WEEKLY SPONSOR COMMUNICATION

TO:	VICTOR NUNEZ, AESCULAP
FROM:	CASSIE CHRISTMAN
EDITOR:	ALEXIS HAUPT
TEAM NAME AND NUMBER:	AESCULAP 1
DATES COVERED IN THIS COMMUNICATION:	MAY 2, 2016 TO MAY 8, 2016
WEEK NUMBER:	12 OF 12

Overview

Since we determined the distraction method for our distractor last week, we were able to make considerable progress on the other components of our distractor this week. After discussing the possible designs for the impaction handle, the ratchet system, the measurement system, and the paddle connect system, we selected the designs that are detailed below. We also generated 2D and 3D sketches of our complete final design.

Accomplishments

Our meetings this week focused primarily on debating the designs for: the impaction handle, the ratchet system, the measurement system, and the paddle connect system. The ideas we decided to pursue for each component are explained below:

- Impaction Handle: We chose Christian's "Impaction Handle Attachment Idea 2," displayed in Appendix A, for the impaction handle but made minor modifications to the design. The impaction handle will still be placed inside the handles of the distractor, but the handles will have a knob/step on them that the impaction handle will rest upon. These knobs/steps will prevent the impaction handle from sliding towards the distractor as the surgeon hammers on the impaction handle.

- Ratchet System: We decided on the Brian's ratchet system idea that functions similarly to a socket wrench. In this design, a gear with teeth is attached to the upper section of the top handle. The teeth are designed in such a way that movement in one direction has minimal resistance to the lever attached to the bottom handle, but prevents movement in the opposite direction. In order to move in the opposite direction and therefore reset the paddles, the inside lever is released from between the gear teeth by the surgeon pulling on an external lever. The sketch of this design is shown in Appendix B.

- Measurement System: The measurement system will consist of a bar on the inside of the handles, which will be fixed at one handle and has a roller on the other. As the surgeon distracts the spine, the handles close,

pushing the rolling end down the handle and along teeth-like grooves. Once we determine the relationship between the distracted height and the distance between grooves, we will be able to create an accurate measurement system which the surgeon can use to determine the distracted height based on which groove the bar is located in. The measurement system can be seen in the full design of the distractor in Exhibits 3 and 4.

- Paddle Connect System: For the paddle connect system, we developed a new idea that is similar to a coaxial cable. The end of the distractor where the paddles connect is a solid cylinder with a square cutout in the center. The portion of the paddle which connects to the distractor is also a solid cylinder but has an extruded square extending out the back. The surface of the paddle's cylindrical part is threaded. When the extruded square on the paddle is inserted into the cutout in the distractor, an internally threaded sheath on the distractor can be slid towards the paddle and tightened onto the threaded portion of the paddle. This quick connect design both secures the paddle to the distractor through the threaded sheath and prevents any twisting motion of the paddle should the paddle not be inserted completely parallel to the vertebrae through the tight-fitting squares inside the distractor and paddle ends. This design is illustrated in Exhibit 1.

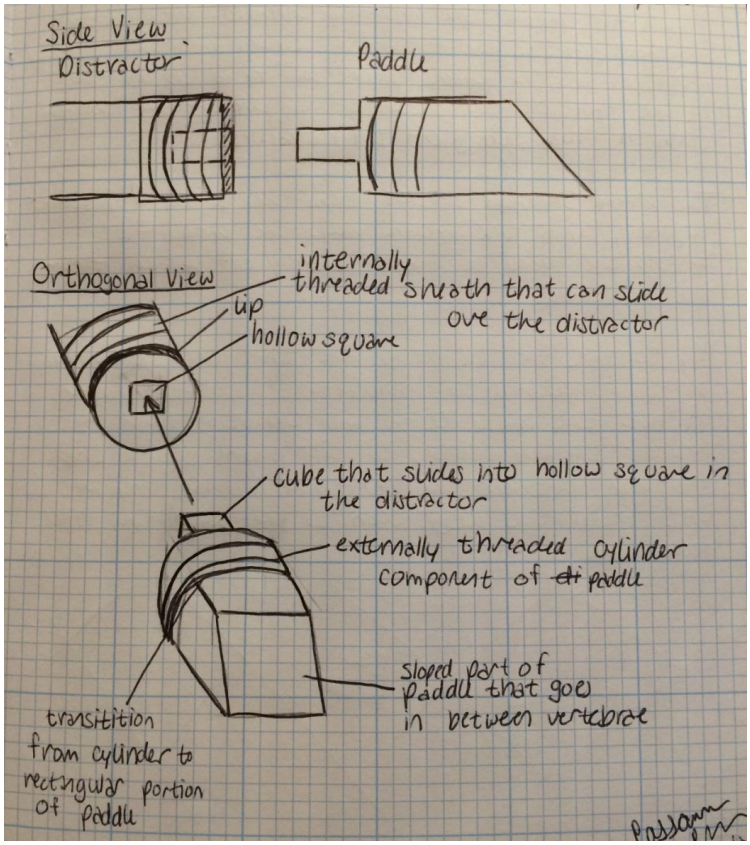


Exhibit 1- Paddle Connect System Sketch

The sketches below display the different components combined to form the complete version of our distractor. Exhibit 2 illustrates a 2D side view sketch done by Christian. Exhibit 3 depicts a 3D drawing of the distractor in the closed position, and Exhibit 4 portrays the distractor when it is an open position.

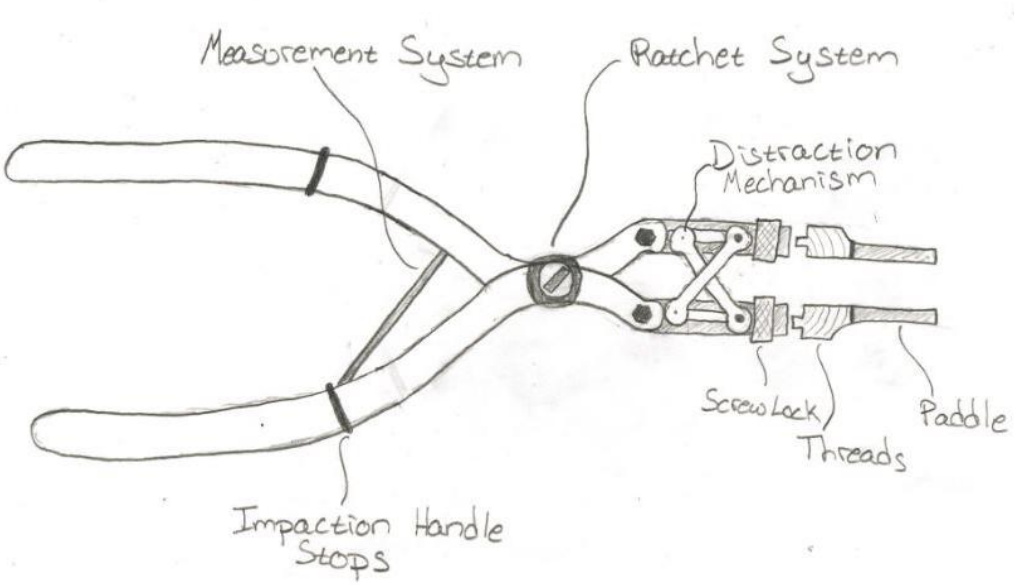


Exhibit 2- 2D Side View of Final Distraction Design

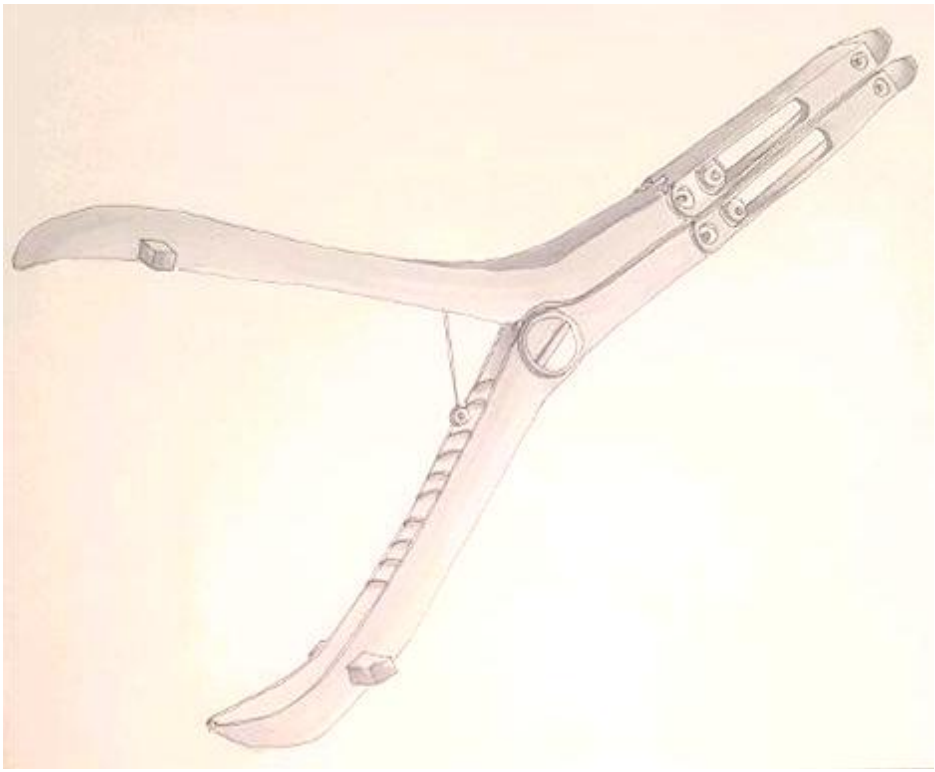


Exhibit 3- 3D Model of Final Distraction Design in Closed Position

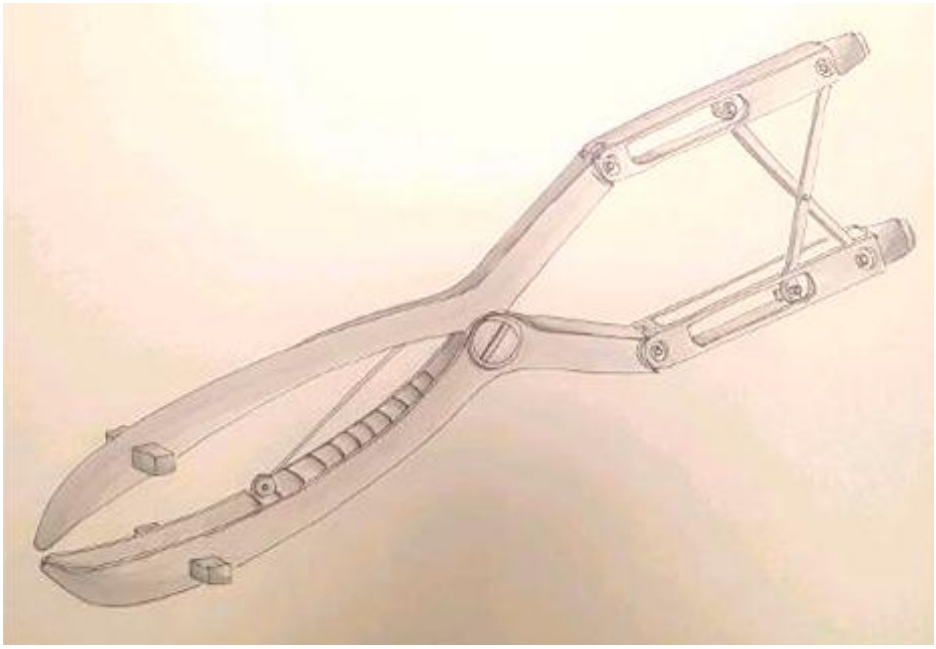
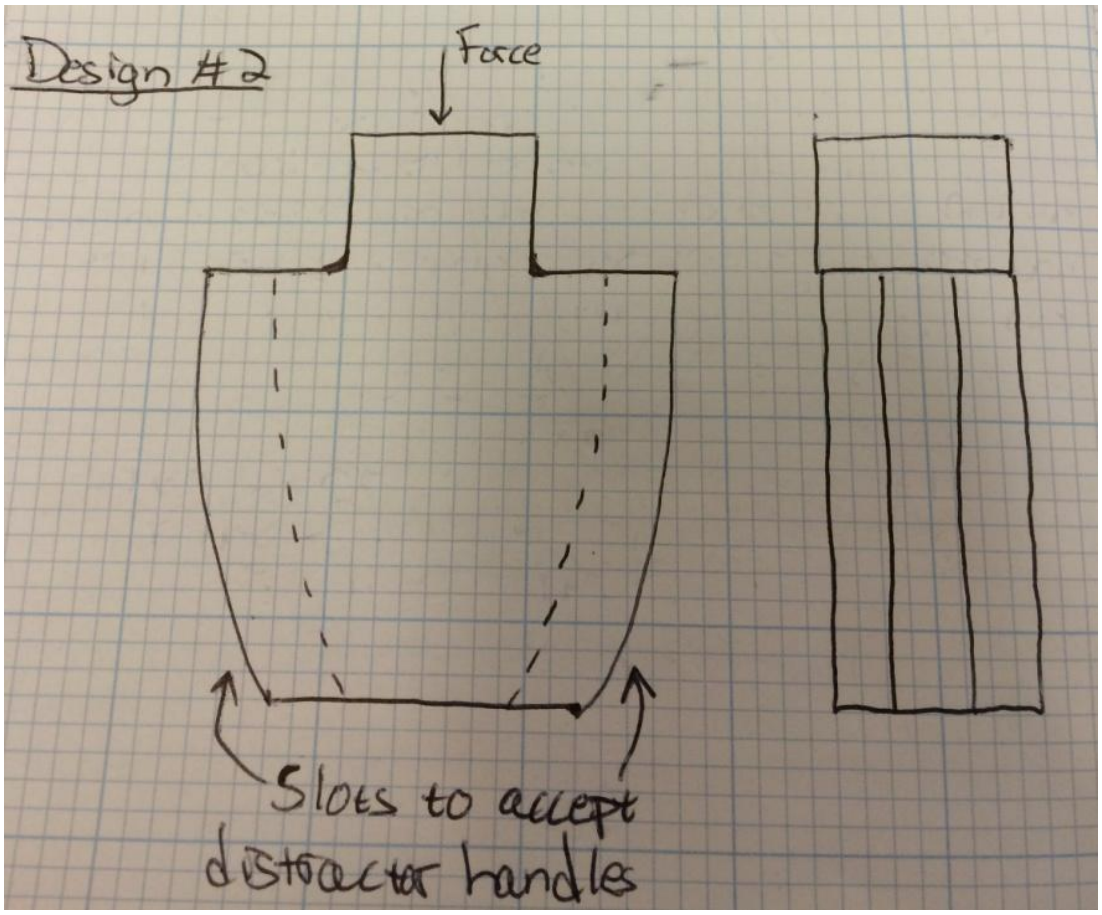


Exhibit 4- 3D Model of Final Distraction Design in Opened Position

Next Steps

1. For our final presentation, we wish to have "looks like" and "works like" mockups for all components of the final design of our distractor. Therefore, we will continue sketching and 3D modeling the designs detailed above.
2. We will continue making progress on our final presentation and our other final deliverables, which include graphical and written summaries of the work we have done this semester and financial analysis of our distractor.

<u>Appendix A</u>: Impaction Handle Design



<u>Appendix B:</u> Ratchet System Sketch