IN-SILICO INVESTIGATION OF PERIPROSTHETIC FRACTURES: ROLE OF THE BODY MASS INDEX

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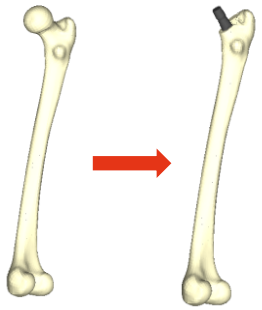
Introduction

- Periprosthetic femur fractures (PFFs) are the third most common reason for revision surgeries.
- Mostly due to low energy falls and physiological load cases like stumbling
- The influence of body mass index (BMI) in PFFs is discussed in several studies with contradicting results.

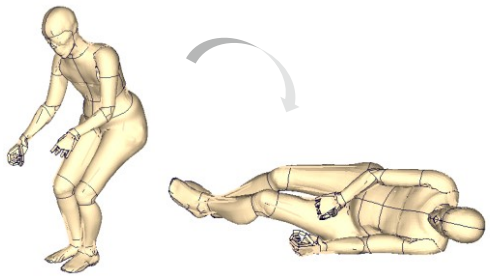
Methods

Implanted femur models:

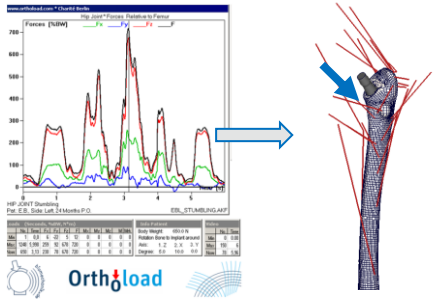
- Two femurs for BMI values of 20 and 32 (T-score: -1.8 and -1.4, respectively).
- A generic tapered stem was implanted following surgical procedures.



Load cases:



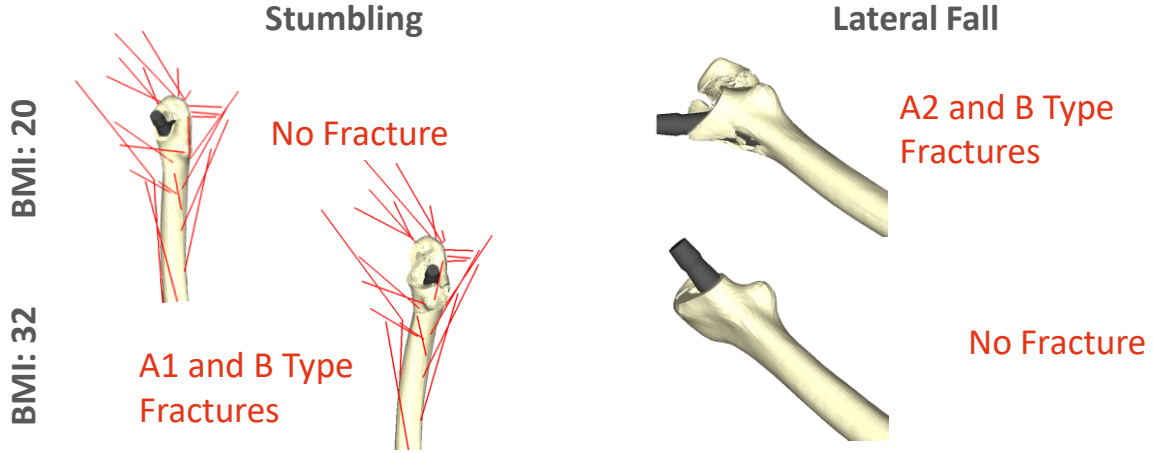
Lateral falls: Proximal femur reaction forces were measured with HBM simulations (Cebeci, 2020).



Stumbling: Hip joint reaction forces (Orthoload-Database) were applied along with the hip muscle contractions.

Results

- Fall induced early postoperative PFF risk is negatively corelated with BMI.
- Early postoperative PFF risk under stumbling loads increase with BMI.



Discussion

- No overall increase in early postoperative fracture risk due to the increased BMI.
- BMI and load case specific fractures risks were identified
- Developing patent specific fracture prevention strategies

- Future work: Influence of stem design

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QUESTIONS AND CONTACT

THANKS FOR YOUR ATTENTION

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