evaluation of these pains was composed of a human body picture under a back and front view, with one simply divided on the main regions affected beside the perception schedule subjected to Borg pain. After seven days the same volunteers performed the tests differentiating only the execution of light muscle stretching, concentrated and of short lasting before and after the tests. The procedure of the interview was repeated and then, the data comparison. As statstistics analysis, it was used the non parametric willcoxon. The test showed to be significant ($p<0,05$) with p - value = 0,0006. Conclude, therefore, that the muscle stretching exercises, performed before and after neuromuscle exercises of maximum repetitions reduced the delayed muscle pain perceived by students with average age of 16 years during the physical education classes.

WORD-KEY: stretching, delayed muscle pain and Located Muscle Resistance.

RÉSUMÉ

Ceci je étudie tuvieve comme son foyer l'influence des exercices d'elongamiento musculara pour diminuer la douleur musculaire tardive (DMT) entretemps effectuée précédemment et ensuite essais de resitencia musculaire située (RML). La présente étude tuvieve coo objective être surveillé les exercices d'elongamiento pudem diminuer la douleur musculaire dans les classes d'éducation physique la l'école. Ce qui est amuesta est formée par un groupe de 46 aluminos d'écoles des Villes de São Gonzalo et Itaboraí à Rio de Janeiro. De de lui 46 aluminos 28 sont des hommes et 18 filles com âge de ±16 années. Les élèves le feraient par essais de RML sentadillas, flexion et estención de bras et abdominaux non haceno exercices d'elongamiento avant et après les exercices. Après 30 heures les sujets étaient interviewées sur l'intensité de lãs des douleurs et les lieux où ils étaient sentis. On utilise um instrumeiento pour l'évaluation desta douleur qui a été composée d'uma diburo du corps humain vu antiriormente et postérieurement et uma tableau de perception subjective de douleur (BORG). Après 7 jours les même élèves feraient les essais différenciés seulement EM l'exécution des exercices d'elongamiento lèves, concentrés et de courte durée avant et après les essais. La statistique anlise a été appliquée com le teste de willcoxon. Le testez demonstro significatif ($p <0,05$), com p - valor = 0,0006. El estúdio Conclui asi, que los ejercicios de elongamiento realizados antes y despues de ejercicios musculares puede disminuir la dolor retardada em alumnos com edad promedia de 16 años en las clases de educación física.

MOTS-CLES: Elongamiento, dolor muscular retardada y Resistencia Muscular Localizada.

RESUMEN

Esto estúdio tuvieve como su foco la influencia de los ejercicios de elongamiento musculara para disminuir la dolor muscular tardia (DMT) mientras realizado antes y después testes de resitencia muscular localizada (RML). El presente estudio tuvieve coo objetivo mirar se los ejercicios de elongamiento pudem disminuir la dolor muscular en las clases de educación física el la escuela. La amuesta es formada por un grupo de 46 aluminos de escuelas de las Ciudades de São Gonzalo y Itaboraí en Rio de Janeiro. De lo 46 aluminos 28 son varones y 18 muchachas com edad de ±16 años. Los alumnos hicierán lo testes de RML de sentadillas, flexión y estención de brazos y abdominales no haceno ejercicios de elongamiento antes y despues de los ejercicios. Después de 30 horas los sujetos fuerán entrevistados sobre la intensidad de lãs dolores y los lugares donde se fuerán sentidas. Se utilizo um instrumeiento para la evaluación desta dolor que se fue compuesto por uma diburo del cuerpo humano visto antiriormente y posteriormente y uma tabla de percepción subjetiva de dolor (BORG). Después de 7 dias los mismo alumnos hicierán los testes diferenciados solamente em la ejecución de los ejercicíos de elongamiento leves, concentrados y de corta duración antes y después de los testes. La anlise estadistica se fue aplicada com el teste de willcoxon. El teste demonstro significativo ($p<0,05$), com p - valor = 0,0006. El estúdio Conclui asi, que los ejercicios de elongamiento realizados antes y despues de ejercicios musculares puede disminuir la dolor retardada em alumnos com edad promedia de 16 años en las clases de educación física.

PALABRAS-CLAVE: Elongamiento, dolor muscular retardada y Resistencia Muscular Localizada.

ALONGAMENTO MUSCULAR X DOR MUSCULAR TARDIA: VERDADE OU MITO?

RESUMO

Esta pesquisa teve como foco a influência dos exercícios de alongamento muscular para reduzir a dor muscular tardia (DMT) quando realizados antes e após testes de resistência muscular localizada (RML). O presente estudo teve como objetivo verificar se os exercícios de alongamento muscular amenizariam o sofrimento muscular percebido por alunos após a prática de exercícios físicos nas aulas de educação física escolar. A amostra é composta por um grupo de 46 alunos estudantes de escolas contidas nos municípios de São Gonçalo e Itaboraí - RJ. Dos 46 voluntários, 28 são do gênero masculino e 18 do gênero feminino tendo idade de $^{+}$-16 anos. Os alunos realizaram os testes de RML de agachamento, flexão e extensão de cotovelos e flexão abdominal sem a realização de exercícios de alongamento muscular previamente e posteriormente aos testes mencionados. Após 30 horas os indivíduos foram entrevistados sobre a intensidade das dores e regiões percebidas. Foi utilizado um instrumento para avaliação destas dores que é composto por uma figura do corpo humano numa visão anterior e posterior com uma simplesmente dividida nas principais regiões afetadas além da escala de percepção subjetiva de dor de Borg. Após sete dias os mesmos voluntários realizaram os testes diferenciando apenas a execução de exercícios de alongamentos musculares leves, concentrados e de curta duração antes e após os testes. O procedimento da entrevista foi repetido e por fim a comparação dos dados. Como análise estatística aplicou-se o teste não-paramétrico de willcoxon. O teste mostrou-se significativo ($p<0,05$), com p - valor = 0,0006. Conclui-se assim, que os exercícios de alongamento muscular, realizados antes e após exercícios neuromusculares de repetições máximas amenizaram a dor muscular tardia percebida por alunos com idade média de 16 anos nas aulas de educação física.

PALAVRAS-CHAVE: Alongamento, dor muscular tardia e Resistência Muscular Localizada.