RECURRENT TIBIA BONE STRESS RESPONSE IN A 20-YEAR-OLD ELITE SPEED SKATER AS A RESULT OF OVERTRAINING: A CASE STUDY. Justin J. Grasmeyer, DC, CCSP[ab]; Joseph M. Horrigan, DC, DACBSP, CSCS[ab]; David Velasquez, DC, CCSP, CSCS[a]; Steven J. Tunnell, DC, DACBSP, CSCS[a]; *[a]Soft Tissue Center at D.I.S.C, Marina del Rey, CA, [b]Southern California University of Health Sciences, Whittier, CA*

HISTORY: A 20-year-old male elite speed skater presented to the office with left anterior shin pain increasing over a three week period. The athlete pointed to the posterior tibialis and anterior tibia as the site of pain. Pain increased with running, jumping, and dry land training. The pain varied with training intensity, but was rated 4/10. The athlete's training consisted of 3-hour workouts twice a day for six days a week that included skating, plyometrics, extended distance running, and high volumes of jumping and technique drills. The athlete denied previous injuries to his lower leg.
PHYSICAL EXAMINATION: Palpation revealed +4 tenderness over the left posterior tibialis and anteromedial tibia. Ranges of motion of the left ankle were full with pain on resisted plantarflexion, and passive dorsiflexion and eversion. 128Hz tuning fork test reproduced pain on the left anterior tibia.
DIFFERENTIAL DIAGNOSIS: Posterior tibialis strain/tendonitis, Tibia bone stress response, Tibia stress fracture
TESTS AND RESULTS: X rays of the left lower leg did not reveal osseous pathology. MRI revealed a high-grade stress response of the distal tibial metaphysis with evidence of medullary, intracortical, and periosteal edema with no evidence of a fracture line.
WORKING DIAGNOSIS AND TREATMENT: The athlete was treated for tibia bone stress response and placed in a non-weight bearing boot with axillary crutches for three weeks. The athlete was treated with soft tissue mobilization and chiropractic manipulation as indicated and was permitted to participate in upper extremity weight training. A three-week follow-up MRI revealed continued medullary and intracortical bone edema, but resolved periosteal edema. The athlete discontinued the use of the axillary crutches, but was required to continue wearing a walking boot for three additional weeks. An eight-week follow-up MRI revealed residual edema in the medullary bone of the tibia only. The athlete returned to training with dry-land limitations.
FOLLOW UP HISTORY AND EXAMINATION: The athlete presented to the office four weeks after resuming his training complaining of a two week onset of left tibia pain. Pain increased with extreme dorsiflexion and lateral rotation. Examination revealed +1 tenderness along the medial malleolus, distal posterior tibialis, and medial mortise joint. Ranges of motion were full and pain-free. Manual muscle tests did not elicit pain. Tuning fork test and lateral rotation test of the mortise joint were negative.
TESTS AND RESULTS: MRI of the L ankle revealed a small stress fracture along the anterior medial malleolus with surrounding bone marrow edema and distal tibia stress reaction. It was also noted that the athlete's tibia growth plates were not fully fused, suggesting skeletal immaturity. Due to the reoccurrence of bone stress response in this athlete, total testosterone levels were measured sixteen weeks from initial onset and shown to be 250.3ng/dL (241.0-850.0ng/dL). A bone mineral density scan was performed and demonstrated density at more than three standard deviations above normal.

CONCLUSION: It was postulated that in response to overtraining, the athlete's testosterone levels were depressed, thus inhibiting his ability to fully recover from training and predisposing him to multiple recurrent osseous pathologies.

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