DEPARTMENT OF MECHANICAL ENGINEERING

TEAM C6

Ice Hockey Player Assistive Device

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Motivation, Goal, Impact

- Help build a device that helps young hockey players with disabilities get assistance with skating and playing hockey.
- Most users have Autism or Spina Bifida.
- Offers stable and comfortable support to kids to help them have fun being active.
- Device will also help the players improve their skating abilities.
- Partnering with Volunteers for Medical Engineering (VME), this design will be delivered to the Baltimore Saints, an organization for disabled youth hockey.
- There have been many designs, but they are uncomfortable, clunk, or don't provide enough support.

Requirements

- Adjustable for players of different heights, weights, and skill levels.
- Full setup and player entry/exit completed in under 5 minutes.
- Stable and safe with a 250-pound load with factor of safety.
- Durable to withstand at least 10–15 years of weekend use.
- Total material cost under $600.
- No sharp edges, pinch points, or tipping risk.
- Professional aesthetic with VME and UMD logos.
- One kid specifically asked for a speaker holder to listen to music

Final Design

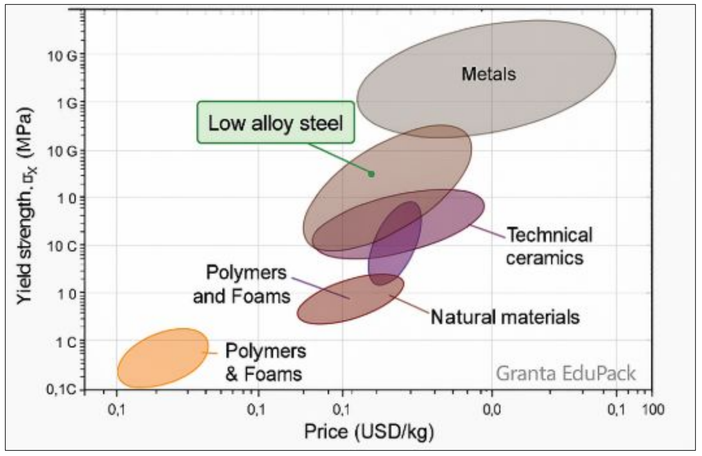
Design Calculations & Decisions

Frame:
- Able to hold large weights. Means less robust design
- Cheap Construction and material costs
- Open front for stick use and fast user swapping
- Closed back for reverse sitting with more arm support
- Minimal material at bottom for no skating interference

Gliding System:
- 4 caster wheels
- State of the art design choice
- Glides very well on and off the ice, makes storage easy

Support System:
- Swing seat-style mesh seat
- Comfortable and supportive seat (user approved)
- Deep seat for upper body support

Height Adjustment System:
- Pulley with crank system and carabiner clips
- Precise, reliable, and quick
- Carabiner clips for fast entry, exit, and pre-entry adjustment



Prototype & Test Results

Testing
- Frame and Seat Load Test:
  - Can withstand 300 lbs with no physical deformation
- Crank and Pulley Function Test:
  - Crank operates smoothly and locks securely at various heights, and seat remains level at various heights
- Caster Wheel Mobility Test:
  - Wheels roll freely and have the ability to fully lock
- Seat Entry and Exit Simulation:
  - Each entry and exit takes under 90 seconds

Outcome

We have a developed prototype that we will be delivering to the Baltimore Saints next season to help disabled children play ice hockey using our assistive device.

Future Work
- Making it universal and mass producible for other organizations to use.
- More feedback from coaches and kids on the successes and limitations of the design.