Thesis Title	Effect of Duration and Number of Repetition of Passive Static Stretching on Hamstring Muscle Flexibility.
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ABSTRACT

Passive static stretching was popularly used for increasing flexibility in fields of sports, sports medicine, physical therapy, and many others. Duration and number of repetition of passive static stretching were the important component for increasing flexibility. This study was an experimental design conducted to investigate the effects of these 2 factors: 1) The effect of duration of sustained passive static stretching for 5, 10 seconds and no stretching on hamstring muscle flexibility, 2) The effect of number of repetition of passive static stretching of one, five, and ten repetitions on hamstring muscle flexibility.

The hamstring muscle flexibility was measured by recording the range of passive knee extension angle (PKEA) in degrees with a goniometer and by recording the passive knee extension resistance (PKER) in kilograms with a spring scale.

Sixty nursing students within age range of 19-21 years voluntarily participated and were separated into 3 groups (20 students per each group). Each group underwent three similar treatments (sustained stretching for 5, 10 seconds, and no stretching) in a different order. Each treatment was separated by two-week rest period. The left hamstring muscles were stretched, and PKEA and PKER were measured in range of maximal passive knee extension angle and resistance with fixed 90^{o} hip flexion in right side lying. The baseline and post stretching PKEA and PKER were measured before and after the first, the fifth, and the tenth repetitions.

The results of this study revealed the following: 1) The baseline and post stretching mean differences in passive knee extension angle (MPKEA) and passive knee extension resistance (MPKER) following 5 seconds of sustained stretching repetitively 10 times were 4.06 ± 1.77 degrees and 0.35 ± 0.19 kilograms, respectively, 10 seconds were 4.58 ± 1.78 degrees and 0.42 ± 0.17 kilograms, and no stretching, 0.91 ± 1.65 degrees and 0.06 ± 0.16 kilograms. Both 5 and 10 seconds of sustained stretching increased the MPKEA and MPKER significantly ($p<0.01$) when compared with no stretching. However,there were no significant differences between the 5-second and10-second groups ($p>0.01$). 2) In sustained static stretching for 10

seconds, the MPKEA of 4.58±1.78 degrees measured at the tenth repetition was significantly greater than both the fifth repetition (MPKEA = 3.83±1.67) and the first repetition (MPKEA = 2.73±1.46)($p<0.01$).The MPKER measured at the tenth repetition (0.42±0.17 kg.) was significantly greater than the fifth repetition(0.353±0.17 kg)and the first repetition (0.26±0.16 kg)($p<0.01$). Additionally, the fifth repetition post -stretching also significantly increased MPKEA and MPKER more than the first repetition ($p<0.01$).

The results of this study indicated that passive static stretching sustained for 10 seconds or 5 seconds following 10 repetitions similarily increased flexibility of hamstring muscles. Ten repetitions of passive static stretching sustained for 10 seconds increased flexibility of hamstring muscles greater than one or five repetitions. Thus, the duration of sustained stretching and number of repetitions should be considered in order to increase the flexibility of hamstring muscles efficiently and effectively.