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Who: 41- year-old female diagnosed with Left tibial plateau fracture after high impact moment while horseback riding.

What: The AlterG Anti-Gravity Treadmill was used to help the patient with weight bearing progression and gait training post ORIF.

Why: Body weight support allows for safe controlled loading of the post-surgical limb, avoiding pain and reducing muscle guarding, allowing the patient to work towards normal gait pattern.

Introduction

An 41 year old female was diagnosed with a fractured left lateral tibial plateau after an high impact moment during horseback riding. The high impact moment occurred with a fully extended leg when trying to step off as the horse was reared up. After a visit to the emergency room, the patient was sent home with a cast for two weeks before surgery was performed. Thereafter, the fracture was internally fixated with osteosynthetic material and the patient was referred to physiotherapy directly after surgery. A non-weight bearing policy was applied for the first 6 weeks post-surgery, thereafter weight bearing could be increased guided by the pain. Reducing the body weight during rehabilitation allowed for early progression to higher intensities while maintaining the parameters required for her hemodynamic stability and safety. Status post surgical diagnosis included: medial meniscus tear, cyst, grade 3 chondromalacia patella, grade 1 chondromalacia trochlea, grade 3 chondromalacia lateral tibial plateau, grade 1 chondromalacia lateral femoral condyle. The patient is active, exercises regularly, and works full time as an Acute Care Physical Therapy Assistant in a hospital.

Goals

The treatment goals set by the patient and therapist were as follows:

Main goals:

- Return to normal daily activities
- Return to sport activities (horseback riding)

Subgoals:

- Full weight bearing at 12 weeks post-surgery.
- Restore normal range of motion (ROM)
- Restore normal gait pattern
- Restore normal strength
- Restore cardiovascular condition

Post-Surgery Treatment

Initially, the patient showed loss of range of motion (ROM) of flexion and extension of the knee (90/5/0), extra- and intra- articular edema and muscle atrophy of the left lower extremity.

During the non-weight bearing phase, the physical therapy treatment consisted mobilizing exercises, non-weight bearing strengthening exercises and soft tissue mobilization. After 3 weeks full ROM (140/0/5) had been restored and edema was reduced.

At 4 weeks post-surgery treatment focused on dynamic mobilizing exercises such as cycling, and increasing muscle strength using the Biodex system pro 4 isokinetic dynamometer (Biodex Medical Systems, Inc., Shirley, New York, USA) for quadriceps and hamstring strength.

At 6 weeks post-surgery, weight bearing gait training was started at 20% of body weight using the AlterG Anti-Gravity Treadmill® walking forward at 2.5 km/u for 10 minutes. The gait training progressed over the next 5 weeks increasing the weight, speed and duration up to 100% at 5 km/u for 30 minutes (see progression table).

Besides gait training a progressive exercise program was performed consisting of strength training, stabilization exercises

and coordination exercises. After each exercise session the involved knee was treated with a cooling and compression system (Game Ready®) to enhance soft tissue recovery.

Measurements

Three measurements were conducted at onset of the AlterG progressive weight bearing program, 6 weeks post-surgery (Baseline). The measurements were repeated at 9 weeks post-surgery (T1) and at 12 weeks post-surgery (T2).

Measurements:

- Range Of Motion (ROM).
- Knee injury and Osteoarthritis Outcome Score (KOOS)
- Patient Specific Complaint questionnaire (PSK); Dutch questionnaire to determine the effort of specific tasks. Consisting of three items:
 - PSK 1: lying in bed
 - PSK 2: working
 - PSK 3: standing for a long period

Week (post-surgery)	Program	Speed (km/hr)	Incline (%)	Time (minutes)	Frequency	Additional: Reverse Time/speed
7	Walking at 20 - 30% of BW	2-3 km/hr	0	10-15	3 x week	3 min 1.7-2.2 km/hr
8	Walking at 30 - 50% of BW	2-3 km/hr	0	20	3 x week	6 min 1.7-2.2 km/hr
9	Walking at 60 - 70% of BW	3-5 km/hr	0	15	3 x week	3 x week
10	Walking at 70 - 80% of BW	3-5 km/hr	0	15-10	3 x week	3 x week
11	90-100% of BW	3-5 km/hr	0-2	20	3 x week	3 x week
12	90-100% of BW	3-5 km/hr	0-2	20-30	3 x week	3 x week