

Comparison of the effect of a Physical Education-Based Stretching Program applied during the Warm-Up, ColdDown and both periods on hamstring extensibility in Primary Schoolchildren

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Purpose. To compare the effects of a physical education-based stretching program applied during the warm-up, cold-down and both periods on hamstring extensibility in primary schoolchildren.

Methods. A sample of 237 schoolchildren aged 7-12 years old (128 girls and 109 boys) from two primary school centres participated in the present study and met satisfactorily the inclusion and exclusion criteria. A cluster randomized controlled trial design was used. The classes balanced by grade were randomly assigned to the warm-up (n = 57), cold-down (n = 55), both periods (n = 61) or control groups (n = 64). During the physical education sessions, the students from the interventional groups performed a four-minute stretching program twice a week for eight weeks. The intervention program was applied during the warm-up (4 minutes), cold-down (4 minutes) and warm-up (2 minutes)-cold-down (2 minutes) for the warm-up, cold-down and both periods groups, respectively. Hamstring extensibility (estimated by the back-saver sit-and-reach test) was assessed at the beginning and at the end of the intervention program.

Results. The one-way ANOVA ($p < 0.001$) on the average obtained in the back-saver sit-and-reach change scores (post-intervention – pre-intervention), followed by the Bonferroni adjustment, showed that the students that performed the stretching program during the cold-down period significantly improved their hamstring extensibility levels compared to the control group ($p < 0.001$). However, statistically significant differences between the warm-up/ both periods groups and the control group were not found ($p > 0.05$).

Discussion. The students that performed the stretching program during the cold-down period significantly improved their hamstring extensibility levels compared to the control group. However, statistically significant differences between the warm-up/ both periods groups and the control group were not found. Stretching programs can be included in Physical Education classes, specifically during the warm-up and the cool down periods in order to improve hamstring extensibility. Although it seems that the stretching exercises in the warm-up period could be less effective in gaining flexibility in school children (BecerraFernandez & Merino-Marban, 2015). In line with this study, Mayorga-Vega et al. (2014) compared the effects of a PE-based stretching program performed during warm-up and cool-down periods on hamstring extensibility in schoolchildren. Founding that both the warm-up and cool-down students had statistically significant higher values on the hamstring extensibility than the no-training students ($p < 0.05$). The warm-up and cool-down groups did not show statistically significant differences. Nevertheless, the cool-down students obtained a slightly higher magnitude effect when compared with the warm-up group ($g = 0.67$ and $g = 0.56$, respectively).

Conclusions. In order to develop students' flexibility, PE teachers should apply stretching programs during the cold-down period. This knowledge could help and guide teachers to design programs that allow a feasible and effective development of students' flexibility in the physical education setting. Due to the negative effect of static stretching on performance as previously found in the literature, it seems that PE teachers should improve students' flexibility during the cool-down period of the sessions.

References.

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