BICEPS BRACHII FASCIA MOVEMENT DURING ECCENTRIC MUSCLE CONTRACTIONS OF THE ELBOW FLEXORS IN RELATION TO MUSCLE DAMAGE

Wing Yin LAU and Kazunori NOSAKA
School of Medical and Health Sciences, Edith Cowan University (AUSTRALIA)
Email: wlau0@our.ecu.edu.au, k.nosaka@ecu.edu.au

BACKGROUND
Eccentric contractions, in which active muscle fibres are lengthened, induce muscle damage characterised by prolonged (> 1 day) decreases in muscle function and delayed onset muscle soreness, but the magnitude of muscle damage is reduced after the second eccentric exercise bout when compared with the initial bout. Restricted muscle fascia movements are reported for lower-back pain patients. This study tested the hypothesis that biceps brachii muscle fascia movement during eccentric contractions would become smaller with increasing in the number of contractions during the first but not the second eccentric exercise bout.

METHODS
Ten untrained men (21-39 y) performed two exercise bouts consisting of 10 sets of 6 maximal eccentric contractions of the elbow flexors with the non-dominant arm separated by 4 weeks. During each eccentric contraction, the elbow joint angle was forcibly extended from a flexed (60°) to a fully extended position (0°) under maximal activation. The movements of the biceps brachii fascia were recorded by B-mode ultrasonography, and the fascia movement distance from the beginning to the end of each contraction was tracked over contractions. Maximal voluntary isometric contraction (MVC) torque and muscle soreness were measured before, immediately after, and 1-7 days following exercise. Changes in the fascia movement during the exercise, and MVC torque and muscle soreness after exercise were compared between the first and second bouts by a two-way repeated measures ANOVA.

RESULTS
Changes in MVC torque and muscle soreness were smaller (P<0.05) after the second than the first bout, showing that muscle damage was attenuated in the second exercise bout. Biceps brachii fascia movement distance during eccentric contractions decreased greater (P<0.05) from the 1st set (8.3 ± 0.8 mm) to the 10th set (3.4 ± 0.6 mm) for the first bout when compared with the second bout (1st set: 8.2 ± 0.7 mm, 10th set: 6.9 ± 0.6 mm).

CONCLUSION
These results showed that the magnitude of muscle damage was greater when the fascia movement became smaller over contractions, and muscle damage was reduced when fascia movement was consistent over contractions. It appears that fascia movement during eccentric contractions affects the magnitude of muscle damage.