**Automated Therapeutic Swing Design**

**BME 1920: Swing Kings**

Ahmed Alhamdani ● Jennifer Ferrari
Lance Harmer ● Taylor Heilig ● David Tes

---

**Background**

The purpose of this project is to design a swing that will provide comfort to a client who has the genetic disorder CDKL5. This device will also be beneficial for others with developmental disorders and conditions, and therefore is designed with people of varying ages, sizes, and dispositions in mind.

**Summary of User Needs**

- **Moderately priced**
- **Compact – possible outdoor use**
- **Supports adolescents of varying sizes and weights**
- **Comfortable and adjustable seat**
- **Adjustable swinging speeds**
- **Safe to leave a child alone while in use**

**Design Input Summary**

**Constraints**

- **Accommodating seat**
- **75 kg max user weight**
- **Contains appropriate safety features**
- **Structure is at maximum 1.8 m x 1.8 m x 2 m**
- **4-6 hours daily operation**

**Goals**

- **Cost below $2000**
- **Lightweight frame - no more than 100 kg**
- **Quiet - no more than 50 db**
- **Multiple swinging directions**
- **Conditioned for outdoor use**
- **Secondary power source**

---

**Design Concept**

---

**Design Specifications**

<table>
<thead>
<tr>
<th>Design Feature</th>
<th>Summary of Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame</td>
<td>Aluminum and Carbon Steel</td>
</tr>
<tr>
<td>Seat</td>
<td>Polyethylene</td>
</tr>
<tr>
<td>Support Bar</td>
<td>Aluminum</td>
</tr>
<tr>
<td>Motor</td>
<td>NEMA 17 Stepper Motor</td>
</tr>
<tr>
<td>Safety Features</td>
<td>5-point Harness</td>
</tr>
<tr>
<td>Power Source</td>
<td>Household Power</td>
</tr>
</tbody>
</table>

**Future Plans**

- **Create prototype**
- **Commence validation testing**
- **Remove excessive weight from beam thicknesses**
- **Re-evaluate design output**
- **Test in market**

**References**


---

Special Thanks to the Chandler family for this opportunity,
To Steven Patterson for his input and expertise,
And to Michele Grimm and Tonya Whitehead for their support.