BMI – Not a Risk Factor for Medial Tibial Stress Syndrome? A Critically Appraised Topic

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Context:

Medial Tibial Stress Syndrome (MTSS) is a common leg injury. It primarily affects military athletes and those participating in running and jumping sports. MTSS is an inflammatory condition of the leg that involves the tibia and surrounding muscle tissue and fascia. Prevention and treatment of medial tibial stress syndrome (MTSS) remains elusive; the cause of MTSS is likely multifactorial. Few modifiable risk factors have been directly linked to the development of MTSS. In recent critical reviews, body mass index (BMI) has been identified as a risk factor for MTSS. However, BMI, while considered a modifiable risk factor, may not be easily changed for some athletes. The importance of BMI as a risk factor for MTSS must be quantified. Our objective was to summarize and calculate the 1) pooled effect of BMI on the presence of MTSS. In athletes [P], with MTSS [E] vs no MTSS [C], is there a difference in BMI [O]?

Data Extraction:

PubMed and EBSCOHost (Academic Premier, CINAHL, Medline, SportDiscus) were searched through September 2021. Search terms included iterations of "medial tibial stress syndrome", "shin splints", "risk factors", "leg pain". Studies were limited to those published within the last 5 years in English. Selection criteria required that studies 1) investigated participants with MTSS and 2) were etiologic in design (prospective or retrospective). Included studies were critiqued using the modified Levine Scale for Harm Studies (mLevine). The mLevine is used to identify potential bias and is scored out of 6, with higher scores indicating fewer threats to validity. Extracted data included sample sizes, and participant height, and mass. A sample-size adjusted weighted BMI (wtBMI), weighted standard deviation (wtSD), and weighted 95% confidence interval (wt95%CI) around BMI was calculated for MTSS and control. These weighted values were used to calculate Hedges' g effect sizes[95%CI] (ES) to determine the magnitude of the difference in BMI between MTSS and control groups. ES were interpreted as weak (<0.4), moderate (0.4-0.8), and strong (>0.8).

Data Synthesis:

Seven studies met selection criteria and were analyzed. Four studies were retrospective (case-control) and 3 were prospective (cohort). Scores from the mLevine ranged from 4 to 6. The most commonly missed criteria were lack of blinding of assessors and inadequate reporting of the duration between exposure and MTSS. Collectively, there were fewer participants in the MTSS group (n=168) compared to the control group (n=277). Descriptively, the wtBMI [95%C] for each group was within the normal range for adults and similar between groups (MTSS = 23.0 [22.8, 23.3] vs. control = 22.8 [22.5, 23.1]). There was no difference in the weighted BMI between MTSS and control participants (ES = 0.10 [-0.09, 0.29]).

Conclusions:

Regardless of study perspective, we identified no association between BMI and MTSS. The role of BMI as a risk factor for MTSS is unclear. Based on the current analysis, BMI is not a risk factor for MTSS, contradicting previously published evidence. Clinicians should continue to address other modifiable risk factors, before encouraging an athlete to "lose weight" to treat or prevent MTSS, particularly if the athlete is within a normal BMI range. Threats to internal validity were likely minimal due to the standard procedures used to objectively determine participant height, mass, and presence of MTSS.

Word Count: 531

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