

MUSCLE FASCICLE LENGTH CHANGES OF THE LONG HEAD OF BICEPS FEMORIS MUSCLE DURING VARIOUS PHYSICAL ACTIVITIES

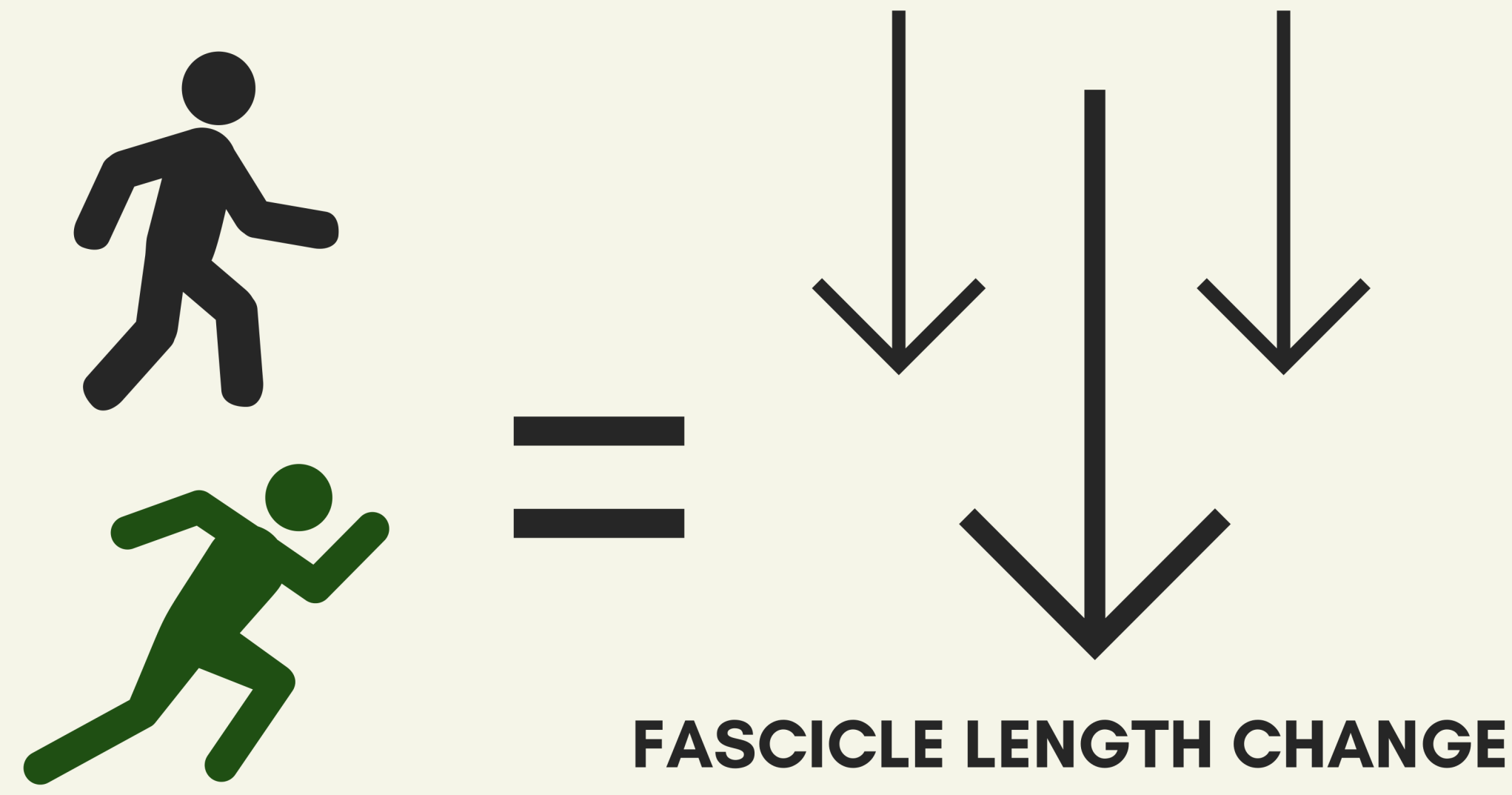
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BACKGROUND

The lateral hamstrings, specifically biceps femoris, play a crucial role in dynamic activities and are one of the most commonly injured muscles in athletes. Due to this prevalence, there has been a focus on researching the effectiveness of eccentric activities (Nordic hamstring exercise) within the clinical setting.

Previous studies have demonstrated greater stretch by the tendon with decreased movement by the biceps femoris during running via a stretch shortening model similar to the Achilles tendon. This stretch shortening model is highlighted during cyclical movements where the recoil of the tendon is utilized to a larger extent as opposed to the planter flexor musculature.

HYPOTHESIS



We predict that the muscle fascicles of the biceps femoris long head will behave similarly to the ankle plantar flexors in that they will undergo smaller length changes during dynamic activities (running, walking) and greater changes during static activities (single leg Romanian deadlift, standing hamstring curl).

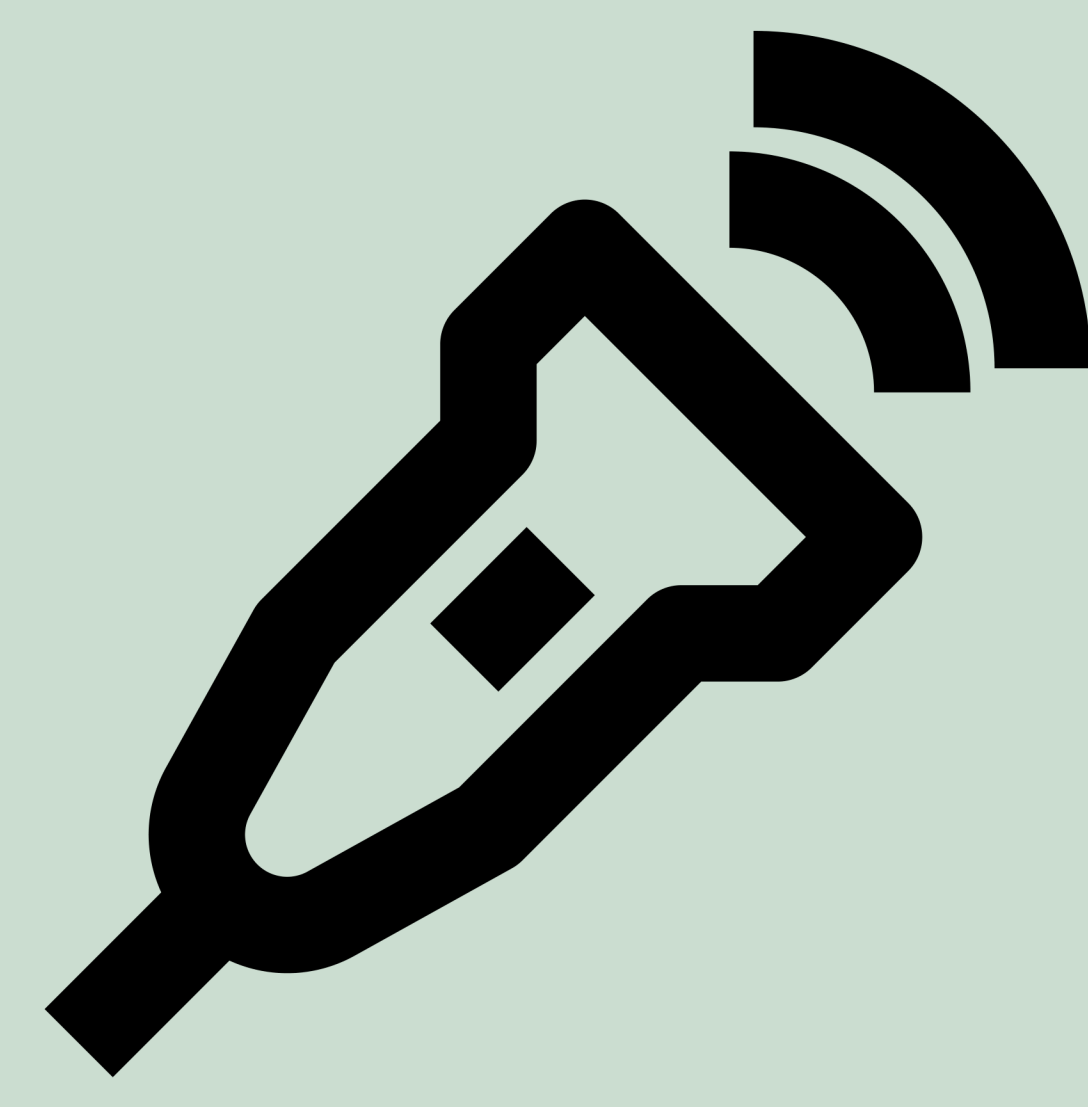
METHODS

SUBJECT DEMOGRAPHICS:

- n= 20
- Age: 23-32
- Prior right hamstring injury: no
- Multiple comorbidities: no

EXERCISES PERFORMED:

- 3 repetitions of SL static hamstring curls
- 3 repetitions of SL RDL
- Walking normal pace
- Running



RESULTS

FASCICLE LENGTH CHANGES

SL RDL & HSC = INCREASE LENGTH CHANGE

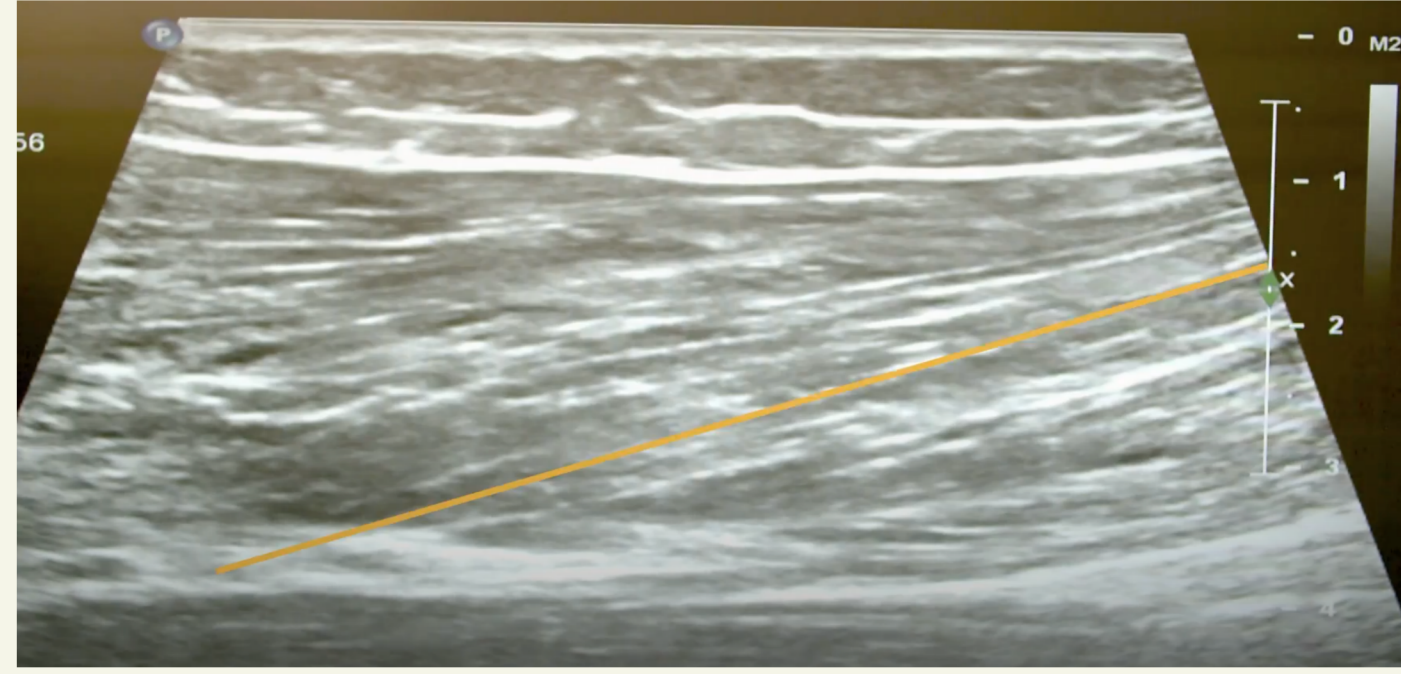


Fig. 1: LHBF lengthened during HSC

RUNNING > WALKING = DECREASE LENGTH CHANGE

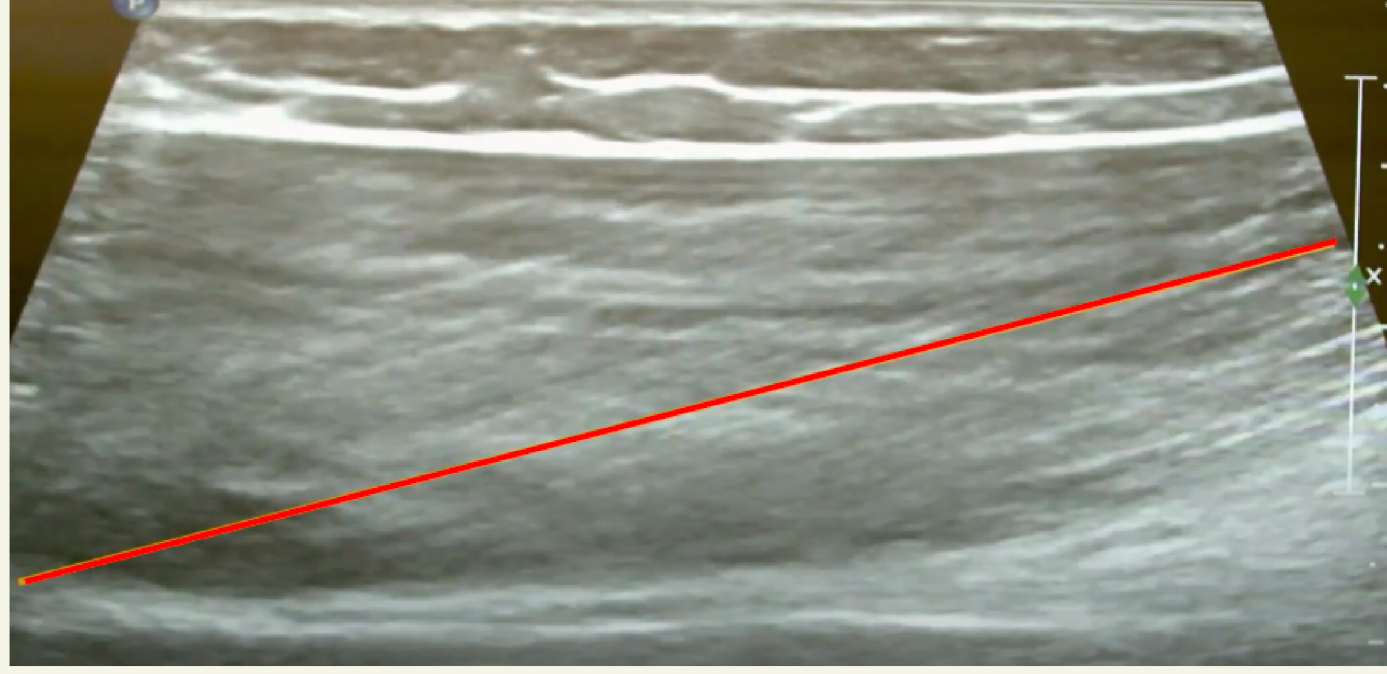


Fig. 2: LHBF lengthened during running

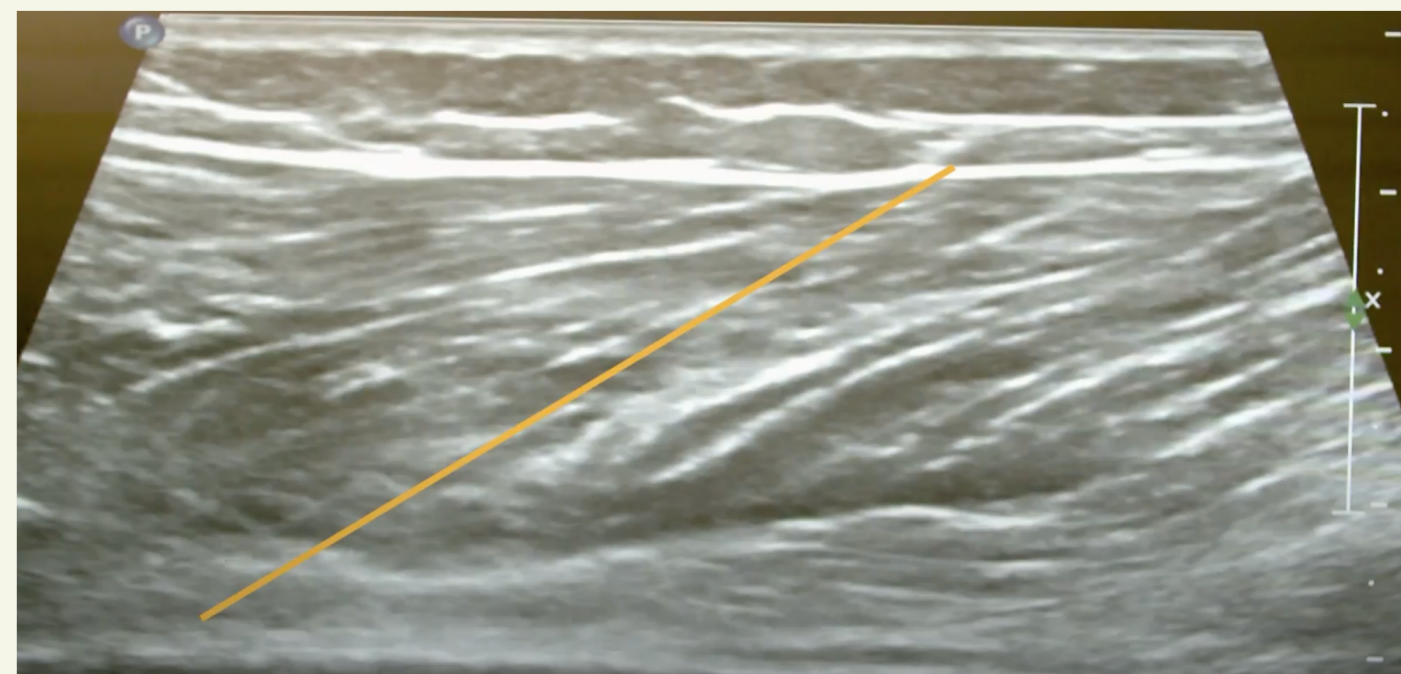


Fig. 3: LHBF shortened during HSC

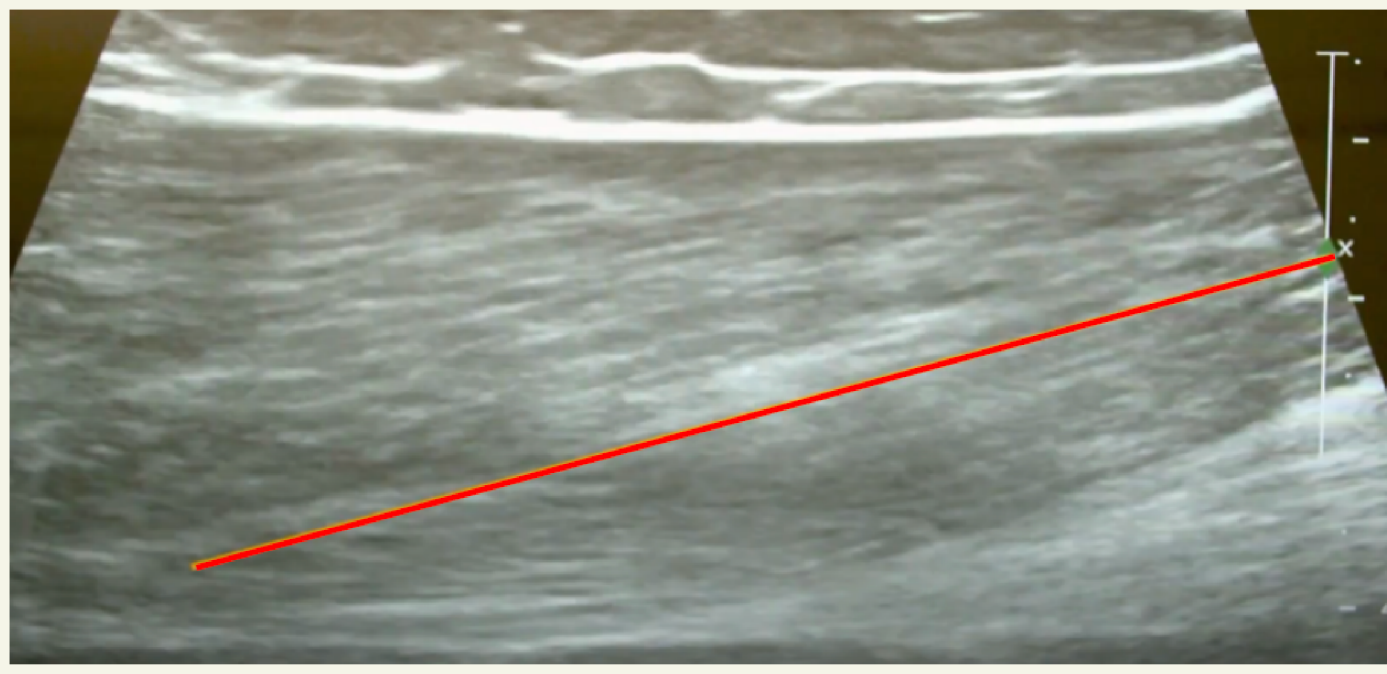
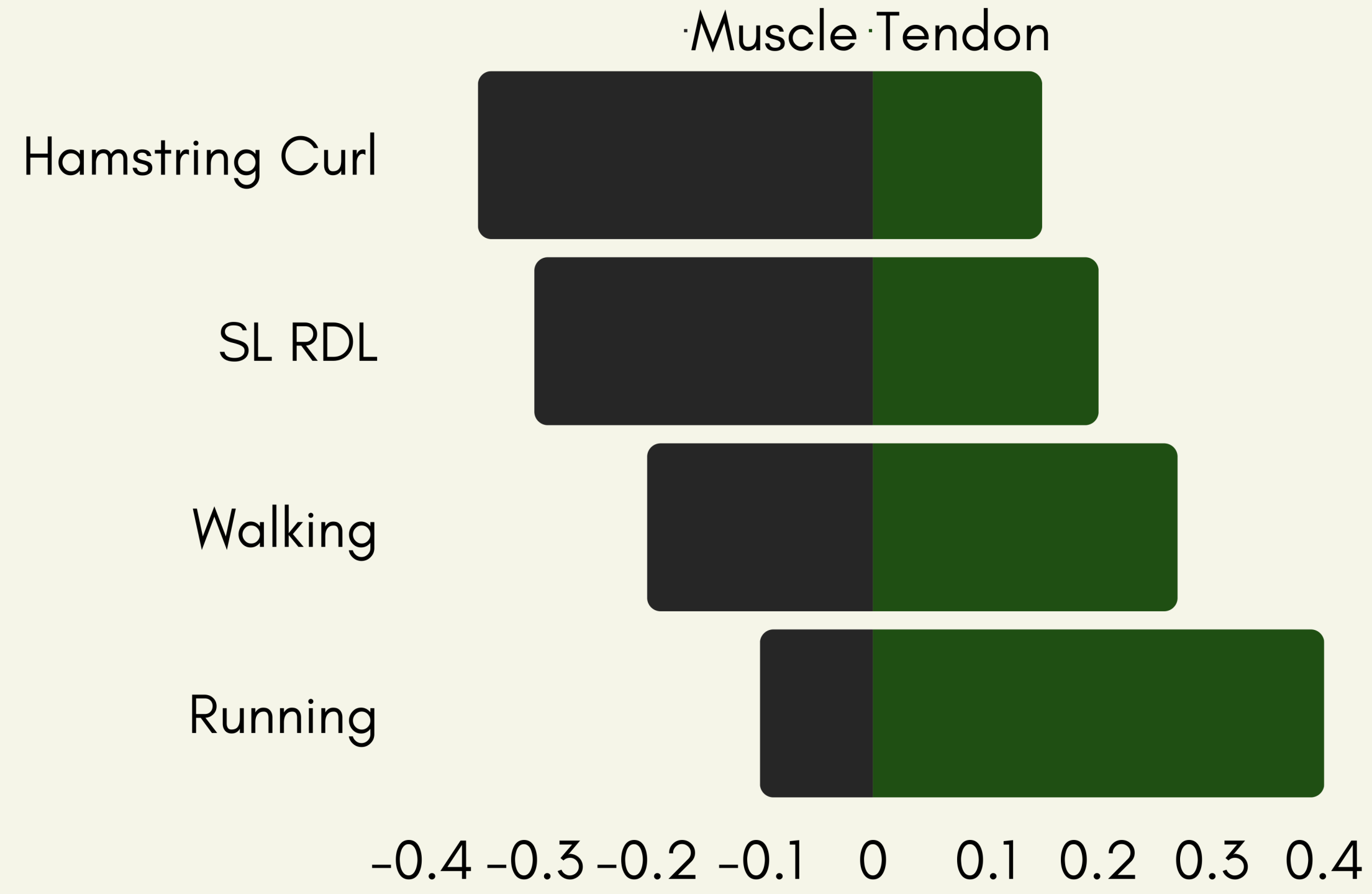


Fig. 4: LHBF shortened during running

80-20 PRINCIPLE



APONEUROSIS MOVEMENT



SL RDL= **Deep** Aponeurosis
SL HSC = **Superficial** Aponeurosis

DISCUSSION

Biceps femoris behaves similarly to plantar flexor group during static and dynamic activities.

Muscle fascicle length changes decrease with dynamic activities like running.

Aponeurosis movement changes depending on activity under static conditions.

LIMITATIONS

This study's limitations include a small sample size limited to the young adult population, poor clarity of ultrasound view, limited ultrasound field of view, and lack of quantitative data.

FUTURE RESEARCH

In vivo quantitative data of muscle fascicle length changes, stiffness during running and evaluation of aponeurosis primary movement during various conditions such as increased load and speed of movement would be areas of potential future research.

REFERENCES

