

Tibial Stent Design Team Progress Report

Client: Dr. Matthew Halanski

Advisor: Dr. Wan-Ju Li

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

- 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 Goals/Individual Goals

- Finish detailed specifications of final design
- Complete Midsemester Report

This Week's Accomplishments

- *Overhaul of final design – braided cylinder vs. mesh cylinder*
- Completed Midsemester Report

Project Difficulties

- Issues getting all team members together for working on Midsemester Presentation and Midsemester Report
- Last minute overhaul of final design between Midsemester Presentation and Midsemester Report

Next Week's Team Goals

- Obtain existing device
- Conduct testing on existing device
 - measure dimensions
 - become familiar with insertion procedure

Activities

Person(s)	Task	Time (hrs)	Weekly Total	Semester Total
Evan	<i>Team Role (Leader)</i>		27.0	57.5
	Weekly progress report	1.5		
	Developed next week's team goals	0.5		
	<i>Other</i>			
	Midsemester Presentation Preparation	1.0		
	Research Changes for Final Design	5.0		
	Team Meeting	1.0		
	Write Midsemester Report	6.0		
Compile and Edit Midsemester Report	12.0			
Karl	<i>Team Role (Communicator)</i>		15.5	43.0
	n/a			
	<i>Other</i>			
	Midsemester Presentation Preparation	1.0		
	Team Meeting	1.0		
	Write Midsemester Report	3.5		
Edit Midsemester Report	10.0			
Tyler	<i>Team Role (BSAC)</i>		7.5	24.5
	n/a			
	<i>Other</i>			
	Midsemester Presentation Preparation	1.0		
	Write Midsemester Report	3.0		
Edit Midsemester Report	3.5			
Sarah	<i>Team Role (BWIG)</i>		11.5	33.0
	Update Website	0.5		
	<i>Other</i>			
	Midsemester Presentation Preparation	1.0		
	Write Midsemester Report	2.0		
	Team Meeting	1.0		
Edit Midsemester Report	7.0			
Lida	<i>Team Role (BPAG)</i>		8.5	16.0
	n/a			
	<i>Other</i>			
	Midsemester Presentation Preparation	2.0		
	Write Midsemester Report	4.0		
Edit Midsemester Report	2.5			