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BIOMECHANICAL COMPARISON OF TITANIUM VERSUS ZIRCONIA IMPLANTS: (3D-FEA STUDY)

Mesut Tuzlali¹, Esmâ Başak Gül², Emre Özyılmaz³, Ediz Kale¹, Aslıhan Köroğlu¹, Mehmet Dalkız¹, Halil Aykul³

¹Department of Dentistry, Mustafa Kemal University, Hatay, Turkey

²Department of Dentistry, İnönü University, Malatya, Turkey

³Department of Mechanical Engineering, Hitit University, Çorum, Turkey

PURPOSE: The aim of this study was to use 3D FEA engineering tools in order to understand the influence of material type which the dental implants are made of on the stress distribution in cortical human bone under regular biting forces.

MATERIALS & METHODS: A 3D FEA model of the maxilla, two types of implants and their respective abutments made of titanium or zirconia and an implant supported anterior fixed partial prosthesis were simulated. An arbitrary static biting force of 100 N was applied at the palatal surface of the maxillary incisors obliquely. The material properties of the implants, boundary conditions and interface definitions based on literature were used. 3D FEA was performed in order to analyze the amount of stress transmitted to the cortical bone through the different implant materials. The Ansys software was used for these purposes.

RESULTS: Comparable stress values were measured in peri-implant cortical bone for both types of implants. From a biomechanical point of view, the stress distribution of zirconia made implants slightly increased in the cortical bone.

CONCLUSION: It can be concluded that zirconia implants may be a viable alternative to titanium implants for the anterior fixed partial prosthesis. This is particularly relevant for a select group of patients with esthetic demands and a proven allergy to titanium. Further studies are required to verify these in vitro results.

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A4 - YEAR FOLLOW - UP OF A FRACTURED ENDODONTICALLY TREATED INCISOR RESTORED WITH A ONE-PIECE POST AND CORE LAMINATE VENEER

Sara Valizadeh¹, Zohreh Moradi²

¹Department of Operative Dentistry, Tehran University of Medical Science, Tehran, Iran

²Operative Department, Tehran University Of Medical Sciences, Iran

To achieve natural-appearing esthetic result and also conservation of tooth structure, it is important for the practitioner to be aware of technological advances in materials science as well as the proper use of esthetic dental techniques. This clinical report describes the restoration of a left maxillary lateral incisor using an one-piece post and core laminate veneer. This proposed restoration technique represents an alternative to traditional restoration procedures such as metal-ceramic restorations, all ceramic crowns and conventional porcelain laminate veneers. It also conserves the remaining tooth structure, reestablishes function and offers satisfactory esthetics with the use of adhesive bonding techniques.

