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Who: 42 year-old male with multiple lower extremity fractures, with pain and little functional improvement with traditional physical therapy and regular treadmill walking program.

What: Walking program with the AlterG Anti-Gravity Treadmill™ provided benefits to this patient that had failed traditional rehab methods.

Why: Body weight support allowed patient to decrease pain, normalise gait mechanics, improve walking and functional confidence for activities of daily life (ADLs), and improve quality of life.

Introduction

Lower extremity fracture rehabilitation is important to reduce the risk of morbidity. Optimising the rehabilitation of lower extremity fractures can significantly improve patient quality of life. Partial weight bearing, along with active range of motion exercises are traditionally recommended for various surgically repaired lower extremity fractures. However, current methods of partial weight bearing such as crutches or cane may not adequately reduce lower extremity loads and require modification of gait patterns. Research has shown that patients with lower extremity fractures consistently bear loads much greater than recommended when ambulating under partial weight bearing conditions. The AlterG® Anti-Gravity Treadmill™ was developed to support rehabilitation through accurate and precise body weight unloading. The case report highlights the benefits of AlterG rehabilitation in a patient with multiple lower extremity fractures who had failed traditional rehabilitation methods.

Goals

The AlterG effectively allowed the patient to:

- Reduce body weight to reduce pain during ambulation.
- Normalise gait mechanics during training.
- Improve walking and functional confidence for daily activities performed outside of the rehabilitation setting.
- Improve quality of life.
- She had been unable to hike for the past 6 weeks.

Progression Table

Time (6 week intervals)	Maximum speed per session, m/s Mean (SD)	Minimum LBPP, % unloading* Mean (SD)	Maximum pain 0-100 mm VAS Mean (SD)	Total AAOS scores* Mean (SD)
Baseline	0.67	20.0	10.0	89.0
6 weeks	0.78 (0.13)	17.9 (2.87)	5.0 (5.1)	85.8 (7.5)
12 weeks	0.88 (0.23)	14.5 (2.55)	11.6 (8.3)	76.6 (3.0)
18 weeks	0.89 (0.24)	13.1 (4.47)	19.0 (9.1)	73.3 (6.4)
24 weeks	0.80 (0.08)	18.1 (2.59)	1.2 (3.5)	73.0 (2.9)

*Significant values. VAS=visual analog scale. SD= standard deviation



History

The patient was a 42 year-old man with multiple lower extremity fractures. The patient had an avulsion fracture of the right medial malleolus, comminuted fracture of the left talus, and fractures of the left proximal and distal tibia and fibula due to a mountain climbing accident. He underwent a traditional six-month rehabilitation program, however, the patient experienced pain and little functional improvement with therapy and the traditional treadmill walking program, upon which AlterG rehabilitation therapy then commenced. He took three 20-minute sessions per week, for a total of 48 sessions.

Figure 1. Mean maximum speed reached per session, minimum bodyweight support required (lower body positive-pressure; LBPP), maximum pain level experienced, and mean American Academy of Orthopaedic Surgeons (AAOS) score in 6-week intervals of the rehabilitation protocol.

Results

The patient experienced a significant reduction in pain and an improvement in ankle range of motion ($p = 0.002$), walking speed ($p > 0.05$) and physical function ($p = 0.004$), as assessed by the Foot and Ankle Module of the American Academy of Orthopaedic Surgeons Lower Limb Outcomes Assessment Instrument. (Figure 1). Training did not appear to have any adverse effect on fracture healing, as was evident on radiograph.