

Comparative Dose-Response Study of Stretching On Strength of Proximal (Hamstring) and Distal (Calf) Muscle

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Abstract

Objective: To compare the stretching induced strength changes between the proximal and distal groups of muscles. *Methods:* Twenty-eight recreationally active male individuals participated in this study. They were assigned into Group A for proximal muscle (hamstring) and group B for distal muscle (calf) with 14 subjects in each group. This study is an experimental trial of self-stretching for 2 minutes (SS₂). This stretch duration involved a 30 second stretch and a 20 second relaxation period, intermittently. Maximum Isometric Voluntary Contraction Force (MIVCF) was measured in both groups before (pretest) and immediately after (posttest) stretching. Change in pre-stretching and immediately post-stretching MIVCF was compared between the two groups. *Results:* Maximum Isometric Voluntary Contraction Force increased with SS₂ in the hamstring by 1.31% and in calf muscle, it increased by 2.92%. However, these changes were statistically insignificant between the two groups ($p>0.05$). *Conclusion:* Shorter stretching (2 minute) increases maximum isometric voluntary contraction force in both muscles but relatively more in the calf.

Key Words: Stretching induced, strength, MIVCF, strain gauge

Introduction

Stretching is traditionally used as part of a warm-up to increase flexibility or pain-free range of motion (ROM) about a joint in an attempt to promote better performances and/or reduce the risk of injury (Shellock and Prentice, 1985; Smith, 1994; Fowles et al., 2000). Athletic trainers and other rehabilitation professionals also recommend that their athletes or patients stretch before performing strengthening exercises or strength assessment tests (Bixler and Jonese, 1992). However, authors of recent systematic reviews and many original studies have suggested that pre exercise

stretching may temporarily compromise a muscle's ability to produce force (Behm, 2001; Young and Elliott, 2001; Thacker et al., 2004; Shrier, 2004). It is possible that this short-term effect of stretching on muscle force production may affect the performance of various rehabilitation strengthening exercises. More importantly, pre exercise stretching may adversely affect the results obtained by muscle strength assessments and, in turn, influence a clinician's decisions regarding rehabilitation progression or return to play (McHugh and Nesse, 2007; Herda et al., 2009). Fowles et al (2000) reported that 30 minute of passive stretching reduces