

HIP MUSCLE ACTIVITY DURING THREE SIDE-LYING HIP STRENGTHENING EXERCISES IN DISTANCE RUNNERS

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Purpose: The purpose of this study was to quantify activity of the gluteus medius (GMed), tensor fasciae latae (TFL), anterior hip flexors (AHF) and gluteus maximus (GMax) muscles during three common side-lying hip strengthening exercises: side-lying hip abduction (ABD), side-lying hip abduction with external rotation (ABD-ER), and the “clamshell” (CLAM). Hypotheses were made regarding muscle activity across exercises and the order in which muscles would be activated during each exercise, from greatest to least. **Methods:** To test these hypotheses, surface electromyography (EMG) was recorded on each of the muscles while 20 healthy distance runners (age: 25.45 ± 5.8 years, height: 1.71 ± 0.07 m, mass: 64.43 ± 7.75 kg) performed the exercises of interest in a weighted condition. Results of a two-way repeated measures ANOVA showed a significant interaction between exercise and muscle ($p < 0.001$) so Tukey’s Honestly Significant Post Hoc testing was done to determine where significant differences existed. **Results:** Some hypotheses regarding relative levels of muscle activation were supported while others were not, possibly due to the unique sample or the collection of EMG data over only one portion of each of the muscles of interest. The results suggest that each of the exercises studied have potential to strengthen one or more of the hip muscles. The CLAM exercise, however, did not show potential to strengthen the hip abductors or external rotators, as speculated, and the ABD-ER exercise may induce excess activation and strengthening of the TFL beyond what is desired in certain cases. The ABD exercise appears to be most effective for strengthening the GMed with little activation of the TFL and AHF. None of the exercises, however, activated the GMax, a primary external rotator of the hip, adequately (beyond 40-60% MVIC) to induce strengthening. **Conclusions:** In conclusion, it was found that each of the exercises studied have potential to strengthen one or more of the hip muscles. With an external load of 5% of body weight, the CLAM exercise, may not activate hip abductors or external rotators sufficiently to strengthen these muscles, and the ABD-ER exercise may induce excess activation and strengthening of the TFL beyond what is desired depending on the goals of the rehabilitation. The ABD exercise appears to be desirable for isolating GMed with little activation of the TFL and AHF. None of the exercises, however, adequately activated the GMax, a primary external rotator of the hip, to induce strengthening at the current load.