A Novel Planning Paradigm for Augmentation of Osteoporotic Femora

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Goals:

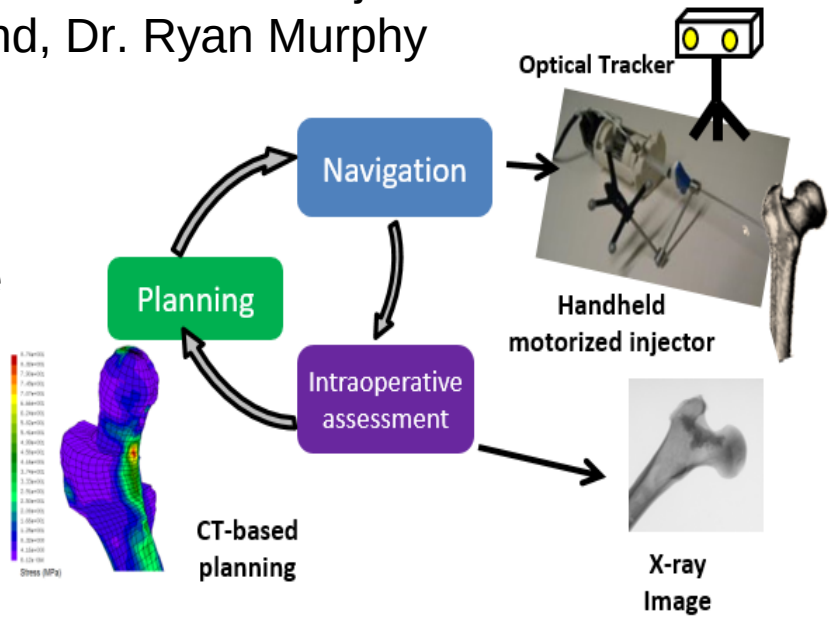
- Validate a modified planning paradigm for reducing the injection volume of femoroplasty.
- Create a Finite Element (FE) model to estimate the bone temperature after cement injection
- Introduce a methodology to reduce the curing temperature of the cement.

Significance:

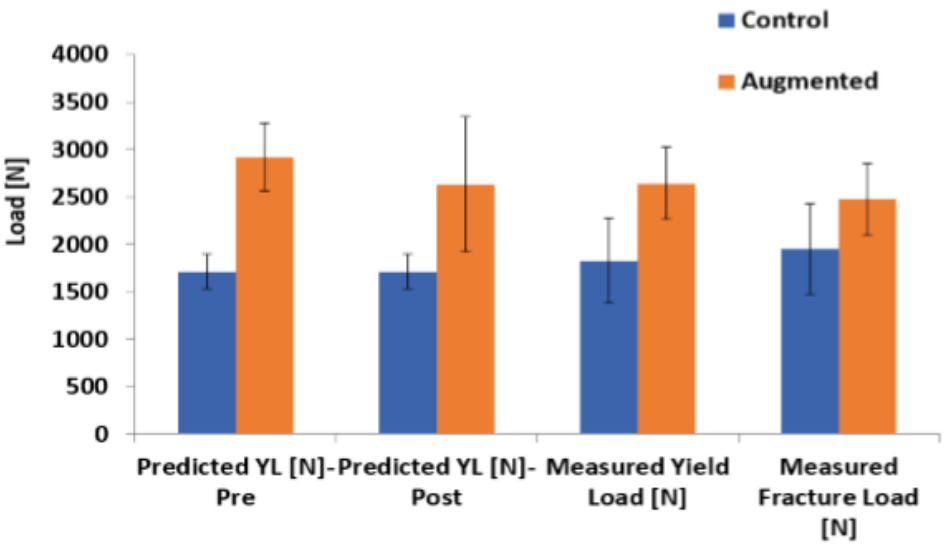
- Osteoporotic hip fractures are responsible for thousands of deaths
- Higher volumes of PMMA injection may introduce the risk of thermal necrosis

Results:

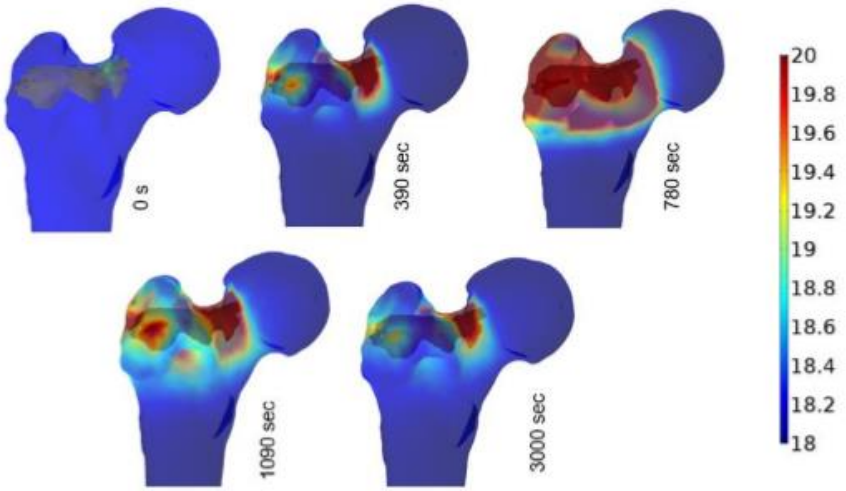
- Augmentation significantly increased:
  - Yield Load : 27.1 %
  - Yield Energy: 48.8%
- Heat transfer Finite Element model and cooling system have shown promising first-attempt results



Biomechanical Results of Augmentation



COMSOL Temperature Estimations



Temperature Reduction by cooling