

# Feasibility, Functionality, and Design of Open-Source 3D Printed Pediatric Prosthetics

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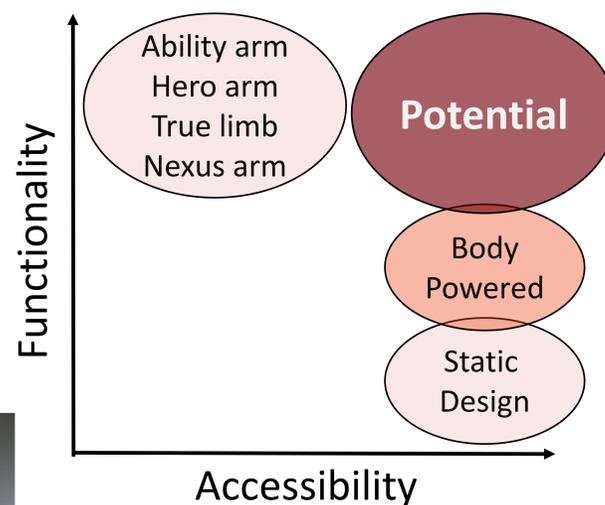
## Introduction

- **Types of prostheses**
  - Passive
  - Body powered
  - Externally powered
- **Conventional options for prostheses**
- **Open-source prosthetics: e-NABLE**
- **Hands Up Greenville (HUG)**
- **Demographics**
  - Upper extremity handicaps
  - Pediatrics
  - Low SES
- **Problem**
  - Functionality vs. accessibility
  - Usable time span in pediatrics
  - Emotional/psychosocial impact



## Aim

- **Open-source myoelectric arm**
  - Accessibility
    - Low-cost production- \$400
    - Free to patients
    - Adaptable to growing pediatric patients
    - Feasibility of repairs
  - High functionality
  - Repeatable process



## Methods

1. **Assembly**
  - Existing design available on eNABLE platform (EI Medallo model)
  - Adjust prosthesis parameters to fit patient arm using CAD software
  - Create arm using 3D printer
  - Integrate circuitry into prosthesis
2. **Comparison of Functionality**
  - Myoelectric prosthesis to be compared with wrist actuated designs
  - Considered metrics
    - Ability to grasp small, medium, large objects
    - Ease of use
    - Comfort
    - Cosmetics
3. **Increasing Accessibility**
  - Establish HUG's capability to offer myoelectric designs to community
  - Create compiled instruction manual with parts list, printing files, and code

## Conclusion and Next Steps

- 3D printed myoelectric arms offer the best opportunity for easily accessible, highly functional options for a vulnerable population of handicapped pediatrics.

Completed

Preparation of resources  
Parts list ordered

In Process

Printing, circuitry, assembly

Next Steps

Trial of capabilities  
Functional comparison  
Organizing resources

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Bionic Hand	Price Range (USD)
Hero Arm	\$10,000 to \$20,000
Ability Hand	\$20,000 to \$30,000
Atom Hand	\$50,000 plus
MyHand	\$10,000 to \$20,000
Vincent Evolution	\$30,000 to \$40,000
<b>EI Medallo (HUG)</b>	<b>\$400 or less</b>

