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