

# AN IN VITRO STUDY OF THE INFLUENCE OF INTERIMPLANT DISTANCE AND IMPLANT LENGTH ON THE STRESSES INDUCED AROUND MANDIBULAR OVERDENTURES IMPLANT

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## Abstract

**Purpose:** A strain gauge analysis was performed to investigate the influence of interimplant distance and implant length on stress induced around mandibular overdenture implant. **Materials and methods:** The stresses were evaluated for three groups, group (A) two implants of length 11 mm were placed at 19, 23 and 29 mm from each other, group (B) two implants of length 13 mm were placed at 19, 23 and 29 mm from each other and group (C) two implants of length 15 mm were placed at 19, 23 and 29 mm from each other. Acrylic casts were constructed representing completely edentulous mandible. On each cast two implants of same diameter 3.4mm were inserted, upon which complete overdentures supported by ball attachments were constructed. Strain gauges were installed in the labial, lingual and distal sides of each implant to record the strain induced by the applied loads. A special loading device used to produce standardized static vertical load of 60N. The loading positions were located at six points on the occlusal surface (second premolar, P2; first molar, M1; second molar, M2 on the right and left sides). **Results:** Maximum stress areas were numerically located at the buccal sides of implants. Increasing implant length gradually from 11 mm to 13 mm and to 15 mm decreased the maximum stresses around the implants. Increasing interimplant distances gradually from 19 mm to 23 mm and to 29 mm increased the maximum stresses around the implants. **Conclusion:** interimplant distance and implant length affect load transmitting mechanism to the alveolar bone. The results of this study suggested that the use of shorter interimplant distance and longer implant might ensure a better biomechanical environment for both implant and alveolar ridge.

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