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The Relationship between Trunk Angle and Electromyography (EMG) Signals in Biceps Branchii and Erector Spinae Muscles During Core-Lifting Task

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Abstract. The core-lifting task is one of the functional capacity evaluations (FCEs) executed at the Social Security Organization rehabilitation center, Malaysia with the end goal to assess the fitness level of return-to-work patients. However, the current lifting task perform depends solely based on the instructor's evaluation without knowing precisely the muscle condition of the patients. A research is currently done to design a pattern recognition based on electromyography signal to distinguish the muscle performance. It is also known that proper way of lifting does affect the EMG signal. Hence, this paper studies the relationship between the trunk angle and EMG signal. EMG signals from 7 subjects performing a total of 3 core-lifting task cycles were recorded using skin-surface electrodes located over the belly of right and left biceps branchii, and left and right erector spinae, while the subject's motion was captured and analyzed using Venus 3D. Trunk angle was then calculated and compared with the electromyography signal. Results illustrate that there exists a relationship but not a distinguishable one between the trunk posture (mainly the trunk angle) and the electromyography signal of the erector spinae when the subjects performed core-lifting task by implementing squat lifting. Thus, the results conclude that the trunk angle can be ignored as long as the same squat lifting is applied. However, the results may vary if compared with stoop lifting, as the trunk angle is significantly different for both.

Keywords: Electromyography, trunk angle, core-lifting task, squat lifting.