

# Progression and treatment of experimental peri-implantitis

Akademisk avhandling

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av

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Tandläkare

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Avhandlingen baseras på följande delarbeten:

- I. Albouy, J.-P., Abrahamsson, I., Persson, L. G. & Berglundh, T. (2008) Spontaneous progression of peri-implantitis at different types of implants. An experimental study in dogs. I: clinical and radiographic observations. *Clinical Oral Implants Research* 19, 997-1002.
- II. Albouy, J.-P., Abrahamsson, I., Persson, L. G. & Berglundh, T. (2009) Spontaneous progression of ligature induced peri-implantitis at implants with different surface characteristics. An experimental study in dogs II: histological observations. *Clinical Oral Implants Research* 20, 366-371.
- III. Albouy, J. P., Abrahamsson, I. & Berglundh, T. (2011) Spontaneous progression of peri-implantitis at implants with different surface characteristics. An experimental study in dogs. *Submitted*.
- IV. Albouy, J. P., Abrahamsson, I., Persson, L. G. & Berglundh, T. (2011) Implant surface characteristics influence the outcome of treatment of peri-implantitis: an experimental study in dogs. *J Clin Periodontol* 38, 58-64.



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## Abstract

### Progression and treatment of experimental peri-implantitis.

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Peri-implantitis is characterized by inflammatory lesions in peri-implant tissues and loss of supporting bone. The aims of the present series of studies were to analyze (i) spontaneous progression and (ii) the effect of surgical treatment of experimental peri-implantitis at different types of implants.

Labrador dogs were used. Implants representing 4 different implant systems; group A (turned; Biomet 3i), B (TiOblast; Astra Tech AB), C (SLA; Straumann) and D (TiUnite; Nobel Biocare) (*Study I, II and IV*) or with similar geometry and with different surface characteristics (turned/TiUnite; Nobel Biocare AB) (*Study III*) were placed in the mandible 3 months after tooth extraction. Experimental peri-implantitis was initiated by placement of ligatures and plaque accumulation. The ligatures were removed when about 40-50% of the supporting bone was lost. Plaque formation continued for 6 months in *Study I, II and III*, while in *Study IV* surgical therapy including mechanical cleaning of implant surfaces was carried out. Radiographic and clinical examinations were performed. Block biopsies containing implants and their surrounding tissues were obtained and prepared for histological analysis.

The bone loss that occurred during the plaque formation period after ligature removal was 1.84 (A), 1.72 (B), 1.55 (C) and 2.78 mm (D). Specimens from all types of implants exhibited extensive inflammatory cell infiltrates and large crater-formed osseous defects (*Study I and II*).

The bone loss that occurred after ligature removal in *Study III* was significantly larger at TiUnite implants than at turned surface implants. The vertical dimensions of the ICT and the pocket epithelium and the apical extension of the biofilm were significantly larger at TiUnite implants than at turned surface implants (*Study III*).

While bone gain occurred at implants with turned, TiOblast and SLA surfaces, TiUnite implants demonstrated bone loss after treatment of peri-implantitis. Resolution after treatment was achieved in tissues surrounding implants with turned and TiOblast surfaces (*Study IV*).

**Keywords:** animal experiment, bone loss, dental implants, histology, infection, inflammation, ICT, inflammatory lesion, peri-implant disease, peri-implantitis, plaque, radiographs, titanium, treatment

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