



# Lower Extremity Stress Fracture

by James K. Hashimoto, ATC, MPT  
Elite PT LLC, Wilmington, DE

## GENERAL PRINCIPLES

This protocol for lower extremity stress fractures is designed to provide the rehabilitation professional with a general guideline for patient care with the [AlterG Anti-Gravity Treadmill®](#). As such, it should be stressed that this is only a protocol and should not be a substitute for professional clinical decision-making regarding a patient's progression. And it should be further noted that progression should be individualized based upon each patient's specific needs, pain level, physical examination, progress, and presence of any complications.

## PHASE I (Immediate): Week 1-Week 2

### GOALS

- Control pain and inflammation
- Maintain joint mobility and AROM/PROM of appropriate joints
- Maintain base level of cardiovascular conditioning
- Promote normal walking gait mechanics within the AlterG

### TREATMENT OPTIONS:

#### Modalities

Ice and interferential electric stimulation for pain/inflammation control, Game ready as needed to control swelling

#### Manual Therapy

Appropriate ankle joint mobilizations as needed to maintain ankle mobility (Gr 2/3), Mild PROM for foot/ankle and knee as appropriate, Edema massage as appropriate

#### Therapeutic Exercise

Aqua jogging for CV fitness, Stationary Bike, LE stretches, NWB or PWB AROM (ie: Babst/Wobble/Teeter board), Towel stretching, towel curls, Theraband ankle exercises, Hip and knee strengthening in open chain. Begin proprioceptive activities in the [AlterG Anti-Gravity Treadmill®](#).

#### Gait Training

Emphasis on proper gait mechanics within the [AlterG Anti-Gravity Treadmill®](#). Utilize forward and backward walking in the AlterG at 60% to 65% BW. Walking 2.5 mph to 3.5 mph at 0% incline

## PHASE II (Early Recovery Phase): Week 3–Week 4

### GOALS

- Control pain and inflammation
- Maintain joint mobility and AROM/PROM of appropriate joints
- Begin weight bearing activities
- Initiate strengthening progression
- Maintain base level of cardiovascular conditioning
- Promote normal walking gait mechanics within the AlterG

### TREATMENT OPTIONS:

#### Modalities

Ice and interferential electric stimulation for pain/inflammation control, Game ready as needed to control swelling

#### Manual Therapy

Appropriate ankle joint (subtalar and talocrural) mobilizations as needed to maintain ankle mobility (Gr 2/3), Mild PROM for foot/ankle and knee as appropriate, Edema massage as appropriate, Soft tissue mobilization techniques to the plantar fascia, gastrocnemius, soleus, peroneals, and anterior/posterior tibialis. Lower extremity PNF patterns (hip D1/2 F/E)

#### Therapeutic Exercise

Stationary Bike, LE stretches, NWB or PWB AROM (ie: Babst/Wobble/Teeter board), Towel stretches in long sitting, Controlled closed chain activities in [AlterG Anti-Gravity Treadmill®](#) (Squats, Single Leg Mini-Squats, SLS, Heel and toe raises), Progression to FWB: Squats, Leg Press, Step-Ups, Band walks

#### Gait Training

Emphasis on proper gait mechanics within the [AlterG Anti-Gravity Treadmill®](#). Utilize forward and backward walking in the AlterG – 65% to 75% BW. Walking 3.5 mph to 6.0 mph at 0% to 6% incline (incline at lower walking speeds only). Beginning week 3 may increase incline range for lower walking speeds to 0% to 8%.

## PHASE III (Intermediate Phase): Week 5–Week 7

### GOALS

- Painfree ADLs
- Full painfree AROM/PROM
- FWB closed chain strengthening progression
- Progress to sports and recreational activity progressions
- Progress walking and jogging progressions on AlterG

### TREATMENT OPTIONS:

#### Modalities

Ice and interferential electric stimulation for pain/inflammation control, Game ready as needed to control swelling

#### Manual Therapy

Advanced mobilization techniques for foot and ankle to normalized ROM and mechanics. Ankle PNF patterns. Lower extremity PNF patterns (hip D1/2 F/E). Edema massage as appropriate, Soft tissue mobilization techniques to the plantar fascia, gastrocnemius, soleus, peroneals, and anterior/posterior tibialis.

#### Therapeutic Exercise

Continue with foundation strengthening activities. Begin lower level functional training (progress linear to lateral movements). Begin progressive dynamic proprioceptive activities.

### Gait Training

In **AlterG Anti-Gravity Treadmill®** single leg strengthening; Walk and jog/run progressions at 70% to 85% BW at 2% to 4% incline (incline at lower speeds only). Speeds from 5 mph to 8 mph. During week 5 may increase to 75% to 90% BW at 2% to 6% incline at lower speeds only.

### Manual Therapy

Advanced mobilization techniques for foot and ankle to normalize ROM and mechanics – AS NEEDED. Ankle PNF patterns. Lower extremity PNF patterns (hip D1/2 F/E). Massage/Soft tissue mobilization as needed to assist in recovery and soreness to the plantar fascia, gastrocnemius, soleus, peroneals, and anterior/posterior tibialis.

### Therapeutic Exercise

Continue with foundation strengthening activities. Begin advanced functional training (progress linear to lateral movements). Begin plyometric and advanced agility as appropriate. Progress dynamic proprioceptive activities.

### Gait Training

In **AlterG Anti-Gravity Treadmill®** single leg strengthening; 1st week of PHASE IV to consist of active rest period with decreased BW% (65% to 75% BW) at 4.5 mph to 6.0 mph (incline of 2% to 6% at lower speeds only). Following first week of active rest may begin jogging and running progressions at 85% to 90% BW at 0% to 2% incline as appropriate. Speeds from 6 mph to 12 mph. Second week after active rest may increase BW% range to 85% to 100% BW.

## PHASE IV (Advanced Phase) : Week 8+

### GOALS

- Advanced progressions with sports and recreational activity
- Advanced progressions with jogging and running on the AlterG

### TREATMENT OPTIONS:

#### Modalities

Ice and interferential electric stimulation for pain/inflammation control, Game ready as needed to control swelling

### ALTERG PROGRESSION TABLE

Day or Week (for surgical patients this must be listed as "post-op week")	Program Walking? Running? % Body Weight	Speed (mph)	Incline (%)	Time (Minutes)	Frequency (How many times per day or week was the exercise or training?)
PHASE I (1 – 3 weeks in duration)	60 - 65%	2.5 to 3.5 mph	2%	15 to 30 minutes	2 – 3x/week plus pool
PHASE IIa (2 weeks in duration)	65 - 75%	3.5 to 6.0 mph	Can do incline intervals from 2 – 6% (incline at lower walking speeds only)	*20 to 30 minutes (jog/walk intervals combined with incline intervals)	3x/week plus pool
PHASE IIb (1 week duration)	65 - 75%	4.5 to 6.0 mph	Can do incline intervals from 2 – 8% (incline at lower walking speeds only)	*20 to 30 minutes (jog/walk intervals combined with incline intervals)	3x/week plus pool and cross training
PHASE IIIa - FUNCTIONAL (2 weeks in duration)	70 - 85%	5.0 to 8.0 mph	Can do incline intervals from 2 – 6% (incline at lower speeds only)	*30 min Run/jog intervals – can be combined with incline intervals	3 - 5x/week (intervals x 3: distance x 1) plus cross training
PHASE IIIb – FUNCTIONAL (1 week in duration)	75 - 90%	5.0 to 8.0 mph	Can do incline intervals from 2 – 6% (incline at lower speeds only)	*30 min Run/jog intervals – can be combined with incline intervals	3 - 5x/week (intervals x 3: distance x 1) plus cross training
ACTIVE REST PHASE (1 week in duration)	65 – 75%	4.5 to 6.0 mph	Can do incline intervals from 2 – 6% (incline at lower speeds only)	*30 min jog/walk or run/jog intervals can be combined with incline intervals	3x/week plus aquajog, plus cross training
Week 7 - RTA	85% - 95%	6.0 to 12.0 mph	1-2%	*35 min continuous run	2-3x/week plus overland & agility
Week 8 - RTA	85% – 100%	6.0 to 12.0	1-2%	*45 min continuous run	2-3x/week plus overland & agility

\* In time column denotes that this time does not include a 5-10 minute walking warm up at the workout weight percentage prior to the designated workout.