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REVIEW ARTICLE

STRETCHING AFTER AND AFTER MUSCULATION TRAINING

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ABSTRACT

The practice of stretching before and after physical activities has been increasingly recommended by Physical Education professionals, as well as physicians and physiotherapists, either for muscle preparation for applied force training in order to prevent injuries or, as they discuss some authors, to improve performance in training. Stretching exercises contribute to increase muscle flexibility and its effects have been exhaustively studied by professionals in the area, with "studies highlighting the influence of muscle warm-up prior to stretching, its influence on sports performance and injury prevention. The research carried out, through the literature review, to identify importance of the stretching for the quality of strength training in bodybuilding to prevent injuries during the practice of physical activity. We will carry out a bibliographical research on the topic of stretching, with descriptors on stretching, bodybuilding, strength training. After analyzing the articles found, it was identified that some authors report that pre and post workout stretching can prevent muscle injuries, increase muscle elasticity and allow for range of motion.

INTRODUCTION

The practice of stretching before and after physical activities has been increasingly recommended by Physical Education professionals, as well as physicians and physiotherapists, either for muscle preparation for applied force training in order to prevent injuries or, as they discuss some authors, to improve performance in training. Stretching exercises contribute to increase muscle flexibility and its effects have been exhaustively studied by professionals in the area, with "studies highlighting the influence of muscle warming prior to stretching, its influence on sports performance and injury prevention" (ALMEIDA *et al.*, 2009). Stretching is used to prevent muscle shortening, because when we do it, we stimulate the muscles, joints and tendons to continue having their maximum range of motion. One of the consequences of stretching is to promote the flexibility of those who practice it, with the practice of stretching done correctly, our body becomes more flexible, and consequently less conducive or subject to injury. A person who performs the stretching correctly, consequently, develops a good joint flexibility, his body becomes more flexible and his joints can increase the degrees of movement (THOMPSON *et al.*, 2011). Thus, the goal of stretching is according to Nahas (2010) "to increase the range of motion and possibly prevent cramps, contractures and muscle or ligament injuries." It is understood, therefore, that the elongation is responsible for maintaining and developing

the elasticity, that is, the flexibility of the muscles. Due to the recognition that health is closely associated with movement and the practice of activities as a way of maintaining health, much is said about the practice of exercises and the importance of stretching. The muscle stretching exercise is a widely used technique, mainly to increase flexibility, both in healthy individuals and in rehabilitation. The muscle is elongated by means of a traction force, which removes its origin and insertion, positioning it to a new length and maintaining it in this position for a certain period (PEVIANI; GOMES, 2013). Stretching should be an integral part of any training program, but it can also be used in School Physical Education, in the gym, in sports, at work, at home, in the open air. Stretching the body is a simple action and it can bring numerous benefits. For Alter (1999, p. 1) "stretching exercises refer to the process of stretching connective tissues, muscles and other tissues." According to Dantas (1995, 65), "stretching is a form of work that aims at maintaining the levels of flexibility obtained and performing normal amplitude movements with the least possible physical restraint". Other studies address the elongation from the point of view of treatment of tissue stiffness, with applications of several protocols, for different periods for observations of different muscle insertions, obtaining significant positive results (ARAÚJO *et al.*, 2012). In the same way, other professionals demonstrated that they did not observe large differences between groups that did pre and post workout stretching with those who underwent another

kind of warm-up prior to strength training (ARRUDA *et al.*, 2006). Thus, through a literature review, the present research aims to contribute to the academic discussions that address the issue of the effects produced using the pre and post strength training stretching.

MATERIALS AND METHODS

The research carried out, through the literature review, to identify importance of the stretching for the quality of strength training in bodybuilding to prevent injuries during the practice of physical activity. It is a bibliographic research of exploratory and descriptive character, referring to the scientific production regarding the subject in question, in order to make feasible the analysis about the subject and to produce scientific knowledge. To elaborate the article, the following steps were followed: establishment of the guiding question of the research, bibliographic survey, critical analysis of the articles found, interpretation and synthesis of the results. The criteria for inclusion of the articles were established as follows: be a book or article published in national journals in Portuguese language, indexed in databases and published in the period from 1995 to 2018. Descriptors as search indexers registered at Bireme were stretching, bodybuilding, strength training. The computerized databases Virtual Health Library (VHL), Scientific Electronic Library Online (SciELO), Virtual Health Library (VHL), Latin American and Caribbean Literature on Health Sciences Information (LILACS) and Google Scholar. Books and articles were selected from 1995 to 2018, under the following inclusion criteria: articles published in national online journals indexed in the database researched and whose texts were presented in full, portraying the theme to be worked in Portuguese and related selected descriptors. For the synthesis and analysis of the material, the following procedures were performed: exploratory reading, which consisted in reading the material to know what the articles were about; selective reading, which was concerned with the description and selection as to its relevance to the study, critical and reflexive reading that sought through the data the construction of the results found. The exclusion criteria were articles with no summary on the platforms searched, editorial articles and / or articles whose development was not related to the selected keywords / descriptors. The critical analysis of the articles found constituted a study and synthesis of the same, and elaboration of a data collection instrument, filled with the variables: reference (author / date), objectives, search source and results found. The results of the articles were discussed by the authors and brought to light the understanding of what the researchers observed in their research on stretching and its benefits.

RESULTS AND DISCUSSION

In the literature review, among the many articles, many questions were addressed, ranging from complex information to practical analysis. Arruda *et al.* (2006) in their specific study for flexibility training and loading exercises, have identified that static stretching exercises can be dispensed with when the subsequent activity requires maximum force test and "loss of strength or increase of possibility of injury during the maximum weight lifting, when preceded by stretching exercises to develop flexibility".

Moraes (2013) observed in his study that

The results show that stretching preceded by force exertion may have an inverse negative result, due to factors such as the decrease in electrical activity and the muscle torque spike due to it, in relation to injury prevention, the results diverge, of some experiments it may be observed that it is necessary to analyze the specificity of the exercise, since it was observed that exercises with high intensity of the elongation-shortening cycle require a greater elasticity of musculotendinea, consequently techniques that improve this elasticity can reduce the risk of injury, in contrast studies show that pre-workout stretching does not reduce injury rates and in some cases may predispose it, that is, there is likely to be little or no benefit in injury prevention when the subject undergoes stretching exercise prior to the training session. Tiggeman *et al.* (2016), observed in their study that stretching can often be detrimental to strength training, but rather quite satisfactorily counteract that "[...] Possibly, the long time between finalization of stretches and the performance of the series of strength training, do with the negative effect of the stretches are canceled. In addition, performing several contractions during repetitions may also contribute in this regard". When referring specifically to injury prevention, Trajano (2014) points out quite pertinently. One of the problems found in the argument that stretching is ineffective in injury prevention is that some studies have analyzed the incidence of injuries as if they were alike. Quite possibly, stretching can affect one type of injury (stretch) without affecting others (trauma, fractures, twisting, repetitive strain). Thus, to better understand the role of stretching in injury prevention the most logical hypothesis to be investigated would be that stretching exercises with durations enough to alter the mechanical properties of muscles could reduce the risk of stretch lesions. Trajano (2016) brings us in a very concrete way about the existing literature evaluating and the benefits of pre-workout stretching of bodybuilding. [...] Pre-activity elongation: 1) does not reduce the general incidence of lesions in populations with low incidence of muscle strain injuries; 2) possibly helps to reduce muscle injuries by stretching; and 3) can adversely affect performance on tasks that require strength and power. Thus, its use in a pre-physical preparation routine will depend on the cost / benefit interpretation by the trainer or physical education professional.

Conclusion

From all the studies observed, the practice of stretching is directly linked to the expected result, and should be followed closely by professionals, so that it brings benefits rather than being detrimental to strength training.

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