Tibial Stent Design Team Progress Report

Client: Dr. Matthew Halanski

Advisor: Dr. Wan-Ju Li

Team: Evan Lange elange2@wisc.edu (Team Leader)

Karl Kabarowski kabarowski@wisc.edu (Communicator)

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Date: September 20th, 2013 - September 27th, 2013

Problem Statement

Tibia fractures are common in children, and these injuries are currently managed non-operatively using casts; however, a surgically implanted device would provide more structural stability and aid the healing of the fracture. Adult patients with this injury typically have a rigid intramedullary device implanted into their tibia bone. Unfortunately, these implants cannot be used in pediatric patients due to the presence of growth plates at the implantation site. A previous design team produced a working device that can enter the medullary canal through a hole in the side of the bone and then expand outward to stabilize the fracture, held in place by static friction against the canal wall. This device is flexible enough to fit into the canal, yet rigid enough to maintain fracture reduction, can be secured in place with screws, and can be removed from the canal when desired; however, the device is not fully fixated against the walls of the bone canal and the friction force of the device is not sufficient to prevent axial rotation within the canal. This rotation can lead to device failure resulting in unnecessary pain for the patient and extra surgery to correct the issue.

The goal of this semester is to improve the existing device by improving its fixation and adding more rigidity thereby advancing this project toward clinical use.

Last Week's Goals

- Meet with client
- Conduct background research
- Become familiar with last semester's design; possibly set up meeting with member of previous semester's design team
- Compose problem statement after meeting with client to better understand the problem
 Complete this no later than the team meeting after the client meeting

This Week's Goals/Individual Goals

- · Begin work on problem statement and PDS
- Meet with client
- Conduct more specific literature searches and research based on client needs established at meeting

This Week's Accomplishments

- · First Client Meeting
- · Problem Statement established
- Began work on PDS
- Design Matrix v.1 completed, but needs more design options

Project Difficulties

· Issues getting all team members together for brainstorming

Next Week's Team Goals

- Get feedback from all team members regarding design ideas and revise design matrix
- Complete PDS v.1
- Complete Midsemester Presentation
- Begin work on Midsemester Report

Summary of Design Accomplishments

- The team is meeting weekly to accelerate the design process
- The team has met with previous semester design team to better understand where the project currently stands
- The team has completed the problem statement and began work on the PDS

Expenses

None at this time

Schedule for Fall 2013

<u>Task</u>		September				October			November				December		
	6	13	20	27	4	11	18	25	1	8	15	22	29	6	13
Groundwork															
Set Meeting Time	X	Χ													
Brainstorming	X	Х	X	X											
Biomaterials Lab Access															
Research															
Tibia Fractures	X	Χ	X												
Stent Protocol	X	Χ	X	Х											
Fixation Methods	X	Χ	X	X											
Contextual Research	X	Χ	Х	Х											
Prototyping															
Order Materials															
Build Prototype															
Test Prototype															
Deliverables															
Progress Reports	X	Χ	Х	Х											
Notebooks	X	Χ	Х	Х											
PDS			X	Х											
Midsemester Presentation				X											
Midsemester Report				X											
Final Poster															
Final Report															
Meetings															
Advisor Meeting	X	Χ	Χ	Χ											
Team Meeting	X	Χ	Χ	Χ											
Client Meeting				Χ											
Website															_
Update	Χ	Χ	Χ	Χ											

Activities

Person(s)	Task	Time (hrs)	Weekly Total	Semester Total
Evan	Team Role (Leader)	Ì	9.5	16.5
	Weekly progress report	1.5		
	Developed next week's team goals	0.5		
	Other			
	Research/Develop Client Questions	1.0		
	Team Meeting/Brainstorming/Design Matrix	5.0		
	Problem Statement	1.5		
Karl	Team Role (Communicator)		9.0	16.0
	n/a			
	Other			
	Research/Develop Client Questions	1.5		
	Team Meeting - Client Questions	1.0		
	Client Meeting	1.0		
	Team Meeting/Brainstorming/Design Matrix	4.5		
	Problem Statement			
Tyler	Team Role (BSAC)		3.0	6.0
	n/a	1		
	Other			
	Team Meeting - Client Questions	1.0		
	Client Meeting			
	Research	1.0		
Sarah	Team Role (BWIG)		7.5	11.5
	Update Website			
	Other			
	Research/Develop Client Questions	0.5		
	Team Meeting - Client Questions	1.0		
	Client Meeting			
	Team Meeting/Brainstorming/Design Matrix	4.5		
Lida	Team Role (BPAG)		2.0	2.5
	n/a]		
	Other]	
	Client Meeting	1.0		
	Brainstorming	0.5]	
	Research	0.5]	