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FUNCTIONALIZATION OF DENTAL IMPLANT ABUTMENT INTERFACE WITH CHITOSAN GEL AND CHITOSAN NANO GEL AND ITS ANTIMICROBIAL EFFECT AT THE IMPLANT ABUTMENT INTERFACE: AN IN-VITRO STUDY

By

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ABSTRACT

Title: Functionalization of Dental implant abutment interface with Chitosan gel and Chitosan nano gel and its Antimicrobial Effect at the Implant Abutment Interface: An In-vitro study

Background: The narrow space that may occur between a dental implant and its abutment is referred to as a "implant abutment microgap". Because it may affect the survival and performance of dental implants, this gap is of great interest to the field of dental implantology. Since microbes may grow in this crevice and cause complications like peri-implantitis and bone loss, it is a crucial area of concern. This study was done in vitro to assess the effectiveness of chitosan gel and chitosan nanogel at the interface between the implant and abutment.

Methods: A total of 40 Bioline implants were divided into four groups, each containing ten implants. Chitosan gel and Chitosan nanogel were prepared.

a) Ten implants from group 1A were each placed into a separate test tube with *enterococcal* BHI broths and chitosan particles in it.

b) Ten implants from group 1B were each put in a separate test tube with broths containing *candidal* BHI and chitosan particles.

c) Ten implants from group 2A were each put in a separate test tube with *enterococcal* BHI broths and chitosan nanoparticles.

d) Ten implants from group 2B were each put in a separate test tube with broths containing *candidal* BHI and chitosan nanoparticles.

All the groups were placed in sterile brain heart infusion broth tubes and inoculated with *enterococcus* and *candida albicans* and the sample was checked at 24 hours, 48 hours, 72

hours, 5th day and the 7th day. After the implants were taken out of the tubes, they were aseptically dried, immersed in a 2% sodium hypochlorite solution for thirty minutes, and then given a five-minute rinse with sterile saline. Following aseptic drying, they were placed in sterile broth tubes intended for brain and heart infusion. This broth was poured in sterile Petri dishes and mixed with liquid BHI Agar at 50 degree centigrade. Thus the data obtained from all the groups were subjected to statistical analysis

Results: There was no statistically significant difference between the two groups when comparing the chitosan and chitosan nanoparticles subgroups.

For *Candida* and *E. Faecalis* species, the comparison between chitosan and chitosan nanoparticles against the control group showed a significant increase in the zone of inhibition in the test groups on days 1, 3, 5, and 7 ($P<0.005$)

Conclusion: Within the limitations of the study, the result suggests that Chitosan and nano-chitosan exhibit considerable promise as antibacterial agents, suggesting their possible usage as dental biomaterials and as an efficient interface between the sealant implant and abutment.

Keywords: Chitosan; Chitosan nanoparticles; Implant abutment interface; Microgap

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