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# **ELECTROMYOGRAPHIC ANALYSIS OF SHOULDER GIRDLE MUSCLES DURING SITTING PIVOT TRANSFER IN INDIVIDUALS WITH PARAPLEGIA**

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## ABSTRACT

**Study design-** An Observational Cross-Sectional study

**Background-** Paraplegics use their shoulder girdle muscles majorly to initiate, lift, pivot and complete the SPT from the initial to target surface. Knowing the muscle recruitment pattern is thus important to be able to predict their effort and independence in achieving this motor skill and to plan an effective strategy of transfer.

**Objectives-** To examine the EMG activity of middle deltoid, pectoralis major, triceps and latissimus dorsi of both the leading and trailing arm during the two tasks of sitting pivot transfer from wheelchair to bed and back in individuals sub-grouped as higher and lower thoracic paraplegia. And also, to determine if there are any differences between the sub-groups in their muscle activity profile.

**Methods-** 28 paraplegics were recruited out of which 9 were in the higher thoracic paraplegia and 19 were in the lower thoracic paraplegia sub-groups. The EMG activity of the four muscles bilaterally was measured using the Delsys Trigno Wireless EMG System and sensors. The sensors were placed on the appropriate landmark and paired to the Lab Chart 8 software which displayed the amplitude, frequency, intermuscular co-ordination and timing of the recruitment during the two sub-tasks of SPT performed in a community-based rehabilitation setup.

**Results-** MANOVA analysis showed that there was no significant difference between both the sub-groups based on the muscle activity in both the leading and trailing upper extremity during the two sub-tasks of SPT. The Wilks' lambda showed ( $p > 0.05$ ). Bilaterally for both the sub-groups, the highest mean recruitment values were seen for middle deltoid and triceps followed by pectoralis major. There was a similar timing of activation across all these three muscles. Latissimus dorsi showed lower mean RMS values with a constant activation throughout the SPT.

**Conclusion-** This study provides a brief understanding of the complete muscle activity profile of both the upper limbs interlinked to the SPT being performed. The results conclude that this motor skill requires appropriate co-ordination and sequencing of muscle actions between the leading and trailing arm.