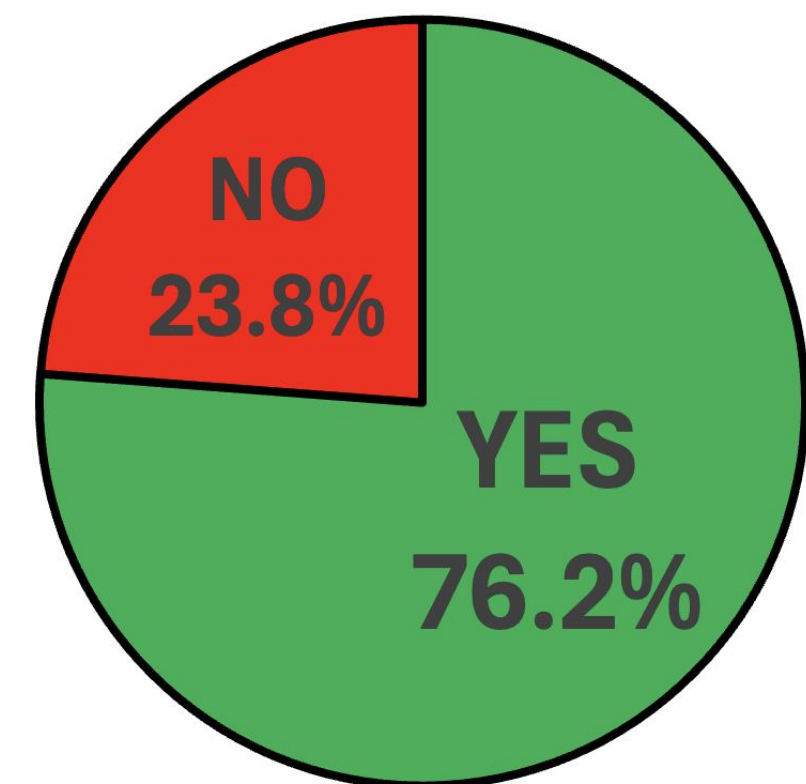


Motivation, Goal, Impact

- **Motivation:** Elderly struggle with bending down to pick up small items
- **Goal:** Make a device to pick up small items for easy retrieval
- **Impact:** Prevent elderly from worsening their pain

Survey: Does Bending Down to Pick Up Items Worsen Your Existing Pain?



Requirements

- Pick up small items (pills, keys, cards, soft food)
- Work on a variety of surfaces (carpet, wood floor, sand)
- Fully mechanical design
- Lightweight
- Compact and easy to store

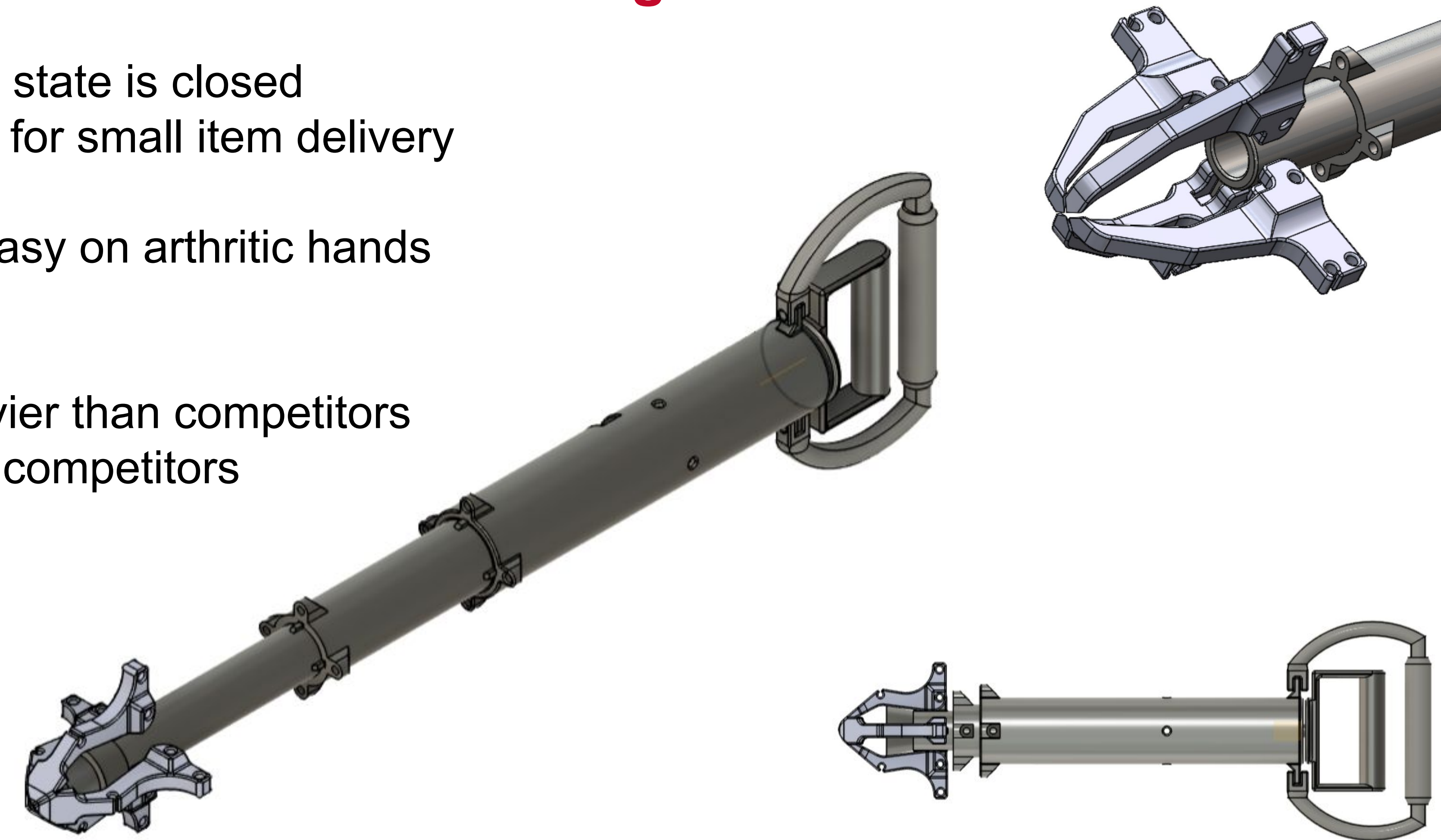
Pros

- Neutral claw state is closed
- Hollow shaft for small item delivery
- Retractable
- Material is easy on arthritic hands

Cons

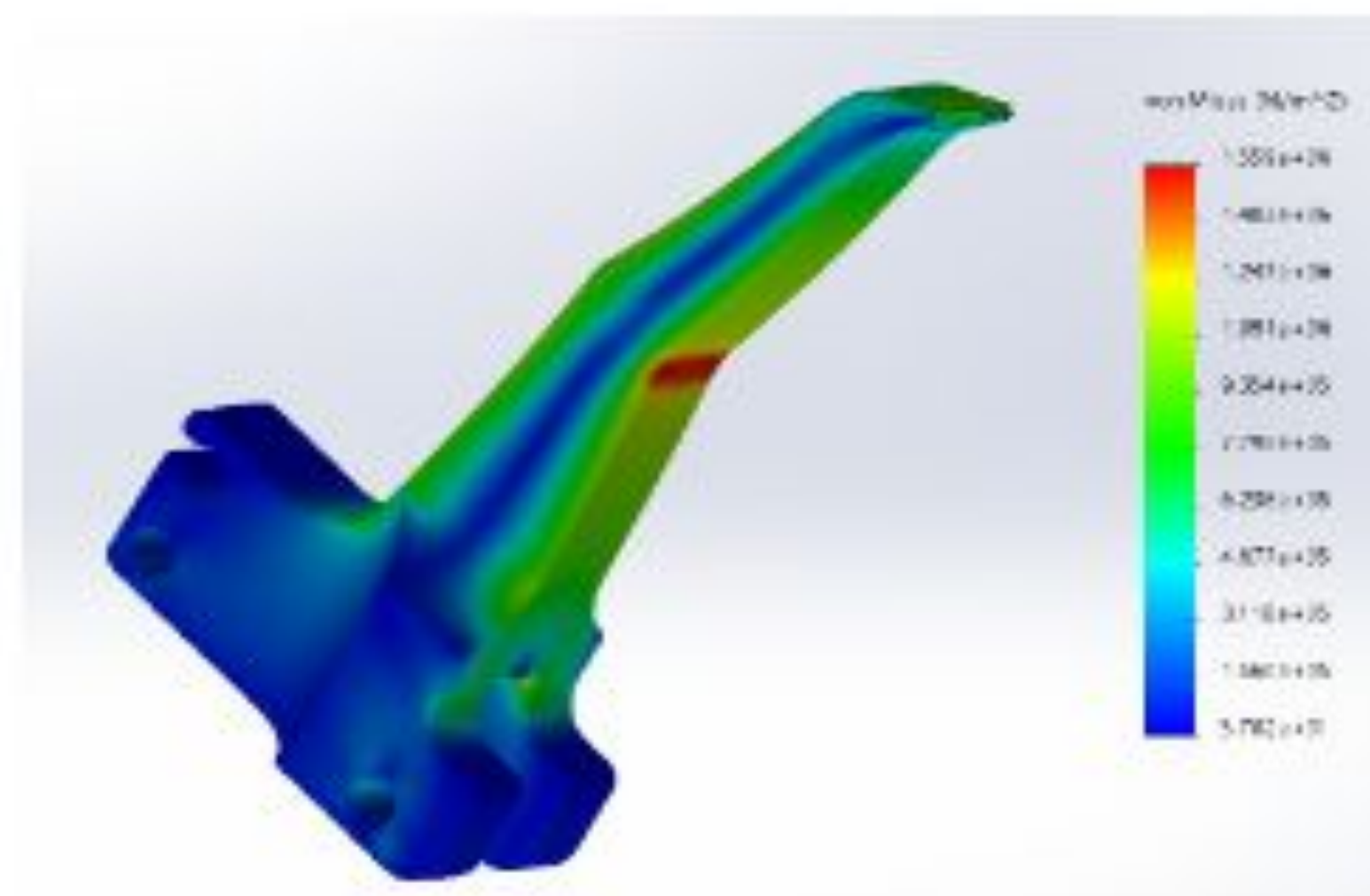
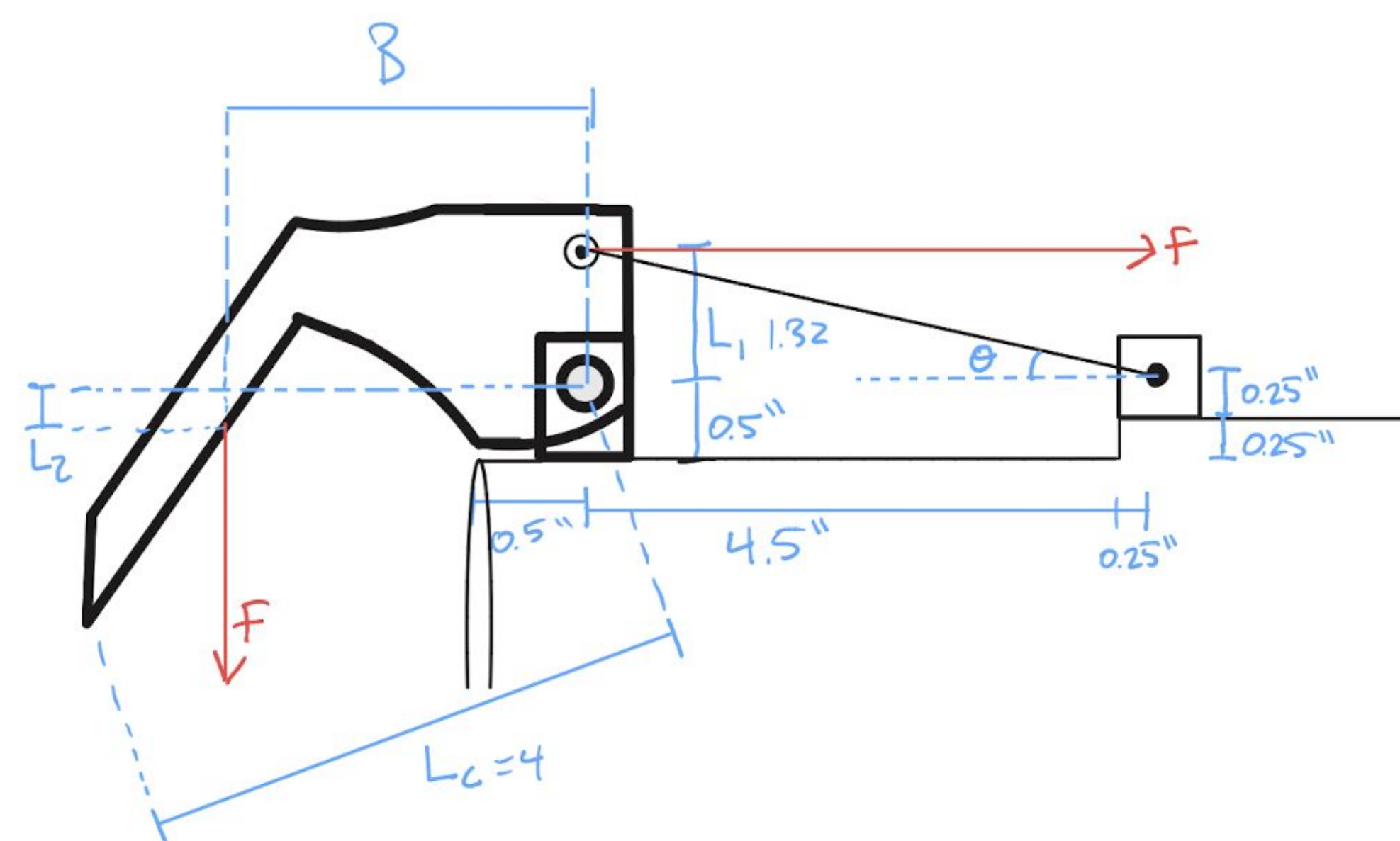
- Slightly heavier than competitors
- Bulkier than competitors

Final Design



Design Calculations & Decisions

- Our design decisions were based on two optimizations. The first minimizing moment arm to achieve general dimensions, the second being claw specific optimization. We also performed stress analysis on critical parts.



Prototype & Test Results



Testing outcomes

- Claw opens using handle
- Prototype can expand and retract
- Hollow shaft delivers pills closer to user
- All parts fit together and work cohesively
- FEA delivered outcomes and locations of pressure and weight on product (von Mises values)

Section View

- Showcases hollow shaft and housing that receives small items (pills) for delivery to user

