1. NEED: Retropulsion in Parkinson’s Patients leads to backward falls which result in severe injuries and economic burden. 

Objective: To create attachments for a standard walker to prevent backward falls and increase user’s stability.

2. DESIGN INPUTS:
   - R1: User Trunk Angle in backward direction ≤ 4.5°
   - R2: Harness Support Time for user > 1200ms
   - R3: Walker Tipping Index (walker’s likelihood to tip backwards when force is applied) between -1 to 0

\[ WTI = \frac{F_{vl} + F_{vr}}{F_{cl} + F_{zl} + G} \cdot \frac{H}{R_{gl}} \]

3. SOLUTION - BUILD
   - Video analyzed to determine user’s trunk angle and harness support time.
   - Series of images displaying constructed harness apparatus and use scenario.

4. Testing/Result
   - Test | Criteria | P/F
   - R1/R2 | User held at <4.5° for >1200ms | P
   - R3 | Prototype BTI Value in the Range -1 to 0 | P

5. Conclusion
   - Provide user with enough support to prevent backward falls.
   - Attachments are affordable and removable, walker can be folded for transport.

Impact: PD patients gain accessible device to aid mobility, increase confidence and reduce the economic and physical burden of falls.