Effect of stretching on hamstring muscle compliance

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Objective: To evaluate the effects of stretching on hamstring muscle compliance indirectly and directly. Methods: Twelve healthy men were instructed to perform passive stretching of one leg daily over 4 weeks, while the other leg served as a control. An instrumental straight leg raise was used to measure stretching force and muscle compliance indirectly with surface electromyography to measure muscle activity during stretching. Muscle compliance was measured directly by computerized muscle tonometer. The thickness of the biceps femoris muscle was measured by ultrasound and knee flexion strength by a dynamometer. Results: In the stretched legs the mean increase in straight leg raise was 17° after 4 weeks (p < 0.001) and the mean stretching force increased by 19 N (p < 0.001). Improved straight leg raise correlated with biceps muscle thickness (r = 0.74). The angle at which stretching was first felt increased by 15° in the stretched legs (p < 0.001). Controls showed no significant changes in straight leg raise. There was no difference in force between the stretched and control legs in comparison of the same angles. No significant changes were noted in muscle compliance, surface electromyography or isometric maximal knee flexion strength. Conclusion: Stretching improved passive straight leg raise with no change in muscle compliance. Muscle viscoelastic properties and strength were preserved despite improved straight leg raise.

Key words: muscle compliance, muscle tonometer, passive stretching, range of motion, isometric strength.

J Rehabil Med 2009; 41: 80–84