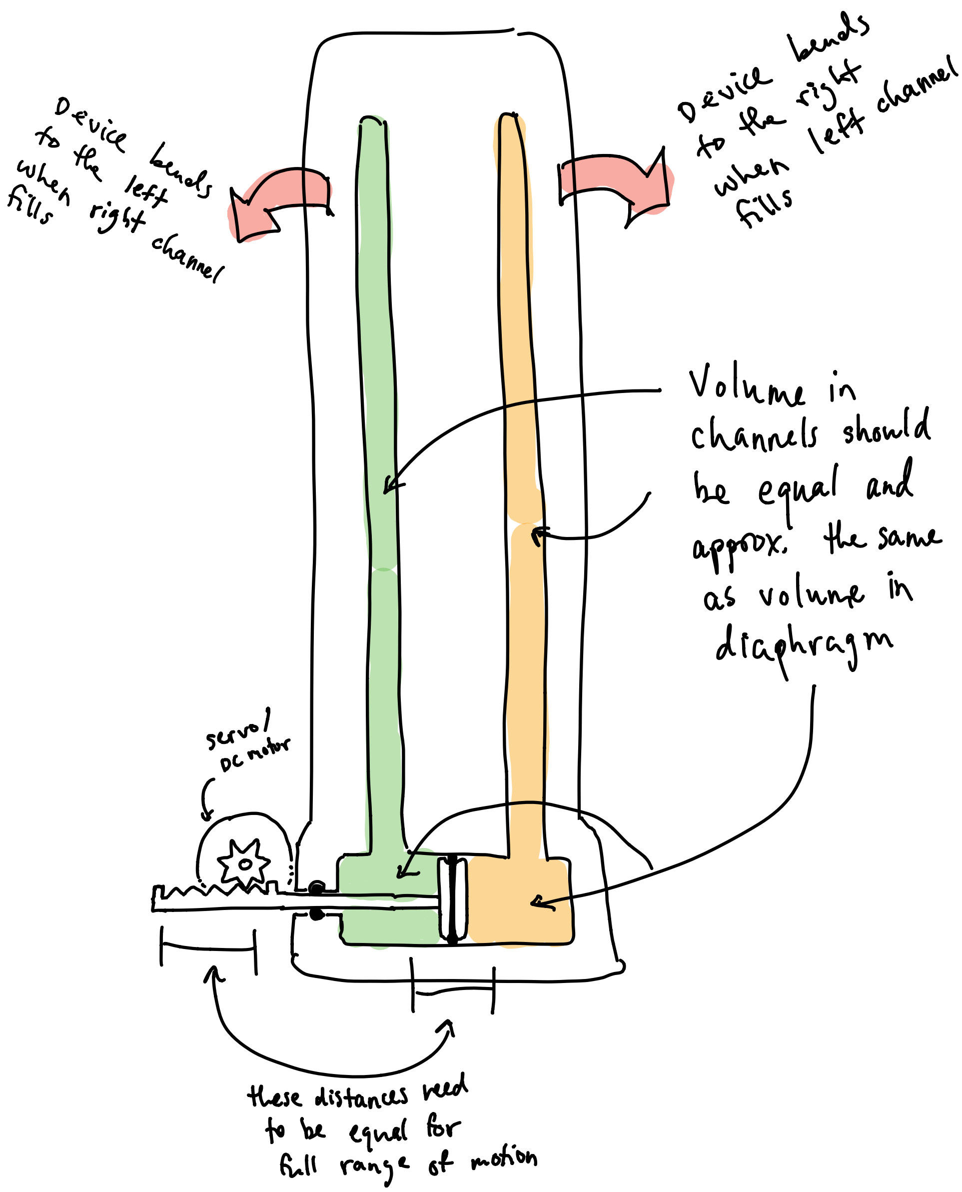
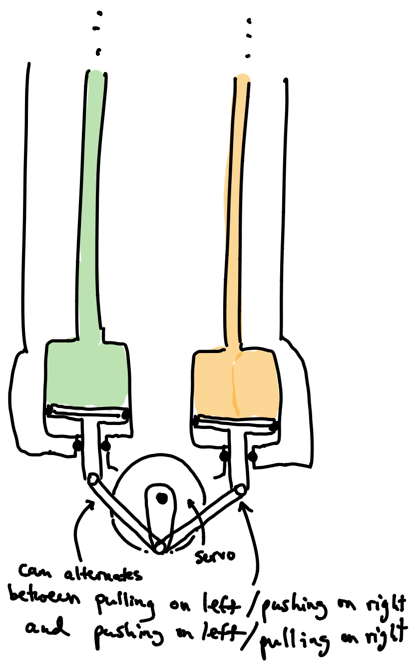
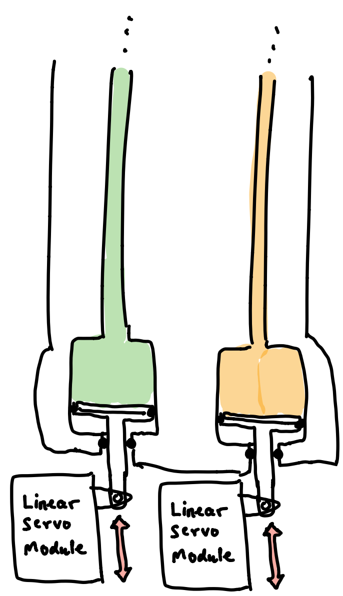






Perks of this design:

- Improved Holding Torque
- Independent Control of left/right
- Modules are cheap/low part ct
- Simple electronics since servo

1/3/21

First, we were thinking about the degrees of freedom of the design. Basically, for each channel / cavity that you create in the mold, you get an extra 1/2 degree of freedom, because if you fill it up it will bend in the other direction and contracting kind of has the opposite effect but not as strongly. So to get a full degree of freedom, you need to mirror that channel to the other side. So we were thinking of starting off with a prototype with 2 degrees of freedom by having two pairs of channels for the up-and-down direction and the side-to-side direction. We can iterate a couple times on this prototype to get an idea of how channel dimensions affect the actuation of the device.
Vibration is another degree of freedom, but is a little simpler since we can just place vibration motors wherever we want and control them independently. If we could use small disc ones it would probably allow for more pleasure sites, so we will build those into the design, and think about the optimal places to put them to get the most control for the amount of motors used.

Next, we considered the method of actuation. The peristaltic pumps don't seem like the right solution because they actuate flow rate, whereas pressure would probably allow for more direct control of the air (or other fluid) in each channel. We've come up with a couple designs for pumps that would probably be more fitting, and they all center around linear actuator / pneumatic cylinder designs of which a syringe pump is an example. We've placed some design ideas in a new folder in the drive called "Technical/v2 design/". The different designs are based on different motors for controlling the linear actuator. The one that seems the most practical uses a linear servo (1.5 g, approx $7 each, and no extra parts). The main concern when deciding on a motor is the holding torque, because if the shaft/head get squeezed too much it could overpower the motor.

Finally, for the sensors, we were thinking the more data we can get from them the better. So it might be possible to create an array of force sensors built into the shaft/head made of a piezoresistive material (these change resistivity when you bend them, so we can sense an array of these with pretty simple electronics). We found this site (https://www.kobakant.at/DIY/) that makes DIY sensors and it seems like we'd be able to embed something like what they have on this site throughout the shaft/head to get lots of multidimensional data. This type of data would probably be better for a Convolutional Neural Network (or other ML architecture) than individual force sensor readings.

prototypes to test:

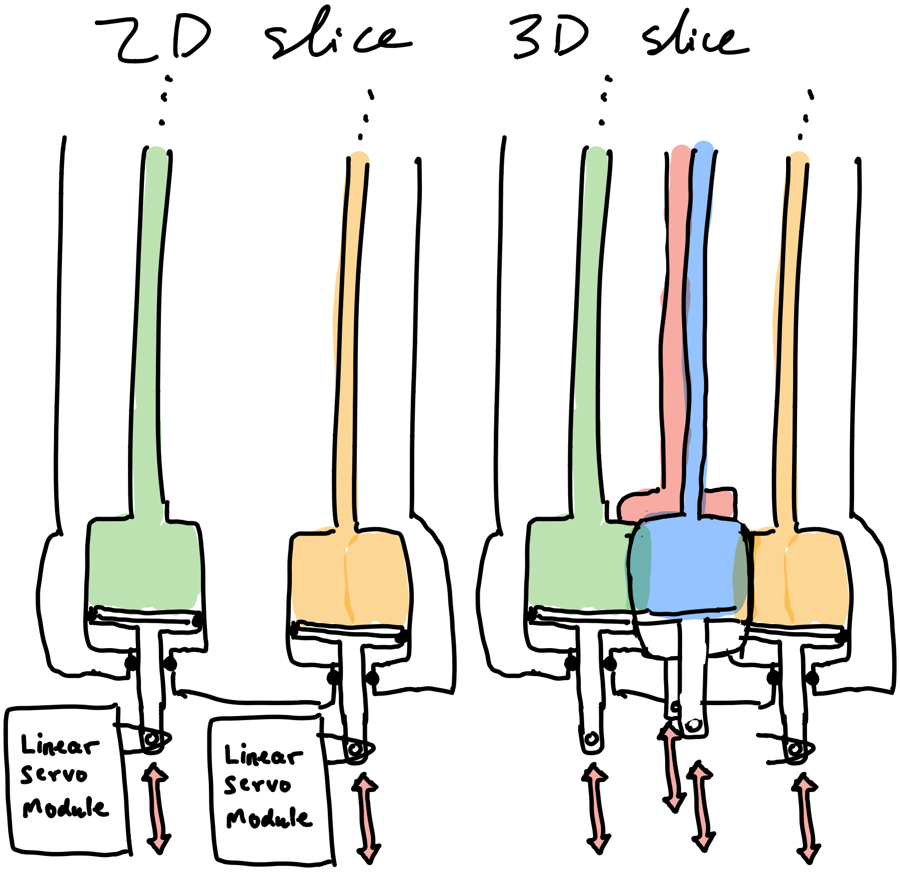
1) dildo moves up & down, side to side
   - mechanism: linear servo

2) dildo with vibration motors

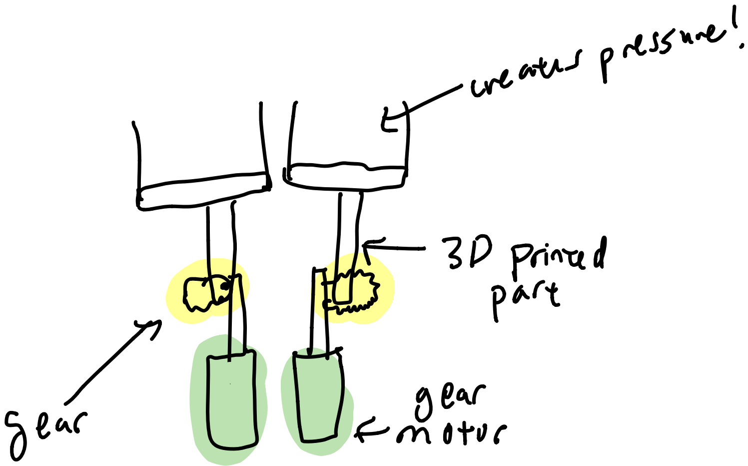
3) dildo with mesh sensor

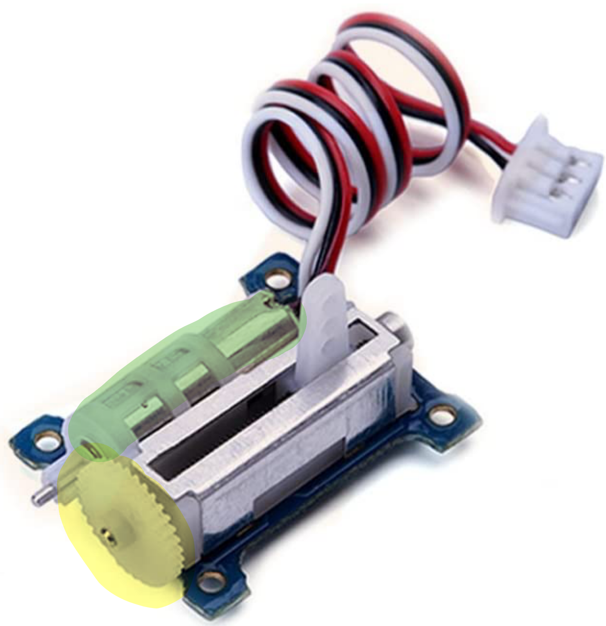
1) dildo moves up & down, side to side
• mechanism: linear servo

https://youtu.be/JSAmBnOtCks



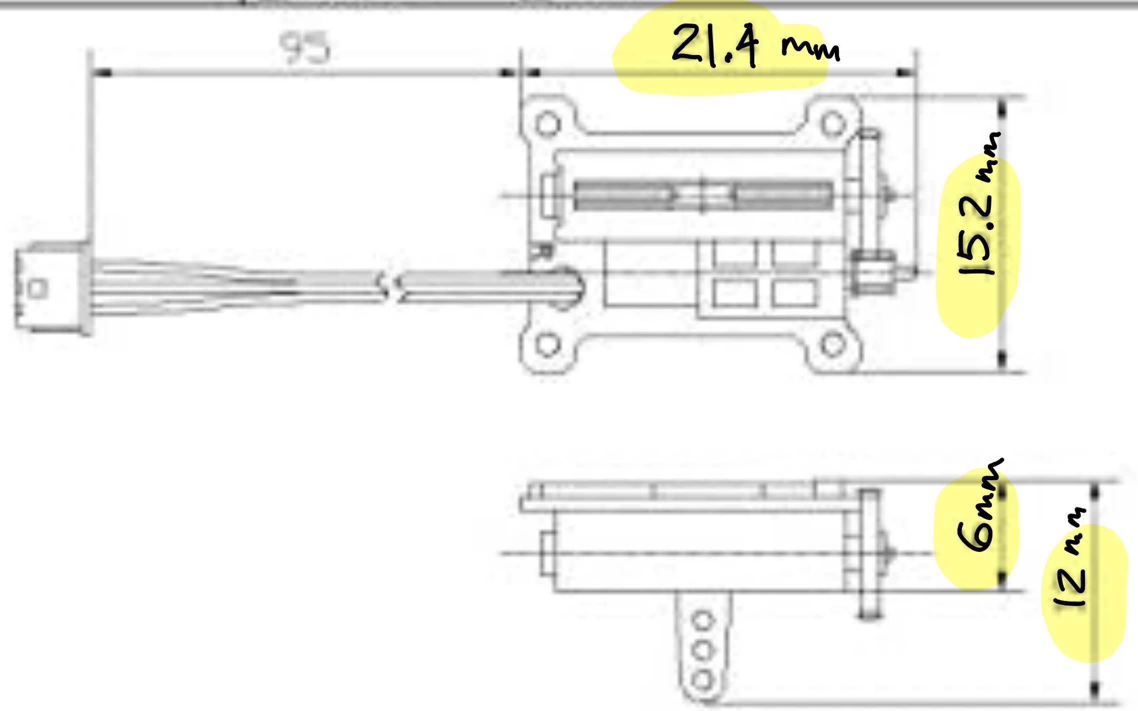
https://www.amazon.com/20Pack-5ml-Syringes-1-5inch-Needles-Disposable/dp/B07JK4KNW7/

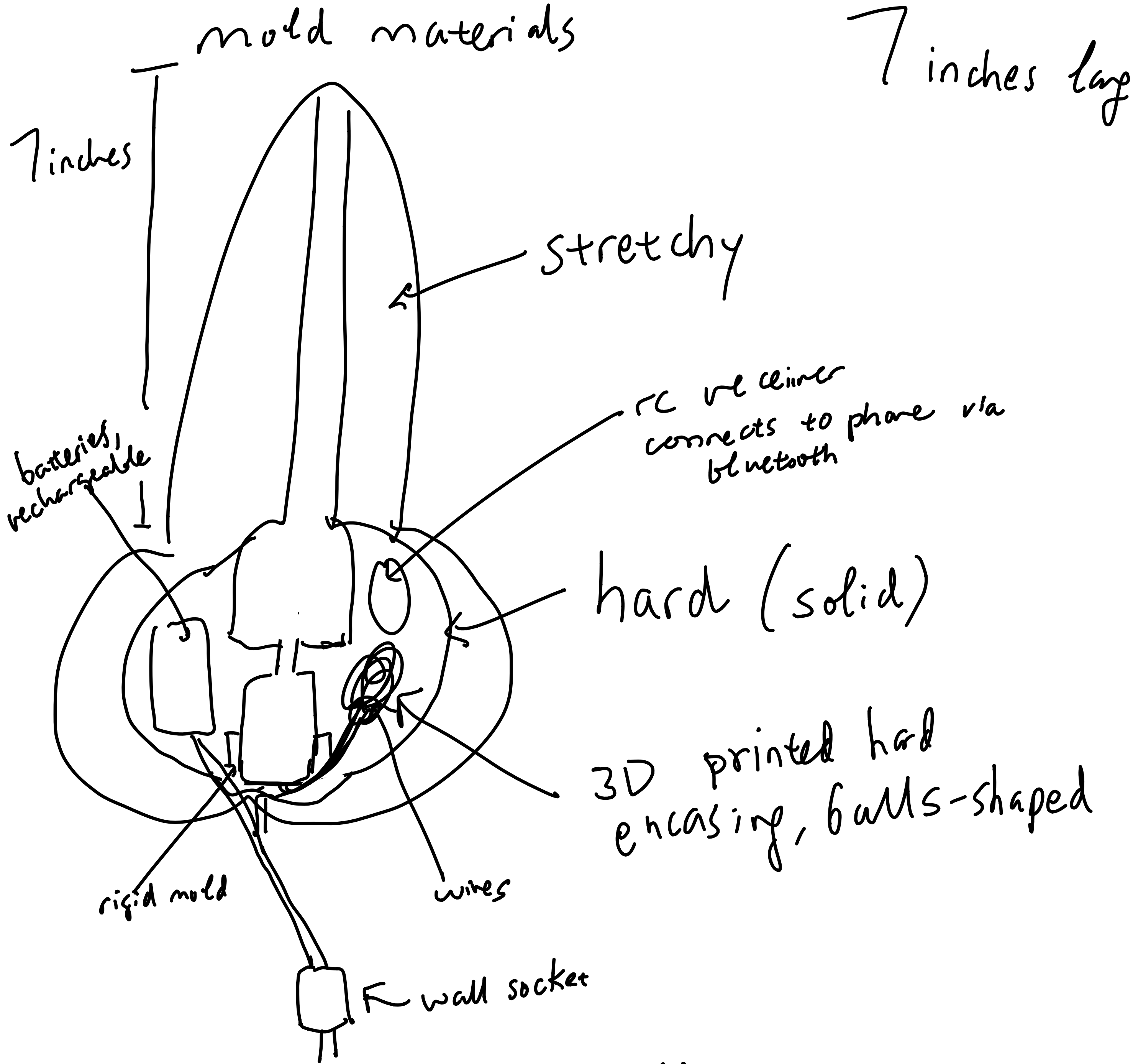




https://www.amazon.com/GoTeck-Analog-GS1502-Loading-Linear/dp/B06XCPRP5L

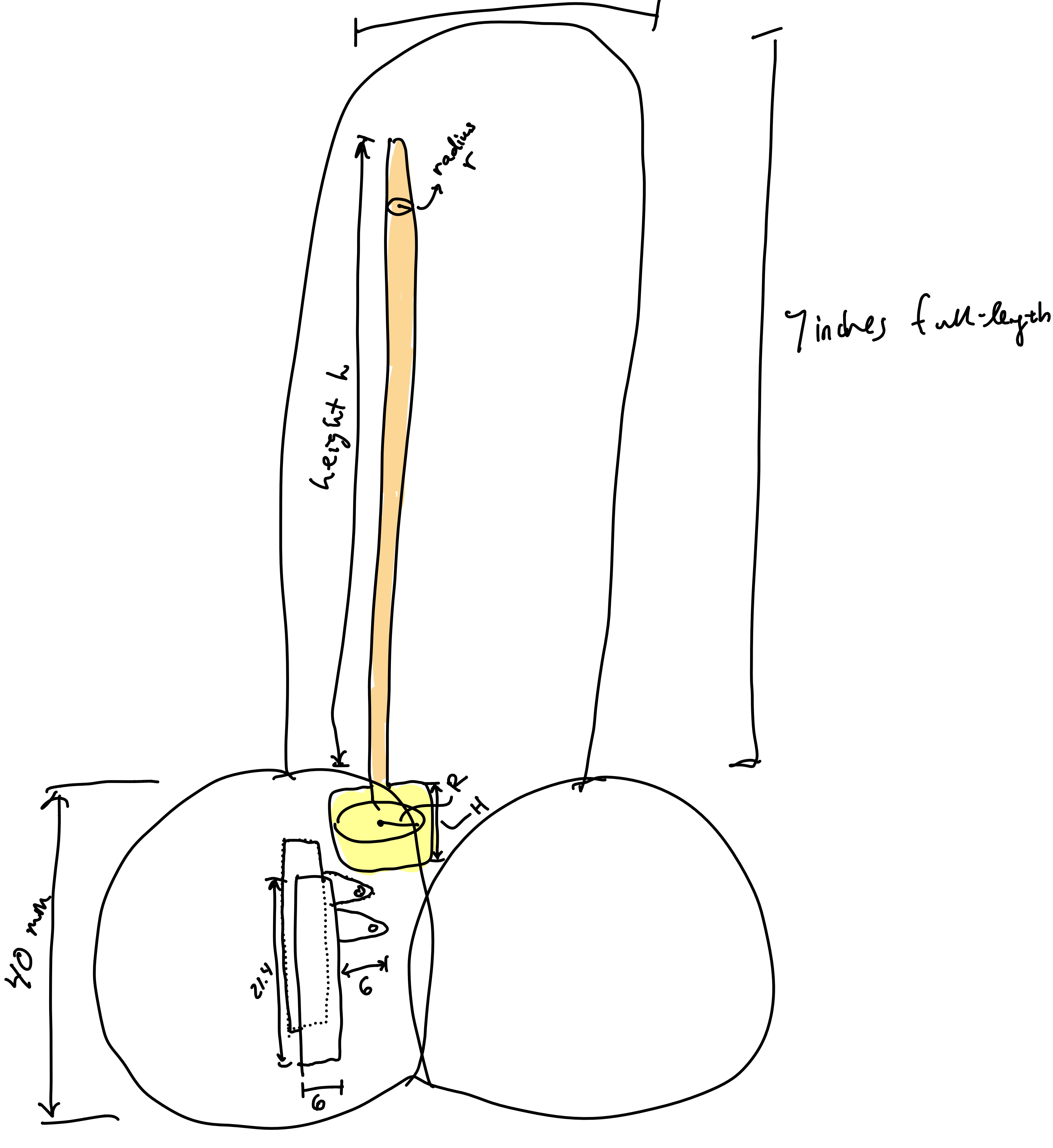
Control System	PWM 1520uS / 333Hz			
Operating Voltage	3.3V ~ 6.0V			
Operating Temperature	-20C°~ +60C°			
Testing Voltage	At 3.7V	At 4.2V	At 5.0V	At 6.0V
Torque	120g.f	170g.f	200g.f	240g.f
Unload Speed	0.12S/7mm	0.11S/7mm	0.10S/7mm	0.08S/7mm
Unload Current	55mA	32mA	80mA	100mA
Loading Current	230mA	300mA	400mA	450mA
Dead band	5 usec			
Life Time	>15000 times/ unload			
Angle	7mm±0. 5mm			
Direction	☐CCW	☒CW / pulse width 1500 to 2100 usec		
Motor Drive	☐FET Drive	☒IC Drive	☐Audion Drive	
Motor Type	☐Brushless	☒Coreless	☐DC	
Angle Sensor	☒Potentiometer	☐Magnet Sensor		
Signal	☒Digital	☐Analog		
Programmable	☐Yes	☒No		
Bearing	☐Metal	☐Plastic		
Gear Material	☐Steel	☐Titanium	☐Copper	☒Plastic
Case Material	☐AL6061T6	☐Plastic + Alu	☒Plastic	
Waterproof	☐IP65	☐IP67		
Dimension	21.4*15.2*6.0mm			
Net Weight	1.5g (excluding accessory)			
Wire Gauge	31AWG			
Wire Length	10mm			
Negative	☒Black	☐Brown	☐Red	
Positive	☒Red	☐Black		
Signal	☒White	☐Orange	☐Grey	
Application	☐RC Car ☐Helicopter	☐RC Boat ☒Robot	☒RC Plane	





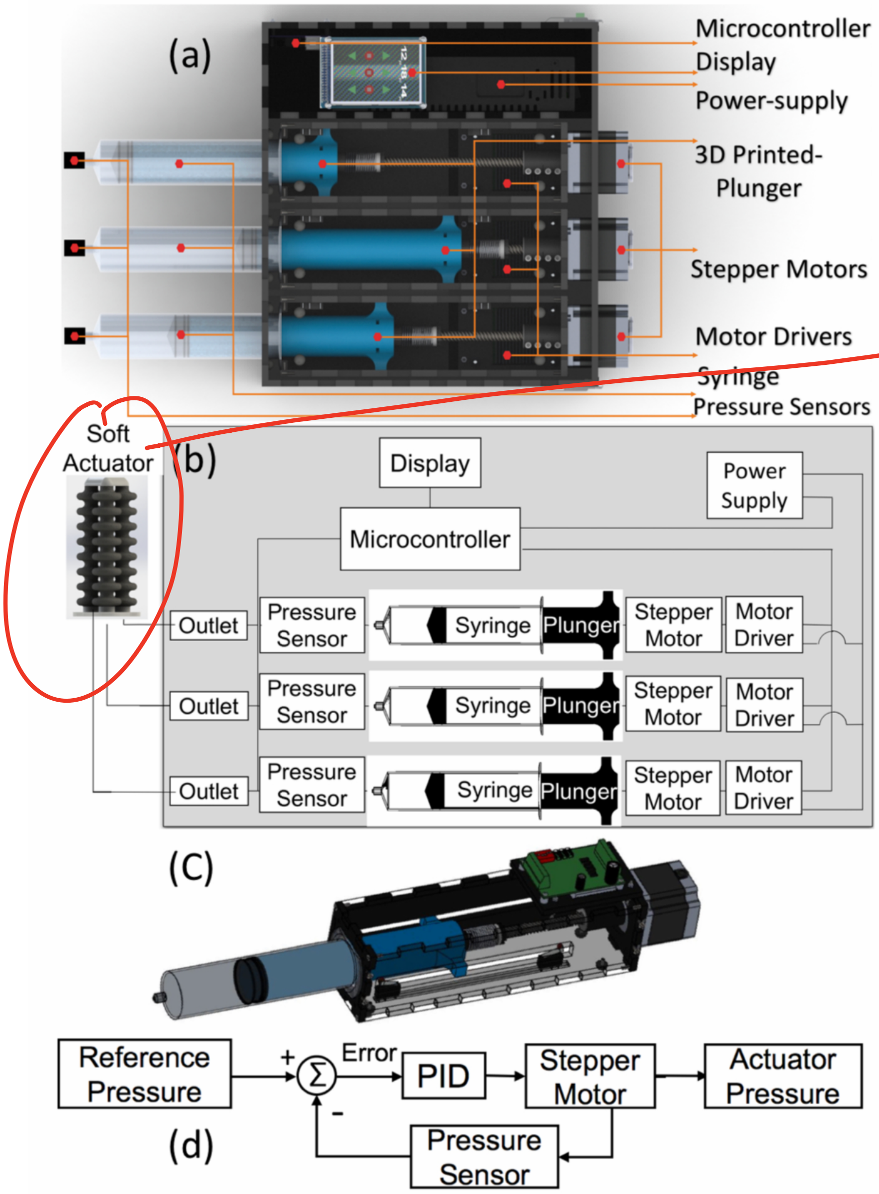
(3.3V)
Voltage regulation: arduino or microcontroller
⇒ need to DRIVE servos w/ arduino

Circumference:
4.56in



2 testes

man testicle is about 4 x 3 x 2 centimeters (cm) in size



we can swap act.

make 3 s