**Thigh Walker:**
**Assistive Mobility Device for Pediatric Patients with Lower Limb Injuries**

**User and Problem**
- Children under the age of 7 are unable to use crutches due to underdeveloped motor coordination.
- Parents are required to carry around the child as the limb should not bear weight.

**Current Limitations**
- Crutches - not able to be used by the targeted age group.
- Walkers - inability to use stairs.

**Objective**
Create a device that is height adjustable, portable, lightweight, able to be used on different floor types and stairs, and able to bear the full weight of the user.

**Design Inputs**

**Constraints**
- **Device Weight**: < 6.56 lbs
- **Dimensions**: 61.7 x 44.2 x 23.6 cm
- **Knee Angle**: < 15°

**Requirements**
- **Friction**: \( \mu \geq 0.202 \)
- **Stair Ability**: 17.8 x 27.9 cm
- **Load**: > 515.47 N
- **Adjustability**: 100.1 - 130.7 cm

**Prototype**

**SC1**
- ¾" OD Metal Tubing
- Main Support of Device

**SC9**
- Adjustable Clamp
- ¾" Tube → 1" Tube

**SC6**
- 60° Bending Base Joint

**Verification/Validation**

**Friction Testing**
- Evaluate coefficient of friction at slippage.
- Two-tailed t-tests show \( \mu_s \neq 0.202 \).
- Confidence intervals infer \( \mu_s > 0.202 \).

**Geometric Modeling**
- Study human geometry required to traverse the stairs with a side swing.
- Make calculations and drawings by hand.
- Passing Criteria:
  - Forward hip angle < 120°
  - Side hip angle < 50°

**Component Load Bearing**
- Ensure device bears weight of children at various heights.
- Apply weight of child to test deformation.
- Passing Criteria:
  - No deformation at < 515.47 N

**Conclusion and Impact**
- Developed a novel device that allows kids with leg injuries to move on their own.
  - Restoring independence to children.
  - Reducing burden of caretakers.
  - Improving overall standard of health care.

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**References:**
[1] Loh et al., 2020