ASSISTED WALKING DEVICE

Team 3
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Project for Annalee Hughes
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Overview

- The Client
- Proposal
- Current Products
- Project Roadmap
- CAD Drawing
- Budget
- Status
The Client

- Annalee Hughes
  - 10 year old girl
  - Suffers from cerebral palsy
  - Back and leg muscles are underdeveloped
  - No protection reaction
  - Tends to lean forward and sit down when tiring
  - Cannot walk on her own
    - Legs tend to scissor when attempting to walk
Proposal

- Design a device that will correct her involuntary leg motions and teach normal gait.
  - Main focus will be on straightening the path of her leg swing while walking
  - Device must train her to walk short distances unassisted
  - Increase her muscle strength in the legs and back
  - Parts must be detachable to allow for increased independence as she learns to walk
On the Market

- **MKII Hart Walker**
  - Give support to user so they can move around under own power
  - Very complicated to mount
  - Not used as a training device
    - Doesn’t promote advancement in gait
  - Expensive!!!!
    - Approximately $11,000
On the Market Cont.

- The Drive Clever Walker
  - Wheels allow for motion in all directions
  - Seat allows a resting platform
  - Does not provide the leg structures necessary to correct her gait
  - No support for her body as she cannot support herself by her arms alone
Project Roadmap

1. **Start**
   - Determine Annalee's needs and limitations

2. **Develop project statement of purpose and specifications**

3. **Build parametric CAD model:**
   - Usability
   - Adjustability
   - Realizability
     - (Fabrication, Materials, Cost)

4. **Get input from family and physical trainer**

5. **Consult research, faculty, other authorities**

6. **Revise, refine CAD model**

7. **Build highly adjustable, standalone components:**
   - Arms (stability, comfort)
   - Legs (shape, strength, locking mechanism)
   - Walker Structure (stability, handling)
   - Electrical components

8. **Build full prototype**

9. **Build Final product**
Determine Annalee’s Needs and Limitations

- Clarify the clients’ expectations
  - overall quality of life goals
- Understand the client’s physical limitations
- Obtain information about the client’s current mobility equipment
Build parametric CAD model
Revise, Refine

- Adjustability is the number one priority
- Most incorporate all of the client’s limitations while maximizing abilities
- Realizability:
  - Manufacturing techniques
  - Material properties, cost, availability
  - Standardize everything
# Budget

## Non-Motorized Model

<table>
<thead>
<tr>
<th>Parts List</th>
<th>Estimated Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walker</td>
<td>$100.00 - $150.00</td>
</tr>
<tr>
<td>Aluminum Stock</td>
<td>$90.00 - $100.00</td>
</tr>
<tr>
<td>Sheet Metal</td>
<td>$100.00 - $150.00</td>
</tr>
<tr>
<td>Caster Wheels</td>
<td>$30.00 - $50.00</td>
</tr>
<tr>
<td>Neoprene Padding</td>
<td>$40.00 - $50.00</td>
</tr>
<tr>
<td>Velcro Straps</td>
<td>$25.00 - $40.00</td>
</tr>
<tr>
<td>Boot Support</td>
<td>$50.00 - $75.00</td>
</tr>
<tr>
<td>Elbow Rests and Handle Bars</td>
<td>$100.00 - $130.00</td>
</tr>
<tr>
<td>Misc. Hardware</td>
<td>$60.00 - $80.00</td>
</tr>
</tbody>
</table>

**Total** $805 - $1100

## Motorized Model

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<td>Misc. Hardware</td>
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<tr>
<td>Motors</td>
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<tr>
<td>Controlling Mechanism</td>
<td>$70.00 - $80.00</td>
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<tr>
<td>Leg Locking Mechanism</td>
<td>$150.00 - $200.00</td>
</tr>
</tbody>
</table>

**Total** $1269 - $1700
Where are we?
Where are we going?

Build parametric CAD model:
- Usability
- Adjustability
- Realizability
  (Fabrication, Materials, Cost)

Get input from family and physical trainer

Consult research, faculty, other authorities

Revise, refine CAD model

Build highly adjustable, standalone components:
- Arms (stability, comfort)
- Legs (shape, strength, locking mechanism)

Walker Structure (stability, handling)

Electrical components

Build full prototype

Build Final product
Where are we?
Where are we going?

- We have good, but still improving, knowledge of the client’s limitations.
- We have been providing the client with progress reports and integrating their suggestions to the CAD model via email.
- We are brainstorming alternate designs.
- We will meet with the client in two weeks to discuss designs and prototyping.
- We are researching gait disorders and CP development in children.
QUESTIONS?