Reg. No: RJ17D0105798 ISSN NO: 2582-0362

HEB JOPD

Journal of Prosthodontics Dentistry
An Official Publication of Bureau for Health & Education Status Upliftment
(Constitutionally Entitled As Health-Education, Bureau)

Photoelastic Stress Analysis around Implants with Two Different Geometric Designs in Patient Simulated 3D Maxillary Model

[1]Dr. S. Hema Nandhini, MDS., [2]Dr. Hariharan Ramasubramanian, M.D.S., [3]Dr. Chitra Shankar Krishnan, M.D.S., [4]Dr. N.S. Azhagarasan, M.D.S., [5]Hariprasad Mohan Prasanna, Ph.D., [6]Ramesh Krishnamurthi, Ph.D.

[1]Associate Professor, Department of Prosthodontics, Dhanalakshmi Srinivasan Dental College and Hospitals, Siruvachur, Perambalur-621113,Tamil Nadu, India.
[2]Professor, Department of Prosthodontics, Ragas Dental College and Hospitals, Chennai, India.
[3]PhD Student, Faculty of Dentistry, University of Otago, Dunedin, New Zealand
[4]Professor & Head of Department, Department of Prosthodontics, Ragas dental college & Hospital, Chennai, India.
[5]Assistant Professor, Department of Mechanical Engineering, Amrita Vishwa Vidyapeetham, Amritapuri, India.
[6]Professor, Department of Applied Mechanics, IIT Madras, Chennai, India.

Corresponding author:
Dr. S. Hema Nandhini, MDS., Associate Professor, Department of Prosthodontics, Dhanalakshmi Srinivasan Dental College and Hospitals, Siruvachur, Perambalur-621113,Tamil Nadu, India.

Email Id: serviceheb@gmail.com

ABSTRACT:

Background: To comparatively evaluate the stress distribution around implants with different geometric designs in varying regions of bone around the implants by means of photoelastic analysis.Five Nobel Active (Group I) and Five Nobel Replace Select (Group II) implants were placed individually in 21 region of patient-simulated maxillary 3D photoelastic models. Loads of 78N and 158N were applied on the cingulum area of the provisional crown to simulate immediate loading and analyzed in a circular polariscope. Fringe patterns produced around each implant before and after loading were photographed. The highest fringe order depicting the stress intensity were recorded and described for the coronal (zone a), middle (zone b) and apical third (zone c) regions of the bone around the implants. Data were tabulated and subjected to a qualitative descriptive analysis of stress patterns.

Results: Nobel Active implants distributed stresses more evenly throughout the length of the implant in zone a, b and c, whereas Nobel Replace Select implants exhibited stress of high intensity in zone b, low to moderate intensity at zones a and c before loading. The intensity of stress was high upon loading

for both the groups at zones a and b. Nobel active implants exhibited moderate to high stress at zone c upon loading, while it remained low to moderate at zone c for Nobel Replace Select implants.

Conclusion: Comparison of two implant designs showed that the stress generated around the immediately loaded implants of both groups were similar in intensity around the coronal and middle thirds. Nobel Replace Select implants showed lesser stress distribution in apical area compared to Nobel Active implants upon loading. Increase in stress intensity was proportional to the increase in load application.

Keywords: stress analysis, immediate loading, implant thread designs, stress distribution.

Access this Article Online	Quick Response Code:
Website:http://heb-nic.in/jopd	
Received on 21/08/2021	
Accepted on 04/09/2021 © HEB All rights reserved	