Title
Effects of manual inter-tissue release on the excursion behavior of the gastrocnemius

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Purpose / Background
Manual inter-structural release (ISR) of skeletal muscles is thought to release adhesions between muscles by scrubbing the loose connective tissue between the muscles using the tip of the distal phalanx. However, objective evidence of its effectiveness has been limited. The purpose of this study was to clarify whether ISR improves the excursion distance of the gastrocnemius.

Methods
Eight healthy young adults participated in this study. These subjects received either ISR or static stretching (SS) of the popliteal muscles on randomly selected sides. ISR was performed on the deep fascia surrounding the lateral head of the gastrocnemius including the capsular/popliteal side. Outcomes included excursion distance of the gastrocnemius during passive dorsiflexion using Echolizer software (GLAB), heel-height difference (HHD), and weight-bearing dorsiflexion angle. Statistical tests included Friedman's test for excursion distances of the gastrocnemius, t-test for HHD, and two-way factorial ANOVA for the ankle dorsiflexion range.
Results

The excursion distances of the gastrocnemius on the ISR side changed from $1.12 \pm 0.83$ cm to $0.95 \pm 0.88$ cm in the superficial tissue and $0.70 \pm 0.36$ cm to $0.61 \pm 0.40$ cm in the deep tissue ($p = 0.760$). Those on the SS side changed from $1.10 \pm 1.21$ cm to $0.90 \pm 0.52$ cm in the superficial tissue and $0.58 \pm 0.31$ cm to $0.61 \pm 0.40$ cm in the deep tissue ($p = 0.133$). The ankle dorsiflexion angle changed from $36.0 \pm 5.0^\circ$ to $39.0\pm 5.0^\circ$(p=0.013)on the ISR side and $36.0 \pm 5.0^\circ$ to $39.0 \pm 5.0^\circ$(p=0.013)on the SS side (Fig.1). There was no significant difference between the two sides ($p=0.0729$).

The excursion distance showed greater improvement on the ISR side (range: $0.55 \cdot 0.73$ cm) in 3/8 subjects and on the SS side ($0.54 \cdot 0.98$ cm) in 2/8 subjects.

Conclusion

Neither ISR nor SS significantly improved the excursion distance of the gastrocnemius, although 3/8 participants exhibited improved excursion distance after ISR. There might have been a ceiling effect in many of the study subjects as well as an impact of mild adhesions of the entire gastrocnemius outside of the released areas.

Figure

Fig. 1. change of ankle dorsiflexion angle