OC34: Analysis of the shoulder complex muscle activity in the eccentric phase of a Neer protocol exercise

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Introduction: The stability of the shoulder complex demands the contribution of scapular and glenohumeral muscles. After rotator cuff surgical repair, the self-assisted forward elevation adapted from Neer protocol is usually performed in the rehabilitation process. Once there is a lack of information that describes the muscle activity during the descendent phase of the exercise, it is important to make this analysis and define the most effective progression for the exercise.

Objectives: To analyse the muscle activity variation timings and level of activity in supine and semi-sit position with short and long lever, during the descendent phase of the self-assisted forward elevation of the *Neer* protocol.

Materials and Methods: Electromyographic (EMG) activity of serratus anterior (SA), infraspinatus (IE) and biceps brachii (BB) muscles was acquired unilaterally while anterior deltoid (AD) and upper trapezius (UT) EMG activity was acquired bilaterally in 25 subjects during the self-assisted forward elevation of the *Neer* protocol, with long and short lever, and in supine and semi-sit positions. EMG signal was used to assess the level of activity obtained in [120º-90º[, [90º-60º[, [60º-30º[and < 30 of elevation, normalized to the maximum voluntary isometric contraction, and the timings of muscle activity variation.

Results and Discussion: In the beginning of the descendent phase there was a feedforward response from all muscles of the shoulder complex but there were no significant differences among their activity variation timings between conditions. Statistical significant differences were found between levers in SA, IE and AD, in the midrange where the long lever required higher activity levels. The comparison of the two positions showed that, generally, higher levels of activity are achieved in the semi-sit position.

Conclusion: Although generally the descendent motion recruits minimal muscle activity levels (<20%), the semi-sit position is more demanding, making the transition from supine to the semi-sit position the most effective progression, in the first stages of rehabilitation.

References

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