# B.U.N.J.E.E.

## Balance Utility Navigational Joints with Elastic Expansion

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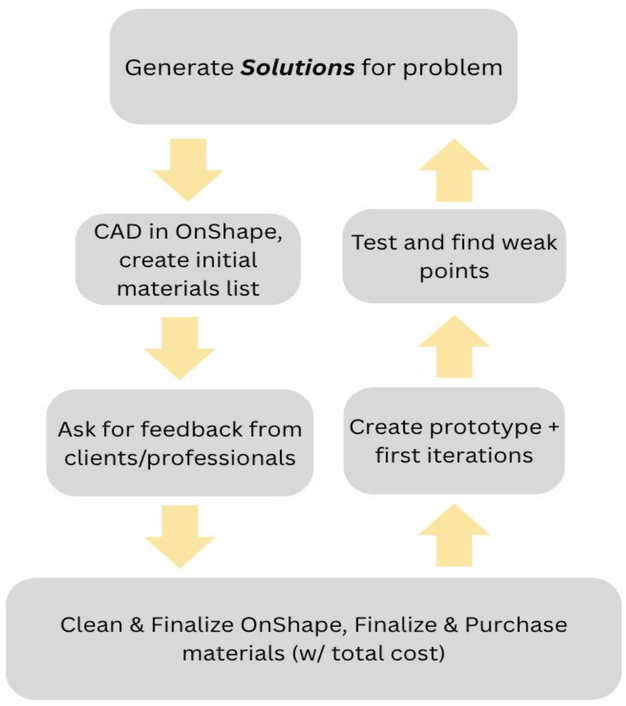
## Problem Statement

People who commonly experience **syncope/limited mobility** often need to rely on others to **stabilize** them (Vasovagal Syncope). If they faint, they might fall and injure themselves. In open areas, they cannot sit on a bench or lean against a wall, so the risk of suddenly feeling faint/weak cannot be avoided.

## Engineering Goal

Many **current designs** for personal seating/support, like a cane or chair, are **not easily portable**, leading to potential accidents due to their inaccessibility. The goal for this design is to create a **cane** that can contract to a **transportable size**, making it more accessible to bring around.

## Methodology

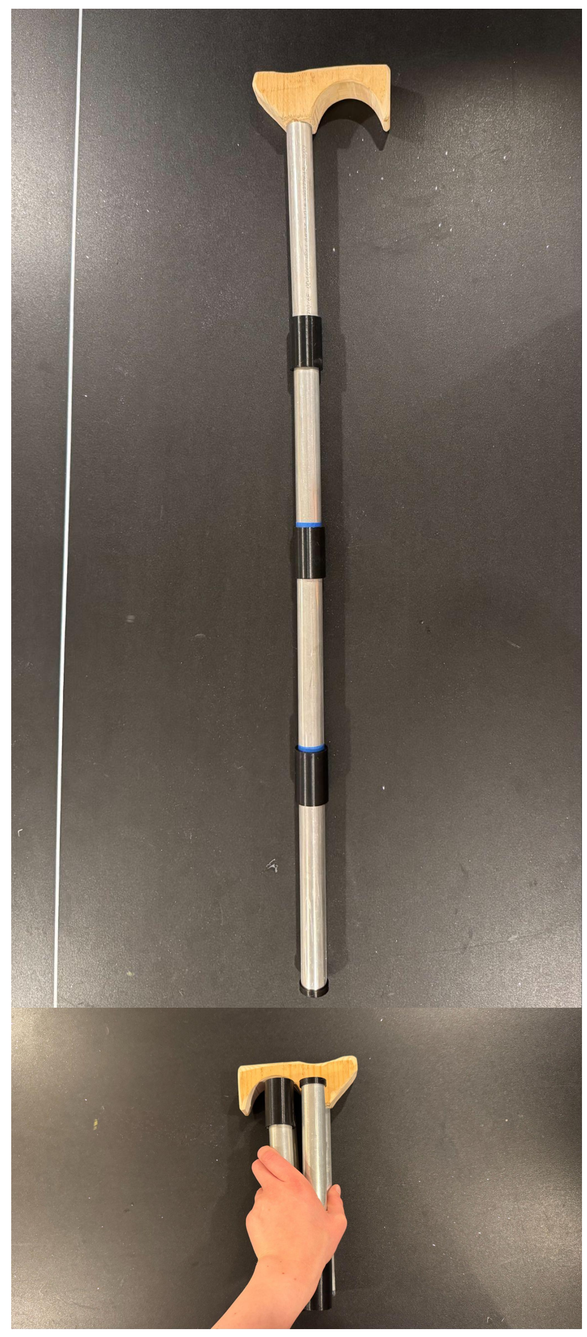



## Our Current Design

### B.U.N.J.E.E. V2

Why We **Chose** This Design:

- More stable than the telescoping cane (Design II)
- Easier to activate
- Simpler extended position locking
- Materials allowed for light weight without sacrificing height or stability



## Design I

### B.U.N.J.E.E. V1

Pros

- **Simple construction**
- **Modular design**
- **Rapid deployment (7s for 3 segments)**
- **Cost-effective**

Cons

- **Outside connectors don't perfectly fit into string connectors**
- **Wider than preferred when condensed**
- **Inconsistency in activation**

## Design II

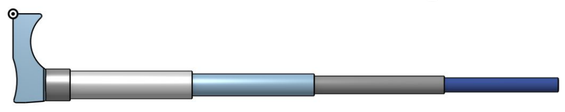
### TELESCOPIC CANE

Pros

- **Extremely small size what contracted**
- **Modular**
- **Customizable length while maintaining the form factor**

Cons

- **Release system has not yet been figured out**
- **Has more weak points and cannot support as much weight**



## Design Study I

### Consolidation Efficiency

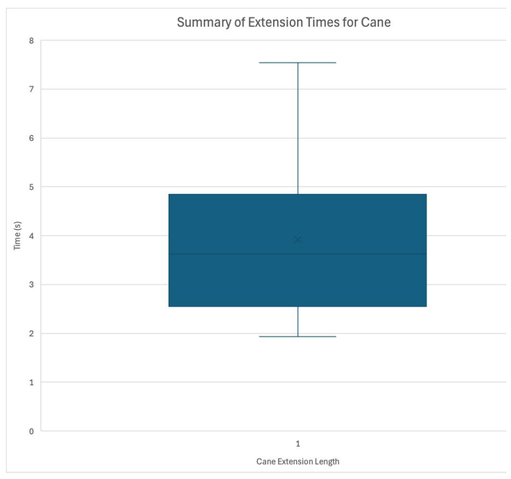
Purpose: To measure how **quickly the cane can extend**

IV: Starting config.

DV: Time to extend device

Findings:

**$T_{avg}$=3.91s**




## Design Study II

### Durability

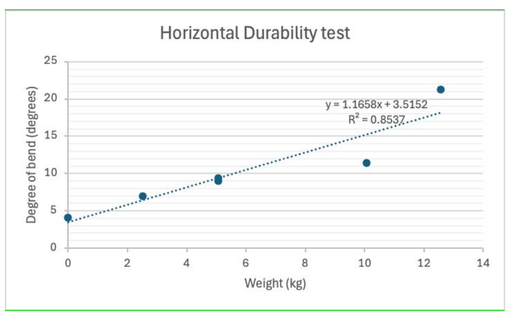
Purpose: To determine max **force** the device can withstand before deformation

IV: Applied force

DV: Deformation

Findings:

**$F_{max}$=128.4N**




## Design Study III

### Streamline Comfort

Purpose: To determine if the handle streamlined for **comfort**

IV: Handle Design

DV: User response

Findings:

1 - 0%

2 - 3.33%

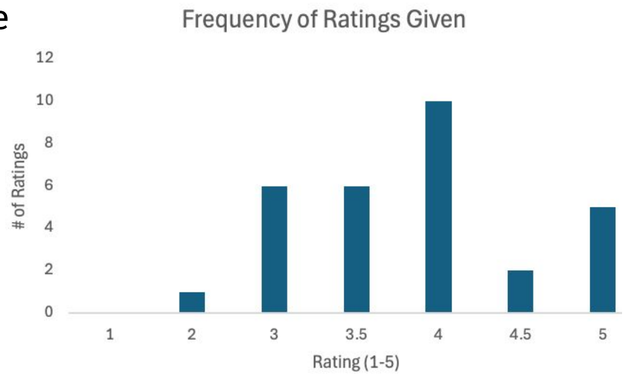
3 - 20%

3.5 - 20%

4 - 33.33%

4.5 - 6.67%

5 - 16.67%




## Conclusions & Future Work

- The device satisfies most of our criteria, but future work can allow for better fulfillment of these requirements
- Incorporate a locking method to keep the extended cane from deploying
- Add chamfers to guide segments together during deployment, therefore reducing extension time