



Stress on Bone with Different Framework Materials and Cantilever Lengths-3D FEA

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ABSTRACT


Background and objectives: Implant supported prosthesis are being widely used nowadays for better function and aesthetics. Success of the treatment depends on the preservation of bone which is affected by the masticatory stresses. The purpose of this study was to evaluate the stress distribution on the bone in implant supported fixed complete mandibular prosthesis with three aesthetic framework materials-PEEK, Trinia, Zirconia and two cantilever lengths of 10mm and 15mm using FEA .

Materials and methods: Six models representative of different framework materials (Peek, Trinia, Zirconia) with cantilever lengths of 10mm and 15 mm were constructed respectively using ANSYS software. All the models were of edentulous mandible with a U-shaped arch and consisted of five Genesis implants. All the models were studied for stress distribution in the bone (cortical and cancellous) under 200 N vertical load with an aim to understand, analyze and compare the stress values.

Results: The results obtained showed that the stress on the cortical bone was least for zirconia framework in 10mm and 15mm cantilever length, while that of cancellous bone was least in Trinia in 10mm cantilever length and zirconia in 15mm cantilever length

Conclusion: Zirconia framework can be the first preferred in implant-supported prosthesis as this transfers less stress to the underlying bone followed by Trinia and Peek frameworks.

Keywords: Finite element analysis, Trinia, PEEK, Zirconia, framework, Cantilever length, implant supported prosthesis.

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