



RESEARCH ROUNDS

Ankle Manipulation & the Hip

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In a study published last year in *JMPT* titled "Effects of Tibiofibular and Ankle Joint Manipulation on Hip Strength and Muscle Activation," our group was able to show that ankle adjusting had a positive, lasting impact on hip abductor force production and activation in subjects with a prior history of ankle sprain.

Background

Hip abductor weakness after ankle sprain is a fairly well-known (and supported¹) clinical entity. Additionally, numerous studies have shown changes in gluteal muscle activation after ankle sprain² or in those with chronic ankle instability (CAI).³⁻⁶ Two studies⁴⁻⁵ that evaluated the gluteus maximus (GMax) during functional tasks demonstrated facilitation, one of which supported a centralized "feed-forward" mechanism in CAI patients.⁴



At least one author suggests CAI individuals compensate for reduced gluteus medius (GMed) activity with GMax facilitation.⁵ (Anatomically, this seems logical, as the superior fibers of GMax assist GMed in hip abduction.) I should also add that clinically, these patients often exhibit signs of gluteus minimus and/or piriformis compensation, although to my knowledge no one has looked at their activation levels in this context.

Methods

Our study was designed as a proof of concept, and as such was kept deliberately simple. Twenty-five participants were recruited (mostly DPT students - a perfect population, as they tend to be young and healthy, but banged up with old sports injuries). Included were those with a history of ankle sprain and unilateral hip abductor weakness, as measured with a TFL manual muscle test (MMT). [We chose this over GMed as clinically, I initially believed TFL MMT to be more sensitive to ankle joint complex (AJC) dysfunction and less prone to lumbopelvic issues.] Excluded were those who failed a hip flexion MMT, along with anyone with contraindications to ankle manipulation.



Hip abductor force was measured using a custom-designed rig holding a transducer, and activation with surface EMG.

Force production was measured before and after a single round of ankle manipulation and again 48 hours later, using a custom-designed rig holding a force transducer along with appropriate blinding. TFL and GMed muscle activation were measured via surface EMG.

Intervention

Based on motion palpation, I performed HVLA manipulations to all four joints of the AJC on the affected side of each subject, utilizing hand contacts, but with the thrust coming from the legs. (I prefer this adjustment, as you can deliver significantly more force with your hamstrings and glutes than with your arms.) We tracked what was adjusted, and while only about half of the proximal and 68 percent of the distal tib-fib joints required release, 100 percent of the talocrural and subtalar joints cavitated.

Results



Ankle manipulation was performed using hand contacts, but with the thrust delivered from the legs.

Immediately after manipulation, there was an increase of 12.2 percent average and 9.8 percent maximum GMed activation. Forty-eight hours after manipulation, average hip abductor force production increased 18.5 percent and maximal force production 14.2 percent. No significant changes were observed in the uninvolved leg.

Take-Home Points

This study was able to demonstrate that HVLA ankle joint manipulation can improve hip abductor muscle function in individuals with a history of ankle sprain, - the first time this has been shown. As chiropractors, we are used to thinking of the downstream effects of nerve root irritation. Importantly, however, there are also *upstream* mechanisms at play that warrant our attention.

In sharing our study with others (not just DCs, but also DPTs and sports allopaths), this proximal effect is what gets keyed in on the most, and is what helped the study garner a top-five research award from the American Academy of Orthopedic Manual Physical Therapists – a nice interdisciplinary kudo.

To be honest, I didn't initiate this study to win awards or because this study seemed like a next logical step in the literature. I am first and foremost a clinician; I simply hoped to validate a unique treatment aspect I had already been utilizing for years.

Clinically speaking, I can tell you that the converse of our findings is also true: By *not* addressing ankle subluxations, you may inadvertently perpetuate hip abductor inhibition, which can factor into a myriad of issues including lower back, hip and knee conditions.

Author's Note: In part 2 of this article, I'll apply this information to what should prove relevant to a majority of readers: how these findings apply clinically, and how MMT and ankle manipulation can help you better treat your patients.

References

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