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Who: 85 year-old male with history of cardiovascular disease with increasing difficulty standing, walking, stepping up/down curbs secondary to weakness Bilateral Lower Extremities.

What: The patient reported significant decreases in pain to Bilateral knees, improved Berg Balance Score and improved functional mobility after Physical Therapy, including use of the Anti-Gravity Treadmill™.

Why: Body weight support helped to reduce patient's knee pain during ambulation, allowing him to walk in physical therapy and decrease joint/soft-tissue restrictions, resulting in improved knee range of motion (ROM), strength, and balance.

Introduction

The patient is a 66 year-old male with history of right knee pain from osteoarthritis that was becoming progressively worse and limiting his activity level. The patient underwent a right Total Knee Replacement in October 2014 at Mt. Sinai Beth Israel Hospital. The patient lives with his family in a two-family home, and prior to surgery he was able to ambulate with no assistive devices. The patient lives an active lifestyle, and he enjoys traveling to his community Synagogue for prayers daily and visiting with his family. The patient was admitted to Bedford Center for Nursing and Rehabilitation on three days after surgery to participate in physical and occupational therapy.

Goals

- Develop a normal gait pattern.
- Improve strength of R lower extremity.
- Improve knee ROM for extension and flexion.
- Tolerate standing to safely participate in self-care and mobility.
- Participate in community ambulation using a straight cane.
- Restore normal stair ascend/descend mechanics.

History

The patient had a long history of right knee osteoarthritis and pain, which was progressively getting worse and limiting his daily activity.

Prior to surgery, the patient was attending traditional outpatient physical therapy for two years, which provided short term relief. Therapy focused on pain management through the use of Ultrasound, TENS, ice/heat, soft tissue mobilisation and traditional dynamic knee exercises focusing on knee extension and flexion. The patient also participated in Aqua therapy.

When symptoms increased and traditional physical therapy was not providing patient with any further pain relief, the patient elected to undergo a Right Total Knee Arthroplasty in October 2014. During inpatient stay, the patient participated in 3 days of inpatient rehabilitation.

At initial evaluation, the patient's right knee premature rupture of membranes (PROM) was: flexion = 0-80, extension = 80-0. The patient was ambulating 10 feet with a rolling walker and moderate assistance and weight bearing as tolerated. The patient's strength was 3-/5 and pain was rated at 5/10 with moderate effect on function.

One week post-op, the patient began outpatient physical therapy and occupational therapy at Bedford Center for Nursing and Rehabilitation. The patient initiated a walking program on the AlterG Anti-Gravity Treadmill at 35% of his body weight at 1.5 mph and no incline for a 15 minute interval. The protocol included gait training on the AlterG Anti-Gravity Treadmill, soft tissue mobilisation, proprioception training, and strengthening/stretching of the right lower extremity.



AlterG Case Study

- Two weeks post-op, the patient progressed to 50% his body weight at 2.0 mph and no incline for a 30 minute interval.
- Three weeks post-op, the patient progressed to 60% of his body weight at 2.0 mph and no incline for a 40 minute interval.
- Four weeks post-op, the patient progressed to 85% of his body weight at 1.0 mph and no incline for a 40 minute interval.
- Program duration was 5 weeks.

Results

The patient was seen for a total of 26 physical therapy sessions utilising the AlterG Anti-Gravity Treadmill. He achieved post-operative PROM of 0-115 degrees of knee flexion, which will enable him to participate in stair negotiation with proper gait mechanics and allowed for increased toe clearance to improve safety during ambulation.

He demonstrated strength of 4+/5 in his right lower extremities after completion of physical therapy. The effect of pain no longer impacted the patient's function and the patient demonstrated independence with preventative pain management strategies including utilising a cold compress following exercise sessions.

The AlterG Anti-Gravity Treadmill assisted in improving the patient's gait pattern and provided the patient visual feedback to self-monitor his gait pattern during ambulation. Following treatment, the patient demonstrated the ability to ambulate on both even and uneven surfaces for community distances with use of a standard cane. The patient demonstrated the ability to negotiate 3 flights of stairs with proper gait mechanics. He uses a standard cane and unilateral handrail, which will enable him to return to visiting with his family on the second floor living space and attending daily prayers at his Synagogue.

Week	Program (% Body Weight and Speed)	Speed (mph)	Time (mins.)	Incline %	Frequency
1	Walking at 35% body weight	1.5	15	0	6 times a week
2	Walking at 50% body weight	2.0	30	0	6 times a week
3	Walking at 65% body weight	2.0	40	0	6 times a week
4	Walking at 85% body weight	2.0	45	0	6 times a week
5	Walking at 85% body weight	2.0	45	0	3 times a week

