Dynamic Assistive Walking Device for Non-Weight-Bearing Injuries

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Medical Need

1. **FOOT DEFICIT FROM DIABETES**
   - 50% of 50+ diabetic patients
   - HIGH severity

2. **ANKLE FRACTURE/SPRAIN**
   - 680,000 patients between 2012 - 2016
   - MODERATE severity

3. **ACHILLES TENDON TEAR**
   - 106 per 100,000 patients
   - HIGH severity

Objective

Assistive walking device that allows for:

1. Non-weight-bearing
2. Affordability
3. Controlled mobility

Existing Solutions

**The Kneeler**

**Kneeler Limitations**
- Lack of hip mobility
- Complicated installation
- Expensive
- Lack of padding = discomfort & pain
- Over-padding = leg slipping

Other Existing Solutions

Improves on other existing solutions with:

1. Stability & control
2. Mobility
3. Ease of use

Results

**Component Testing**
- Top orientation best suited for track roller
- Withstand 140 lbs (V1 will test to 230.4 lbs)
- Comparing efficacy of single & double rail for ROM & interference with healthy leg

**Force to Pull Slider with Weights**

- Side
- Top 45 mm
- Top

Results for V1, V2, V3 to be obtained

**Component Testing:**
- Weight applied on top or side?
- Single or Double Rail?

**Verification Testing:**
- V1
  - Compression and Tension
- V2
  - Pressure Sensor
- V3
  - Hip ROM Testing in Gait Lab

**Solution**

**Weight on Top**

**Walker with Embedded Slider (Left leg use)**

**Features:**
- Non-weight-bearing
- Holds patient population’s weight
- Dynamic for walking
- Comfortable

**Component Testing**

- Weight applied on top or side?
- Single or Double Rail?

**Verification Testing**

- V1
  - Compression and Tension
- V2
  - Pressure Sensor
- V3
  - Hip ROM Testing in Gait Lab

**Constraints**

- **Size**
  - Fits any walker’s dimensions

- **Adjustable**
  - Fits any patient’s leg dimensions

- **Cost out-of-pocket**
  - Max Price: $230 (price of Kneeler)

- **Reversible**
  - Either leg (right or left side of walker)

- **Safety**
  - No falls/slips, boundaries for A-P motion

- **Ease of Use**
  - Easy assembly, attachable to any walker

**Requirements**

- **R1**
  - 168 - 230.4 lbs
  - Hold patient pop. weight

- **R2**
  - <4,400 Pa
  - Prevent pressure ulcers

- **R3**
  - No significant difference in Hip ROM

**Impact**

- Prevent further injury aggravation & hip atrophy
- Maintain mobility while walking
- Ease financial burden (TBD)

**Conclusion and Next Steps**

- Further component testing to determine # of rails
- Verification testing (V1, V2, V3)
- Cost analysis

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