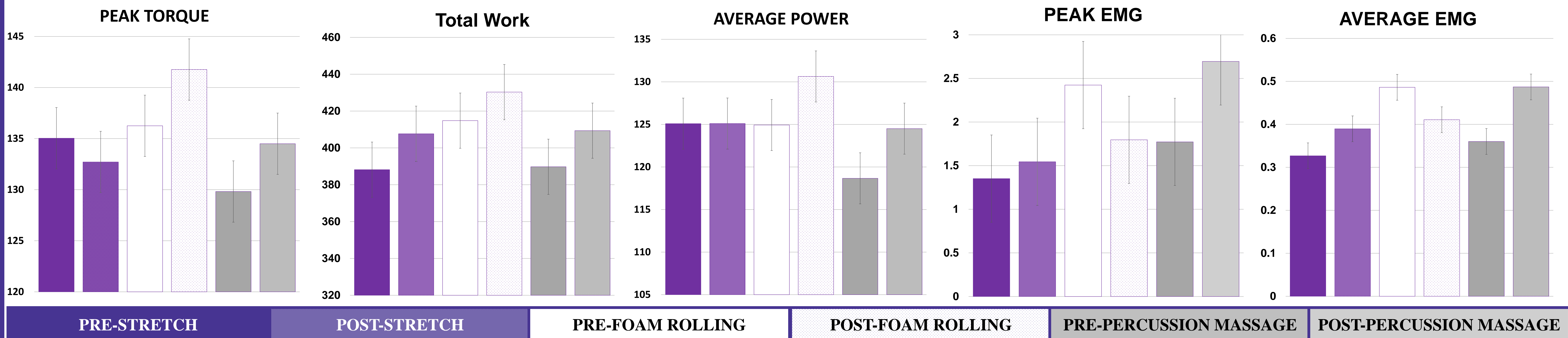




THE EFFECTS OF STRETCHING, FOAM ROLLING, AND PERCUSSION MASSAGE ON NEUROMUSCULAR PERFORMANCE



NO MODALITIES SIGNIFICANTLY AFFECTED TORQUE MEASUREMENTS OR MUSCLE ACTIVITY



ABSTRACT

Prior to training many athletes perform different preparation protocols. Many of these protocols involve stretching, foam rolling and/or percussion massage. The goal of these protocols can range from warming up, increasing tissue compliance to pain management. Static stretching has been shown to reduce force output and muscle activation, however the effects of foam rolling and percussion massage have not been as heavily studied. It is still unknown if these protocols can positively or negatively influence performance.

PURPOSE: To determine if stretching, foam rolling, and percussion massage influence neuromuscular performance during an isometric strength assessment.

METHODS: Twenty-eight participants (67.7 ± 4.5 cm, 77.3 ± 17.2 kg, Age 24.2 ± 10.5 years) volunteered. The first day served as a familiarization session on the isokinetic dynamometer. The testing procedure consisted of three single leg maximal isometric contractions of the knee extensors with the knee flexed to 90° . An amplified bar electrode was placed on the vastus lateralis to record muscle activity. Isometric strength was tested prior to and following the four protocols. Each protocol was randomly tested on a different day with at least 72 hours between days. The protocols consisted of a control (did nothing), percussion massage in a sweeping pattern over the muscle, stretching performed with the standing quad stretch, and foam rolling in the prone position. Each intervention lasted 7 minutes total with 5 sets of 60 seconds of intervention with 30 a second rest in between. Peak torque, work, and average power were taken from the isokinetic dynamometer and the highest value for peak torque was used for subsequent analysis. EMG signal was filtered and peak EMG and average EMG were analyzed. Change scores from pre to post for each variable and condition were calculated and compared using repeated measures ANOVAs.

RESULTS: There was no significant effect for all of the conditions across all variables. ($F=0.18-1.82$, $P=0.25-0.91$). Change scores \pm SD (control, stretching, foam rolling & percussion massage, respectfully) for: peak torque (5.6 ± 19.9 , -2.1 ± 17.7 , 6.2 ± 22.4 , & 9.3 ± 33.5) work (24.2 ± 50.3 , 19.5 ± 50.2 , 17.6 ± 65.2 , & 33.3 ± 59.6), average power (8.9 ± 22.3 , 0.9 ± 12.9 , 6.31 ± 18.97 , & 10.4 ± 30.8), peak EMG (0.5 ± 1.9 , 0.2 ± 1.4 , 0.3 ± 2.0 , & 0.9 ± 1.9) and average EMG (0.1 ± 0.3 , 0.3 ± 0.5 , 0.1 ± 0.9 , & 0.1 ± 0.9).

CONCLUSION: After evaluating the four different protocols, there was no significant difference in muscle activation or force output between them. Most of the protocols had a minor positive effect but did not differ from the control. It was interesting to note that the changes score for peak torque for the stretching protocol was overall negative but not significantly different. This is constant with previous literature, that stretching alone might reduce performance however that was just seen in peak torque and no other measurement.

PRACTICAL APPLICATIONS: The results of this study indicate that as there is no measurable benefit to performing these types of modalities prior to performance however there is also not a significant detriment either. If a coach or athlete prefers one of these modalities then there is no evidence that they should not do them, it would be a matter of preference and other possible psychological benefits.

