HSPI The Open Access Publisher

J S M T JOURNAL OF SPORTS MEDICINE AND THERAPY
ISSN 2573-1726

Case Report

Medial Tibial Stress Syndrome during Police Academy Training: A Case Report and Occupational Medicine Review

Timothy M Silver[1]* and Timothy M Silver Jr.[2]

[1]Employee Medical Center, Chesterfield, Virginia, USA
[2]Bridgetown, Barbados

Abstract

Background: Medial tibial stress syndrome (MTSS), commonly referred to as shin splints, is one of the most frequent lower-extremity overuse injuries encountered among runners, military personnel, and law enforcement recruits [1,2]. Police academy training environments create a unique occupational risk because recruits are frequently exposed to abrupt increases in running volume, sprinting, jumping, obstacle courses, defensive tactics, formation marching, and load-bearing activities over a relatively short period.

MTSS is increasingly recognised as part of a continuum of bone stress injury rather than an isolated inflammatory process. Early identification is essential because progression may result in tibial stress fracture, prolonged training restrictions, delayed academy completion, and increased occupational attrition.

Case: A healthy 24-year-old female police academy recruit developed progressive bilateral shin pain during the third week of academy training following a substantial increase in physical training volume.

Before academy enrollment, the recruit participated in limited recreational running (approximately ½–2 miles per week). During academy training, running volume increased to approximately 18–22 miles per week within three weeks, accompanied by daily callisthenics, sprint drills, agility training, defensive tactics, and obstacle course activities.

Physical examination demonstrated diffuse tenderness along the posteromedial borders of both tibias extending greater than 5 cm, consistent with medial tibial stress syndrome. There was no evidence of tibial stress fracture, chronic exertional compartment syndrome, neurologic deficit, or vascular compromise.

MRI demonstrated periosteal oedema and bone marrow oedema without a cortical fracture line.

Treatment included temporary impact modification, physical therapy, footwear assessment, and a structured return-to-running program. The recruit returned to unrestricted academy participation after seven weeks and completed training without recurrence at six-month follow-up.

Conclusion: Early recognition of MTSS allows occupational medicine providers to balance injury management with preservation of academy participation. Diagnosis requires differentiation from more serious causes of exertional leg pain, particularly tibial stress fracture and chronic exertional compartment syndrome. Evidence supports conservative treatment emphasising relative rest, progressive loading, rehabilitation, biomechanical correction, and functional return-to-duty assessment.

More Information

***Corresponding author:** Timothy M. Silver, MD, Employee Medical Center, Chesterfield, Virginia, USA, Email: Silvert@chesterfield.gov; Tsilv@comcast.net

Submitted: June 22, 2026
Accepted: June 29, 2026
Published: June 30, 2026

Citation: Silver TM, Silver TM, Jr. Medial Tibial Stress Syndrome during Police Academy Training: A Case Report and Occupational Medicine Review. J Sports Med Ther. 2026; 11(2): 14-19. Available from: https://dx.doi.org/10.29328/journal.jsmt.1001099

Keywords: Medial tibial stress syndrome; Shin splints; Police academy; Law enforcement; Occupational medicine; Overuse injury; Bone stress injury; Recruit training

Introduction

Police academy recruits undergo rapid transitions from variable levels of physical conditioning into highly structured occupational training programs. Unlike recreational athletes, recruits often experience mandated increases in physical activity that may exceed the adaptive capacity of bone, muscle, and connective tissue.

Academy activities commonly include:

- Distance running
- Sprint intervals
- Stair climbing
- Obstacle courses
- Defensive tactics
- Repetitive jumping
- Load carriage
- Formation marching

These activities create repetitive axial and rotational forces through the tibia. When tissue adaptation cannot match training demands, overuse injuries may develop.

Medial tibial stress syndrome is among the most common causes of exercise-related lower-leg pain and has been reported frequently in military populations where physical training demands resemble those encountered in police academies [1,3,10].

MTSS accounts for approximately 13–20% of running-related injuries, with higher incidence among populations undergoing rapid conditioning programs [1].

Historically, MTSS was described as tibial periostitis; however, current evidence suggests that it represents a complex process involving:

- Repetitive tibial loading
- Periosteal remodeling
- Muscle traction forces
- Bone stress response
- Potential progression toward stress fracture [2,5,6].

Occupational relevance

Police officers must maintain the ability to perform sudden, high-intensity physical tasks throughout their careers. A preventable lower-extremity injury during academy training may result in lost training time, delayed graduation, or unnecessary occupational exclusion.

Early diagnosis and appropriate rehabilitation allow recruits to remain engaged in training while reducing risk of progression.

Case presentation

Patient

A 24-year-old female police academy recruit presented for evaluation of progressive bilateral shin pain during the third week of academy training.

Relevant history:

- No prior lower-extremity injuries
- BMI: 27 kg/m^2
- Limited recreational running history
- Baseline activity level: approximately ½–2 miles of running per week before academy enrollment

The recruit entered academy training without adequate progressive conditioning for the sudden increase in occupational physical demands.

Academy training exposure

The academy training schedule included:

- Running 4–5 days per week
- Daily calisthenics
- Sprint drills
- Agility training
- Defensive tactics
- Weekly obstacle course activities

Training volume progression

Training period	Estimated running volume
Before academy	Approximately 2 miles/week
Week 3 of academy	Approximately 18–22 miles/week

The recruit experienced nearly a tenfold increase in weekly running exposure within three weeks. Rapid increases in training load are recognised contributors to lower-extremity overuse injury risk among military and occupational trainees [3,10,11].

History of present illness

During the third week of academy training, the recruit developed gradually progressive bilateral lower-leg pain.

Symptoms included:

- Aching pain along both shins
- Pain worsened with running

- Increased discomfort during marching activities
- Improvement with rest
- No traumatic injury
- No numbness
- No weakness

The patient reported that pain gradually began occurring earlier during exercise sessions and interfered with running performance.

Physical examination

Vital signs were normal.

Inspection:

- No swelling
- No ecchymosis
- No deformity

Palpation: Diffuse tenderness was present along the posteromedial tibial borders extending greater than 5 cm bilaterally.

Range of motion: Normal ankle and knee range of motion.

Strength: 5/5 strength throughout bilateral lower extremities.

Neurologic examination: Normal sensation and motor function.

Vascular examination: Normal distal pulses without evidence of vascular compromise.

Functional testing: Hop test produced discomfort but was completed.

Clinical interpretation: The presence of diffuse tenderness greater than 5 cm along the posteromedial tibia supported MTSS. Tibial stress fracture typically presents with focal tenderness, localised pain, and possible progression to pain at rest or nighttime symptoms [4,5].

Differential diagnosis

Important conditions considered included:

Diagnosis	Key features
Medial tibial stress syndrome	Diffuse posteromedial tibial tenderness >5 cm, exercise-related pain
Tibial stress fracture	Focal tenderness, persistent pain, possible positive hop test
Chronic exertional compartment syndrome	Exercise-induced tightness, pressure, predictable symptoms relieved by rest
Nerve entrapment	Numbness, weakness, sensory abnormalities
Popliteal artery entrapment syndrome	Exercise-related vascular symptoms

Diagnostic workup

Plain radiographs: Initial tibial radiographs were normal.

Magnetic resonance imaging: Because symptoms persisted despite two weeks of activity modification, MRI was obtained.

MRI findings:

- Periosteal edema
- Bone marrow oedema
- No fracture line
- No cortical disruption

Final diagnosis

Medial tibial stress syndrome: MRI findings supported an early bone stress response without progression to an established stress fracture. MRI remains the preferred advanced imaging modality when clinical findings are uncertain, or symptoms fail to improve with conservative management [4-6].

Management

Activity modification:

Initial treatment focused on reducing repetitive tibial loading while maintaining cardiovascular conditioning and academy participation.

Management included:

- Temporary cessation of impact running
- Avoidance of sprint intervals and repetitive jumping
- Low-impact aerobic conditioning:
  - Cycling
  - Swimming
  - Elliptical training

Complete immobilisation and prolonged inactivity are generally unnecessary for uncomplicated MTSS. Current evidence supports relative rest followed by progressive mechanical loading to restore tissue tolerance and reduce recurrence risk [2,5,6].

Physical therapy rehabilitation

The recruit participated in a structured rehabilitation program focused on restoring lower-extremity strength, flexibility, and movement mechanics.

Treatment included:

- Gastrocnemius stretching

- Soleus stretching
- Posterior tibialis strengthening
- Hip abductor strengthening
- Core stabilization
- Balance and proprioceptive training
- Running mechanics evaluation

Contemporary models recognise MTSS as a multifactorial overuse condition involving bone stress, muscular fatigue, biomechanical contributors, and training errors rather than isolated periosteal inflammation [2,6].

Footwear assessment

The recruit's running shoes demonstrated excessive wear patterns.

Intervention included:

- Replacement of worn running shoes
- Academy-approved footwear selection
- Review of shoe fit and training surfaces

Foot biomechanics, including excessive pronation, increased navicular drop, and abnormal lower-extremity alignment, may contribute to MTSS development in susceptible individuals [1,3].

Return-to-running program

A progressive six-week return-to-running protocol was implemented.

Week	Activity Progression
Week 1	Walk-jog intervals
Week 2	Easy continuous jogging
Weeks 3–4	Gradual mileage progression with symptom monitoring
Weeks 5–6	Return to academy physical training.

Running progression was based on:

- Pain response
- Functional ability
- Strength recovery
- Ability to perform occupational movements
- rather than an arbitrary timeline.

Outcome

The recruit demonstrated steady improvement.

Clinical course:

- Significant symptom improvement within approximately three weeks
- Full academy physical participation resumed after seven weeks
- Successful completion of police academy training
- No recurrence reported at six-month follow-up

This case demonstrates that early identification and appropriate modification of training demands can prevent unnecessary academy withdrawal while maintaining safety and functional readiness.

Discussion

Medial tibial stress syndrome is one of the most common exercise-related lower-extremity injuries among runners, military trainees, and physically demanding occupational groups.

Historically, MTSS was attributed primarily to inflammation of the tibial periosteum. However, current literature supports a broader understanding of MTSS as part of a bone stress injury continuum involving:

- Repetitive tibial loading
- Periosteal remodeling
- Cortical stress response
- Bone marrow oedema
- Potential progression to stress fracture [2,4-6].

This distinction has important implications in occupational medicine because early symptoms may represent a warning phase in which intervention can prevent more severe injury and prolonged loss of function.

Risk factors

Intrinsic risk factors

Reported risk factors include:

- Female sex
- Increased BMI
- Previous MTSS
- Limited ankle dorsiflexion
- Pes planus or excessive pronation
- Increased navicular drop
- Reduced hip strength
- Poor lower-extremity biomechanics [1,3,6,11].

Extrinsic risk factors

Training-related risk factors include:

- Sudden increases in running mileage

- High training frequency
- Hard running surfaces
- Excessive marching
- Load carriage
- Inadequate recovery periods
- Worn or inappropriate footwear [3,8-10].

Police academy recruits often experience multiple simultaneous risk factors because they transition from civilian activity levels to occupational training demands within weeks.

Diagnosis

MTSS remains primarily a clinical diagnosis.

Characteristic findings include:

- Diffuse tenderness along the posteromedial tibia
- Tenderness extending greater than 5 cm
- Exercise-related pain
- Improvement with rest

Stress fracture should be considered when there is:

- Focal tenderness
- Persistent pain at rest
- Night pain
- Progressive symptoms despite activity modification [4,5].

MRI is recommended when:

- Symptoms persist despite conservative treatment
- Stress fracture is suspected
- Diagnosis remains uncertain

MRI can detect early bone stress changes before abnormalities appear on plain radiographs.

Rehabilitation principles

Evidence-supported rehabilitation strategies include:

- Relative rest
- Progressive loading
- Calf strengthening
- Hip and core strengthening
- Correction of running mechanics
- Gradual return to impact activity [2,5,6].

Prolonged immobilisation should generally be avoided unless imaging demonstrates a higher-rade bone stress injury.

Occupational medicine considerations in police academy training

Police officers are required to perform essential physical tasks including:

- Sprinting during pursuits
- Rapid acceleration and deceleration
- Stair climbing
- Defensive tactics
- Ground fighting
- Emergency response
- Prolonged standing
- Equipment carriage

These occupational requirements distinguish police recruits from recreational athletes. The goal of medical management is not simply symptom reduction but restoration of the ability to safely perform essential job functions.

Temporary training restrictions

Appropriate temporary restrictions may include:

- No distance running
- No sprint intervals
- No obstacle course participation
- Modified defensive tactics training
- Low-impact cardiovascular conditioning
- Progressive strengthening program

Restrictions should be individualised, documented, and reassessed regularly. A diagnosis of MTSS alone should not automatically result in academy dismissal when safe rehabilitation is possible.

Fitness-for-duty and return-to-training criteria

Return to unrestricted academy participation should be based on:

- Pain-free walking
- Ability to complete progressive running program
- Restoration of strength and endurance
- Ability to perform job-specific tasks
- Absence of concerning clinical findings

Functional capacity and safety should guide return decisions rather than diagnosis alone [14,15].

Prevention in police academies

Police training programs should incorporate evidence-based injury prevention strategies.

Training progression:

- Gradual increases in running volume
- Avoidance of sudden workload spikes
- Scheduled recovery periods
- Progressive conditioning before academy entry

Strength and conditioning

Programs should emphasise:

- Lower-extremity strengthening
- Hip stability
- Core conditioning
- Flexibility and mobility

Equipment and environment

Recommendations:

- Appropriate footwear evaluation
- Replacement of worn shoes
- Surface variation when possible

Medical surveillance

Strategies include:

- Early reporting of symptoms
- Recruit education
- Identification of high-risk individuals
- Early intervention protocols

Military injury prevention programs demonstrate that structured conditioning and injury surveillance can reduce lower-extremity overuse injuries in high-demand training populations [8-10].

Learning points

1. **MTSS is one of the most common overuse injuries encountered during police academy and military-style training** [1.2].
2. **Rapid increases in physical workload are a major modifiable risk factor** [3,8].
3. **Diffuse tibial tenderness greater than 5 cm supports MTSS, whereas focal tenderness raises concern for stress fracture** [4,5].
4. **MRI is useful when symptoms persist or when stress fracture cannot be excluded** [4].
5. **Conservative treatment with rehabilitation and graded return to activity is usually successful** [2,6].
6. **Occupational decisions should be based on functional ability and essential job demands rather than diagnosis alone** [14,15].
7. **Police academies should integrate injury prevention programs to reduce recruit injury, attrition, and lost training time** [8-10].

References

1. Newman P, Witchalls J, Waddington G, Adams R. Risk factors associated with medial tibial stress syndrome in runners: a systematic review and meta-analysis. Open Access J Sports Med. 2013;4:229-241. Available from: https://doi.org/10.2147/oajsm.s39331
2. Moen MH, Tol JL, Weir A, Steunebrink M, De Winter TC. Medial tibial stress syndrome: a critical review. Sports Med. 2009;39(7):523-546. Available from: https://doi.org/10.2165/00007256-200939070-00002
3. Williamson BL, Arthur CHC. Shin-splints: common exercise-related syndromes affecting the lower leg. J R Nav Med Serv. 2014;100(2):158-162.
4. Bergman AG, Fredericson M. MR imaging of stress reactions and fractures in athletes. Radiol Clin North Am. 2002;40(2):349-366.
5. Tenforde AS, Kraus E, Fredericson M. Bone stress injuries in runners: a review of epidemiology, aetiology, and management. Sports Med. 2016;46(6):831-843.
6. Reinking MF. Exercise-related leg pain in the young athlete: differential diagnosis and management. J Athl Train. 2017;52(11):1071-1083.
7. Kahanov L, Eberman LE, Games KE, Wasik M. Diagnosis, treatment, and rehabilitation of stress fractures in athletes. J Sport Rehabil. 2015;24(1):1-11.
8. Naderi A, Bagheri S, Ramazanian Ahoor F, Moen MH, Degens H. Foot orthoses enhance the effectiveness of exercise, shockwave, and ice therapy in the management of medial tibial stress syndrome. Clin J Sport Med. 2022;32(6):e618-e626.
9. Grier TL, Canham-Chervak M, Bushman TT, Anderson MK, Jones BH. Evaluating injury risk and prevention strategies in military recruits. Mil Med. 2013;178(Suppl 9):1-9.
10. Knapik JJ, Sharp MA, Montain SJ. Association between injury and fitness among military recruits: implications for training programs. Mil Med. 2006;171(8):710-716.
11. Bullock SH, Jones BH, Gilchrist J, Marshall SW. Prevention of physical training-related injuries: recommendations for military recruits. Mil Med. 2008;173(Suppl 1):1-7.
12. Wentz L, Liu PY, Haymes E, Ilich JZ. Females have a greater incidence of stress fractures than males in military populations: a systematic review. Mil Med. 2011;176(4):420-426. Available from: https://doi.org/10.7205/milmed-d-10-00322
13. Winters M, Bakker EWP, Moen MH, Barten CC, Teeuwen R, Weir A. Medial tibial stress syndrome can be diagnosed reliably using history and physical examination. Br J Sports Med. 2019.
14. International Association of Chiefs of Police. Medical Evaluation and Fitness-for-Duty Guidelines for Law Enforcement Officers. Alexandria, VA.
15. National Institute for Occupational Safety and Health (NIOSH). Work-Related Musculoskeletal Disorders Among Public Safety Personnel. Centres for Disease Control and Prevention.