

# Hip Joint Implant Design Improvement

## Feasible, Optimised Complex Surface features through CAE & Additive Manufacturing

### BACKGROUND AND CHALLENGE

The life and success of uncemented hip joint stem implants were highly dependent on osseointegration with femur bone. The osseointegration was in turn reliant on the geometry/surface of uncemented implant.

### SCOPE OF WORK

- CAD support for design improvement
- Optimize hip joint stem
- Maximize osseointegration
- Use CAE simulation and additive manufacturing

### SOLUTION

- Ensured design improvement by providing geometrical features that facilitated osseointegration
- Identified the most suitable design proposal through comparison of predictions by structural/durability CAE analysis of multiple design proposals
- Achieved weight reduction without losing the advantage of complex surface geometry for osseointegration
- Used the best design approach for Additive Manufacturing
- Devised a future-facing manufacturing process that catered to upcoming changes in design

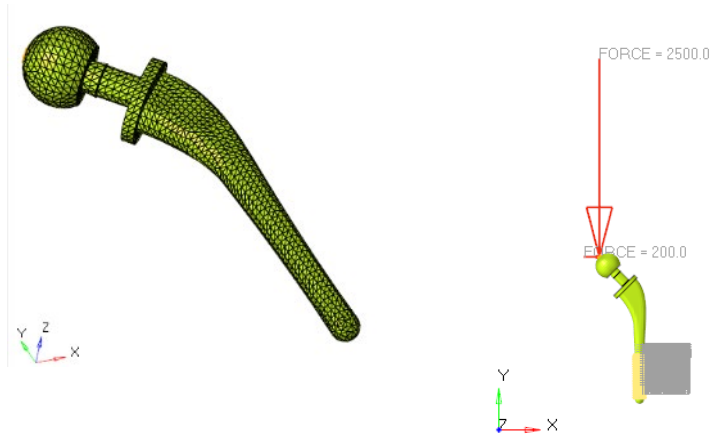


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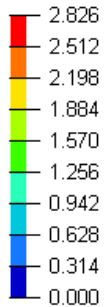
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**IMPACT**

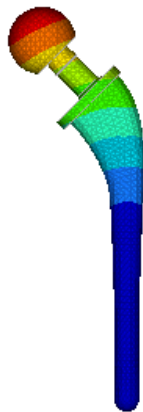
- Expedited the design and manufacturing process
- Helped the customer provide the most effective and customized implants



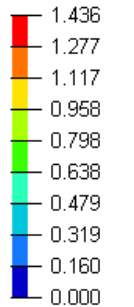
Contour Plot  
Displacement(Mag)  
Analysis system



1: Model  
Subcase 1 (LoadSteo) : Static Analysis : Frame 0



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