Tibial Stent Design Team Progress Report

Client: Dr. Matthew Halanski

Advisor: Dr. Wan-Ju Li

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

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Problem Statement

Tibia fractures are common in children, and these injuries are currently managed nonoperatively 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 radial force thereby advancing this project toward clinical use.

Last Week's 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 Goals/Individual 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

This Week's Accomplishments

- **Completed Midsemester Presentation**
- Revised design matrix
- Completed PDS v.1
- Divided writing assignments for Midsemester Report

Project Difficulties

Issues getting all team members together for working on Midsemester Presentation

Next Week's Team Goals

- · Finish detailed specifications of final design
- Complete 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 the PDS
- The team has completed the Midsemester Presentation and started the Midsemester Report

Expenses

• None at this time

Schedule for Fall 2013

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

Activities

Person(s)	Task	Time (hrs)	Weekly Total	Semester Total	
Evan	Team Role (Leader)	(1113)	14.0	30.5	
Evan	Weekly progress report	1.5		30.3	
	Developed next week's team goals	0.5	-		
	Created Design Matrix Documents	2.0			
	Other				
	Team Meeting	1.0			
	Midsemester Presentation Preparation	9.0			
Karl	Team Role (Communicator)		11.5	27.5	
	Invite Client to Midsemester Presentation	0.5			
	Other				
	Work on PDS	1.0			
	Team Meeting	1.0			
	Midsemester Presentation Preparation				
Tyler	Team Role (BSAC)		9.0	17.0	
	n/a]			
	Other				
	Team Meeting	1.0			
	Research	0.5			
	Problem Statement Review	0.5			
	Midsemester Presentation Preparation	7.0			
Sarah	Team Role (BWIG)		10.0	21.5	
	Update Website	0.5			
	Other				
	Research	2.0			
	PDS/Problem Statement work	0.5			
	Midsemester Presentation Preparation	7.0			
Lida	Team Role (BPAG)		5.0	7.5	
	n/a				
	Other				
	Midsemester Presentation Preparation	5.0			