



University of Idaho

College of Engineering

SMOOTH ARTHROSCOPIC SHAVER

The \$1500 Shave Club



TEAM INFORMATION

THE \$1500 DOLLAR SHAVE CLUB

I Jett Murray



- I Biological Engineering
- I Preston, ID
- I Client Contact, Recorder

I Lucas Dibelius



- I Mechanical Engineering
- I Boise, ID
- I Purchasing Liaison, Wiki

I Maclean Landis



- I Mechanical Engineering
- I Boise, ID
- I Portfolio

I Ryan Crowell



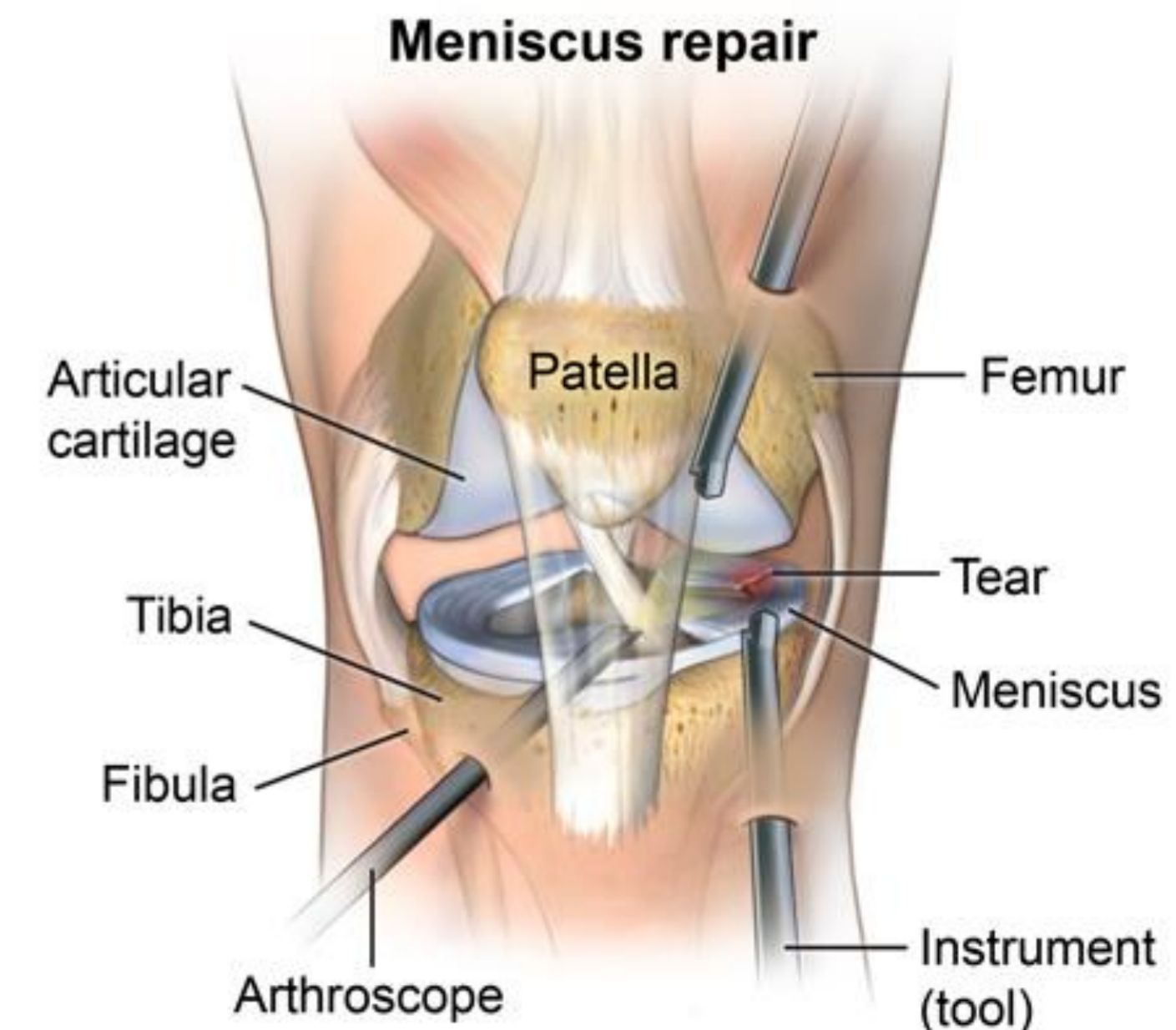
- I Mechanical Engineering
- I Davis, CA
- I Financial Advisor



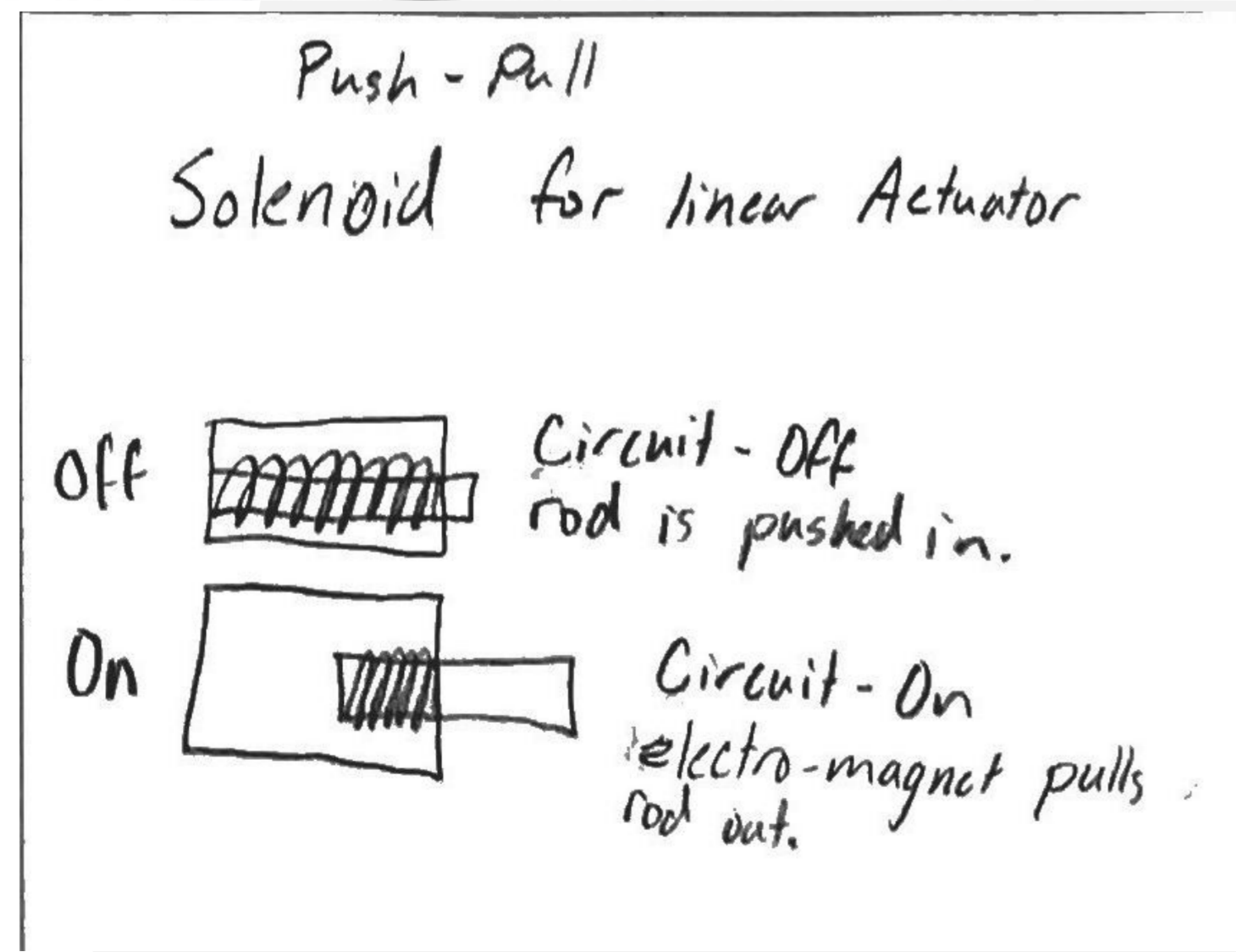
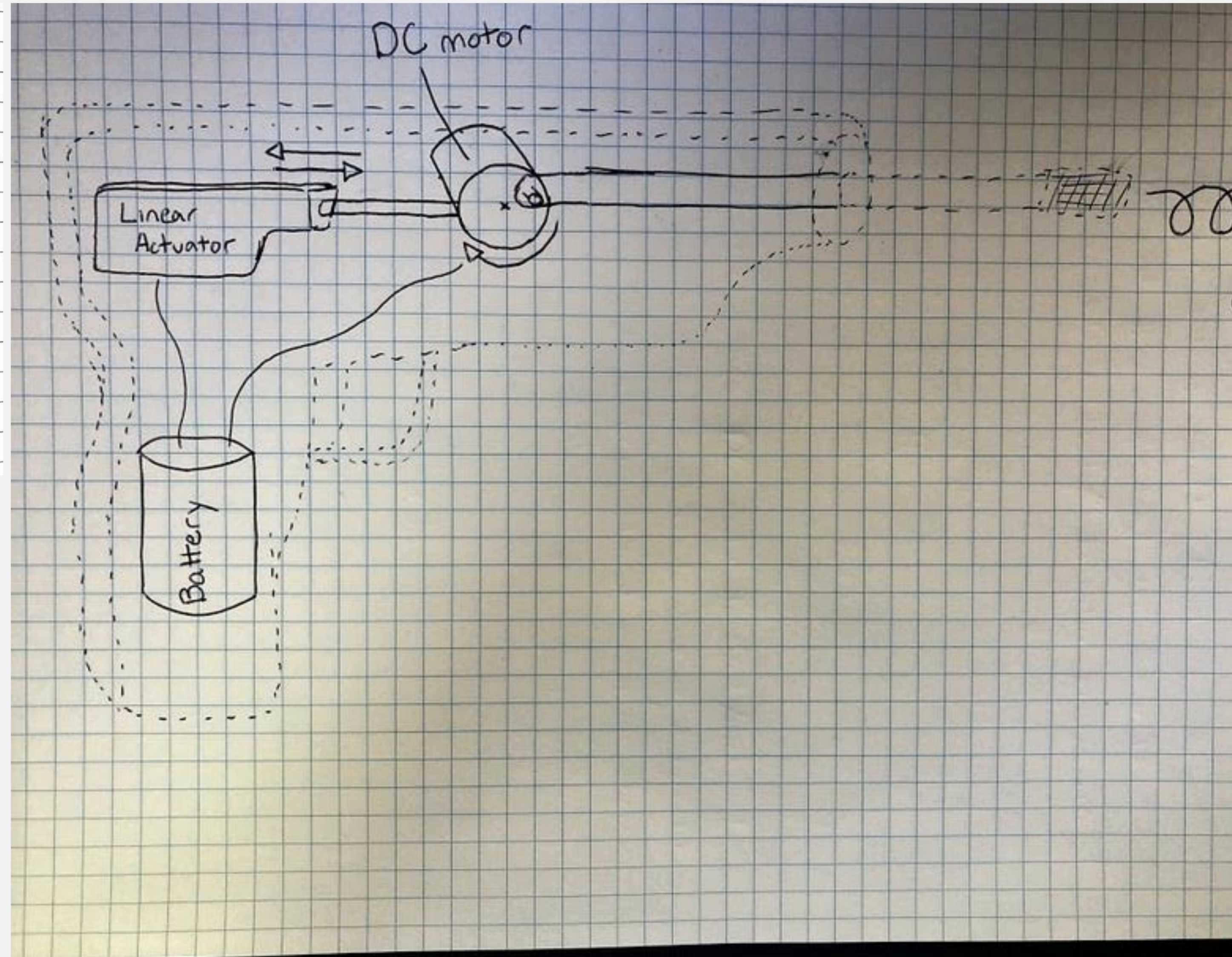
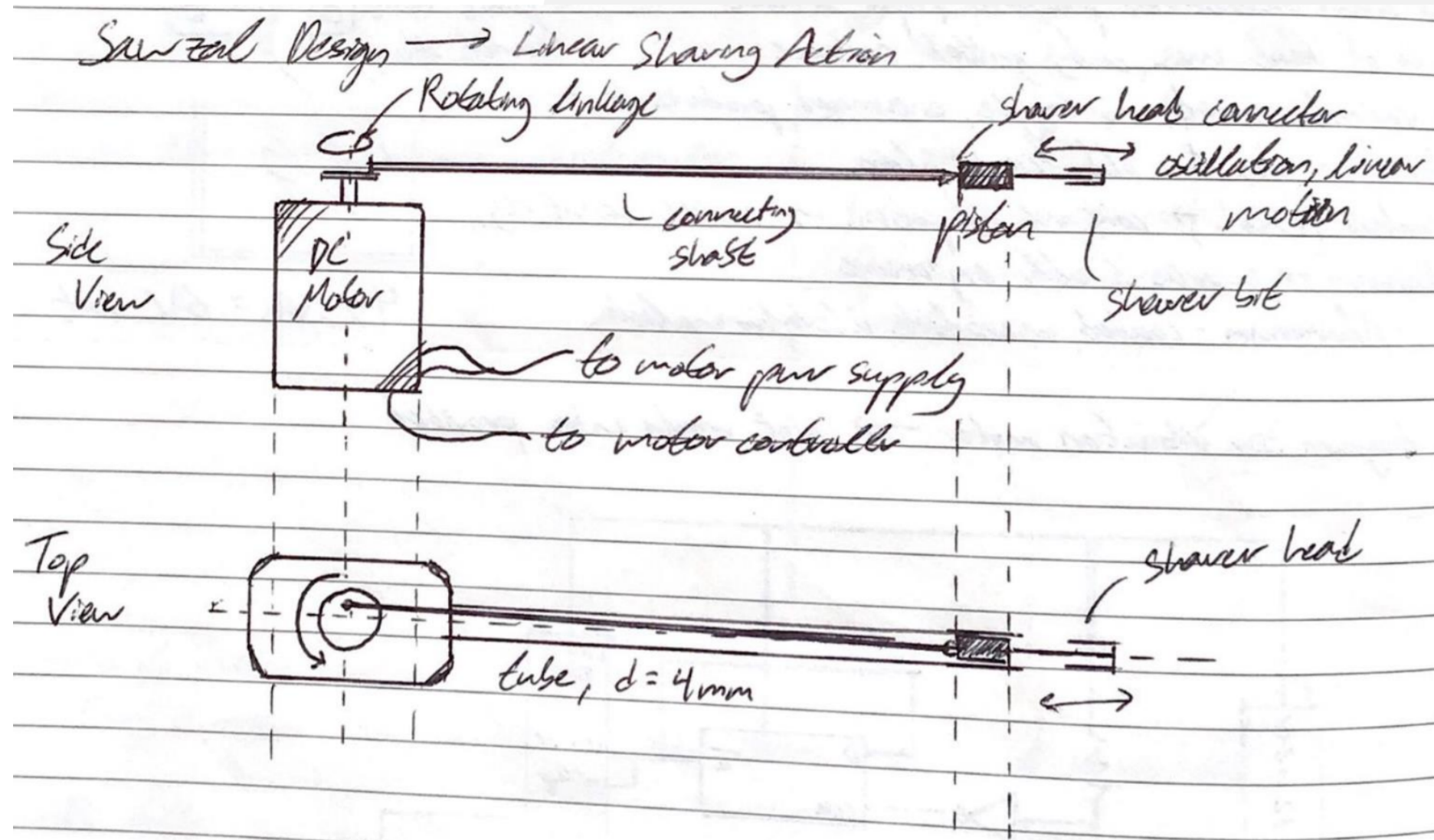
PRODUCT REQUIREMENTS

For this project, the client specifically requested that the product met several criteria:

- I Variable speed output with 900-6000 RPM oscillation settings
- I Random orbital sanding action within a pistol-grip device
- I Maximum output shaft diameter of 4mm
 - Output shaft should be able to withstand corrosion in saline-rich environments
- I Compatibility with 100-400 grit shaver heads/burs
 - ~300 grit shaver heads/burs have been previously noted to work the best
- I Reliable two-hour battery life
- I Compatibility with existing surgical suction pumps
 - Debris removal during shaving (condyle, menisci cartilage, bone fragments)
- The device should be reusable, and compatible with different shaver heads
 - Autoclaving (60kPa, 150 degrees Celsius)



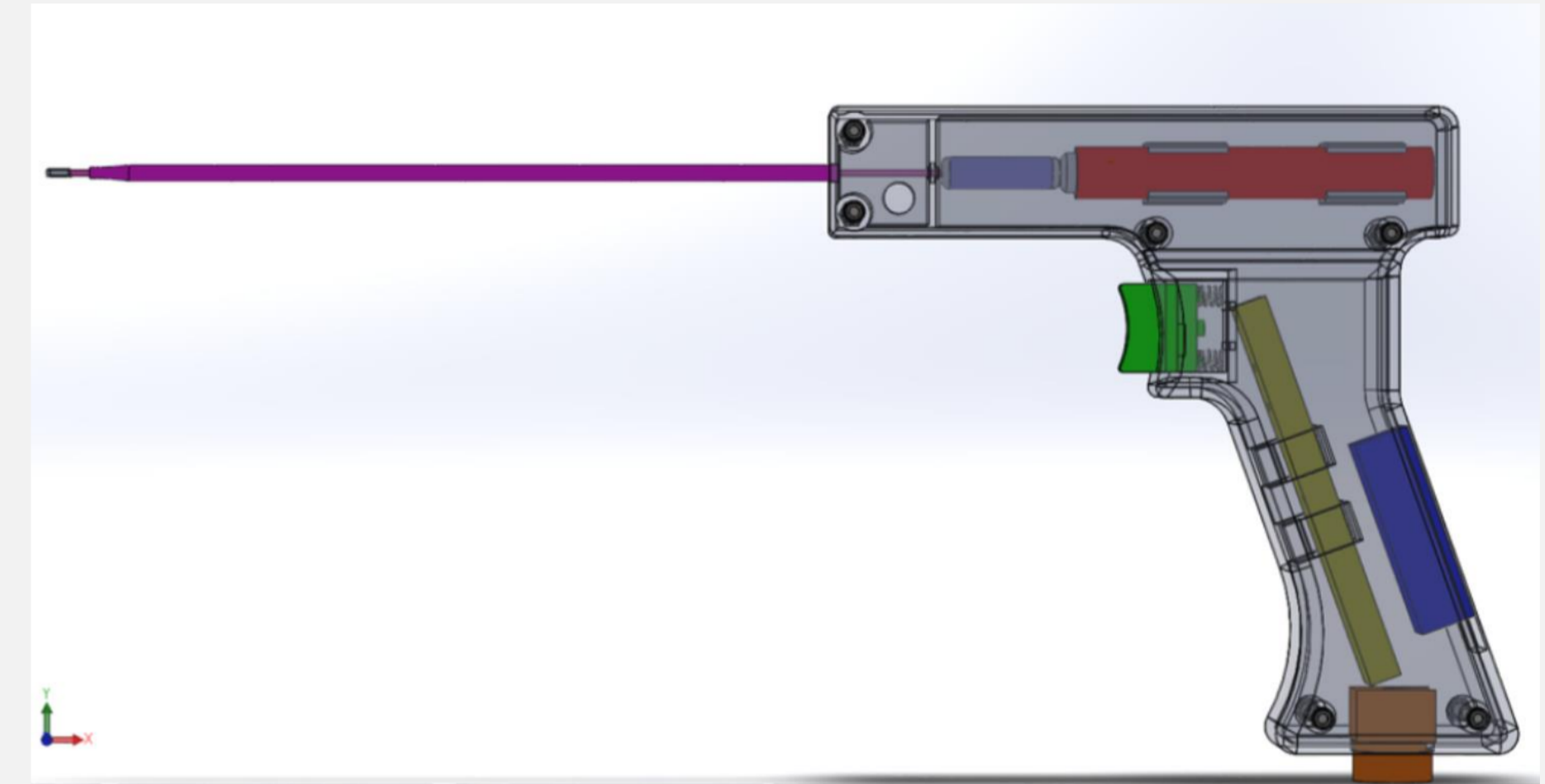
DESIGN PLANS



RESEARCH AND DEVELOPMENT

OLD PROTOTYPE

- I Bulky, unreliable, complicated to disassemble
- I Held together by hot glue and tape
- I Motor could not function under load
 - No vacuum or speed variability for output



ACTUATOR/SANDER PLANS

- I Utilizing high-power RC-aircraft motor with electronic speed controller
 - Introduce speed variability, high RPM capability, necessary torque to function under load
- I Combining rotary motion with linear actuation
 - Random orbital sanding approximation
 - Motor would actuate forward and back while running inside of handle

PROJECT LEARNING

CONVERSATIONS WITH PAST GROUP

- I Past group created prototype using vibration Sonicare toothbrush motor
 - Very little manipulative control considering non compatible motor with Arduino microcontroller
- I Experimented with concave, convex, round heads with varying sandpaper grits
 - We will use their designs and 300 grit sandpaper
- I No variable speed, no suction, non-detachable heads
 - Client asked for these, last group didn't touch on them, but we plan to work on variable speed
- I Exterior battery casing
 - Dangling battery unit in past design, ours will be housed within handle

SCHEDULE



Capstone Project Schedule Template - Fall-Spring																																														
		Project: Arthroscopic Bone Shaver																																												
		Last Updated: 10/6/20																																												
		2020															2021																													
		Sept			Oct				Nov				Dec				Jan			Feb			Mar			Apr			May																	
Task Description	Duration	Assigned	9/3	9/10	9/17	9/24	10/1	10/8	10/15	10/22	10/29	11/5	11/12	11/19	11/26	12/3	12/10	12/17	12/24	12/31	1/7	1/14	1/21	1/28	2/4	2/11	2/18	2/25	3/4	3/11	3/18	3/25	4/1	4/8	4/15	4/22	4/29	5/6	5/13	5/20	5/27					
Portfolio Check								#1					#2				#3													#4									#5							
Snapshot								#1								#2												#3																		
Design Validation Plan																																														
Value Proposition																																														
Wikipage												#1					#2												#3												#4					
Concept Design Review																																														
Team Member Citizenship																																														
Design Expo Registration																																														
Engineering Release Review																																														
Poster																																														
Technical Presentation																																														
Team Decided																																														
Prototype #1																																														
Prototype #2																																														
Final Prototype																																														
Parts Purchased																																														
Motor/Linkage Systems Assembled																																														
Handle Redesign																																														
Experimental Testing																																														
Expo																																														

I This is a brief look at our preliminary schedule for the Capstone course



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**THANK YOU FOR
LISTENING**

QUESTIONS?