

# Modified Bicycle Motion Capstone

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## Team 19

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- Client Contact

- Web Developer

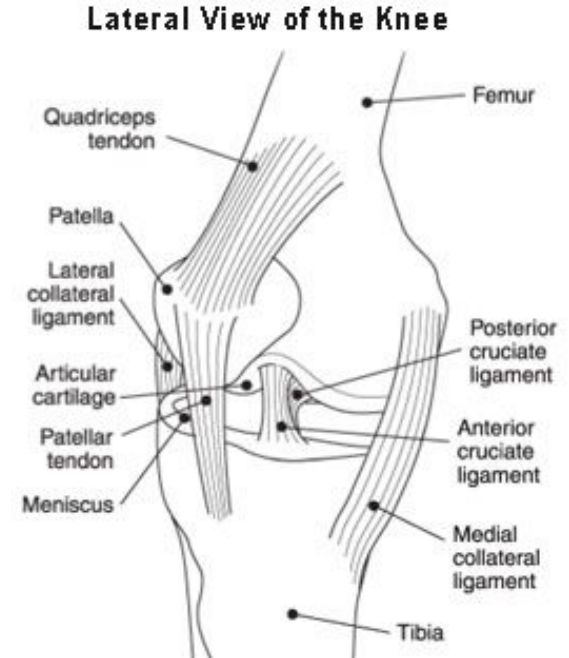
- Project Manager

- Secretary

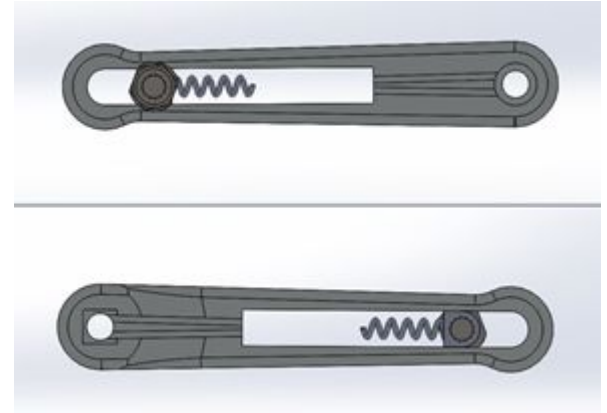
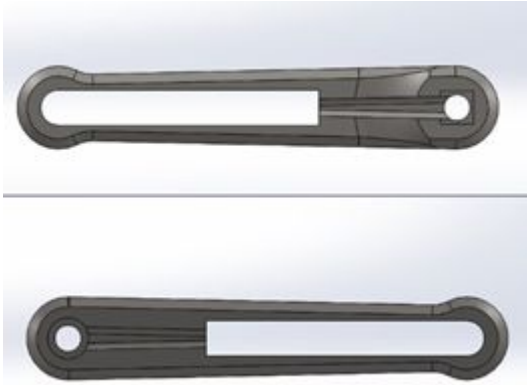
- Budget Liaison

# Project Introduction

- Modified Bicycle Motion
  - Limit Range of Motion (ROM) experienced by the knee
  - Create maximal torque
  - Limit the modifications to existing bicycles



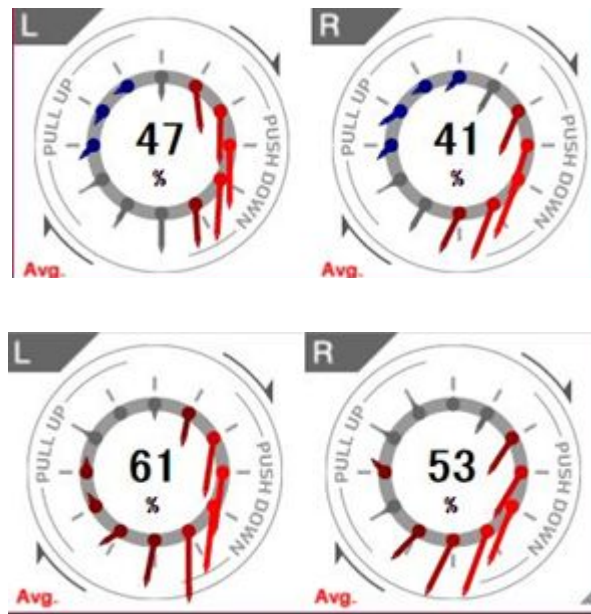
# Modeled Drawing



# Design Functions

- Spring
  - Extension - Increases Torque
  - Retracts - Limits ROM
- Video

[https://www.youtube.com/watch?v=pMun\\_EvZcpQ](https://www.youtube.com/watch?v=pMun_EvZcpQ)




















Pedal Stroke Force Vectors

# Design Requirements

- Customer Requirements (Engineering Requirements):
  - Durable (Sustain a falling weight of 50lbs at height of 0.6ft)
  - Retrofittable
  - Increased Knee Angle (Must be  $> 90$  degrees)
  - Low added weight (Added Weight  $< 300$ g)
  - Maximum Torque (Generation difference as compared to a standard crank arm  $< 5\%$ )
  - Low Cost (For each crank arm  $< \$250$ )
  - Safety
  - Aesthetics

# Schedule and Budget

## Schedule

		Name	Duration	Start	Finish
1		Team Meetings	1d?	01/16/2017	01/16/2017
2		Staff Meetings	1d?	01/23/2017	01/23/2017
3		Presentations	1d?	01/30/2017	01/30/2017
4		Team Meetings	1d?	02/06/2017	02/06/2017
5		Hardware Review 1	1d?	02/13/2017	02/13/2017
6		Staff Meetings	1d?	02/20/2017	02/20/2017
7		Team Meetings	1d?	02/27/2017	02/27/2017
8		Midpoint Report	1d?	02/27/2017	02/27/2017
9		Midpoint Review Presentations	1d?	03/06/2017	03/06/2017
10		Hardware Review 2	1d?	03/20/2017	03/20/2017
11		Team Meetings	1d?	03/27/2017	03/27/2017
12		Staff Meetings	1d?	04/03/2017	04/03/2017
13		Presentation walk-throughs	1d?	04/10/2017	04/10/2017
14		Final Product Testing Proof	1d?	04/17/2017	04/17/2017
15		Team Meetings	1d?	05/01/2017	05/01/2017
16		Final	2d?	05/04/2017	05/05/2017

## Budget

- Total budget: \$1500
- Estimated Design Cost: \$216

Part No.	Part Name	Quantity	Function	Material	Cost
1	<b>Crankset</b>	1	Converts reciprocating motion from the legs to rotational motion of the chain	Carbon Fiber	\$140
2	<b>Chain</b>	1	The chain transfers power from the pedals to the drive-wheel of a bicycle	Nickel Plated Steel	\$46
3	<b>Cassette</b> (7-Speed)	1	Transfers power from the chain to the rear wheel	Steel	\$30
<b>Total</b>		3			\$216

**Questions?**