Overhead work is considered a high risk for occupational musculoskeletal shoulder and back injuries. This study is examining the variability in muscle activation and co-activation patterns in the shoulder and upper back prior to and following overhead work. The aims of this research are to examine sex differences in fatigue response, variation in fatigue responses across individuals, and the effect of fatigue on the imbalance of upper limb and spine musculature. Fifteen men and women (n=30), aged 18-35 years, will be recruited from the York University population to complete two sessions of the protocol (one week apart to assess reliability in musculoskeletal responses).

Surface electromyography will be used to capture activity from the rotator cuff, scapular stabilizers, surrounding humeral abductors, adductors, elevators and trunk extensors, including erector spinae (T4 level) of the participants’ dominant side. Simultaneously, fine-wire electrodes will capture in-muscle activity from the rotator cuff and trunk extensor muscles. Maximal and reference exertions will be completed before, during, and after the overhead work tasks. Participants will be asked to press a 2kg drill to portable force transducers located at four locations (anthropometrically scaled) and will apply a 4-second upward push force of 30N. Participants will complete the task in a randomized order following a 64s cycle time and 50% duty cycle (32s work period, 32s rest period). During the rest period, participants will move their arms below shoulder height and perform a keyboard typing task and every X will rate their perceived exertion. This research will advance our knowledge of muscle responses and imbalances induced by fatiguing overhead work.

References


