**METHODS**

- Mechanical testing system allowed for unconfined lengthening, twisting, and circumferential distension
- ICP was cycled between 0–60 mm Hg
- Outer diameter and length of the ONS were recorded
- Tests were performed under variable axial loads

**RESULTS**

Representative pressure-diameter response of the ONS at different axial loads. Note that the curves cross over at ~11 mmHg (black circle), suggesting that at this pressure the diameter does not change despite variations in axial loading.

Representative change in length in response to pressure. The length of the ONS adjusts to maintain a constant diameter at ~11 mmHg.

**CONCLUSIONS**

- The ONS is a mechanically complex structure
- Crossover point at 11 mmHg of the pressure-diameter curves
  - Diameter remains constant at this pressure regardless of the axial load that is applied
  - Corresponds to in vivo ICP levels for pigs (Kaiser et al. Laboratory animals, 2007)
  - The observed helical and axial orientation of the collagen fibers may explain this behavior
  - Such mechanical behavior would avoid compression of the optic nerve during change in gaze angle
- Despite large variations in strain, the stress remained nearly constant between samples
- Remodeling of the ONS may be targeted at maintaining this homostatic stress target

Future studies will involve studying the effects of varying ICPs for extended periods of time on the mechanical properties of the ONS. In addition, we will include these observations into current computational models of the optic nerve to help improve their accuracy and enable prediction of possible risk factors of VIIP.

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