Patient Positioning Aid
funded by RERC

TEAM 10:
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Overview

- Introduction
- Market Analysis
- Optimal Design
  - 5 Major Components
- Finished Prototype
- Testing
- Budget
- Conclusion
Statement of Need

Patients with disabilities require access to a variety of medical imaging technologies. Currently available patient positioning aids do not meet the needs of patients and hospital staff creating the need for an improved design.

Objectives:

- Design a low-cost, versatile, easy-to-adjust patient positioning aid.
- Compatible with CT scan and MRI imaging device
- Meet the needs of patients with a wide variety of disabilities
  - Obesity
  - Parkinson's Disease
  - Fragility
  - Muscle Weakness
Market Analysis:

- Foam Wedges
  - $150-400 per set
- VacLok
  - $150
- Wrap-around Coils
Optimal Design:
Major component 1: Base

- Transfer Board – PVC
  - 72” x 22” x 1/2”
- Foam padding
  - 70” x 16” x 1”

Anti-Flexion Component:
- Aluminum Side-Members
- PVC Cross-Members
Major Component 2: Arm Stabilizer

- Made from PVC sheet
- Includes Polyfoam padding with nylon cover
- Attached to board via the track system
- Supports arms - greatly reducing patient fatigue during the lengthy procedure
Major Component 3: Hand Bar

- Made of PVC with rubber grip
- Aids in separating arms from rest of body
- Increases patient comfort during exam
Major Component 4: Leg Stabilizer

- Base: made from PVC sheet and 2- 80/20 Aluminum extrusions
- Bar: made from HDPE
- Bar includes cushion for comfort and increased lower body stabilization
Major Component 5: Track System

- Composed of a bolt with a thin head that slides within a slot cut in the transfer board
- Knob on top will allow for the tightening of the arm/leg stabilizer to the board
- Loosening of the knob allows for quick and easy positioning from patient to patient
Storage of the Device:

- The device is easily stored in a limited amount of space once the components are removed.
- The board can be hung on the wall using two hooks.
  - Space required for hanging – 72”x22”x6”
- All detachable components fit into a space of 25” x 13” x 5.5”.
- These components can be placed in a convenient carrying case which keeps the components together at all time.
Finished Prototype:
Weight Testing:

- Board stability was tested with real-patient weight of 275 pounds
  - Minimal flexion experienced

- When tested with larger weights and more lifting aids – same minimal flexion was experienced
Limited Mobility Testing:

- Testing of simulated weakened arm strength and mild tremors demonstrated superior comfort and stability for extended periods of time.

- Similar testing was done with simulated limited leg movement as well as moderate tremors and same superior comfort and stability was experienced.
# Budget:

## Budget Allowance $2000.00

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
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<tbody>
<tr>
<td>Base for Position Table</td>
<td>$175.00</td>
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<tr>
<td>Foam Headrest</td>
<td>$80.00</td>
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<tr>
<td>T-foam</td>
<td>$16.00</td>
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<tr>
<td>HDPE rectangular bars</td>
<td>$55.00</td>
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<tr>
<td>PVC 1” Rod</td>
<td>$5.00</td>
</tr>
<tr>
<td>PVC 1” sheet</td>
<td>$25.00</td>
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<tr>
<td>PVC .75” sheet</td>
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<tr>
<td>Palm Grip Aluminum Knobs</td>
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<tr>
<td>80/20 Materials for Arm/Leg Stabilizer</td>
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<tr>
<td>Aluminum 6061 Aluminum Material</td>
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<tr>
<td>PVC 1” Square Rod</td>
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<tr>
<td>Velcro</td>
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<td>MSC Hardware</td>
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<td>Foam Pad for Patient Positioning Aid</td>
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<td>4 Aluminum Handles</td>
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<tr>
<td>Sticky Rulers</td>
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**Total** $1055.00

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<tr>
<td>Aluminum Carrying Case</td>
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<td>Two wall hooks</td>
<td>$18.00</td>
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</table>

**Total with storage** $1115.00
In Conclusion

Our design is:

- Cost effective
- Versatile:
  - works with wide variety of patients
  - compatible with imaging technologies
- Easy to store
- Easy to use
- Practical in clinical setting
Acknowledgments

- Dr. John Enderle
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- Quing Zhu
- Sandra Thomsen
Any Questions?