

EMG Analysis and Motor Unit Recruitment in the Rectus Femoris of College Students

Crise, R.S., Franklin, E.L., Brooks, K.A. Louisiana Tech University, Ruston, LA.

The rectus femoris works as part of the quadriceps muscle group to provide the force needed to generate very explosive movements during knee extension. Because many sports require explosive movements from the lower body, many strength coaches implement exercise routines that strengthen the muscles and prevent injuries. In the general population, activities using knee extension are essential in getting the full benefit of a designed exercise program. Muscle fibers provide the contractile force needed to accomplish a movement. Commonly, a deficiency is present in people who tend to favor one leg more than the other during activity. This is due to factors such as improper training, improper biomechanics, and joint injury. Having a strength imbalance from one leg to the other can strongly influence the amount of force generated, and therefore the amount of weight lifted. The purpose of this study was to determine whether these subjects had an imbalance in the contractile force of the rectus femoris. The participants were all kinesiology students in a Master's degree program. Their age ranges from 22 years of age to 25 years of age. The instruments being used for this procedure are a leg extension machine and Biopac EMG. Each participant was required to perform five reps of a single leg extension for each leg, after determining maximum voluntary contraction. To analyze data that is collected. Data was analyzed using SPSS and Microsoft Excel. Muscle contractions were compared between and within subjects and compared from the participant's dominant to non-dominant leg. For this particular study, the purpose was calculating whether the contractions are different from dominant leg to non-dominant leg. The results indicate that participants have a significant decrease in the contractile force from their dominant to non-dominant leg; significance was set at $p < .05$. This study shows where coaches, trainers, and athletes need to focus on strength training to correct muscle imbalances. Imbalances could indicate that subjects are not trained properly, or they are favoring one leg while performing explosive maneuvers, or have an injury that prevents proper firing motor unit recruitment^(1, 4).