

THE EFFECTS OF DYNAMIC AND STATIC STRETCHING METHODS ON SPEED, AGILITY AND POWER.

Daniel C. Bishop

Department of Sport, Coaching and Exercise Science, University of Lincoln, UK

KEY WORDS: Warm-up, Illinois, Vertical Jump,

INTRODUCTION: Warm-ups are integral to coaches' and athletes' preparations, yet current research and practice provides conflicting advice on the most effective warm-up procedure for aiding performance. The value of a warm-up is not in question but the role of static stretching within the warm-up is contentious. A number of studies have suggested that static stretching is detrimental to performance (Shrier, 2004), though these have not always employed stretching protocols that reflect those actually used by performers. Many athletes continue to include static stretching as part of their routine, often following a dynamic warm-up. The purpose of the study was to investigate, using realistic protocols, the effects on speed, agility and power of additional static stretching following a dynamic warm-up.

METHOD: To date 16 University sports students (11 male, 5 female) have been recruited to the study, which was approved by the University ethics committee. Following familiarisation with the warm-up methods and sports performance measures, all participants performed two warm-up protocols one week apart. The protocols concentrated on the quadriceps, hamstrings, gastrocnemius, soleus, gluteals, adductors and hip flexors. The Dynamic Warm-up (DW) protocol used a series of specific progressive exercises lasting 10 minutes over a distance of 20m with a jog recovery. The Dynamic Warm-up plus Static Stretching (DWS) protocol used the same DW protocol followed by a 5 minute period during which 7 stretches were held at a point of moderate discomfort for 20 seconds. After an initial rest period of 2 minutes the subjects performed a countermovement vertical jump (CMJ), 20m sprint and Illinois agility test. A one minute rest period was used between performance measures to mimic competitive performance. The order the performance measures were conducted were randomised for each subject; for an individual subject the order was maintained for both protocols. Paired t-tests were used to identify differences between the 3 performance measures over the two warm-up protocols, with a significance level of $p \leq 0.05$.

RESULTS & DISCUSSION: 20m sprint performance was significantly reduced ($p=0.03$) by the use of the DWS protocol ($3.4 \pm 0.32s$, mean \pm SD) when compared to DW only ($3.29 \pm 0.29s$). The CMJ (DW = $0.51 \pm 0.09m$ vs DWS = $0.48 \pm 0.09m$) and Illinois agility (DW = $17.31 \pm 1.0s$ vs DWS = $17.37 \pm 1.04s$) performance showed no significant difference with the addition of static stretching. Previous studies have used static stretching for periods in excess of levels used in conventional warm-ups but the present study indicates that static stretching for as little as 20 seconds after a dynamic warm-up can reduce 20m sprinting performance. Possible mechanisms for this include a decrease in the stiffness of the musculotendinous unit and an acute neural inhibition leading to a decrease in muscle activation levels (Young, 2007).

CONCLUSION: The use of static stretching following a dynamic warm-up decreased sprinting performance compared with the dynamic warm-up alone. Practitioners and athletes should use static stretching prior to performance with caution.

REFERENCES:

- Shrier, I. (2004). Does stretching improve performance? a systematic and critical review of the literature. *Clinical Journal of Sport Medicine*, 14(5), 267-273.
- Young, W.B. (2007). The use of static stretching in warm-up for training and competition. *International Journal of Sports Physiology and Performance*, 2, 212-216.