

CASE SCENARIO: FOOT AND ANKLE

The patient is a 22-year-old female with complaints of bilateral medial leg pain. She started “boot camp” at the regional army training facility 3 weeks ago and the pain has been progressively increasing since that time. She states she has had similar pain before, but it has always resolved on its own. This time it seems to be getting worse and she really wants to get back to her squad. The current pain ranges from 4/10 to 7/10 increasing with activity. The pain is primarily described as a relative ache but local to the medial side of her leg. She is overweight with a BMI of 29. She has been losing weight over the last year after she decided to enlist in the army and started running. She also quit smoking 6 months ago. Based on her report, you suspect medial tibial stress syndrome to be the most likely diagnosis.

1. Which of the following theories related to the etiology of medial tibial stress syndrome is best supported by contemporary evidence?
 - a. foot and ankle weakness leads to altered loading up the chain during running and inadequate ground reaction force dampening.
 - b. hip and pelvis weakness altering lower kinetic chain mechanics leads to overload during running.
 - c. periosteal modeling to reinforce the tibia where it bears the greatest stress or inflammation of the periosteum due to excessive traction.
 - d. strain of the soleus or gastrocnemius muscle leads to excessive utilization of the tibialis anterior and subsequent overuse.

Objective examination

Upon observation, the patient had low medial longitudinal arches and a valgus position of the hindfoot bilaterally. Sensation tested with light touch was normal in bilateral lower extremities. Pain to palpation was present along the distal half of the posterior medial tibial border extending down to just above the medial malleolus. Passive range of motion at the ankle was full in all planes except limited dorsiflexion to 8° when the knee was flexed. The patient was able to complete 25 single-leg heel rises on the right and 20 on the left, although both sides were painful with testing.

2. The presence of the following signs may support a diagnosis of medial tibial stress syndrome:
 - a. exercise-induced pain that lasts for hours or days after exercise.
 - b. focal pain on the posteromedial border of the tibia produced with palpation.
 - c. presence of paresthesias.
 - d. presence of pain with exercise that immediately reduces when exercise is stopped.

3. Tibial stress fracture is a concern for this patient and in the differential diagnosis of medial tibial stress syndrome. Factors that may be suggestive of stress fracture include:
 - a. a focal area of pain.
 - b. frequency of exercise such as running.
 - c. pronated foot postures.
 - d. symptoms of tibial nerve compression.

4. Treatment for medial tibial stress syndrome should begin with:
 - a. hip strengthening
 - b. relative rest.
 - c. stretching of the soleus.
 - d. use of a shin splint strap.

ANSWERS

1. The correct answer is **c. periosteal modeling to reinforce the tibia where it bears the greatest stress and/or inflammation of the periosteum due to excessive traction.** The two theories of the cause of MTSS most supported by the literature include (1) periosteal modeling to reinforce the tibia at its narrowest diaphyseal cross section, which bears the greatest stress with loading and is at the same area as pain due to MTSS, and (2) inflammation of the periosteum (periostitis) due to excessive traction on muscle fibers and fascia at their attachment site to the medial border of the distal tibia.
2. The correct answer is **a. exercise induced pain that lasts for hours or days after exercise.** While studies differ on the definition of MTSS, the criteria defined by Yates and White include pain history, location, and palpation. Pain history: The pain was induced by exercise and lasted for a few hours or days after exercise. There was no history of paraesthesia or other symptoms indicative of other causes of exercise-induced leg pain. Location: The [participants] identified pain along the posteromedial border of the tibia. The site had to be spread over a minimum of 5 cm (diffuse area along medial border of tibia). Palpation: Palpation of the posteromedial border of the tibia produced discomfort that was diffuse in nature and confined to the posteromedial border of the tibia. In the areas of discomfort, the bone surface may feel uneven.
3. The correct answer is **a. a focal area of pain.** Stress fracture is suspected if the pain is more focal and the history is linked to an abrupt increase in training (eg, increase in frequency, duration, or intensity). Compartment syndrome may be suspected when pain and paresthesias occur consistent with tibial nerve compression.
4. The correct answer is **b. relative rest.** Relative rest for up to 4 months is considered a key treatment to allow for tissue healing. Nonweight bearing activities, such as swimming or biking, may be useful to maintain aerobic fitness while minimizing pain. Because these patients are typically athletes eager to return to play, “relative rest” may be more achievable. Footwear modifications (focusing on improving shock absorption and minimizing pronation) may be important.