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Surface EMG Evaluation of Medical Sonography Scanning Task – A Pilot Study

Arijit Sengupta^a* and Gul Ahmed^a

^aNew Jersey Institute of Technology, Newark, NJ 07079, USA

Abstract

Objective of this study was to evaluate the effects downward push force (0, 22 and 44N), the reach distance (normal, maximum and extreme), and the shoulder rotation angle (- 45° , 0° and 45°) on upper body muscle activities of 10 male participants in a simulated sonography task. The EMG activity of pectoralis major and triceps, increased (p<.05) predictably with increased downward pressure and reach distance. Contrarily, for the shoulder muscles, trapezius and supraspinatus, EMG was minimized for medium (22N) downward pressure, but increased with low (0N) or high (44N) downward pressure at every reach level. This increase was more pronounced for low downward force at extended reach. For 7 out of 10 participants the EMG levels in these two muscles exceeded the safe limit of 10% of MVC. The effect of change of shoulder rotation was found not to be significant. The results of this study indicated that for a sonography task, over extended reach has potentially more harmful effect than increased downward pressure on the transducer, which depends on the type of sonography being performed and patient's adipose tissue thickness. Extended reach requirement should be avoided which may arise from the workplace layout and the part of the body area being scanned.

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Keywords: reach distance, transducer pressure, sonographer

* Corresponding author. Tel.: +0-973-642-7073; fax: +0-973-642-4184. *E-mail address:* sengupta@njit.edu

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