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Biomechanical behavior of different implant abutment materials

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Purpose: to check the mechanical properties and finite element stress analysis of 3 implant abutment materials. Materials and methods: fifteen bars (25mm length, 4mm. Thick and 5mm.width) of 3 abutment materials; high performance polymer hybrid abutments, nano-fiber reinforced composite and fiber strengthened composite divided into 3 teams were exposed to flexure strength and deflection tests. Fifteen implant abutments (two components abutment) coated by all ceramic crowns divided into 3 teams were exposed to static fracture resistance take a look at and finite element stress analysis. Results: flexure strength tests mean and standard deviation of bar specimens showed vital distinction, wherever gp I, II, III were 519.29 ± 0.46 , 200.74 ± 0.33 and 315.43 ± 0.59). Also, deflection takes a look at mean and standard deviation were 3.052 ± 0.040 , 0.984 ± 0.106 , 2.028 ± 0.027 respectively discovered vital distinction. The comparison between fracture resistance mean and standard deviation of the tested abutment 3 groups were 642.00 ± 5.637 , 306.00 ± 30.496 and 514.40 ± 12.915 respectively and discovered significant distinction. Finite part stress analysis of applied vertical load on the 3 abutment materials failed to have clear distinction however the smallest amount stresses created on bone with Nano-FRC abutment (16.2) followed with FRC (17.32) then biohpp abutment (18.55). Conclusion: fracture strength of biohpp abutments with ceramic crowns had the potential to resist most occlusal forces, conjointly showed higher fracture patterns than the FRC and NFRC abutments. And showed a higher stress distribution on the set, suggesting a decent mechanical behavior.

Recent Publications

1. Mohamed Atif Elkholy, Mohamed Kamel Sedeek, Waleed Mohamed Elshahawy and Elrefaiy Sobhy Qenawy, Biomechanical behavior of different implant abutment materials, E.D.J. Vol. 67, No. 4
2. Att W, Kurun S, Gerds T, Strub JR. Fracture resistance of single-tooth implant-supported all-ceramic restorations: an in vitro study. The Journal of prosthetic dentistry. 2006;95(2):111-6.
3. Keller JC, Stewart M, Roehm M, Schneider GB. Osteoporosis-like bone conditions affect osseointegration of implants. International Journal of Oral & Maxillofacial Implants. 2004;19(5):687-94.

Biography

Mohamed Atif Elkholy, was an expertise in evaluation and passionate about improving health. Also, an open and contextual evaluation model based on responsive constructivists creates new pathways for improving healthcare and having experience in research, evaluation, teaching, and administration both in hospital and education institutions.

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