**Best Practice Recommendations**

*A series of evidenced-based guidelines to improve your patient care, provided by the developers of ATGenius.com.*

# Shin Pain: Medial Tibial Stress Syndrome

**Each Best Practice Recommendation includes key elements to evaluating or treating the condition, a Strength of Recommendation (SOR) grade based on research quality, and supporting evidence.**

## Best Practice Recommendation #1: INCIDENCE

**Medial Tibial Stress Syndrome (MTSS) is common among individuals participating in running activities and females have a higher incidence. SOR:A (prospective studies)**

- The incidence among high school cross-country runners is 2.8 per 1,000 exposures. Females have a non-statistically higher rate than males.[1]
- Thirty-five percent of naval recruits develop MTSS; the condition is more common in females than males (58% vs 28%).[2]

## Best Practice Recommendation #2: PATHOPHYSIOLOGY

**Fascia, bone or muscle pathology contributes to MTSS symptoms, however the exact cause is unclear. SOR:B (inconsistent results, lower evidence level in lab studies)**

- Tibial fascial tension may play a role in the development of MTSS.[3]
- Bone injury from stresses associated with tibial bending or bowing cause MTSS symptoms, particularly in those with smaller tibial cross-section dimensions.[4]
- Cadaveric studies indicate the soleus, flexor digitorum longus and the deep crural fascia attach most frequently at the site where MTSS symptoms occur; the tibialis posterior was not found at the MTSS site in any specimen.[5]
- Traction-induced muscle injury is not supported by anatomical evidence; support exists for traction-induced injury to the deep crural fascia.[6]

## Best Practice Recommendation #3: RISK FACTORS

**Running gait kinematics, biomechanical abnormalities, musculoskeletal factors, female gender and elevated BMI increase MTSS risk. SOR:B (references include Level 2 evidence, small studies, retrospective design and inconsistent results)**

- Runners with greater forward trunk lean, contralateral pelvic drop, greater ankle dorsiflexion and greater knee extension at foot strike are more likely to sustain a running injury including MTSS.[7]
- Runners with weak hip abductors, a tight iliotibial band, and longer durations of rearfoot eversion are at a higher risk for developing MTSS.[8]

- Individuals with greater BMI, navicular drop measurements, ankle plantar flexion and hip external range of motion have an increased risk of MTSS.[9,10]
- Increased external hip rotation in males, prior orthotics use, fewer years of running experience, previous history of MTSS and female gender are risk factors associated with MTSS.[10]
- A navicular drop measurement (comparing a bilateral to unilateral stance) greater than 10mm doubles the risk of MTSS.[10]
- Females and those with a pronated foot-type are 2.03 and 1.7 more times respectively to develop MTSS.[2]

## Best Practice Recommendation #4: DIAGNOSIS

**Medial Tibial Stress Syndrome can be diagnosed accurately with an appropriate history and physical exam; MRI is useful for differential diagnosis. SOR:B (references include small study size and inconsistent results)**

- Exercise-induced pain along the distal 2/3 of the medial tibia and pain on palpation of the posteromedial tibial border ≥5 consecutive centimeters in length are indicators of MTSS with high interrater reliability.[11]
- MRI is useful to aid differential diagnosis such as tibial stress fracture, with 79-88% sensitivity and 33-100% specificity for MTSS.[12,13]

## Best Practice Recommendation #5: TREATMENT

**A lack of evidence exists to clearly indicate if any particular treatment of MTSS is effective other than rest. SOR:B (lower quality studies with bias, inconsistent results, some small studies, lack of randomization or control group in some cases)**

- Low-energy laser treatment, stretching and strengthening exercises, compression stockings, and leg braces do not show any treatment effect.[14]
- The addition of a stretching and strengthening exercises, or sports compression stockings to a graded running program does not affect the time to completing the running program.[15]
- Iontophoresis, phonophoresis, ice massage, ultrasound, periosteal pecking (a form of acupuncture) and extracorporeal shock wave therapy provide some benefit.[15]
- No additional large effect was found among military recruits wearing a pneumatic leg brace vs control when completing an MTSS rehabilitation program.[16]
- Use of pre-fabricated foot orthoses and calf stretching improves pain levels.[17]
- Rest is equal to any other intervention.[18]

## Best Practice Recommendation #5: PREVENTION

**Orthoses, conditioning and proper training progression can lower the risk of MTSS. SOR:B (inconsistent results, lower evidence level in lab study)**

- Prefabricated and custom-made orthosis are effective for preventing shin pain and tibial stress fractures.[19]
- A fatigued gastrocnemius muscle increases tibial bone strain 26-29%. Muscle conditioning may reduce injury risk.[20]

- Training errors cause 60% of MTSS cases; proper progression reduces injury risk.[21]
- Evidence on MTSS prevention is limited.[22]

**Information researched and provided by Casey Christy, DAT, ATC, CSCS, Co-Developer, ATGenius.com. Treatment decisions should be made based on the best available evidence, patient preference, and clinician expertise, in consultation with, and at the direction of a physician.**

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- **ACL Injuries**
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- **Plantar Fasciitis**

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