OC8: Shoulder muscle timings and sequences during shoulder depression in the scapular plan in subjects with shoulder pain episodes

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Introduction: Shoulder pain has been associated with changes in temporal activation of shoulder muscles but the research on this association in the eccentric movement of participants with pain episodes is scarce.

Objectives: To analyse muscle timings and sequences in shoulder muscles during shoulder depression in the scapular plan in subjects with and without pain history in the last year.

Materials and Methods: 25 individuals with history of pain episodes in the shoulder in the last year and 24 asymptomatic individuals in the last two years were included in the group 1 (G1) and 2 (G2) respectively. The electromyographic activity of the upper (UT) and lower trapezius (LT), serratus anterior (SA), middle deltoid (MD) and infraspinatus (IE) muscles and 3D shoulder kinematics was acquired during shoulder depression in the scapular plan. The electromyographic signal was used to calculate muscle timings and sequences in relation to the start of the movement defined through kinematic analysis.

Results and Discussion: Statistical significant differences were observed between groups in the increase and reduction of UT activity ($p=0.001$ and $p=0.016$ respectively), together with SA ($p=0.019$) and LT ($p=0.003$) concerning the activity reduction. LT and IE increased activity later while the remaining muscles increased their activity earlier in the G1. Also, this group presented a later reduction of the UT activity and an earlier reduction of the remaining muscles. In general, the G2 present an increased activity of stability muscles first followed by the mobility ones. In the G1, the sequence was reversed. As for the activity reduction the sequence was not as linear, having MD assumed in both groups the first places and the UT had a variable behavior in the G2.

Conclusion: The present study suggests that shoulder pain episodes up to one year are related to changes in temporal motor control patterns of shoulder.

References

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