# Static Stretching Reduces Power Production in Gymnasts

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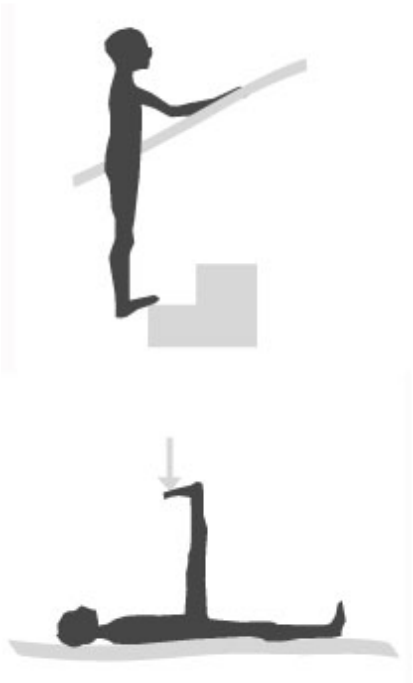
Static stretching, consisting of holding muscles at lengthened positions for typically 15-45 seconds, has been recommended before participating in physical activity. Gymnasts historically have performed static stretches, such as splits, during the warmup portion of training. Recently however, data has been presented from studies on adults which have shown that static stretching immediately prior to performing powerful activities reduces performance (for example, Kokkonen, Nelson, " Cornwell, 1998; Nelson, Cornwell, " Heise, 1996). The reported reductions in performance have persisted over an hour following static stretching! Athletes in some sports such as track and field no longer stretch in this manner because of the detrimental effects on movement speed. This effect of static stretching on power has not been studied in children, and in particular on gymnasts who often use static stretching as part of their training. Therefore, we conducted a study to investigate the effects of stretching the calf muscles on the ability to perform a drop jump (punch jump).

Fourteen female gymnasts, competitive levels 7-9, (149.2 ± 11.8 cm, 97.3 ± 26.4 lbs) performed drop jumps onto a timing mat under two conditions. On one day the gymnasts were stretched statically for 30 seconds on 3 different exercises (Figure 1: stair stretch, partner supine stretch, and pike stretch). These exercises were performed twice in a circuit fashion. The gymnasts then immediately performed 3 drop jumps. We evaluated the time on the ground for each gymnast, as well as the height she achieved in the jump.



On the second day, the gymnasts did not stretch, but performed the drop jumps after their usual warm-up activities (which did not include static stretching). The order of the conditions was randomly assigned. The results showed that the gymnasts jumped significantly lower following the stretching protocol (.246 m compared to .268 m). This difference in performance is equivalent to an average 8.2% loss in height. This reduction in performance could mean the difference between landing safely and under-rotating a tumbling skill. Time on the ground during the jump was not changed.

Research on adult subjects has shown that static stretching

reduces strength performance by reducing muscle activation as
well as compromising the muscle's ability to contract at the cellular level (Fowles " Sale, 2000). Although we have been recommending the discontinuance of intense static stretching in favor of dynamic stretching as part of the warmup for gymnasts, coaches and athletes have seemed slow to accept this recommendation.

While static stretching is beneficial and important for a gymnast's flexibility development, this type of training should not be placed before activities in which the gymnast must be strong or powerful (i.e. - before or during gymnastics training). Based on the data presented here, coaches should re-evaluate their warmup practices and consider the effects of static stretching on their gymnasts' ability to produce powerful movements. As athletes in other sports have found, dynamic stretches such as leg kicks are probably a better choice for preparing gymnasts for training explosive movements.

## References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