
Applications of ANSA – Morphing Tool in Biomechanics modelling.

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ABSTRACT

The Finite Element Analysis of a human body member, as far as its strength is concerned, requires a time-consuming process to prepare the geometrical data and depends on the software that will be used. Usually, the existing geometrical data result from a computer tomography of human body members and are 2D images. These 2D images should somehow construct 3D views, which will be used to generate 3D geometry.

The aim of this paper is to define how the CT Scan data are translated to 3D geometry, as well as how to prepare the resulted geometry for further analysis, using a finite element software. To avoid the repentance of this process each time that appears a new tomography of the same member, it is recommended to create a general geometric model for the studied human body member, called template-model. The template-model is modified according to the feature parameters coming from the new human body member, called examinant-model. This modification decreases the duration of the whole process of getting the final model, since it is not required the translation of the examinant-model CT Scan data to geometrical.

In the current project, in order to reach this achievement, ANSA pre-processor has been used and more specifically the ANSA – Morphing Tool. The ANSA – Morphing Tool can modify the shape of a FE – Model with a flexible way allowing the convergence between the template – model and the examinant – model.

Although the so far ANSA – Morphing Tool functionality is developed based on the demands of technical structural applications, it could be expanded in biomechanical field, investigating its demands for further development of new functions.

Keywords: template-model, examinant-model, ANSA – Morphing Tool, feature parameters, FE – Model, FEM, CT scan, biomechanics, mandible, teeth, vertebra, segmentation