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Practical Applications of Electromyography for Strength Coaches: A Case Study of the Isometric Squat

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Electromyography (EMG) provides quantitative information such as identification of muscle activity, relative muscle activity, and fatigue. This information is valuable to strength coaches as it allows for the development of novel performance-enhancing strategies; however, EMG is not regularly utilized by strength coaches. **PURPOSE:** To provide strength coaches with a method of measurement that offers immediate and actionable information on lower extremity muscular compensation patterns using the isometric squat and EMG. **METHODS:** 10 subjects completed a 2-minute isometric squat at 30% of their maximum voluntary contraction (MVC) and a 2-minute isometric handgrip trial at 30% of their MVC. These protocols were counterbalanced between subjects. The handgrip protocol was used to identify the expected EMG response solely due to fatigue, i.e. when no muscle compensation is possible. The change in EMG during the isometric handgrip from 20-30s to 110-120s was examined using a dependent *t*-test. 95% CI upper and lower limits from the forearm EMG data were used as thresholds to signify compensatory muscle activation strategies of the vastus medialis, biceps femoris, erector spinae, and gluteus maximus during the isometric squat. Values above the 95% CI upper limit indicate muscle compensation by increasing its contribution, while values below the 95% CI lower limit indicate the muscle reducing its contribution. **RESULTS:** In this case study we highlight a subject with a vastus medialis compensation strategy. This subject had a +188% and +35% change in vastus medialis and gluteus maximus activity, respectively, indicating a greater reliance on those muscles. Additionally, the subject had a -12% change in both the biceps femoris and erector spinae muscles, indicating avoidance or unloading of those muscles. **CONCLUSION:** Strength coaches can use this information to design conditioning programs to focus on specific areas of the kinetic chain with the goal being to keep all %MVC values within the expected range solely due to fatigue. A 2 minute isometric squat in conjunction with EMG of the lower extremity, can be used to acquire quantitative data for strength and conditioning programs.