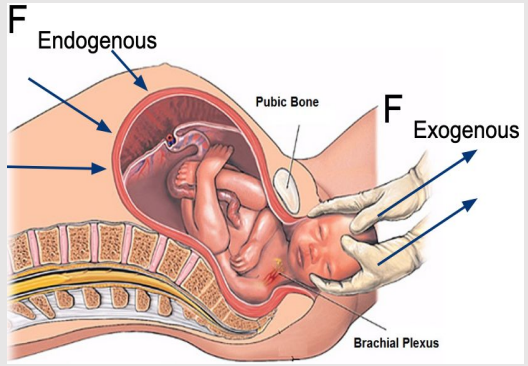
Team 13: Device to Induce In vivo Brachial Plexus (BP) Injury in Neonatal Piglet

Members: May Allall, Aditya Master, Parth Hardikar **Advisors:** Dr. Sriram Balasubramanian (Drexel), Dr. Anita Singh (Widener) **Instructor:** Dr. Joseph Sarver (Drexel)

Medical Need

- Neonatal Brachial Plexus Palsy (NBPP) **affects 1 to 4 per 1000 births**
- Leads to overstretching and/or avulsion of the BP nerves
- Biomechanical injury mechanism is poorly understood

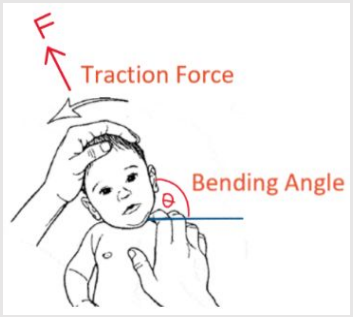


Project Goal

Develop a biomechanical device to cause in vivo external neck stretch that will lead to BP injury in neonatal piglets

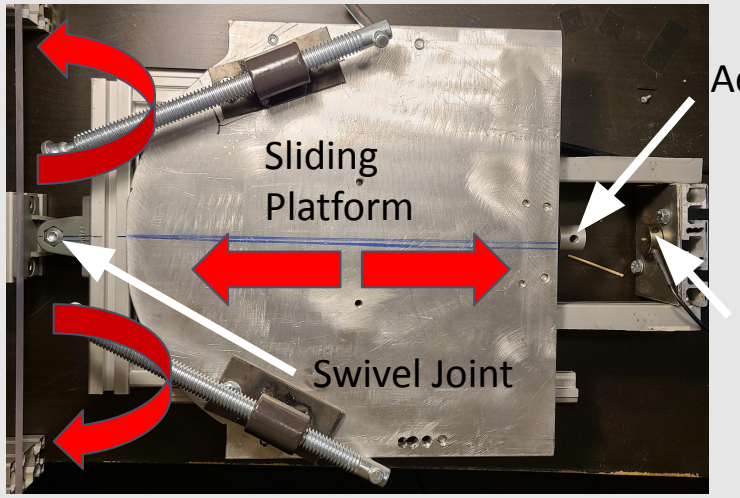
Approach

- Measure Traction Force (load cell)
- Control magnitude and rate of linear distraction (actuator)
- Control lateral bending angle of the neck (swivel joint)



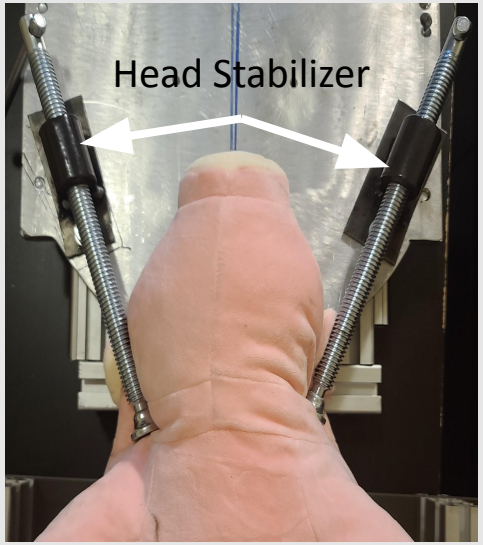
Note: Our device will replicate force and lateral bending on a piglet model

Solution



Actuator

Load Cell



Results - Verification Testing

Test	Average % Error
Known Weight vs. Measured Weight	5.20
Input Displacement vs. Measured Displacement	0.342
Input Displacement Rate vs. Measured Displacement Rate	1.72

Future Plan

- Develop fastening system
- Solder the wires on the circuit board

Impact

- With the development of this device, clinicians will understand more about the mechanisms and biomechanical properties of BP injury