Determining the isometric hip abduction and adduction profile in a competitive surfing cohort

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Determining the isometric hip abduction and adduction profile in a competitive surfing cohort

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Background

- Previous injury epidemiology research has shown the knee to be an injury prone region within competitive surfers

Frequency of acute knee injury ranges from 19-35%[1,2,3]

- Research supports the influence that hip strength has on knee alignment and subsequent injury[4]
- It is theorized that the long hip abductors and adductors may provide mechanical support to the medial and lateral knee

- Minimal scientific research has been conducted specific to the hip region in a competitive surfing cohort

Purpose

- The primary aim of this study was to profile the isometric hip abductor and adductor muscle strength of competitive surfers using a clinical assessment method
- A secondary aim was to compare the surfing cohort to a group of age matched recreational athletes

Methods

- A cross sectional study design was used
- A total 14 elite surfers were recruited from the Surfing Australia High Performance Centre (4 females)
- 21 recreational athletes were recruited from Bond University (4 females)
  - Hip abduction and adduction isometric strength was measured using a hand-held dynamometer (Commander PowerTrack II™ (Nihon Medix, Matsudo, Japan))

- Abduction (Image A) and Adduction (Image B) strength was measured in supine
- A belt was used to stabilize the participants pelvis
- The examiner maintained a stride stance with the testing elbow positioned against their own iliac spine to limit any movement of the hand-held dynamometer
- The hand-held dynamometer was positioned 5cm proximal to the medial / lateral malleolus

- Two maximal isometric contractions (separated by 10 seconds) were sustained for 3 seconds for each movement and repeated on each side
- The testing order was randomised to test side
- To calculate Torque (Newton/ meters) the lever arm was measure from the Greater Trochanter to 5cm proximal to the malleoli
- Normalised force (newtons per kilogram, N/kg) and torque (newton meters per kilogram, Nm/kg) were derived and compared between groups

Results cont.

Table 1: Demographics

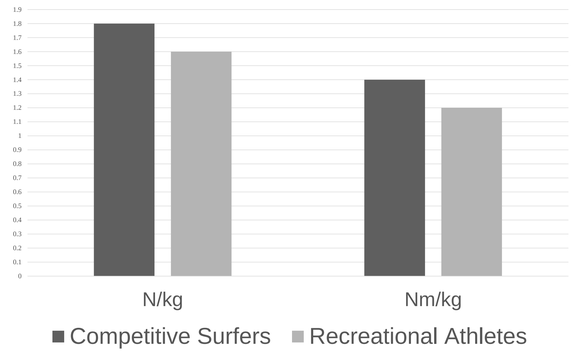
	Competitive Surfers	Recreational Athletes
Age (years)	24.5 ± 6.5	25.3 ± 2.7
Weight (kg)	71.3 ± 8.3	80.0 ± 12.4*
Land Based Training (hours)	4.7 ± 2.6	5.9 ± 2.5
Weekly Surfing Frequency (hours)	11.6 ± 4.5	-

*The recreational athlete group were significantly (p=0.03) heavier (71.3±8.3 vs. 80.0±12.4 kg) and therefore strength values were normalised based on body weight.

Table 2: Isometric hip abduction and adduction strength profile of competitive surfers (n = 14)

	Hip Abduction	Hip Adduction
Force (N)	146.7 ± 32.9	131.7 ± 29.9
Normalised Force (N/kg)	2.0 ± 0.3	1.8 ± 0.3
Torque (Nm)	113.9 ± 26.6	102.4 ± 24.9
Normalised Torque (Nm/kg)	1.6 ± 0.2	1.4 ± 0.2

Normalised isometric hip adduction force and torque values for competitive surfers and recreational athletes



Results cont.

- No significant differences were identified for Nm/kg and N/kg for abduction between the competitive surfers and the recreational athletes (1.6 vs. 1.6 Nm/kg; 2.0 vs. 2.1 N/kg, respectively)
- As seen in the bar graph, the competitive surfer group displayed significantly higher scores for normalised adduction when compared to the recreational athletes (1.4 vs. 1.2 Nm/kg; p<0.01 and 1.8 vs. 1.6 N/kg; p=0.03, respectively)
- The surfer group exhibited an adduction to abduction strength ratio of 0.9 which was significantly (p<0.01) higher than the recreational athlete group (0.8).

Discussion

This study presents an isometric strength profile for the hip abductors and adductors specific to a competitive surfing cohort.

Results indicate that the competitive surfing cohort had significantly stronger adductors and consequently a higher adduction/ abduction ratio when compared with the recreational athlete group.

Implications

This research provides preliminary information specific to hip abduction and adduction strength in a competitive surfing cohort. The data presented provides a baseline specific to competitive surfers who are involved in both land based training and surfing.

The findings may guide rehabilitation or be used as a bench mark to highlight deficiency. Further research is needed to determine how strength at the hip plays a role in injury prevention and performance enhancement.

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