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Comparative finite element method analysis between innovated twin mini screws and conventional anchorage device

Aim: The aim of this study is to evaluate the stability of innovative interconnected orthodontic mini screw system i.e., Seifi Twin Screws (STS) compared with conventional temporary anchorage device (TAD) configuration by using finite element method.

Materials & Methods: A configuration of titanium mini screw with 8 mm long and 1.6 mm diameter and a cantilever spring inserted on mini screws were designed by a computer aided design software Solidworks 2015. Three-dimensional models were created for each mini screw configurations. The size of each element was 0.4 mm and an isotropic type was used in model construction. Loads in different directions have been applied on models and reactions of system, stress distribution and strains were calculated by finite element based software (ABAQUS 6.14.4).

Results: The finite element analysis was a suitable approximation of clinical simulation in relation to stress distribution and force application. Analyzing the von Mises stress values showed significant lower maximum stress, less undesirable movements and less rotations in the innovated system.

Conclusion: The finite element base analysis demonstrated that the innovated model of STS can be adapted as a clinical orthodontic tool. The usage of innovated system is advantageous in terms of biomechanical stability and lower load deflection rate.

Biography

Negin Sadat Matini has received her DDS degree from Shahid Beheshti Dental School in 2015. She has published 3 PubMed articles and a patent during her undergraduate program. She is the Founder and CEO of Noavadental Research Group, Iran. She has attended many international congresses and she is also a private practitioner and a researcher mostly in orthodontics.

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