

ACUTE EFFECTS OF TWO HIP FLEXOR STRETCHING TECHNIQUES ON KNEE JOINT POSITION SENSE AND BALANCE

Hussain I Younis Aslan, MA, MS, ACSM-RCEP¹

Harsh H Buddhadev, PhD, PT²

David N Suprak, PhD, ATC²

Jun G San Juan, PhD, ATC²

ABSTRACT

Background: Tightness of hip flexor muscles has been recognized as a risk factor for various musculoskeletal injuries in the lower extremities.

Purpose: The purpose of this study was to examine the acute effects of two hip flexor stretching techniques (dynamic and hold-relax proprioceptive neuromuscular facilitation, HR-PNF) on hip extension (ROM), knee joint position sense (JPS) and balance in healthy college age students who exhibit tightness in hip flexor muscles.

Study Design: Pretest-posttest randomized experimental groups.

Methods: Thirty-six healthy college age students (mean = 22.37 years) with tight hip flexors participated in this study. Hip extension ROM, knee joint position sense and dynamic balance were tested pre- and post-stretching using a digital inclinometer, an iPod touch and the Y-Balance test, respectively. Subjects were randomly divided into dynamic and HR-PNF stretching groups. Three-way mixed analysis of variance was utilized to explore if an interaction existed between the groups in tested variables.

Results: There was a significant effect of time on hip extension ROM in both groups ($p < 0.001$). There was also a significant effect of stretch type on hip extension ROM ($p = 0.004$) favoring hold-relax over dynamic stretching group. There was a non-significant effect of time on mean knee joint position replication error in both groups. There was a significant main effect of time on the Y-Balance test's mean distance of reach to posteromedial and posterolateral directions ($p < 0.001$). There was also a significant main effect of directions of reach on distances achieved ($p < 0.001$) favoring posterolateral over posteromedial, and the latter over anterior direction.

Conclusions: The results of this study demonstrated the effectiveness of both HR-PNF and dynamic stretching techniques which resulted in a significant acute improvement in hip extension ROM and dynamic balance measures, with HR-PNF being more effective than dynamic stretch. However, there were no significant improvements in knee joint position replication over time in either stretching group.

Level of Evidence: 2b

Key words: Dynamic balance; dynamic stretching; hold-relax proprioceptive neuromuscular facilitation; knee joint position sense; tight hip flexor.

¹ Western Washington University, Bellingham, WA, USA

² Better Health Thru Exercise, Kirkland, WA, USA

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CORRESPONDING AUTHOR

Hussain Aslan

451 4th Ave S. Apt. 205

Kirkland, WA 98033.

253-269-8733

E-mail: gencaslan74@gmail.com