Incline Treadmill Training for a Crush Ankle Injury with an Open Wound: A Case Report

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Background

- Within the industrial workplace, soft tissue injuries to the ankle are common.[1]
- The ankle is the second most commonly injured region in the body.[2]
- Past research has shown that average time away from work was 2.5 weeks for a lateral ankle sprain, with 90% of individuals having full return to work at six weeks.[3]
- Therapeutic activities are part of a comprehensive physical therapy (PT) plan of care that contribute to reintegration into a normal work-load.[3]
- Treadmill training with an incline has been shown to reduce ankle stiffness and improve active range of motion.[4]
- There is a paucity of research investigating the use of incline treadmill training in the industrial setting and its use in treatment of crush injuries.

Purpose

- The purpose of this case report was to examine the effectiveness of inclined treadmill training as a means of increasing dorsiflexion when mobilizations cannot be utilized in a comprehensive PT plan of care for an acute, grade II lateral ankle sprain with open wounds.

Uniqueness

- Conservative PT treatment of a lateral ankle sprain normally incorporates mobilizations to increase ankle dorsiflexion.[5,6]
- This patient had a crush injury resulting in open wounds to multiple locations along the lower extremity which did not allow for manual mobilizations.
- Alternative methods were sought to increase ankle dorsiflexion.

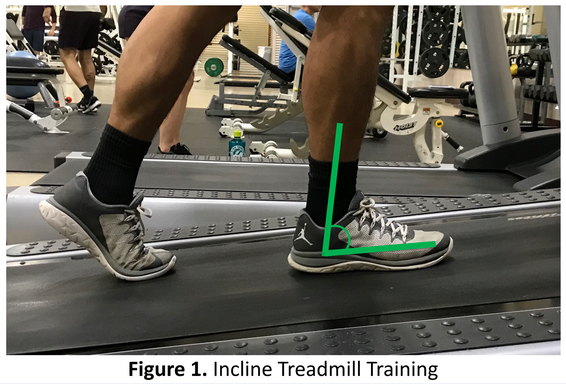

Figure 1. Incline Treadmill Training

Patient Description

- The patient was a 22-year-old male, working in an industrial setting, referred to outpatient PT following a work-related injury.
- The mechanism of injury consisted of the patient falling onto a chain belt at work that was loaded with palettes, the loaded palettes continued to move down the belt and crushed his right lower extremity.
- Patient imaging was negative for fractures.
- The patient presented with anxiety about the injury that consisted of post-traumatic nightmares and worries about return to work.

Wound Progression

Figure 2. Initial Evaluation

Figure 3. Week 3

Figure 4. Week 4

Treatment

	Additions	Progressions
Week 1	AROM and gait training	
Week 2	Treadmill training and therapeutic exercise	Functional ROM training
Week 3	Neuromuscular re-education, edema control, and therapeutic activity	Treadmill training, therapeutic exercise, and functional ROM
Week 4	Neuromuscular re-education, edema control, therapeutic activity, treadmill training, therapeutic exercise, and functional ROM	

Tests and Measures- Results

	Initial Evaluation	Week 2 Re-Eval	Week 4 Discharge
AROM (°)			
Right Ankle:			
Dorsiflexion	Lacking 25°	Lacking 5°	16°
Plantarflexion	40°	50°	55°
Inversion	20°	30°	30°
Eversion	8°	15°	15°
Right Knee:			
Flexion	130°, Painful	135°	135°
Extension	0°, Painful	0°	0°
Edema			
Figure-of-eight (cm)	57 cm	53 cm	50 cm
MMT Right Ankle (0-5/5)			
Dorsiflexion	4-/5, Painful	5-/5, Painful	5/5
Plantarflexion	5/5	5/5	5/5
Inversion	4-/5, Painful	5-/5, Painful	5/5
Eversion	4-/5, Painful	5-/5, Painful	5/5
LEFS (0-80/80)	Score: 46/80 (57.5%)	Score: 54/80 (67.5%)	Score: 77/80 (96.25%)

Discussion/Conclusion

- Incline treadmill training within a comprehensive PT management plan of care revealed a successful outcome for a 22-year-old who sustained a lateral ankle sprain with an open wound.
- Future research may want to consider the long-term effectiveness of utilizing incline treadmill training as a means of increasing dorsiflexion in a lateral ankle sprain when compared to manual mobilizations.

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