LEHIGH UNIVERSITY

IPD INTEGRATED PRODUCT DEVELOPMENT

WEEKLY SPONSOR COMMUNICATION

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DATES COVERED IN THIS COMMUNICATION:	OCTOBER 25, 2016 TO NOVEMBER 1, 2016
WEEK NUMBER:	9 OF 15

Overview

This week we continued refining the CAD model by incorporating the proper connection systems and designing the different paddle sizes. Additionally, the team generated several potential impaction handle alternations to enable it to be used at any stage in the surgery.

Accomplishments

1. Based on the feedback you gave us this week, we have chosen ball plungers as the main component of the quick connect system. These will be easier to fabricate and implement than spring clips. Christian then updated the CAD model to reflect these changes. Exhibit 1 shows the ball plungers on the end of the distracter arm and Exhibit 2 displays the holes for the balls inside a paddle. Note that these reflect the proper geometry but do not yet have springs to make them functional.

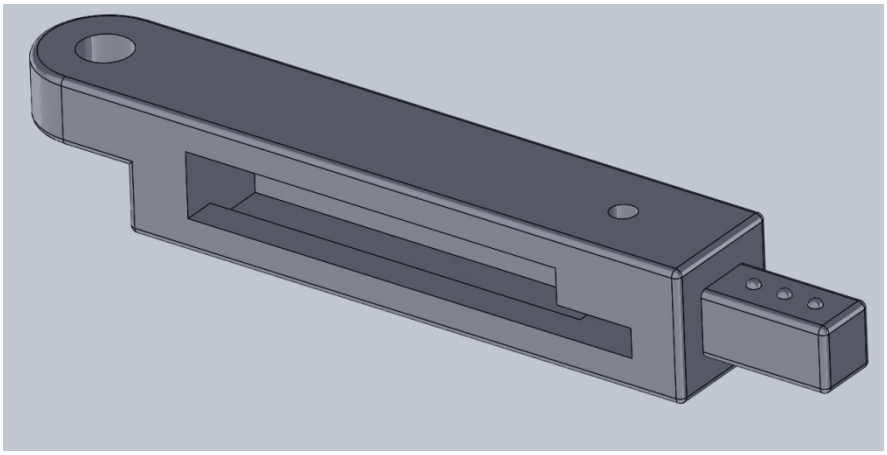

Exhibit 1 - Ball Plunger Quick-Connect System CAD Model for Distractor End

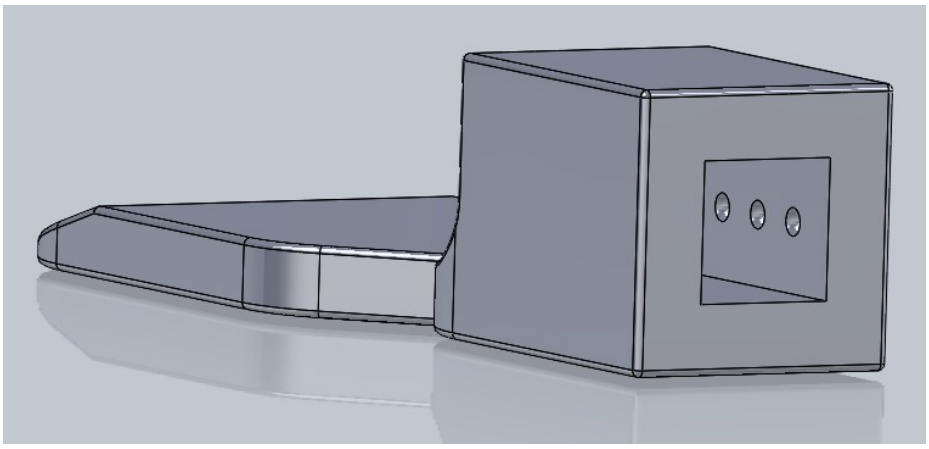

Exhibit 2 - Ball Plunger Quick-Connect System CAD Model for Distractor End

2. Cassie redid the paddle design so that they are easier to edit and analyze in an FEA. She also created four configurations using a design table to account for the variability in the size of patients' vertebrae.

3. Our current design for an impaction handle can only be used when the paddles are fully closed. Now that we know that surgeons may want to use the impaction handle throughout the distraction process (though more often near the beginning), we have come up with two potential solutions to this problem. The first is to continue with our impaction handle that is inserted between the handles. The necessary change would be to add a "stepped" geometry to the outer edge so that it can be inserted at any of several intervals. The only difference between these levels would be the depth of insertion, which would get increasingly deeper as the paddles become more separated. The second solution is completely scraps our original idea and instead extends the central pin where the two handles meet to past the handles on both sides. A wishbone shaped impaction handle would then attach to either side of the pin and come together between the handles for the surgeon to hit. Exhibit 3 illustrates a rough sketch of this idea.

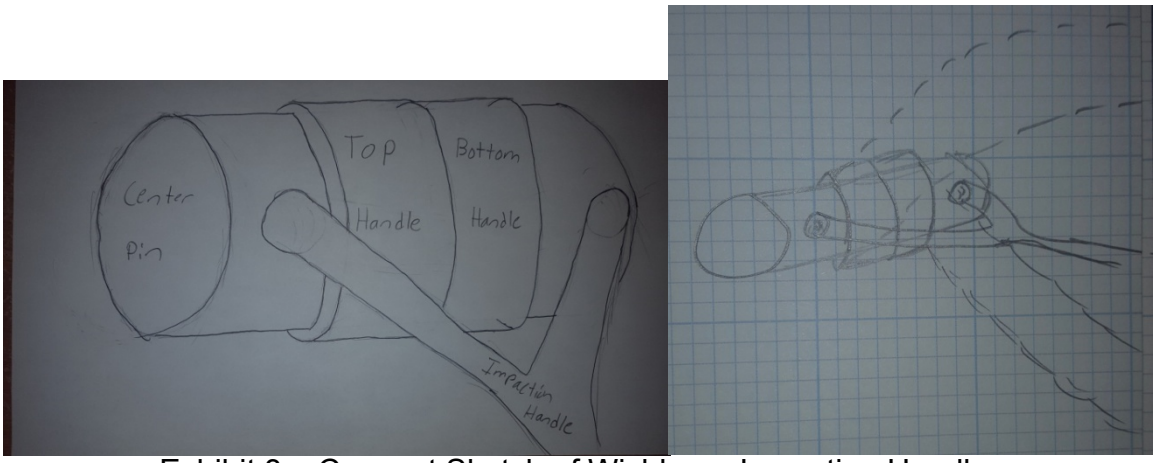

Exhibit 3 – Concept Sketch of Wishbone Impaction Handle

Next Steps

1. We will finalize our ratchet system design with measurement so we can model it in SolidWorks and analyze it using FEA.
2. We will make improvements to, and decide upon the impaction handle design.

Questions

1. What are your thoughts on the impaction handle? Do you think that the current inserted handle can be modified to work or should we investigate the wishbone design further?
2. How would you like us model the ball plungers? Manually place springs in the CAD Model? Leave holes for spring placement later in fabrication?