Patient Positioning Aid

Week #8
March 21st, 2006
Team 10: Andrew Harris, Bhavin Patel, Christen Thomsen, Ashley Reeners

Work Completed:

**Budget Allowance** | **$2000.00**
--- | ---
Base for Position Table | $175.00
Narrow Economy Polyfoam | $99.00
Foam Headrest | $80.00
T-foam | $32.00
PVC 0.75" Rods | $6.20
HDPE rectangular bars | $54.48
PVC 1" Rod | $10.70
PVC 1" sheet | $25.62
PVC .75" sheet | $19.22
Palm Grip Aluminum Knobs | $56.28
80/20 Materials for Arm/Leg Stabilizer | $235.00
Aluminum 6061 Aluminum Material | $45.04
PVC 1" Square Rod | $34.00
Velcro | $11.00
80/20 2- Single Flange Linear Bearings | $72.00
MSC Hardware | $99.76
Foam Pad for Patient Positioning Aid | $141.81
6 Aluminum Handles | $61.74

---

**Tentative Balance as of 3/14/06** | **$741.15 remaining**

This week we were able to get a lot of the components finished. We were able to get most of the positioning aid in working order; still a few things remain to be done. Bhavin disassembled the leg stabilizer since it was attached with all steel bolts. Then Bhavin took the 4 extrusions that the leg stabilizer slides up and down on to the machine shop and took 1.5 inches off. This was mainly due to the fact that we might face difficulties if we put the positioning aid into a MRI, or CT since they are circular with the maximum vertical clearance being less on the sides then in the center. Ashley took a
look at the MRI and CT equipment and we decided that 1.5” should be enough to allow the position aid to pass through the devices without any problems.

Also this week Ashley put in the order for a custom foam pad for the patient positioning aid. As a group we felt this customized pad would be a much better option that cutting and redimensioning the current foam pad we have. This pad will have the dimensions of 1” x 16” x 70”. Since the new pad will only be 70” long that gives us 2” in which to fixate the arm bar to the top of the positioning aid. The 16” is a much better width than the current 19” because there is 19” between the arm stabilizer bases to fit this pad without cutting it down and re-sewing it. If we had to sew it we felt it would not be as liquid proof as a custom made pad. The thickness of the pad is currently the same as the pad we have so that factor has not been changed. This pad should be arriving by hopefully next Monday so that we may secure it to the board using the velcro that we received Friday in lab. Also this week Ashley glued the blue polyfoam to both the arm stabilizer horizontal component and the HDPE leg stabilizer bars. The following figure is a digital image of Ashley doing this:

![Figure 1: Ashley Securing the Polyfoam](image-url)
Also during week 8 Christen was able to completely finish the arm stabilizer system. Christen was also able to finish tapping the arm rest so it could be attached to the rest of the stabilizer system (figure 2)

Figure 2: Tapping Arm Rest

Christen also completed the assembly of the arm stabilizers by swapping out the stainless steel hardware and replacing it with the aluminum. The following figure is a digital image of a completely assembled arm stabilizer:
In lab on Friday we also finalized an order for six handles. I had a lot of trouble with the salesperson from HandlesUnlimited and we finally found ones that would work from McMasterCarr. We ordered six aluminum handles with ¼” x 20 threads and they are 2 3/8” tall and 6” between the ends. We feel 6” is a good amount of room to accommodate the different sizes of staff’s hands and that a handle with more than 2” in height will hopefully diminish the risk of hitting your knuckles on the board and being able to fit your hand through the opening with ease.

In lab on Friday our whole group worked on cutting down and fileing the aluminum bolts and reassembling the arm and leg stabilizers. The following figure is a digital image of me assembling part of the leg stabilizer:
Towards the end of lab on Friday we had the arm stabilizers all put into place so I got up on the board and tested their positing capabilities (figure 5):
Figure 5: Testing the Positioning of Arm Stabilizers

By the end of lab on Friday our project looked nearly completed, with having the arm and leg stabilizers all attached and in working order (figure 6):

Figure 6: Arm and Leg Stabilizers Completed

On Monday Christen and I spent a few hours in the machine shop drilling holes in the transfer board for which we are going to bolt the aluminum flexion supports to (figure 7)
Future Work:

This coming week the aluminum side rails will continue to be put on the positioning board using silicon bronze bolts 6” apart down the entire length of the board. After this has been completed the PVC cross members can be attached using PVC glue.

Since both the leg and arm stabilizer components will be complete by midweek, we can do preliminary testing of our prototype simulating the disabilities that the patients have such as limited arm movement and leg movement and fragility in lab on Friday. Ashley will also look further into getting patients lined up to test our prototype for the weight capacity and ability to provide stability to those suffering from mild tremors. We are anticipating having a person around 250 pounds test out the board physically and then doing a 500 pound test using the theoretical body segment weights.

Also early next week when the new pad is received Drew and I will be able to secure it to the patient positioning aid as well as attach the aluminum handles to the
board. The silicon bronze parts should also be in by late this week or early next week and therefore we will be able to switch them out with the current steel components.

**Project Review:**

We are currently on time, we anticipate having a completed prototype by next Friday the 24th at the latest, which is right on track with the projected timeline for our project. We are just awaiting the last few ordered parts once received we will be able to attach them quickly and begin making changes to our design if the testing proves them necessary.

**Hours Worked:**

Ashley – 10 hours  
Bhavin – 12 hours  
Drew – 10 hours  
Christen – 11 hours