

ACTIVITY OF SERRATUS ANTERIOR, UPPER AND LOWER TRAPEZIUS DURING ARM ABDUCTION IN MULTIDIRECTIONAL INSTABILITY.

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INTRODUCTION: Multidirectional instability of the shoulder is a complex entity and it appears that factors in addition to excessive capsular laxity play a pathophysiologic role. So the objective of this study is to compare the electromyography activity of the scapular muscles during abduction and adduction of shoulder in athletes with multidirectional instability and abnormal scapulothoracic motion with individual without lesion.

METHOD: Five athletes with diagnosis of multidirectional instability and abnormal scapulothoracic motion (age: \bar{x} = 24,6 SD = 1,1; weight: \bar{x} = 67,2 SD = 9,9 and height: \bar{x} = 1,77 SD = 0,08) and five individuals with same physical characteristics (age: \bar{x} = 25 SD = 3,2 ; weight: \bar{x} = 66,6 SD = 8,7 and height: \bar{x} = 1,72 SD = 0,10) participated in the study. The participants performed abduction and adduction of their shoulder while surface electromyography of serratus anterior, upper trapezius and lower trapezius were collected. For the recording of the EMG signals an eight channel surface EMG system was used with a synchronized video recorder camera. All raw EMG signals were bandpass filtered between 10 and 1 KHz, amplified (common mode rejection ratio >100 dB, overall gain 1000) and analogue-to-digital converted (12-bit) at a sampling rate of 2000 Hz. The electromyographic signal was quantified by the root mean square (RMS), and normalized by the maximal voluntary isometric contraction (MVIC). Statistical analysis of involved muscles was carried through the Analysis of Variance (ANOVA) of two factors (% CIVM as dependent variable and group and muscles as fixed factors). The homogeneity of variance was assumed and when the F value was significant, *post-hoc* test of Tukey was used. Statistical level of significance was established at $\alpha=0.05$.

RESULTS: There were no differences in age, weight and height between groups. When compared two groups no statistical difference was found in % MVIC in all muscles during abduction and adduction. However significant statistically difference was found when compared serratus anterior (52,9%) and upper trapezius (53,9%) with lower trapezius (15,3%) in abduction movement only in multidirectional instability group ($p = 0,022$ e $p = 0,012$ respectively). The control group do not presented any statistical difference when compared muscle activity.

DISCUSSION AND CONCLUSION: The results of the present study are in agreement with Matias et al. (2006) who found altered scapular movement due to a decreased activity of the lower portion of trapezius and serratus anterior muscles in not athletes. The muscle activity imbalance observed in the lower trapezius muscle could be related to shoulder instability, since the control group did not present such imbalance. However, the results of the study should be considered carefully, due to the small sample size.

REFERENCES:

Matias R., Pascoal A.G. (2006). The unstable shoulder in arm elevation: a three-dimensional and electromyographic study in subjects with glenohumeral instability. *Clinical Biomechanics*, **21**, S52–S58.