PLANTARFLEXOR MUSCLE ARCHITECTURE CHANGES AS A RESULT OF ECCENTRIC EXERCISE IN PATIENTS WITH ACHILLES TENDINOSIS

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Disclosure

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Our disclosures are in the Final AOFAS Program Book. There are no potential conflicts with this presentation.
Introduction

• An eccentric-based rehabilitation program (EBRP) results in positive clinical outcomes (Alfredson et al., 1998). The physiologic mechanism by which this is achieved is controversial.

• The purpose of this study was to determine changes in muscle architecture that occurred as a result of Achilles tendinosis (AT) injury and a subsequent rehabilitation program and to correlate results with clinical findings.
Methods

• Twenty-five patients diagnosed with AT participated in 6 weeks of supervised rehabilitation.

• Specific exercises for the ankle plantar flexors consisted of maximal load eccentric muscle action using 3 sets of 15 repetitions. The patients also completed the standard protocol for AT which consisted of static stretching, general lower extremity resistance training, and balance training.

• Medial gastrocnemius (MG) and lateral gastrocnemius (LG) muscle fascicle length and thickness were measured with ultrasound at 2 week intervals from initial treatment day to the end of 6 weeks of rehabilitation. Muscles were relaxed with the ankle at 90° and the knee extended fully. All patients were tracked using FOTO (Focus on Therapeutic Outcomes) as a general health score.
Results

Figure 1: MG fascicle length, thickness and pennation angle. * significantly different than 4 weeks

Figure 2: LG fascicle length, thickness and pennation angle.
There was no change in any variable with training.
Results

Figure 3: Measurement of fascicle length. Image from MG.
Discussion

• The aim of this study was to determine the effect of EBRP on MG and LG muscle fascicle length and thickness.

• The results show that MG fascicle length increased (improving functional range of motion) as a result of eccentric training but LG did not. Consistent with others who have shown increases in vastus lateralis fascicle length in as few as 5 weeks in healthy young subjects (Seynnes et al. 2007).

• It is possible a longer training period is necessary to see changes in the LG. It is possible there is a reduced training effect for LG as compared to MG.
Conclusion

• A 6 week eccentric-biased exercise tended to increase the MG muscle fascicle length by 12%, but MG thickness, LG fascicle length, and LG thickness did not change as result of rehabilitation.
References


THANK YOU