Advanced techniques for generating patient-specific parametric Finite Element models

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Solution: Problem: Time reduction through the Bone modeling is a parameterization and time consuming process reuse of models 1. Parameterization 5. Loadcase setup with reusability of New initial and boundary conditions Legacy **Process** Upper boundary **Process** Characteristic **Generic models** Segmentation geometric curves **Pre-processor** Geometry improvement Contacts **Shell mesh** Template 3 Fitted Fitted curves Fix violating 2. Compatible generic model shells Solid mesh Template 1 Template 2 Template 3 Template 1 Template 2 Template 3 **Fix violating** solids Load Assign materials Loadcase setup Patient/ Template 1 Overlapped **Creation of** 3. Geometry Morphing # 1 reference system **Patient-specific** model 4.64863 Extra 3.65309 components 2.65755 1.66202 0.666484 **Pre-processing** Contacts -.32905 **ANSA** -1.3246 Geometry improvement -2.3201 Parameterization **Boundaries** -3.3157 Geometry morphing tool -4.3112 Lower boundary No Value Fix violating elements Loads 6. Post-processing Assign materials Inspection of results Loadcase setup Overlapped Distance plot Solver controls >30.82 Geometric deviation 27.74 4. Geometry Morphing # 2 **Solving** 24.66 Solver 21.58 18.49 15.41 Post-12.33 5.7E-14 processor 9.25 **Post-processing** 1.9E-14 3.08 -2.E-14 < 0.00 -8.E-14 -9.E-14 Benefits: -1.E-13 Target simulation > Fast simulation setup, with few controls > Minimal user interaction Overlapped Distance plot > Reusability of models Geometric deviation