

## 17. SWACSM Abstract

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### A Case Study Comparison of Lower Extremity Kinematics in Medial Tibial Stress Syndrome

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#### ABSTRACT

Medial tibial stress syndrome (MTSS) affects up to 35% of runners. Chronic MTSS can negatively affect performance or lead to a cessation of activity. Though biomechanical variables such as hip internal rotation, tibial abduction, and rearfoot eversion are considered potential risk factors for MTSS, the research is equivocal. **PURPOSE:** Therefore, the purpose of this case analysis is to compare lower extremity kinematics of a D3 middle-distance runner with chronic MTSS vs. a matched uninjured runner. **METHODS:** This case study consists of two female middle-distance runners. Participant one (19 y.o., 1.73 m, 70.3 kg) experienced intermittent MTSS for 4 years. Participant two (20 y.o., 1.70 m, 70 kg) had no history of MTSS. Participants reported to the laboratory for one day of testing. Forty-one retroreflective markers were adhered to the hip, legs, and feet using a modified 6-degrees of freedom model. Participants ran on a treadmill at 3.58 m/s in a lab while eight 3D motion capture cameras collected kinematic data. Marker trajectories were labeled, gap-filled, and smoothed using a low-pass, zero lag Butterworth filter at 10 Hz. Hip, knee, and ankle angles were calculated during stance phase, defined as heel strike to toe-off and identified using a kinematic-only method. Variables of interest include right-limb ROM and peak values of transverse hip kinematics and frontal knee and ankle kinematics. **RESULTS:** The injured participant had less transverse hip ROM (UI: 15.1°, I: 9.6°), and less peak internal rotation (UI: 0.4°, I: 3.0°). At the knee, the injured participant had greater frontal ROM (UI: 6.0°, I: 8.2°) but less peak tibial abduction (UI: 6.6°, I: 5.8°). At the rearfoot, the injured participant had less frontal ROM (UI: 14.5°, I: 6.3°) and less peak eversion (UI: 23.6°, I: 15.2°). **CONCLUSION:** These differences provide additional information regarding potential MTSS risk factors. The athlete with MTSS exhibited less hip internal rotation, which has been indicated as a potential risk factor for MTSS. Other potential factors, including hip abduction and rearfoot eversion, were limited. These results support findings that weak hip stabilizers may contribute to MTSS. Further research should be conducted to better identify biomechanical risk factors for the development of training and rehabilitation programs.