

Medial Tibial Stress Syndrome Rehabilitation Guideline

This rehabilitation program is designed to return the individual to their activities as quickly and safely as possible. It is designed for rehabilitation following Medial Tibial Stress syndrome. Medial tibial stress syndrome is defined as pain along the posteromedial tibia.¹ Modifications to this guideline may be necessary dependent on physician specific instruction, specific tissue healing timeline, chronicity of injury and other contributing impairments that need to be addressed. This evidence-based medial tibial stress syndrome rehabilitation guideline is criterion-based; time frames and visits in each phase will vary depending on many factors including patient demographics, goals, and individual progress. This guideline is designed to progress the individual through rehabilitation to full sport/ activity participation. The therapist may modify the program appropriately depending on the individual's goals for activity following Medial Tibial Stress Syndrome

This guideline is intended to provide the treating clinician a frame of reference for rehabilitation. It is not intended to substitute clinical judgment regarding the patient's post injury care, based on exam/treatment findings, individual progress, and/or the presence of concomitant injuries or complications. If the clinician should have questions regarding progressions, they should contact the referring physician.

General Guidelines/Precautions:

- Rest and gradual return to activity
- Excessive foot pronation if found should be addressed, focus on entire lower extremity kinetic chain.
- Acute vs. chronic shin pain can affect the length of rest period needed for pain to subside.
- General healing timeline varies depending on severity and chronicity (between 4-12 weeks)
- Assess and treat lower extremity kinetic chain from lumbopelvic region to the foot
- Severity/ Irritability/ Nature/ Chronicity of symptoms that may affect progressions

Medial Tibial Stress Syndrome Rehabilitation Guideline

WEEK	SUGGESTED INTERVENTIONS	GOALS/MILESTONES FOR PROGRESSION
<p>Phase I Acute Phase</p> <p>7-14 days, may be up to 4 weeks depending on chronicity</p> <p>1-4 Expected Visits</p>	<p>Discuss:</p> <ul style="list-style-type: none"> Anatomy, existing pathology, rehab schedule and expected progressions <p>Specific Instructions:</p> <ul style="list-style-type: none"> If symptoms are present with daily activities, the use of a cast boot or pneumatic leg splint for 2-4 weeks <p>Suggested Treatments:</p> <ul style="list-style-type: none"> Modalities as indicated: <ul style="list-style-type: none"> Cryotherapy, ultrasound, soft tissue mobilization, electrical stimulation ROM: <ul style="list-style-type: none"> Gastrocnemius, soleus, flexor digitorum, tibialis posterior Manual Therapy: <ul style="list-style-type: none"> Soft tissue mobilization lower extremity kinetic chain, joint mobilization to joints of the lower extremity kinetic chain where impairments are present (i.e. talocrural joint). Consider forefoot mobilization^{2,3} <p>Exercise Examples:</p> <ul style="list-style-type: none"> NWB lower body strengthening focusing on gluteals: clams, sidelying straight leg raise, fire hydrants Core strengthening: planks, side planks, Pallof holds progressing from standing to half kneeling, to kneeling Stretching: hip flexors/quadriceps, hamstrings, gastrocnemius and soleus Ankle invertor and evertor, foot intrinsic strengthening Balance exercises May continue with upper body strengthening <p>Other Activities:</p> <ul style="list-style-type: none"> Cycling, swimming, deep water/pool running, Alter G, or upper body ergometry 	<p>Goals of Phase:</p> <ul style="list-style-type: none"> Diminished pain and inflammation Educate on activity modification Improved flexibility/range of motion if found to be limited Reestablished dynamic muscle control, balance, and proprioception <p>Criteria to Advance to Next Phase:</p> <ul style="list-style-type: none"> No pain to palpation to anteromedial shin Pain-free ADL's Dorsiflexion within 5 degrees or less of non-involved side
<p>Phase II Subacute Phase</p> <p>2-6 Weeks</p> <p>4-8 Expected Visits</p>	<p>Specific Instructions:</p> <ul style="list-style-type: none"> Establish gradual return to prior level of function. Start at <50% prior training volume. Abide by soreness rules (*see appendix*) <p>Suggested Treatments:</p> <ul style="list-style-type: none"> Modalities as indicated: <ul style="list-style-type: none"> Edema controlling treatments ROM: <ul style="list-style-type: none"> Ankle DF ROM Manual Therapy: <ul style="list-style-type: none"> Continue as needed for joint and soft tissue limitations throughout the lower extremity kinetic chain <p>Exercise Examples:</p> <ul style="list-style-type: none"> Foot/ankle strengthening <ul style="list-style-type: none"> Progress balance activities, emphasis single limb stability Single leg heel raises Foot intrinsic strengthening in weight bearing position Lower extremity mobility <ul style="list-style-type: none"> Gastrocnemius/soleus stretching Continue to address lower extremity kinetic chain mobility deficits Hip strengthening <ul style="list-style-type: none"> Double and single limb proximal stability exercise, may include: <ul style="list-style-type: none"> Squats, single leg squats, lunges with forward trunk lean, step ups, step downs, lateral band walks <p>Other Activities:</p> <ul style="list-style-type: none"> Progress Alter-G and pool activities if available at pain-free level, encourage shock absorption strategies such as increasing step rate, step width, and/or forward trunk lean.⁴ 	<p>Goals of Phase:</p> <ul style="list-style-type: none"> Initiation of return to activity <p>Criteria to Advance to Next Phase:</p> <ul style="list-style-type: none"> Ability to single leg Hop 15 times without pain or discomfort 30 minute walk with minimal to no increase in pain 6 repetitions, 6 seconds @ 60% body weight squat >25 single leg heel raises bilaterally

Medial Tibial Stress Syndrome Rehabilitation Guideline

WEEK	SUGGESTED INTERVENTIONS	GOALS/MILESTONES FOR PROGRESSION
<p>Phase III Advanced Strengthening</p> <p>6-8 Weeks</p> <p>4-9 Expected visits</p>	<p>Specific Instructions:</p> <ul style="list-style-type: none"> Continue with previous exercise program Consider Return to Running program⁵ (see appendix) <p>Suggested Treatments:</p> <ul style="list-style-type: none"> Modalities Indicated: <ul style="list-style-type: none"> Continue as needed for pain control Manual therapy: <ul style="list-style-type: none"> Continue as needed for joint and soft tissue limitations throughout the lower extremity kinetic chain <p>Exercise Examples:</p> <ul style="list-style-type: none"> Plyometrics: <ul style="list-style-type: none"> Emphasis soft landing and hip strategy Double limb: box jumps, drop jumps, forward jumps, tuck jumps Single limb: lunge hop, single box hop, drop with single leg land, single forward hop Foot/ankle strengthening <ul style="list-style-type: none"> Continue balance and foot intrinsic strengthening in single limb weight bearing position Lower extremity mobility <ul style="list-style-type: none"> Continue to address lower extremity kinetic chain mobility deficits Hip strengthening <ul style="list-style-type: none"> Continue single limb proximal stability exercises <p>Other Activities:</p> <ul style="list-style-type: none"> Begin return to running program⁴ using soreness rules (see appendix) 	<p>Goals of Phase:</p> <ul style="list-style-type: none"> Return to running Return to recreational/sporting activity Normal lower extremity kinetic chain strength Normal lower extremity kinetic chain muscle length <p>Criteria to advance to competitive sports:</p> <ul style="list-style-type: none"> Pain-free completion of interval running program
<p>Phase IV Return to full activity</p>		

Appendix

Return-to-Running Program

This program is to be used for return to continuous running following injury. It should be started once you are able to walk 30 min consecutively without pain/injury. If pain should return with running, you may continue as long as:

- The pain is not sharp
- The pain lessens or remains unchanged as the running session continues
- The presence of pain does not alter your normal pattern of motion (no limping)

Begin each session with a warm-up consisting of a 2-5 min brisk walk followed by your specific stretching exercises. Perform the appropriate walk/run combination based on the table below. Be sure to follow the walk/run with your stretching exercises.

WEEK	DAY 1	DAY 2	DAY 3
1	6x: walk - 4.5 min run - 0.5 min	6x: walk - 4.0 min run - 1.0 min	6x: walk - 3.5 min run - 1.5 min
2	6x: walk - 3.0 min run - 2.0 min	6x: walk - 2.5 min run - 2.5 min	6x: walk - 2.0 min run - 3.0 min
3	6x: walk - 1.5 min run - 3.5 min	6x: walk - 1.0 min run - 4.0 min	6x: walk - 0.5 min run - 4.5 min
4	run - 30 min	run - 30 min	run - 30 min

Upon completing Week 4, you may resume a gradual transition back to continuous running following a 2 min warm-up walk and stretching. As you return to your pre-injury running level, training duration or intensity should be increased by no more than 10% per week to minimize risk for injury recurrence. Be sure to continue your stretching program as instructed.

Soreness Rules

CRITERION	ACTION
1. Soreness during warm-up that continues	2 days off, drop down 1 step
2. Soreness during warm-up that goes away	Stay at step that led to soreness
3. Soreness during warm-up that goes away but redevelops during session	2 days off, drop down 1 step
4. Soreness the day after lifting (Not muscle soreness)	1 day off, do not advance program to the next step
5. No soreness	Advance 1 step per week or as instructed by healthcare professional

REFERENCES:

1. Galbraith RM, Lavallee ME. Medial tibial stress syndrome: conservative treatment options. *Curr Rev Musculoskeletal Med.* 2009; 2(3):127-33.
2. Wilder RP, Sethi S. Overuse injuries: tendinopathies, stress fractures, compartment syndrome, and shin splints. *Clin Sports Med.* 2004; 23(1):55-81, vi.
3. Kudo S and Hatanaka Y (2015). Forefoot flexibility and medial tibial stress syndrome. *Journal of Orthopaedic Surgery.* 23(3), 357-60.
4. Barton CJ et al. (2016). Running retraining to treat lower limb injuries: a mixed-methods study of current evidence synthesized with expert opinion. *Br J Sports Med.* 50, 513-526.
5. Heiderscheit, B. (2012). Examination and Treatment of Running Injuries [Lecture Notes].