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The influence of different implant suprastructure material in the stress distribution on implant system and supporting bone

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Forces may exceed the mechanical or biological load-bearing capacity of the osseointegrated oral implants or the prosthesis, causing either a mechanical failure or failure in the osseointegration. Load transfer from implants to surrounding bone depends on so many factors; one of it is the prosthesis type. Selection of the type of material used on occlusal surfaces of implant-supported restorations is important because there can be destructive forces at the junction surfaces of the alveolar bone and implant. As several materials have been introduced in this field; the aim of this study is to examine the effect of newly introduced suprastructure materials on the stress distribution in implanted system and supporting bone compare to previously investigated material and is evaluate the influence of different supra structure materials in stress distributions around supporting bone and implant system and establish a relation between module of elasticity in the stress distributed on the implant system and bone. Finite-element stress analysis method using ANSYS program were used for evaluation. XiVE of 13 mm length and 3.8 mm diameter simulated. Implant placed in the mandibular first premolar area was simulated and analysed. Crown designs were as follows: Porcelain fused to noble metal crown, porcelain fused to base metal crown, In-Ceram porcelain crown, and IPS Empress 2 porcelain crown and lava ultimate. A 200-N oblique force was applied to the buccal cusp. The results of this study indicated that different types of restorative materials play an important role in the amount and distribution of the stresses in the suprastructure and implant and may play a role in protecting the bone. The stress on veneer were similar in similar veneered material (PFBM, PFNM, Inceram) highest was PFNM (437.904) and the significant was in the least stressed material lava ultimate which it was (378.507). In framework the highest was inceram (60.166). In bone PFNM was the highest (121.282) and lava ultimate the lowest (121.086). In implant inceram is the highest (215.989) and again the lava ultimate was the lowest 215 (801). Although the modulus of elasticity of suprastructure material has a correlation with stress in implant and bone, it doesn't solely and significantly the influence of the stress value and distribution in implant and bone. A combined with mechanically homogenous character is an important factor in providing a preferable effect on stress and its influence. This character has represented in lava ultimate.

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