BiSTro: Biaxial Strain Tester for Porcine Aortic Tissue

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Problem

150-200k people die from aortic aneurysms each year

From damage to aortic tissue

Dr. Eberth wants to study mechanics of porcine aortic tissue using **planar biaxial testing**

Problem: Biaxial testers are expensive and not customizable

Objective: Create an **affordable** and **customizable** planar biaxial loading device to study porcine aortic tissue

Key Design Requirements

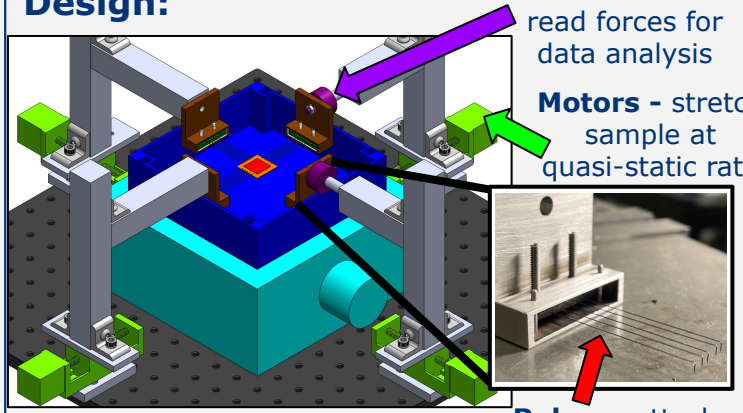
Read small forces (***0.1-2.5 N***)

Stretch tissue sample (***≤ 8.5 mm***)

Quasi-static stretching (***≤ 850 µm/s***)

Solution

Design:

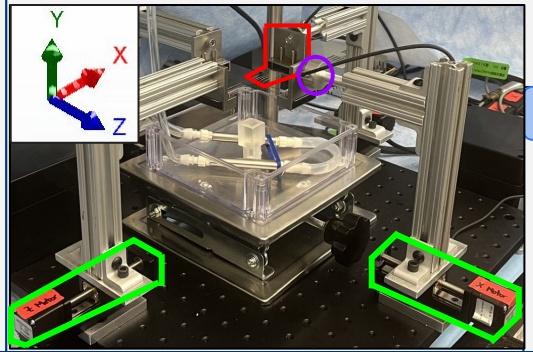


Load Cells - read forces for data analysis

Motors - stretch sample at quasi-static rate

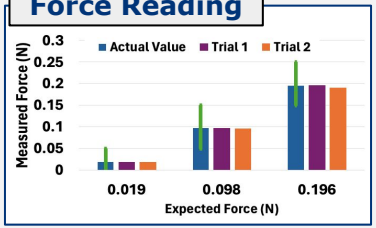
Rakes - attach to sample to stretch it

Build:



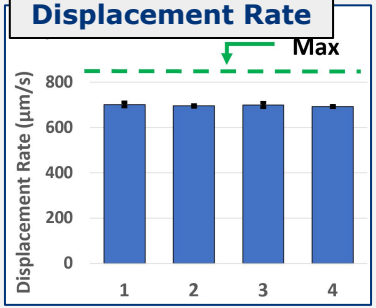
Verification

Force Reading



Both load cells measure 0.1-2.5 N forces at a 0.1 N scale

Displacement Rate



All motors move at < 850 µm/s

Future

Develop image correlation capability

Implement additional testing protocols

BiSTro will allow Dr. Eberth to study aortic mechanics at a low cost (~$3,000), informing research in aortic aneurysm prevention