

Ergonomic re-design of a surgical stapling device

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

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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.

Restatement of Team Goals: n/a

Summary of Team Role Accomplishments

Andrew - Researched more existing designs, focusing on adaptations that would help our client. Thought about and sketched some basic ideas for our design.

Albert - Focused on researching current designs that fit the client's needs and criteria in order to better understand and take inspiration from them.

Therese - Researched anthropometric data trends to identify the proportion of the surgeon population that should be accommodated by the stapler grip. Determined other products on the market that could satisfy the client's needs, including the 3M Pistol grip wound stapler.

Ellen - Analyzed anthropometric data taken at client meeting to better understand the range of size we should be dealing with in our design. Researched the Medtronic solution called iDrive and looked into how we can incorporate a similar button solution without violating patents.

Summary of Design Accomplishments

The team split up this week and did personal design research. Specifically on competing designs and current patents we would need to keep in mind of while working on our new design. Because of UW Hospital's contract with the Ethicon, we are unable to present or recommend any design that is produced by another company to our client as an option.

Activities:

Person	Task	Weekly Total	Semester Total
Andrew	<ul style="list-style-type: none">● Researched adapted devices in this field to get ideas for a design.● Brainstorm preliminary ideas for a decision matrix.	2	5
Albert	<ul style="list-style-type: none">● Researched devices that fit the client's needs and descriptions of desired improvement	2	5
Therese	<ul style="list-style-type: none">● Researched comparable devices already on the market● Determined the 5% female to 95% male anthropometric hand grip sizes	1	5
Ellen	<ul style="list-style-type: none">● Analyzed anthropometric data taken at client meeting● Researched the Medtronic solution called iDrive● Brainstorm	1	6.5

Statement of Team Goals:

This week we want to determine the three preliminary designs we hope to evaluate on our presentation next week. With this we also plan on determining criteria we wish to try each of the designs against in a design matrix.

Individual Goals:

Andrew - Work on and refine a design matrix in order to narrow in on design ideas.

Albert - Brainstorm potential designs and critically examine them using a design matrix.

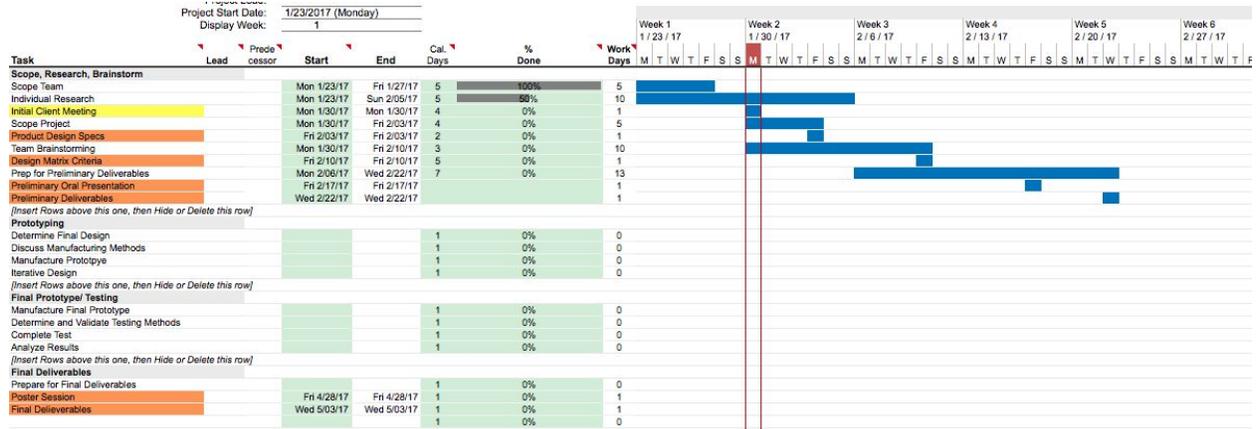
Therese - Finalize design ideas and determine the best design using a matrix.

Ellen - Polish design ideas and begin thinking of manufacturing options.

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: None