

## Electromyographic Analysis of Trunk Muscle Activity of Healthy Individuals While Catching a Ball on Three Different Seating Surfaces

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**Abstract :** Catching a ball during sitting is a functional exercise commonly used in rehabilitation to enhance trunk muscle activity. To progress this exercise, physiotherapists incorporate a Swiss ball or change seat height. However, no study has assessed the effect of different seating surfaces on trunk muscle activity while catching a ball. Objective: To investigate the effect of catching a ball during sitting on a Swiss ball, a low seat and a high seat on trunk muscle activity. Method: A repeated-measures, counterbalanced design was used. A total of 26 healthy participants (15 female and 11 male) performed three repetitions of catching a ball on each seating surface. Using surface electromyography (sEMG), the activity of the bilateral transversus abdominis/internal oblique (TrA/IO), rectus abdominis (RA), erector spinae (ES) and lumbar multifidus (MF) was recorded. Trunk muscle activity was normalized using maximum voluntary isometric contraction and analyzed. Statistical significance was set at  $p \leq .05$ . Results: No significant differences were observed in the activity of RA, TrA/IO, ES or MF between a low seat and a Swiss ball. However, the activity of the right and left ES on a low seat was significantly greater than on a high seat ( $p = .017$  and  $p = .017$ , respectively). Conversely, the activity of the right and left RA on a high seat was significantly greater than on a low seat ( $p = .007$  and  $p = .004$ , respectively). Conclusion: This study suggests that replacing a low seat with a Swiss ball while catching a ball is insufficient to increase trunk muscle activity, whereas changing the seat height could induce different trunk muscle activities. However, research conducted on patients is needed before translating these results into clinical settings.

**Keywords :** catching, electromyography, seating, trunk

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