

# Effect of Implant Design on Preservation of Marginal Bone in the Mandible

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## ABSTRACT

**Background:** Implant design and surface may have an influence on the marginal bone response during immediate functional loading.

**Aim:** The purpose of this study was to radiographically study the effect of implant design on marginal bone preservation at immediately loaded implants used for prosthetic rehabilitation of the completely edentulous mandible.

**Materials and Methods:** A total of 39 patients, previously treated with five implants for support of a full-arch fixed bridge in the mandible, were included in the study. Either machined Brånemark® implants (Ma) (Nobel Biocare AB, Gothenburg, Sweden) or surface modified Astra Tech® implants with (Mi) or without a microthreaded neck (Ti) (TiOblast, AstraTech AB, Mölndal, Sweden) were used. All fixtures were loaded with a provisional glass fiber or metal-reinforced screw-retained restoration within 24 hours. The provisional restorations were replaced by a 12-unit screw-retained metal-ceramic or metal-resin cantilever bridge after 3 months. Bone loss from baseline to 1 year of loading was measured by means of intraoral radiographs. Only patients with baseline and 1-year radiographs of all implants were selected for comparison. Statistical analysis was carried out on both patient and implant levels.

**Results:** The survival rates after 1 year in function were 98.6, 100, and 100% for the Ma, Ti, and Mi implants, respectively. The overall mean bone loss after 1 year was 1.03 mm (SD 0.87; range 0.77 to 2.5). The mean bone loss was calculated to 1.52 (SD 0.66) for the Ma group, 0.79 (SD 0.79) for the Ti group, and 0.70 (SD 1.01) for the Mi group. There was a significant difference between Ma and Ti ( $p = .023$ ) and between Ma and Mi ( $p = .046$ ) groups but not within Ti and Mi implants ( $p = .70$ ). These conclusions were also valid when the statistical analysis was performed on implant level.

**Conclusions:** There is no impact of design and surface on implant survival in the completely edentulous mandible. Bone preservation in immediately loaded implants in the mandible is influenced by implant design and significantly better on surface-modified AstraTech implants compared with machined Brånemark implants. In the mandible, a microthread design of the implant collar does not seem to improve bone preservation.

**KEY WORDS :** immediate loading, implant design, implant surface, turned surface

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