The Immediate and Long Term Effects of Negative Pressure Soft Tissue Mobilization on the Iliotibial Bands of Runners using Magnetic Resonance Imaging

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Introduction/Background
Myofascial decompression (MFD) is a soft tissue mobilization technique in which negative pressure is applied to soft tissues through active range of motion (ROM). Overuse injuries, such as iliotibial band syndrome (ITBS), result in compression and irritation of lateral knee structures commonly seen in runners [1]. The purpose of this study is to quantify the effects of MFD using MR imaging (MRI) to compare tissue changes with clinical measures for addressing ITBS. We hypothesize, immediately and 72 hours after application, the space between the tissue layers will increase. Clinically, subjective pain, hip adduction ROM, and functional single leg squat (SLS) will be improved.

Methods
This single-group pretest-posttest study will evaluate the effects of MFD in 8 knees on pain, hip adduction ROM with Ober’s testing, paired with radiologic tissue findings at baseline, immediately after intervention, and post 72 hours. MFD will be applied using a pneumatic pump and 2.5-in. diameter concave plastic cup on the ITB at the lateral femoral condyle (LFC) of the knee. After two minutes of static application in side-lying, hip extension/adduction ROM and active knee flexion for one minute each. Changes in tissue thickness will be measured on T1 weighted MRI using OsiriXTM software, observing the millimeter difference from the periosteum to the medial border of the ITB and from the lateral border of the ITB to the epidermis.

Results
Results show increased space of the ITB to LFC (Table 1) with a mean change of 15% increase in the symptomatic side immediately post-treatment and maintained a 13% change 72hrs after treatment. Pain began and stayed at zero, and SLS was normal throughout. Ober's (Table 3) showed 7 degree mean improvement in horizontal adduction.

Conclusion
The results of this study support our hypothesis that MFD is beneficial in treating ITBS via increasing space between tissue layers around the ITB/LFC both in the immediate effects and 72hrs later. Increased space theoretically allows these tissues to glide more readily when performing repetitive ROM activities such as running [3]. An intervention that efficiently reduce compressive forces of the ITB to the deep osseous structures, could improve rehabilitation outcomes for runners with ITBS.
Table 1. Comparing symptomatic and asymptomatic average distance from iliotibial band to lateral femoral condyle pre, post, and 72 hours post treatment.

Table 2. Comparing symptomatic and asymptomatic thickness from epidermis to ITB pre, post, and 72 hours post treatment.

Table 3. Ober’s test ROM changes for hip adduction symptomatic vs asymptomatic

Figure 1. T1 weighted MR imaging of 1) Pre-intervention of MFD treatment, 2) immediately post MFD treatment, 3) 72 hours post treatment

a) Iliotibial band (ITB) (black)
b) lateral femoral condyle (LFC) (grey)
References

