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Stretching optimization for lower limb posterior chain: comparison between two different executions of the same exercise

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Stretching of the posterior kinetic chain muscles, especially the hamstrings, is one of the most practiced exercises in all types of physical activity and postural rehabilitation protocols (1). Objective of our experimental trial was to compare the performance of two different variants of muscle stretching (A and B), highlighting for each one the regions of the posterior kinetic chain (lumbar region, gluteus muscles, hamstrings) most affected by the exercise. 161 selected subjects reported on a specific Body Chart the localization of the stretching sensation; the software Pain-drawing (2) was employed for the analysis of the stretching sensation felt by each subject (75 men and 86 women) aged between 20 and 80 years old, with different lifestyles but subjected to defined exclusion criteria (prosthesis, artificial implants, crippling arthritis, flare–up pain, recent surgical procedures). Stretching A is the generally accepted practice available in the literature. The proposed variant (Stretching B) is the experimental suggested procedure which adapts the execution of the exercise on biomechanical reasoning, in order to focus the stretching sensation on the hamstrings muscles and, at the same time, decreasing the stress in the lumbar region. In stretching B, subjects were positioned with lower limb in neutral position, knee with approximately 18° of feeble bending (variable depth, compact rolls in various size, behind popliteal fossa. Notably, results show that the same area has not been affected; when subjects performed Stretching B exercise avoids both the pre-tension of the hamstrings and the lever created by the arms stretched forward, focusing the stretching sensation on the hamstrings muscles and gastrocnemius and affecting only marginally the lumbar region and never the back region. This appears particularly relevant for the prevention of lower back pain and for situation when the stretching of the posterior kinetic chain is performed as a cool-down following physical activity or for rehabilitation purposes.

References

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Keywords

Hamstring; stretching; low back pain; biomechanics.