

Ergonomic re-design of a surgical stapling device

Client: Dr. Amy Liepert, liepert@surgery.wisc.edu

Advisor: Beth Meyerand, memeyerand@wisc.edu

Date: 24 Feb 2017 - 2 March 2017

Team:

- Andrew Fugate - afugate@wisc.edu, Team Leader
- Albert Anderson - afanderson2@wisc.edu, Communicator
- Therese Besser - tmbesser@wisc.edu, BSAC
- Ellen Restyanszki, restyanszki@wisc.edu, BWIG & BPAG

Problem Statement:

Surgical staplers have undergone many design modifications including the recent addition of powered devices. Stapling devices are used both for intestinal resections and anastomoses as well as for vascular control. The users of these devices have also changed overtime with both the increase in female surgeons as well as an aging surgeon population.

Opportunities for improvements in device design for the increasingly diversified surgeon users are multiple. This project provides the opportunity for lab based and field study investigation of the ergonomic implications for the device users as well as potential for novel design modifications and/or solutions.

Summary of Team Role Accomplishments

Andrew - modeled prototypes in clay, put those prototypes into solidworks using general anthropometric data.

Albert - Modeled prototypes using clay

Therese - Modeled prototypes using clay, calculated dimensions for the average female, average male, and 5% female to 95% male dimensions for prototypes

Ellen - Worked on modeling mock up of pencil design in clay.

Summary of Design Accomplishments

- Finalized preliminary report
- Began developing prototypes for testing

Activities:

Person	Task	Weekly Total	Semester Total
Andrew	<ul style="list-style-type: none"> Clay modeling, Solidworks building 	4	13
Albert	<ul style="list-style-type: none"> Clay Modeling of Prototypes 	1.5	9.5
Therese	<ul style="list-style-type: none"> Modeling prototypes Calculations for prototype dimensions using anthropometry databases 	3	13
Ellen	<ul style="list-style-type: none"> Brainstorm and modeling 	2	12.5

Statement of Team Goals:

- Prototype several designs and present to Dr. Liepert for feedback
- Begin making SolidWorks models of designs

Individual Goals:

Andrew - Finish Solidworks assembly and begin running simulations in order to find the best dimensions to use.

Albert - Refine prototype designs and consult Dr. Liepert regarding her preferred model

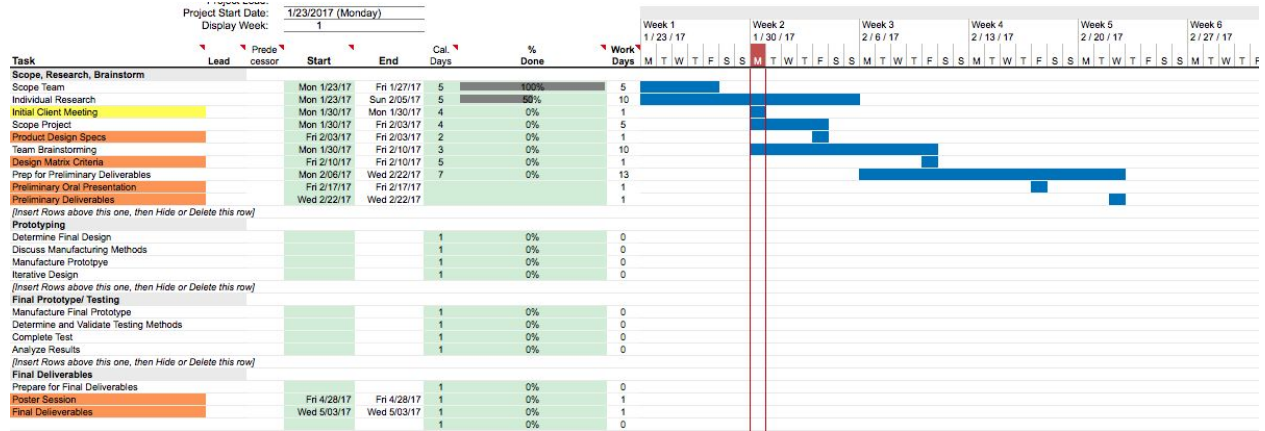
Therese - Determine the most realistic dimensions for the individual prototypes, accommodating the largest percentage of the surgeon population as possible.

Ellen - continue prototyping, move towards a final model

Difficulties:

- We foresee issues with the design of the mechanism inside the stapler.
- We need to find out if it is in our scope to contact and potentially work with Ethicon. To be successful for our client we are dependant of either selling our idea or working with this company.

Project Schedule/Timeline:



Task	Jan	Feb					March					April				May	
	29-Jan	5-Feb	12-Feb	19-Feb	26-Feb	2-Mar	9-Mar	16-Mar	23-Mar	30-Mar	7-Apr	14-Apr	21-Apr	28-Apr	4-May	11-May	
R&D																	
Research	X																
Brainstorming																	
Final Design Selection																	
Prototyping																	
Manufacturing																	
Testing																	
Deliverables																	
PDS																	
Preliminaries																	
Final Poster																	

Expenses:

Date	Store	Reason	Total Items	Purchase Total	Description
24 Feb 2017	Hobby Lobby	Prototyping	7	\$30.57	Molding clay, foam blocks, super glue, pipe cleaners