

## Isokinetic profile of the shoulder internal and external rotators in surfers

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**Introduction:** Shoulder pain and shoulder instability have been largely associated with overhead sports as swimming, volleyball or baseball [1,2]. The measurement of concentric torque and agonist/antagonist ratio of the internal (IR) and external rotators (ER) of the shoulder, has been used to relate the symptoms with altered parameters in this assessment. Surfing, as an exponential growing sport, is also considered an overhead sport, since over 50% of the time spent practicing is done by paddling technique [3]. To date, there was no study found which evaluates shoulder internal and external rotators isokinetic profile in this population. As so, the aim of this study is to characterize the isokinetic profile of the shoulder internal and external rotators in surfers.

**Materials and methods:** The authors measured bilaterally the shoulder concentric torque and unilateral ratios for the internal and external rotators of 5 male surfers, aged between 19 and 23, who have been practicing for at least 3 years for a minimum of 2,5h per week. The procedure was done in the sitting position with 90° shoulder abduction and 90° elbow flexion at 60°/s and 180°/s angular speed by means of 3 and 20 repetitions respectively, using an isokinetic dynamometer (Biodex System 3). This study follows all the principles of the Declaration of Helsinki.

**Results:** The participants mean age was  $22.13 \pm 1.78$  years, with a BMI of  $22. \pm 2.14$  kg/m<sup>2</sup>. Surfers presented for 60°/s concentric torque test of IR of dominant shoulder a  $48.73 \pm 6.45$  Nm and  $44.23 \pm 11.55$  Nm for non-dominant shoulder. Concentric ratio ER/IR at the same speed for the dominant shoulder of  $75.53 \pm 7.5\%$  and  $78.48 \pm 11.69\%$  for the non-dominant shoulder. At 180°/s concentric torque test of IR of dominant shoulder a  $48.08 \pm 4.18$  Nm and  $42.73 \pm 5.21$  Nm for non-dominant shoulder. Concentric ratio ER/IR at the same speed for the dominant shoulder of  $74.90 \pm 8.24\%$  and  $78.55 \pm 7.92\%$  for the non-dominant shoulder.

**Discussion and conclusions:** Based on this data, surfers obtained higher values for concentric torque of IR and smaller percentage for ER/IR ratio in both dominant and non-dominant limbs when compared to data obtained from other studies with control (non-practice of overhead sport) populations within the same characteristics [4]. When compared surfer's dominant limb with non-dominant limb, there were not found significant changes in IR concentric torque or ER/IR torque ratio. Studies where ER/IR torque ratio was measured in overhead athletes showed slightly smaller ratios when compared to the surfers [5]. This is probably related with the moderate frequency and intensity of training of the surfers in this study when compared with high intensity/frequency of training of the overhead athletes.

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