Kelly Valentine
Team 3

**Week 3 Progress Report**

Prior to last week’s meeting on Monday, Caitlin and I met with Sean’s physical therapist, JR, to discuss the concerns the neurologist had with the assistive jumping device. We brought the harness system with the waist support to give him a good visualization of what the support system entailed. After verifying a few things, JR supported our plan and thought the AJD would work for Sean. He, as well as the other physical therapists in the practice, felt that Sean might actually need more head support depending on how Sean reacts to jumping.

With JR’s approval, I contacted Mrs. Stenglein to discuss future plans. I explained our meeting with JR and the family consented to continue with the design as planned. The family also did not find it necessary to contact the neurologist, or any other doctor, to determine why there would be a recommendation for no head support.

We also decided that it would be beneficial to test Sean’s jumping ability as we continue to build the AJD. Throughout the week I contacted friends and family to find a mini-trampoline (aerobics size) to test with Sean as he is connected to his lite gait walking system. I was finally able to find one, thanks to the Bruno family. The team will meet with the family this Friday to test Sean’s jumping.

With that complete, I was able to help Caitlin with the seat and waist harness system. At the start of the week, the bottom of the Tumble Forms seat had been removed to modify the harness. The exposed seating was covered temporarily with duct tape to smooth the surface and clean up the loose ends as shown below.

![Figure 1: Seat Harness at the Start of Week 3](image)

The mission for the week was to develop a way for the waist harness to attach safely and securely to the seat. Since Sean’s upper body is supported to the chair with the seat’s straps, Caitlin and I were able to remove the extra seatbelt straps from the bottom of the seat. With the removed seatbelt material, we were able to 6 inch pieces. Superglue was then applied to the ends in order to prevent fraying from occurring. The looped seatbelt has a buckle at the end.
that will click into the chest support. There are already adjustable straps on the right side of the chest support harness. Since the seatbelt is a single unit that carries through the back of the chair to the other side, the single sided adjustability will be enough to control both sides of the chest system. These are currently duct taped into place. The plan is to sew these together. The extra seatbelt at the bottom of the clips wraps around the waist harness. This finally connects the chest support to the waist support.

![Figure 2: Chest Support Buckles Reattached](image)

Once the chest support was reattached to the system, Caitlin and I continued on to work on how to attach the waist support to the seat. When we originally received the climbing harness, we thought we could use the two loops that were on the back. However, after consulting with Dave, we found out that these were only utility loops to attach possible tools needed while climbing and that they were unable to support a load. Unsure of what to do from here, I went to Eastern Mountain Sports (EMS) in West Hartford to talk with a climbing associate specialist. I explained the situation we were in and the details of the project. In return, I received a pretty detailed lesson on climbing equipment and support needed while climbing. He also recommended that the best way to attach the harness to the chair would be with two carabineers looped over the entire back strap of the harness.

On Friday, Caitlin and I went to the EMS in Manchester to purchase two carabineers. We again talked it over with the employee and he taught us how to read the codes on the carabiner to find the best possible choice. The two carabineers would be attached to the back of the waist harness. From there, they will clip onto the upper sides of the seat with a previously bolted buckle system and are then wrapped around the loops of the chair. There is a clip provided from the seat that locks the seatbelt into place. The clips also allow for height adjustment to Sean’s waist location on the seat and to provide for growth.
With the straps readjusted, we wanted to test the comfort level of the seat. Since Caitlin and Blaine did not even close fit into the seat, I volunteered to attempt to test the comfort of the seat. This kind of worked, I didn’t exactly fit into the seat but we were able to get a rough idea of how the seat felt. The seat was heavy on my back, which could potentially become a problem (we might need to add bungee cords to help lessen the load), and I could feel the carabineers on my back, even without fully fitting against the back. We decided that the carabineers needed to be padded as well as the waist harness against the thighs by request of Mrs. Stenglein and myself after wearing it. I refuse to put the picture of myself during the comfort test on this report as Caitlin has in hers.

Friday afternoon, Caitlin and I also went to JoAnn’s Fabrics in Manchester to check out some options for reupholstering the bottom of the seat and padding choices. We consulted with the fabric specialist and were able to find a silver vinyl fabric that could be used to cover the seat. Aerosol superglue was also bought that worked with vinyl adhesion as a possibility to attach the silver vinyl to the seat. While there, we tried to find some options to pad the carabineers and the straps. The best option was two packs of shoulder pads in different sizes. We found larger, more padded pads for the waist strapping and a smaller sized pad for the carabineers. These could just be sewed into place. Taping the ends of the pad together in the location it will be sewed tested the padded thigh area.
However, the smaller pads would not be strong enough to hold the carabineers in place along the back of the harness. To solve this problem, Caitlin and I cut four, 3-inch straps of leftover seatbelt and glued the ends to prevent fraying. These would be sewed onto the harness to create a pocket for the carabineer to clip into and to prevent from sliding across the back of the harness while jumping. The shoulder pads would then be sewed over the exposed clip where Sean would come into contact to. Figure 5 shows the strapping laid out as this still needs to be sewed.

This upcoming week, the sewing of the pockets, padding, and harness will need to be completed. Since the team does not know how to sew, we are going to consult with someone that can help. Hopefully this will be complete by our meeting with the Stengleins on Friday so that Sean can test the completed harness system out for comfort and size. Also during this meeting, Sean will finally be able to jump on the mini trampoline. This will help us determine any final adjustments that may be needed on the entire harness system including the possible addition of more head support. I will also continue to look up the possible addition of bungee cords to decrease the weight of the seat while Sean jumps. The team also needs to find a way to connect the vertical rail to the back of the seat.
The travel computer mount was completed this week. The family is extremely looking forward to receiving it during the meeting on Friday. As the family uses the mount, they will be able to test it out and the team will then have the chance to fix any problems that might arise.

Hours Worked Week 3: 12 hours