

P53: The influence of upper limb lever in muscle activity of scapular stabilizers in push-up position on the wall

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Introduction: The push-up has been extensively studied regarding scapular stabilizers. However, certain variations of push-up position still need further study.

Objectives: To analyze the influence of different levers of the upper limb - hands and forearms support - in muscle activity of scapular stabilizers in push-up position on the wall, as well as to analyze the electromyographic differences between protraction and retraction phases of the scapulas.

Materials and Methods: Analytical cross-sectional study, conducted on 20 healthy college students. Participants performed both push-up phases on the wall, in isometric contraction, with both levers. Muscle activity of the upper trapezius (UT), lower trapezius (LT), latissimus dorsi (LD) and serratus anterior (SA) from the dominant upper limb were recorded by surface electromyography and analyzed through AcqKnowledge software. The UT/SA, UT/LT and LD/LT ratios were also analyzed. Statistically, Wilcoxon Signed-Rank test and Friedman ANOVA test were used, both with a significance level of 0,05.

Results and Discussion: Among levers, SA activity was significantly higher with forearms support in protraction ($p < 0.001$) and there were no significant differences concerning LT. The UT/SA ratio in protraction was lower with forearms support ($p = 0.002$); the UT/LT and LD/LT ratios in retraction were low, but there were no significant differences among levers. Between phases, in both levers, SA activity was higher in protraction ($p < 0.001$) while UT and LT activity were higher in retraction (UT: $p < 0.001$ for hands, $p = 0.001$ for forearms; LT: $p < 0.001$).

Conclusion: In push-up position on the wall, protraction seems to recruit higher SA activity, more selectively with forearms support. Retraction seems to recruit higher LT activity, in a selective way, even though it's not significantly influenced by the two levers.

References

1. Cricchio, M., & Frazer, C. (2011). Scapulothoracic and scapulohumeral exercises: a narrative review of electromyographic studies. *Journal of Hand Therapy*, 24(4), 322-334.