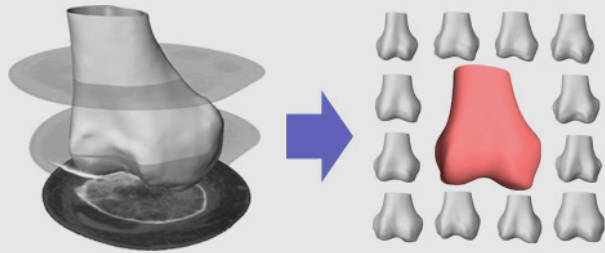


Statistical Shape Analysis for Implant Design

1. Statistical model generation

Statistical bone model is built based on 20-50 input datasets. Models can be generated either from CT or MR imaging.

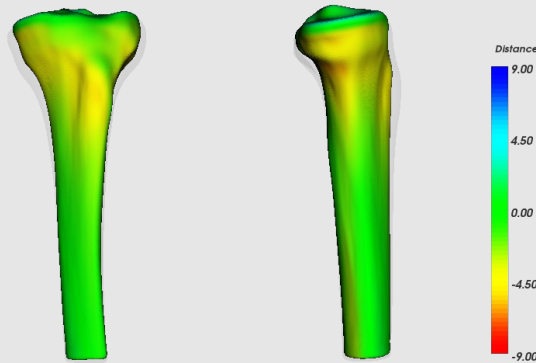
The model can include additional information like landmarks, axis and other patient information (gender, age, indication).



2. Compute shape variations

Generate mean model and main shape variations.

Analysis and visualization of shape variations for the full bone model or specified surface areas including landmarks and axis data.

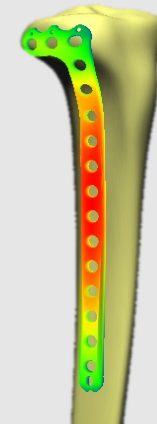


3. Implant design and validation

Statistical analysis can show the range of variability in a given target population for the full bone shape or defined surface regions.

Evaluation of implant specific features based on computed shape variations.

Design optimization and automated validation of bone-implant fit.



Results

Semi-automated segmentation tools.

Model generation from CT and MR imaging.

Input model optimization (smoothing, reduction, cleaning).

Model alignment, landmark/axis definition.

High resolution model generation using parallel computation (cloud computing).

Create animations of main shape variations with color coded distance map.

Analysis of full bone shape, partial surface areas and 2D contours.

Model export in CAD-Formats (STL, PLY, STEP).

Automated implant fit on statistical bone model based on landmarks and surface distance.

Analysis/validation of bone-implant fit, surface coverage, screw trajectories.