ORIGINAL RESEARCH PAPER

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Modified hold relax proprioceptive neuromuscular Facilitation stretching versus static stretching techniques for increasing the flexibility of hamstring muscle : A review of literature.

KEY WORDS: Hold Relax Proprioceptive Neuromuscular Stretching, Static Stretching, Flexibility, Hamstring Muscle.

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ABSTRACT

Modified Hold-Relax Proprioceptive Neuromuscular Facilitation (PNF) Stretching and Static Stretching techniques are common practice for increasing range of motion, though a systematic literature review has been done to evaluate theories behind it. The purpose of this study is intended to review possible mechanisms, proposed theories, and physiological changes that occur due to Modified Hold Relax PNF and Static Stretching Techniques. The studies suggested that both the stretching techniques are effective in increasing the Hamstring muscle flexibility. Various studies suggested that the combination of stretching techniques with the moist pack application can enhance the effect of Stretching. The Hamstring Muscle Stretching increases range of motion with a variety of Stretching techniques, Position, and Durations. Perfectly done Hamstring muscle stretching prevent low back pathology and planar fasciitis. On the basis of this systematic literature review, it can be concluded that both the Modified Hold Relax PNF Stretching and Static Stretching techniques are similar effective in improving and maintaining ROM, increasing Muscular Flexibility, and increasing athletic performance, especially after exercise. However, proper protocol, duration and intensity and consistency must be followed to attain and maintain the benefits of stretching techniques.

This study was designed to compare the effects of Modified Hold-Relax Stretching and Static Stretching in improving Hamstring Muscle flexibility. Both Modified Hold-Relax Stretching and Static Stretching are effective methods to improve hamstring flexibility.
Modified Hold-Relax Stretching improves flexibility through relaxation of the contractile component of the muscles, while Static Stretching causes an increase in elasticity of the Non-Contractile Viscoelastic component [3)(6)]. Thus, both of these mechanisms play equal roles in improving the flexibility of the muscles.

The low individual physiologic maximum of lower segment lumbar extension mobility may cause overloading of the low back among athletes involved in sports with frequent maximal lumbar extension and that it predicts future low back pain.(Kujala UM (1997) el al). [3], Hamstring tightness plays a significant role in the presence of plantar fasciitis.(Jonathan M. Labovitz, Jenny Yu, Chul Kim (2011) et al) [4]

Feland et al. reported that contract-relax and static stretching had similar benefits in improving flexibility [10]. Similarly, Lim et al. reported similar effects of Static and PNF Stretching on Hamstring muscle extensibility[24]. Recently, Gribble et al. found that Static and Hold-Relax Stretching were equally effective in improving Hamstring range of motion.[26]

The hamstring stretching increases range of motion with a variety of stretching techniques, positions, and durations (Decoster LC (2005) et al) [11] Another possible mechanism for the increase in range of motion is augmentation of stretch tolerance. This is supported by Halbertsma et al., who reported an increase in hamstring flexibility in their study[23].

Funk D (2001) et al studied the efficacy of moist heat pack application over static stretching on hamstring flexibility and concluded that the significant benefits to increase hamstring flexibility could be gained by using moist heat packs in comparison with static stretching despite a perceived attitudinal bias in favor of stretching[17]. Both modified hold-relax stretching technique and static stretching are equally effective.(Hashim Ahmed(2015) et al)[6].

This is also reported by Sharma et al. that stretching along with warming up is an effective way to improve hamstring flexibility[16]. Moreover, their participants reported an increase in pain tolerance at the end of study. They attributed the gains in flexibility to an increase in stretch tolerance.

A possible mechanism for the improvement of hamstring range of motion relies on the effects of autogenic inhibition. Autogenic inhibition is contingent on the function of the Golgi tendon organs, which not only detect changes in length but also changes in tension. Tension is produced in the antagonists with both static and PNF hamstring stretching techniques. Therefore, the presence of autogenic inhibition would not be affected if the measurement technique was an active or passive stretch or if the training method was a static or hold-relax stretch[26].

It would be interesting to compare the effect of modified hold-relax stretching and static stretching in subjects with a history of hamstring injury and low back pain. It is possible that such conditions involve deposition of abnormal fibrous tissue and cross linkages, and may respond differently in healthy muscles.

No increase in flexibility of the hamstring muscles occurred by increasing the duration of stretching from 30 to 60 seconds. (Wandy WD et al)[12]. A 30-second duration is an effective amount of time to sustain a hamstring muscle stretch in order to increase ROM. No increase in flexibility occurred when the duration of stretching was increased from 30 to 60 seconds or when the frequency of stretching was increased from one to three times per day.(Bandy WD, Irion JM, Briggler M (1997) [15].

The effect of contract-relax techniques (similar to modified hold-relax stretching) on hamstring flexibility and found that these techniques produced increased muscle flexibility[11),(12)]. Handel et al. reported significant increase in hamstring flexibility along with an increase in passive torque of muscle after a contract-relax exercise program. Similarly, Wallin et al. reported that the contract-relax technique was more effective than ballistic stretching for improving muscle flexibility over a 30-day period, whereas other researchers have reported no difference between the two techniques[11]. Many studies have evaluated various effects of different types and durations of stretching. A duration of 30 seconds is an effective time of stretching for enhancing the flexibility of the hamstring muscles. [26]. Static stretching is effective

at increasing ROM. The greatest change in ROM with a static stretch occurs between 15 and 30 seconds[23] [26] Most authors suggest that 10 to 30 seconds is sufficient for increasing flexibility.[16] In addition, no increase in muscle elongation occurs after 2 to 4 repetitions.[24]

A systemic review of the literature with the aim of uncovering the effect of hamstring stretching on range of motion concluded that it is difficult to confidingly identify the most effective hamstring stretching method[12]. Further, Feland et al. reported that contract-relax and static stretching had similar benefits in improving hamstring flexibility in the elderly population. However, the increase was much greater for their contract-relax proprioceptive neuromuscular facilitation group as compared with their control and static groups.[10]

Further research comparing active knee extension and passive knee extension measurements may be useful in determining the best method for testing the effectiveness of modified hold-relax stretching and static stretching in improving hamstring flexibility.

CONCLUSION: This study indicates that both the Modified Hold Relax PNF stretching and the static stretching techniques are similar effective in improving and maintaining ROM, increasing muscular flexibility, and increasing athletic performance, especially after exercise. However, proper protocol, duration and intensity and consistency must be followed to attain and maintain the benefits of stretching techniques.

Further research should be completed to prove the efficacy of each of these techniques, modified hold relax neuromuscular proprioceptive facilitation stretching and static stretching in the factors for increasing the muscle flexibility.

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