During intracranial surgery one of the most potentially dangerous and time consuming portions can be repairing fenestrations (openings) in the dura mater. Current methods include suturing the fenestration which is time consuming, costly to the patient and potentially dangerous if mishaps occur. We were tasked with creating a quick efficient and safe solution to this problem.

**EXPERIMENTS**

**Test Chamber:** Stimulated intracranial pressure (ICP) utilizing the pressure chamber and a synthetic membrane in place of dura mater. Increasing pressure from 9 cm H2O (the minimum normal human ICP) to pathologic levels (>20 cm H2O).

**Pig Studies:** In order to determine the efficacy of the design, testing would need to be carried out on dura mater. Swine and bovine dura mater closely resembles human dura. Once extracted SEM and qualitative test were conducted to choose a synthetic material with material characteristics similar to dura.

**APPLICATION**

At this point we have demonstrated proof of concept, where a purely mechanically actuated device would effectively reduce leakage and hold pressure up to 25 cm H2O. We also demonstrated an application where the device is deployed from the applicator on to the fenestration site. Due to material constraints we were not able to combine these two concepts into one. Moving forward we will utilize PLGA (polyactic-co-glycolic acid) as the material for deployable arms or a collagen matrix similar to the base at a higher density. The PLGA is a bio-absorbable material approved by the FDA for human use in dura injury application.

The material properties make it an excellent choice as it is flexible, durable, and resilient under these conditions.

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