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Marissa Basar  
marissa.basar@otterbein.edu

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## **Intrinsic and Extrinsic Factors Associated with Medial Tibial Stress Syndrome in Division III College Female Track Athletes**

Marissa Basar, Lauren Aulick, Joan Rocks, Ph.D, ATC, AT, Angelo Lamatrice, PT, MPT, ATC, AT, and Shelley Payne, DHS, PT, ATC, AT

Otterbein University, Department of Health and Sport Science

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**Background:** Medial Tibial Stress Syndrome (MTSS) or “shin splints” has been classified as a common and frequent overuse injury within the athletic population, specifically in runners. MTSS is typically defined as pain occurring along the posteromedial border of the tibia, due to intensive and repetitive weight bearing activities. The exact epidemiology of MTSS is undefined; therefore the diagnosis for MTSS is based on specific history of pain, location of pain, and pain produced during palpation. The exact mechanism of MTSS may be multifactorial as the literature suggests extrinsic and intrinsic risk factors to be associated and/or influential on the development of MTSS.

**Objective:** The purpose of this study was to examine the combination of specific intrinsic and extrinsic factors frequently suggested in the literature that may indicate a higher prevalence for MTSS. The second purpose of this study was to identify individuals who demonstrated specific risk factors while also experiencing  $\geq 2$  MTSS symptoms. The specific targeted factors included gender, maximum calf girth, and a navicular drop  $\geq 10$ mm.

**Study design:** Descriptive.

**Setting:** Each subject participated in one scheduled session during which data was collected.

**Participants:** Twenty female subjects ranging from 18 to 21 years of age from the Cross Country and Track and Field teams of Otterbein University.

**Interventions:** Each subject was required to complete a subjective questionnaire followed by data collection. The subjective questionnaire was composed of open and close ended questions requiring a written response to obtain specific information regarding demographics and MTSS

symptoms via diagnostic criteria. Data collection included the measurement of maximum calf girth and the Navicular Drop test. Upon completion of data collection, an inclusion and exclusion criteria was used to determine available subjects for the study.

### **Main Outcome Measurement:**

Comparison between of self-reported MTSS symptoms and navicular drop findings. Comparison between self-reported MTSS symptoms and calf girth measurement.

**Results:** After examining the subject pool for exclusion criteria, twelve subjects remained from the initial twenty participants. Of the remaining twelve subjects, six indicated they were experiencing MTSS symptoms, but were never formally diagnosed with MTSS. From the maximum calf girth measurements, the six subjects with  $\geq 2$  MTSS symptoms had a mean calf girth of 35.48cm. The remaining subjects who did not experience  $\geq 2$  MTSS symptoms had a mean calf girth of 34.33cm. The calf girth was higher in subjects experiencing  $\geq 2$  MTSS symptoms. From the Navicular Drop test, six participants displayed a positive navicular drop ( $\geq 10$  mm.) Of the six subjects who displayed a positive navicular drop, only four indicated to also be experiencing  $\geq 2$  MTSS symptoms via detailed diagnostic criteria.

**Conclusions:** The results from this study supported an increase in calf girth and a positive Navicular Drop test for most of the subjects that experienced  $\geq 2$  MTSS symptoms. The findings in this study indicate a potential combination of structures could be involved in MTSS but results are not generalizable due to the small sample size in this study.

**Key Words:** *Medial Tibial Stress Syndrome(MTSS), Navicular Drop test, maximal calf girth, runners*