

Spider Cage to Support Cerebral Palsy Patient

Client: Mr. Matt Jahnke - mattjahnke@ucpdane.org

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Team: Kevin Collins - kdcollins2@wisc.edu (Team Leader)

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Date: February 8th - February 14th, 2017

Problem Statement:

A spider cage is a device used by therapists to work with individuals (usually children) who have cerebral palsy. The cage supports the patient's weight with the use of bungee cords that are connected to a custom suit that allows the patient to work on building leg and arm strength. This product is available commercially but it is quite expensive. The client is looking for a design that is relatively inexpensive, transportable via trailer, able to fit through a standard doorway, and customized to meet the needs of one particular person.

Last Week's Goals

- Submit harness and bungee research to Matt
- Reassemble top of cage
- Work on presentation and report

Summary of Team Role Accomplishments

- *Leader* - Sent progress report to TA, client, and advisor.
- *BWIG* - Updated website and uploaded presentation
- *BSAC* - No meeting attended.

- *Communicator* - Sent harness and bungee research to Matt
- *BPAG* - Received funding approval for base

Summary of Accomplishments:

This week the team was able to reassemble the top of the cage in sections as originally designed for portability. The team also came up with an initial hypothesis for the cage performance. Harness research was compiled by the team and then sent to Matt and Amanda for their review. The team also worked on the BME Presentation and the individual presentations.

Activities

Date	Person	Task	Time (hrs)	Weekly Total	Semester Total
2/9/17	Team	Put top back on cage	0.5	0.5	5
	Kevin				4
2/9/17	Darcy	Consolidated harness and bungee cord recommendations for Matt	1	1	6
2/10/17	Sheetal	Outlined preliminary journal	0.5		
2/12/17		Researched example journals	0.5		
2/12/17 - 2/13/17		Worked on preliminary journal	1	2	6
2/8/17	Breanna	Created PowerPoint presentation	1		

2/10/17		Outlined journal article	0.5		
2/13/17		Worked on journal	0.5	2	8.5
2/9/17	Stephen	Begin setup for mesh deflection testing	1	2	8
2/14/17		Worked on individual presentation	1		

Team Goals

- Buy base and rubber flooring.
- Attach base.
- Do deflection testing for hypothesis.

Individual Goals

- *Kevin:* Work on journal and presentation. Buy base material for cage. Work on deflection testing
- *Darcy:* Work on presentation, modeling cage with fastening in SolidWorks
- *Sheetal:* Work on presentation and continue working on journal
- *Breanna:* Continue working on journal article
- *Stephen:* Buy material for base. Work on deflection testing. Work on journal

Project Timeline

Task	January	February	March	April	May											
	19	25	2	9	16	23	2	9	16	23	30	6	13	20	27	4
Project R&D																
Base Support	X	X														
Padding																
Assembly Tools																
Fabrication																
Order Materials																
Create Fastener Hole		X														
Trim Mesh																
Base Support																
Padding																
Assembly Tools																
Testing																
Exercise Simulation																
Force/Stiffness Calculations																
Assembly Directions																
Redesign																
Deliverables																
Progress Report	X	X	X	X												
Individual Presentation				X												
Preliminary Presentation				X												
Preliminary Deliverables				X												
Poster																
Final Deliverables																
Meetings																
Advisor	X		X													
Client			X													
Team	X	X	X	X												
Website																
Update	X	X	X	X												
Colored Cells: Projected Timeline																
X: Completed Tasks																

Expenses

- Fall 2016: Total cost of materials: \$1,702.75
- Spring 2017: No expenses at this time

ME Technical Section

After assembling the spider cage, the team noticed that the two sides of the cage were capable of splaying or sliding unevenly when a horizontal force was applied to the front vertical members. Figure 1 points out the two main areas of concern for splaying as they are not attached horizontally.

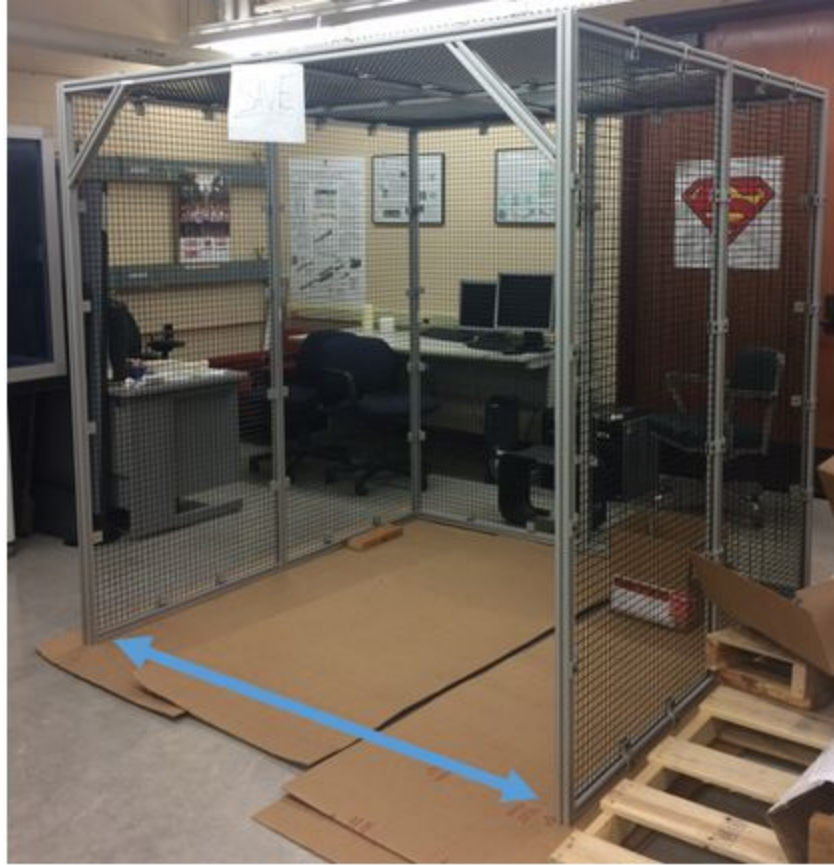


Figure 1: The spider cage without the base support attached.

The team has decided to attach a plywood board to the bottom of the cage to act as a base support. Adding a base support will reinforce the sides of the cage and prevent them from moving or splaying as force is applied in a horizontal direction. The entire weight of the cage will be on the section of plywood which should also prevent it from tipping forward. With the addition of plywood to the base, there needs to be material placed over it to prevent splinters, cover the screws, and other safety precautions. The team considered placing a rubber mat, or several connecting rubber pieces on top of the plywood to address the safety of the patient and therapist. After client input, it was decided to use one inch connecting rubber floor pieces to cover the plywood as it is already a material used in the facility.

Written by: Kevin Collins

Reviewed by: Breanna Hagerty