

ARTIFICIAL INTELLIGENCE IN INTACT TOOTH MODEL CREATING AND STRENGTH TESTING

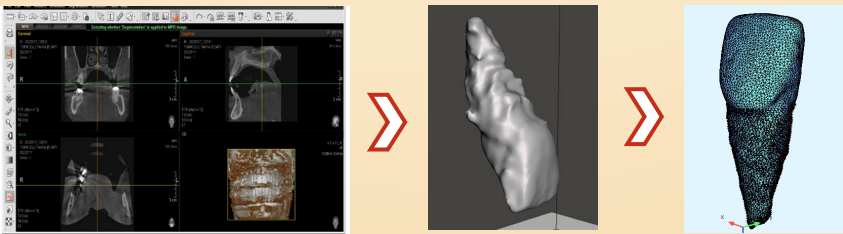


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INTRODUCTION: Artificial intelligence (AI) is becoming an increasingly common, widely used tool for intact tooth 3D modeling from CBCT scans. Also, AI could be used for biomechanics testing, with high value of accurate.

MATERIALS AND METODS: CBCT of the patient was made. After exporting the DICOM format of CBCT in 3D Slicer the upper left central incisor was isolated as volumetric finite element model from the maxilla and then its mesh was corrected and refined in 3D Slicer and Meshmixer. The next step was to convert the exported ASCII code from Meshmixer into appropriate ASCII code for SOFiSTiK with the help of artificial intelligence. The 3D intact tooth model was made with all biological tissue properties. With that, the volumetric model was ready and subjected to strength testing with SOFiSTiK.



RESULTS: The fracture resistance testing was conducted in SOFiSTiK. The results have shown that the intact tooth has a high value of strength, around 1350 N. This value is near to value of in vitro testing with Universal Testing Machine (UTM).

Table and figure 1. Results obtained from testing with a UTM

Species	Mean fracture load				
	n	(\bar{X})	σ	min	max
intact tooth	20	1346,9	320,25	954	2030

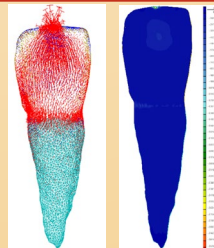
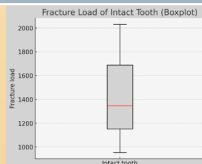


Figure 2. Results obtained from testing with SOFiSTiK

CONCLUSION: Today, in vitro fracture resistance studies have been totally replaced with artificial intelligence algorithms studies. This way of testing the fracture strength could save money and time with value of accurate as in vitro testing.