During the 10th week of senior design we are virtually finished with the patient positioning aid. Bhavin was able to sand down the pieces of the handbar so that they fit 90 degrees with each other and rested flat on the transfer table. Ashley and Bhavin glued the pieced together and let them dry overnight. We drilled and tapped the handbar after which we made corresponding holes on the transfer board. Figure 1 Shows the drilling of the handbar.
Figures 2 and 3 shows Drew and Bhavin holding the transfer board while Christen uses the drill press to make the holes.
We counter sunk the holes and attached the handbar to the board using the brass screws. Figure 4 shows us attaching the handbar to the board.
We were also able to finish the attachment of cross members to the system. Last week we only had the side aluminum bars attached but this week we finished it completely. Figure 5 displays Chris attaching the cross members.

Figure 5: Attachment of Cross Members

After we finished the cross members we attached each of the other component. Once we had the leg and arm stabilizers secured we started preliminary testing of the device. Drew got onto the positioning aid so we could analyze the components. Figure 6 displays him on the aid.
The leg stabilizers and the handbar work great. The leg stabilizers provide comfort while immobilizing the patient at the same time. They do not cut off circulation or make the patient's legs numb. Figure 7 shows his legs strapped in. The handbar works the way we hoped it would and take the hands away from the body. Figure 8 displays this.
The only component that didn’t work the way we had hoped was the arm stabilizer. We initially intended it to hold down the arms from the body’s natural response. Instead we turned them around and decided that it would be easier on the patient if they supported the arms allowing the patient to rest and remove any strain that may accumulate. The following images show the change.

**Figure 9:** Original design  
**Figure 10:** Change in Design

We noticed that the patient can get injured if they turn their head left or right by the PVCs sharp edges so we decided to put some polyfoam as a safety device. Figure 11 shows the attachment.
Figure 11: Attachment of Polyfoam

We took apart the positioning aid in order to round all the other corners for safety. Chris used the router and rounded the Board and all the attachments. Figure 12 shows him rounding them.

Figure 12: Rounding Corners of Board

Chris took the board into the machine shop and elongated the slots for the arm stabilizer. He milled them 3 inches longer to allow for a longer range of motion. Figure 13 shows the new slots.
Ashley worked on obtaining individuals with similar disabilities like our theoretical patients we are designing this aid for. She made up a flyer and posted it around campus with hopes of obtaining volunteers for our study.

Ashley focused primarily on the storage of the device and was going to purchase two hooks from Sears to attach to the wall that would support the board in the horizontal position with none of the attachments on it accept the hand bar which will not be removed from the board at any time. The hook can be seen in the figure 14 below and they are moderately priced and able to hold up to 50lbs, which our board does not weigh more than 50lbs.
The last component of storage that Ashley was obtaining prices for was a storage case for all of the attachments when they are not in use. These however, can be very pricey and she wanted to see how important the storage ability of the device is in the competition because if it’s not a big factor on who wins, we may just scrap the idea to save money. The following are options she was considering for storing the various attachments:

This case can be found on the website: [http://www.scscases.com/store/Storm-iM2700-P11056C3119.aspx](http://www.scscases.com/store/Storm-iM2700-P11056C3119.aspx) and is $124.00 which included the foam inside or $104.00 without the foam inside the case. The dimensions of this case are 22" x 17" x 8".
This case can be found on the website:

http://beaconww.com/pages/detail.las?lumCheckedFlag=&recordID=33712&subcat0=Gun&subcat=Guardforce&subcat2=Rifle-Shotgun%20Case&logo=beacon&-nothing and is $62.95 and available in a solid black exterior not the camouflage as pictured above. The dimensions of this box are 13.375” x 31.5” x 5” (L x W x H).

Future Work:

For this week we have a few minor things left to do. We would like to just glue some foam padding along the edges of the board to aid in comfort of lifting. Along with this we would like to add a label by the hand bar stating not to lift the board using the hand bar. This week our new pad should arrive although this is not crucial to our design. When it arrives we will attach it using Velcro so it can be taken off easily for cleaning. We will also make a final decision on the storage aspect of our design.

We hope to get some responses to our flyers that we posted for individuals with disabilities similar to that of our “made-up” patients. Although we are going to mimic the disabilities with members of our team, we feel that having actual people with the
disabilities is the best way to be sure the design is fully function and can accommodate their additional needs.

Project Overview:

Currently, we are still on track to finish the device in time. No emergency actions are required to finish on time. The device is virtually finished and testing is in process.

Hours Worked:

Andrew: 8 hours
Ashley: 11 hours
Bhavin: 9 hours
Christen: 10 hours