

# **ELECTROMYOGRAPHIC PEAK ANALYSIS IN SHOULDER STABILIZER MUSCLES DURING PENDULAR EXERCISES**

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## **INTRODUCTION:**

Pendular exercise of the shoulder constitutes a traditional exercise in the process of kinetic recuperation of the shoulder. It is a passive exercise in which active or extensive movements should be avoided, as they contribute towards greater activation of the rotator cuff and other dynamic stabilisers of the shoulder, bringing together the acromion and the coracoacromial ligament which could annul the desired effect of the exercise (Kisner & Colby, 1998; Cailliet, 2000).

As it is an extremely unstable joint, the need for stabilisation continues to be fundamental mainly through the action of the rotator cuff, deltoid and long head biceps. Therefore, the aim of this study was to quantify the participation of certain muscle groups that act in the articulation of the shoulder and their contribution during pendular exercises.

## **METHODS**

Thirteen (13) individuals, without any history of shoulder joint injury, were analysed using the electromyographic signal (Miotool 400, Miotec, Brazil) from the brachial biceps and triceps, and medium deltoid during pendular exercise. The movements were: horizontal adduction/abduction of the shoulder and flexion/extension of the shoulder without load and with a 1kg. load. The data were analysed using SAD32 software and the

comparisons made using repeated measures variance analysis and *post-hoc* Bonferroni ( $p \leq 0.05$ ).

## **RESULTS AND DISCUSSION**

The anterior deltoid showed greater activation during the movements, reaching 4% of the maximum. However it did not exert significant influence on the objective of the pendular exercise. The level of activation in the other muscles was practically non-existent, being less than 1%. None of the participants in the study had any previous history of joint and/or muscle injury in the region of the shoulder. Therefore, the findings of the present study can only be inferred for healthy people.

## **CONCLUSIONS**

Our findings suggest that pendular exercise without load and with a small load of 1 kilogram produces low activation of the brachial biceps and triceps, anterior deltoid and medial deltoid. Thus, this exercise is shown to be effective in terms of the passivity of the muscular groups analysed in the present study. Though with a very low level of contribution, the deltoid exhibited the highest level of activation when compared with the other analysed muscles, and hence was seen not to specifically influence the pendular exercise. The lack of

scientific studies dealing with pendular exercise of the shoulder leads us not confer full reliability to the practice of this exercise. However, the parameters shown in the present study indicate a slight muscular contribution suggesting its clinical application.

#### **REFERENCES**

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- CAILLIET, R. *Dor no Ombro 2000* 3<sup>a</sup> ed. Porto Alegre, Artes Médicas Sul.