CASE STUDY

Stress Fracture - 4th Metatarsal

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INTRODUCTION

24 y/o female Field Hockey player with healed Plantar fascia tear, sesamoid fx and entrapped nerve. Sport is played on artificial turf, requires constant running and frequent change of direction.

1. Athlete suffered from acute foot pain after activity. Diagnostic imaging confirmed diagnosis of a 4th Metatarsal Stress Fracture.
2. Athlete followed physician's recommendations for initial care and treatment.

GOALS

- Following release to weight-bearing, incorporate de-weighting into rehabilitation protocol
- Develop a progressive return to activity
- Maintain fitness and function during rehabilitation

HISTORY / PROGRESSION

I. Plan

- Athlete was diagnosed with with a 4th Metatarsal Stress Fracture
- Upon consultation with treating physician and review of diagnostic imaging the athlete was placed in a walking boot for 4 weeks, WBAT
- After physician release to unrestricted weight bearing, a complementary conditioning program was developed incorporating the AlterG Anti-Gravity Treadmill®
- Along with traditional medical treatment: modalities, therapeutic exercise, joint mobilization and NSAID's, the AlterG Anti-Gravity Treadmill® was added to the treatment protocol
- Program duration was for 8 weeks
- AlterG Anti-Gravity Treadmill® was incorporated at week 5 of rehabilitation once athlete was cleared for unrestricted weight bearing
- Athlete achieved desired competition goals

II. Considerations

- Pain/ soreness levels were considered and used to gauge weight percentage and speed. Pain level reported by athlete was not to exceed 4 on a scale of 1-10 during Phase I, and not to exceed 3 on a scale of 1-10 during Phases II-IV
- Athlete feedback was considered prior to each workout
- Pre and post workout pain was recorded and monitored

III. Progression

See *Table 1* and *Table 2*.

RESULTS

The athlete was released for return to sport by the treating physician after 8 weeks of rehabilitation. The athlete achieved the goals of the rehabilitation plan, incorporating a progressive sport specific conditioning plan to transition the athlete to full participation. The AlterG Anti-Gravity Treadmill® was incorporated into

RESULTS (cont.)

the athlete's rehabilitation plan to establish confidence, maintain fitness, manage gait and progressively increase impact on the extremity. The athlete resumed modified activity after release from rehabilitation and continued using the AlterG Anti-Gravity Treadmill® as part of the reconditioning program.

Progression Table 1

Phase I Week 5-6	**Partial Weight-bearing**
	Range of Motion
	Gait evaluation/ re education
	Neuromuscular activation
	Neuromuscular conditioning
	Pain Management
	Proprioception
Phase II Week 7-8	**Weight- bearing**
	Emphasize heel to toe walk
	Pain free activity
	Proprioception
	Initiate cardiovascular training
	Increase load bearing
	Increase volume
	Increase strike frequency
	Increase musculoskeletal strength and endurance
	Decrease incline of surface
Phase III Week 9-11	**Preparation**
	Full foot strike
	Increase intrinsic muscular function
	Proprioception/Technique
	Maintain volume
	Increase intensity/ load
	Increase musculoskeletal strength and conditioning
	Increase cardiovascular training
	Decrease angle of surface
Phase IV Week 12-15	**Return to activity**
	Increase load and intensity
	Challenge Propioception
	Maintain Volume
	Maintain Conditioning
	Maintain Technique
	Maintain angle of surface

(continued on back)

Progression Table 2
(The following table represents the patient's actual device settings during her rehabilitation, beginning post-injury week 5, based on her individual progress and pain levels. Please consult a physician before initiating any exercise or rehabiliation program.)

Day(s)	Time	Speed	Frequency	Body Weight %	Incline
1	15 min	5 min @ 2.5 mph, 5 min @ 3.0 mph, 5 min @ 2.5mph	1 x daily	60%	2 degrees
4	20 min	5 min @ 2.5 mph, 5 min @ 3.0 mph, 5 min @ 3.5 mph, 5 min @ 2.5 mph	1 x daily	65%	2 degrees
7	20 min	6 min @ 3.0 mph, 8 min @ 4.0 mph, 6 min @ 3.0 mph	1 x daily	70%	2 degrees
11	20 min	5 min @ 2.5 mph, 5 min @ 3.5 mph, 5 min @ 4.5 mph, 5 min @ 3.0 mph	1 x daily	70%	1 degree
13	20 min	3.5 min @ 2.5 mph, 5 min @ 3.5 mph, 6 min @ 5.0 mph, 3.5 min @ 3.0 mph, 5 min @ 3.5 mph	1 x daily	75%	1 degree
16	14 min	6 min @ 5.0 mph, 8 min @ 6.0 mph	single	70%	1 degree
19	12 min	3 min @ 6.0 mph x 4 sets	single	90%	1 degree
22	12 min	12 min @ 6.0 mph	single	90%	1 degree
25	20 min	4 min @ 6.0 mph x 5 sets	single	90%	1 degree
30	30 min	5 min @ 6.0 mph x 5 sets	single	90%	1 degree
35 - 40	30 min	5 min @ 5.0 mph, 1 min rest, 5 min @ 6.0 mph, 1 min rest, 5 min @ 7.0 mph, 1.5 min rest, 5 min @ 8.0 mph 1.5 min rest, 6 min @ 5.0 mph	Every other day	90%	1 degree
40 - 48	30 min	5 min @ 4.0 mph, 30 sec rest, 5 min @ 6.0 mph, 1 min rest, 5 min @ 7.0 mph, 1.5 min rest, 5 min @ 8.0 mph, 1.5 min rest, 5 min @ 6.0 mph	Every other day	90%	1 degree

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