WEEKLY SPONSOR COMMUNICATION

TO:	VICTOR NUNEZ, AESCULAP
FROM:	CASSIE CHRISTMAN
EDITOR:	CHRISTIAN DAVIS
TEAM NAME AND NUMBER:	AESCULAP 1
DATES COVERED IN THIS COMMUNICATION:	APRIL 4, 2016 TO APRIL 10, 2016
WEEK NUMBER:	8 OF 15

Overview

This week we established a set of weighted criteria to help us create a concept selection matrix. We utilized this selection matrix to rate our parallel distraction method designs to determine which three ideas we will pursue further.

Accomplishments

1. We established the criteria for the concept selection matrix using the prioritized list of customer needs you sent us, as well as other parameters we deemed important. These additional factors include applied force (the ease with which the surgeon is able to apply force) and ergonomics (they comfort level associated with instrument use). We then categorized the importance of each criteria as either high, medium or low and established a percentage weight scale accordingly.

2. We reviewed our more-developed parallel distraction method concepts to narrow down to five designs to rate using the selection matrix. Those ideas include: Pliers, Pliers-S, Internal Expansion, Stored Energy, and Scissor Lift. Sketches and brief descriptions for each concept are displayed in the following exhibits.

- Pliers: In this design, as the handles are pressed together, the paddles move closer to each other, and as the handles are separated, the paddles will distract. A ratcheting a locking mechanism will be placed in the scissor section to prevent closer and a spring will help close the pliers upon release.

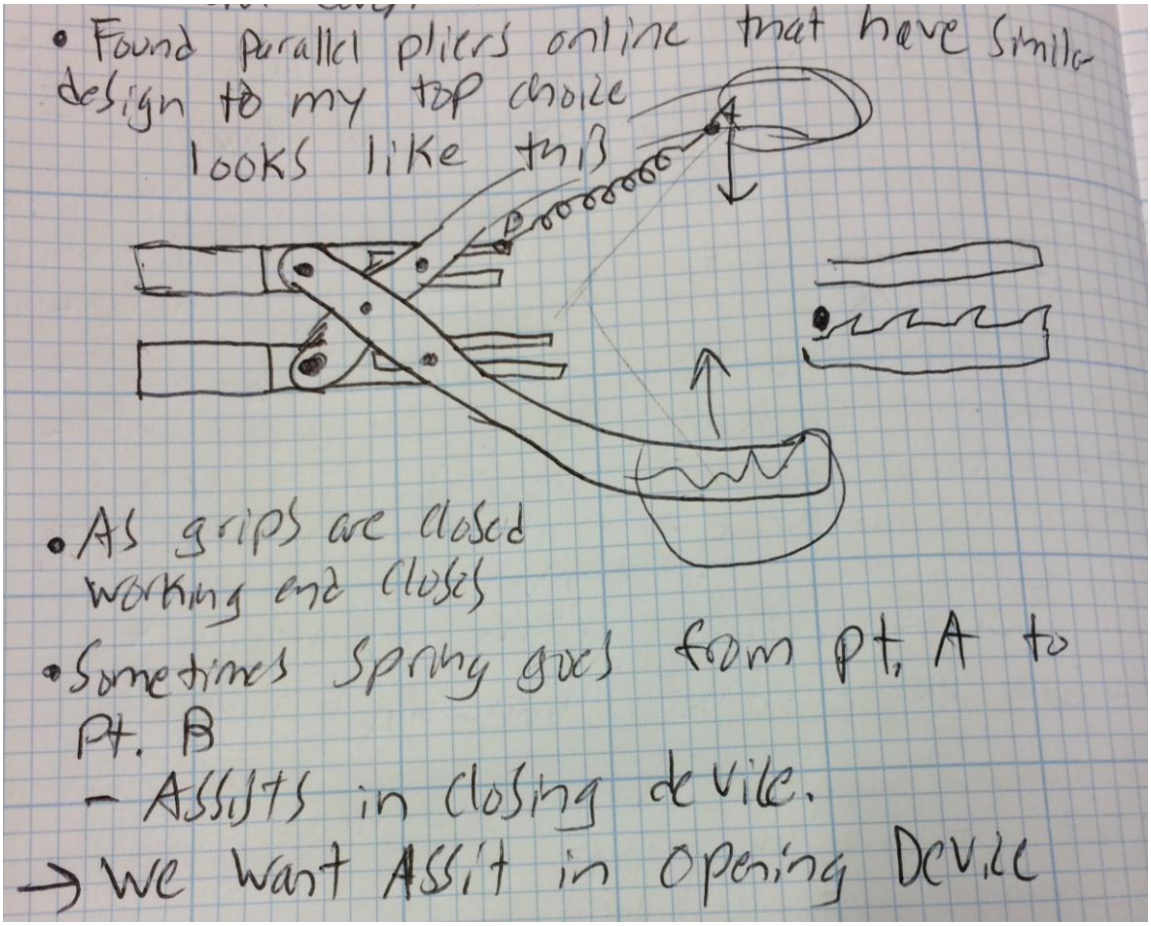

Exhibit 1 Pliers Sketch

- Pliers-S: The distraction method is the same as the other pliers, but the handles cross so the surgeon applies the distracting force by closing his hand rather than opening it. The place where the handles cross is an easy location for the locking mechanism and also allows us to put in a readily visible measuring system.

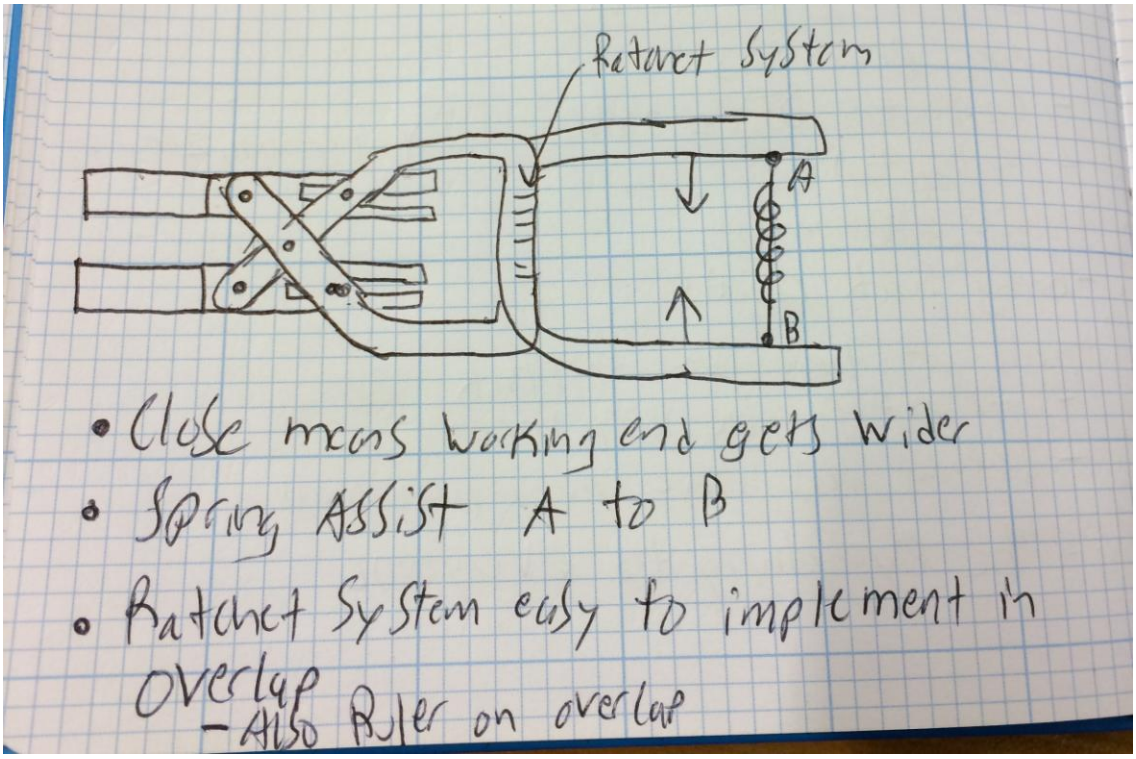

Exhibit 2 Pliers-S Sketch

- Internal Expansion: The internal expansion distraction method utilizes an internal wedging system in order to separate the paddles. The actuating mechanism for the distractor is a lever. As the lever is moved closer to the distractor handle, a camming relationship between the lever and a pin inside the distractor handle causes the pin to move towards the patient-end of the distractor. As the head of the pin moves towards the patient-end it travels along a ramped path between the two arms responsible for distracting the vertebrae. As the pin moves further along these ramps the arms are separated, thereby distracting the vertebrae. A quick release mechanism consisting of a spring and locking mechanism is also included.

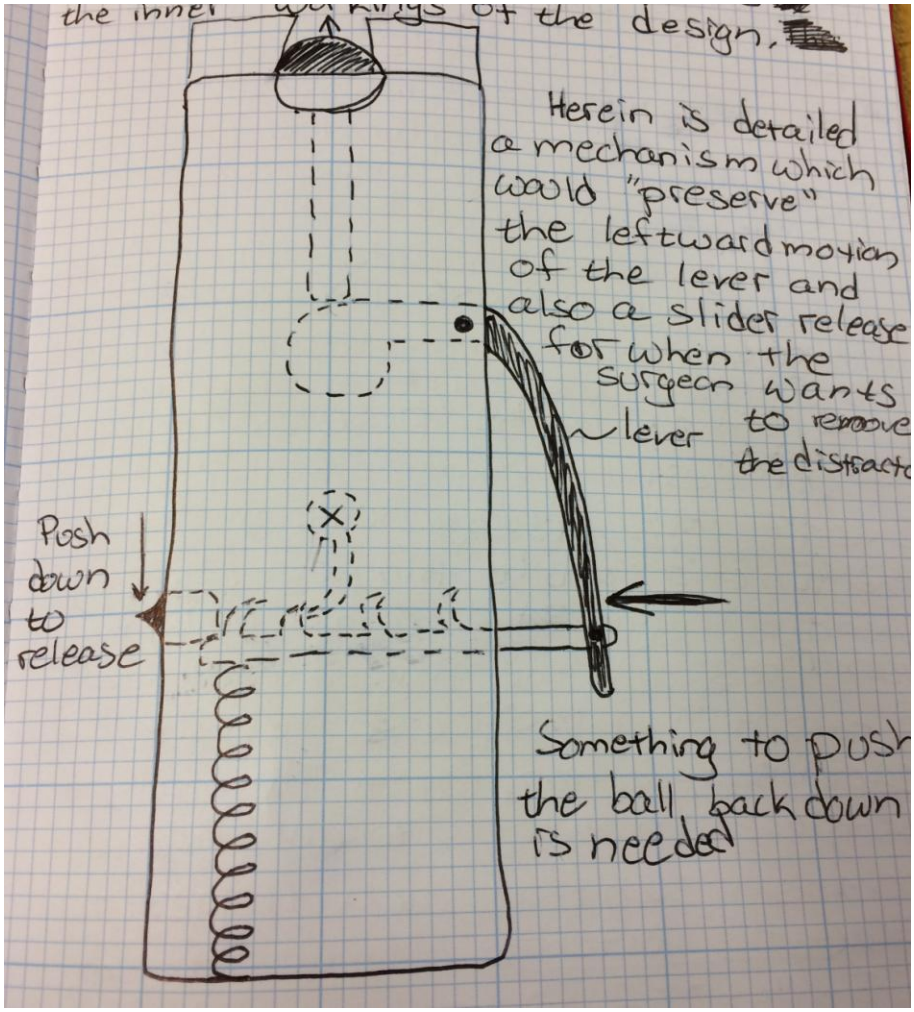

Exhibit 3 Internal Expansion Sketch

- Stored Energy: In this design the separation between distraction arms is controlled by a screw/spring assembly. The distraction arms (which are attached to runners to guarantee parallel distraction) sandwich a screw surrounded by a spring. Before the procedure occurs, a hex bolt or gear can be manually turned to decrease the distance between the distraction arms, thereby compressing the spring. During the distraction process an actuating mechanism (in this sketch, a wheel), can be used to slowly rotate the screw to gradually release the spring forces and separate the distraction arms.

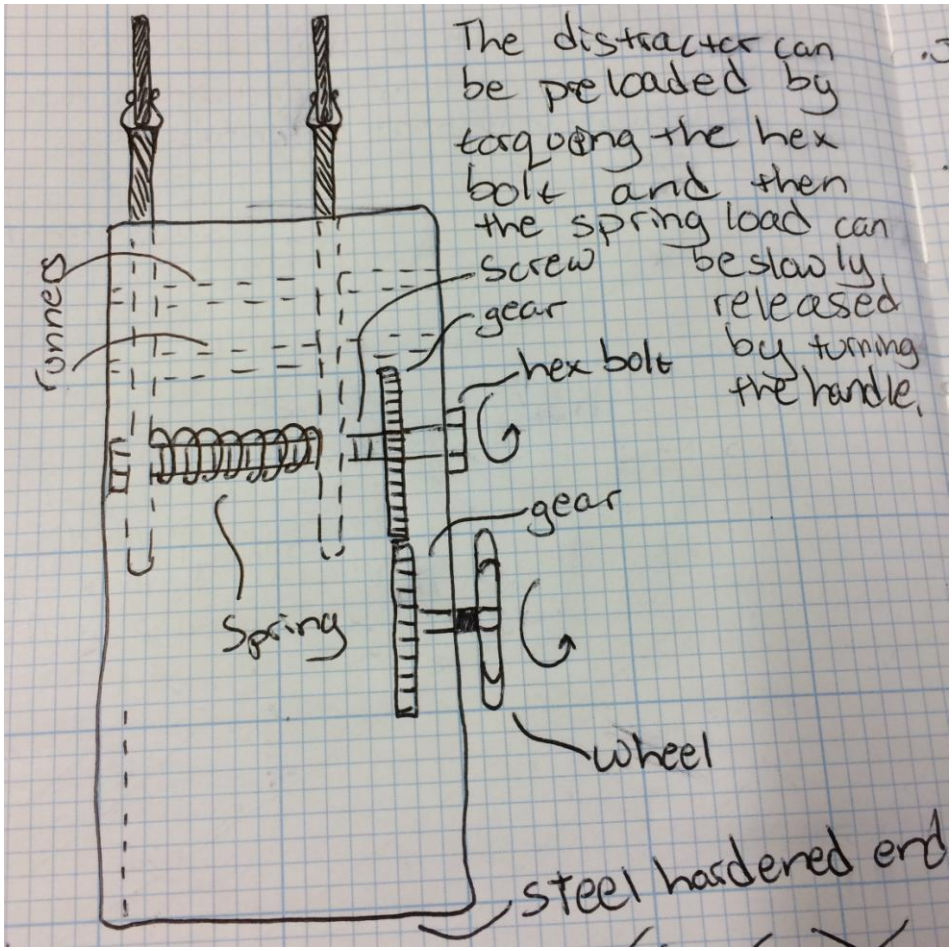

Exhibit 4 Stored Energy Sketch

- Scissor Lift: Operating in a similar fashion to its namesake, the distraction mechanism for this design utilizes a set of cross hinges which are fixed at the points closest to the patient end of the distractor and are able to slide along the distraction arms at the free ends. The distraction arm(s) are attached to perpendicular runners in order to ensure parallel distraction. In this embodiment the actuating mechanism is that of a thumb-controlled slider.

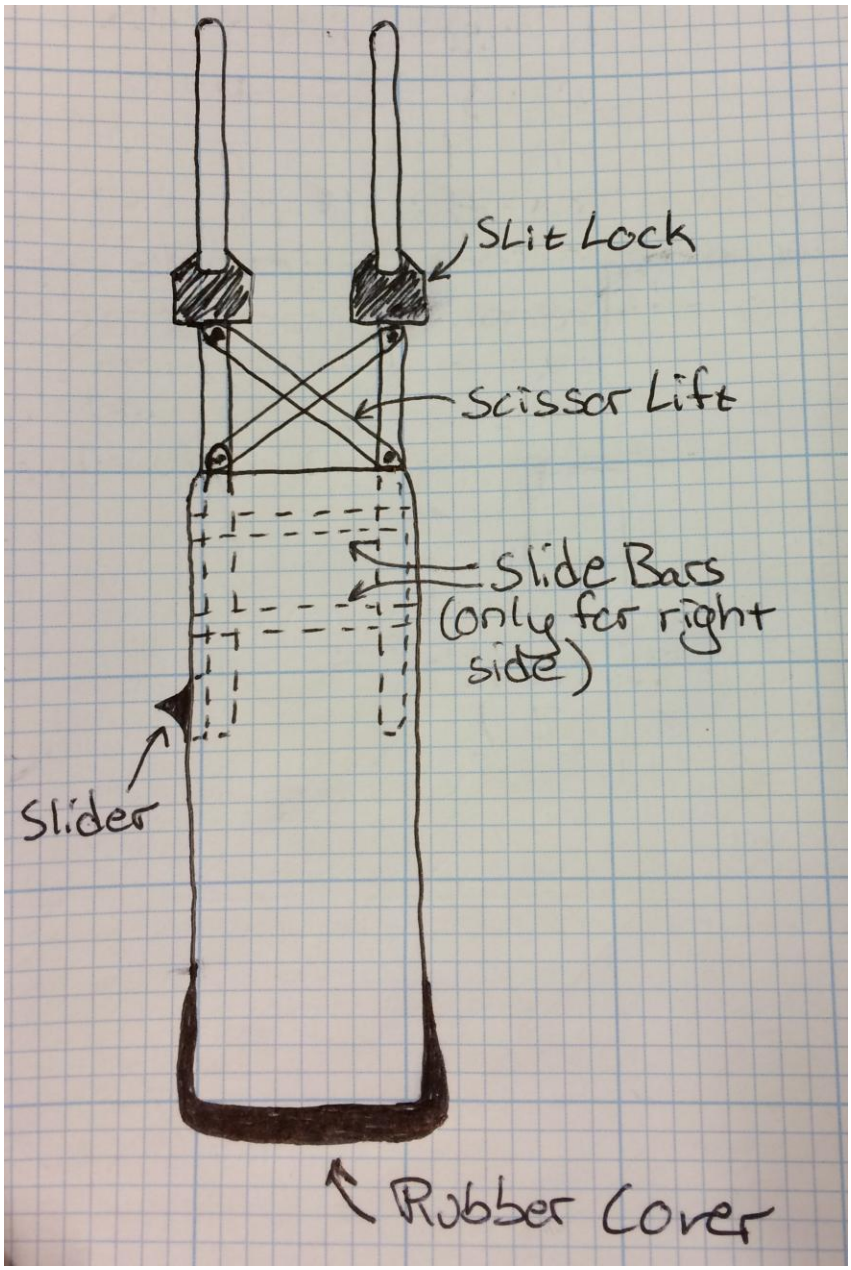

Exhibit 5 Scissor Lift Sketch

3. We then used the concept selection matrix to rate the current angled distractor and the five ideas just described. From the selection matrix, we have chosen to pursue the top three ideas: Pliers-S, Internal Expansion, and Pliers. Our rated selection matrix can be found in the Appendix.

Next Steps

1. In this upcoming week we will develop our Gantt chart to include the steps we will accomplish prior to the final presentation to have a relative timeline of our process.
2. To further assess the designs, we will be considering various target specifications and researching them by visiting a hardware store and calculating mechanical advantage in the actuating mechanisms.

Appendix: Rated Concept Selection Matrix

			Angled (Current)		Pliers		Pliers - S	
Weight	Selection Criteria	Percentage Weight	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score
3	Medical Grade Materials	12.00%	5	0.600	5	0.600	5	0.600
3	Steralizable	12.00%	4	0.480	4	0.480	4	0.480
3	Compression Force	12.00%	5	0.600	5	0.600	5	0.600
3	Parallel	12.00%	0	0.000	5	0.600	5	0.600
3	Applied Force	12.00%	4	0.480	1	0.120	5	0.600
2	Visualization	8.00%	4	0.320	3	0.240	3	0.240
2	Ratchet System	8.00%	3	0.240	3	0.240	4	0.320
2	Interchangeable Paddles	8.00%	0	0.000	5	0.400	5	0.400
1	Instrument Reset	4.00%	3	0.120	5	0.200	3	0.120
1	Paddle Quick Connect	4.00%	0	0.000	5	0.200	5	0.200
1	Impaction Handle	4.00%	0	0.000	4	0.160	2	0.080
1	Ergonomics	4.00%	2	0.080	1	0.040	4	0.160
				0.000		0.000		0.000
				0.000		0.000		0.000
				0.000		0.000		0.000
				0.000		0.000		0.000
				0.000		0.000		0.000
25		**Total Score Rank**	**2.920**		**3.880**		**4.400**	
		Continue?	NO		YES		YES	

			Internal Expansion		Stored Energy		Scissor Lift	
Weight	Selection Criteria	Percentage Weight	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score
3	Medical Grade Materials	12.00%	5	0.600	5	0.600	5	0.600
3	Steralizable	12.00%	2	0.240	2	0.240	2	0.240
3	Compression Force	12.00%	4	0.480	4	0.480	5	0.600
3	Parallel	12.00%	5	0.600	5	0.600	5	0.600
3	Applied Force	12.00%	4	0.480	2	0.240	2	0.240
2	Visualization	8.00%	3	0.240	3	0.240	3	0.240
2	Ratchet System	8.00%	4	0.320	4	0.320	3	0.240
2	Interchangeable Paddles	8.00%	5	0.400	5	0.400	5	0.400
1	Instrument Reset	4.00%	5	0.200	2	0.080	3	0.120
1	Paddle Quick Connect	4.00%	5	0.200	5	0.200	5	0.200
1	Impaction Handle	4.00%	5	0.200	5	0.200	5	0.200
1	Ergonomics	4.00%	3	0.120	3	0.120	4	0.160
				0.000		0.000		0.000
				0.000		0.000		0.000
				0.000		0.000		0.000
				0.000		0.000		0.000
				0.000		0.000		0.000
25		**Total Score Rank**	**4.080**		**3.720**		**3.840**	
		Continue?	YES		NO		NO	