Upsala J Med Sci 113 (2): 217–220, 2008

Porous Titanium Granules for Implant Stability and Bone Regeneration – a Case Followed for 12 Years

Leif Holmberg[1] Lillemor Forsgren[2], Lars Kristerson[3]

[1]Ädelfors Kungsgård 1, Holsbybrunn, Sweden, [2]Department of Dentomaxillofacial Radiology, The Institute for Postgraduate Dental Education, Jönköping University, Jönköping, Sweden, [3]Elvabovägen 22, Höllviken, Sweden.

Abstract

The clinical and radiological results were excellent for each of the nine fixtures individually tested in a case followed for 12 years after implant treatment using split crest technique in combination with porous titanium granules for an augmentation of the dento-alveolar ridge in a severely resorbed maxilla.

Introduction

The split crest technique is used for augmentation of an dento-alveolar ridge with sufficient vertical bone height but insufficient bone width (1, 2). However, as there still may be a problem to achieve a sufficient bone ingrowth around the fixtures in case of a severely resorbed dento-alveolar ridge, we used porous titanium granules, which previously have been used to stabilize hip prostheses (3, 4), to enhance bone regeneration.

Case report

A patient (born in 1922) received in 1995 nine fixtures ad modum Brånemark in her maxilla (Figure 1). At surgery a split crest procedure was performed in region 17–14 and 21–27 because of a narrow bone ridge. Porous titanium granules (Natix®, Tigran Technologies AB, Malmö, Sweden) mixed with autogenous blood and bone-suction material was gently packed around the fixtures. The procedure was less time-consuming than bone-grafting and the titanium granules were used to fill the space between the buccal and the palatal bone plates after the splitting procedure.

Nine months later, 9 abutments were placed and a temporary bridge was connected and adjusted to correct occlusal scheme. The temporary bridge was duplicated after three months into a permanent fixed-bridge-work in gold and acrylic resin denture teeth. Radiographic and/or clinical examinations were performed at 6 months after fixture installation and again after 1, 2, 3, 5, 7 and 12 years.

After 12 years there was a loss of marginal bone height in average of less than 2 mm compared to baseline 1996 (Figure 2–4). The fixture stability was excellent

Received 14 December 2007
Accepted 18 December 2007

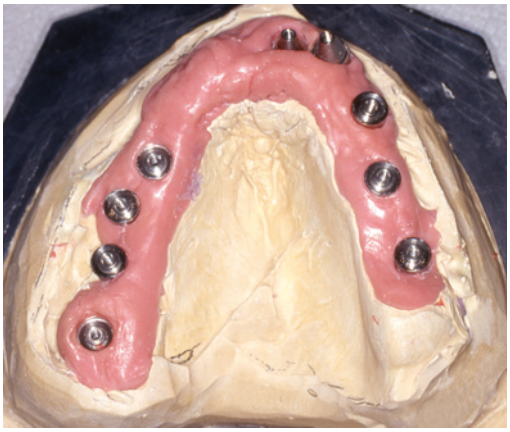

Figure 1. The location of the nine fixtures ad modum Brånemark in the maxilla.

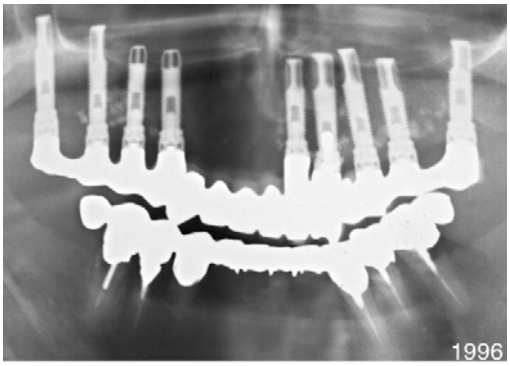

Figure 2. Radiograph demonstrating the bone height after 9 months.

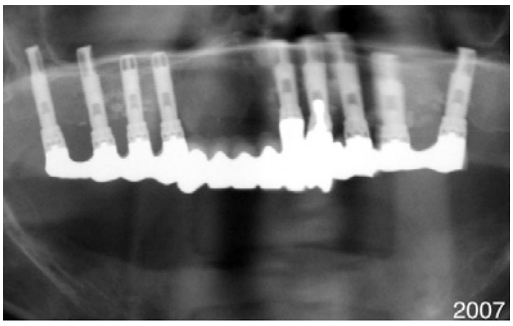

Figure 3. Radiograph demonstrating the bone height after 12 years.

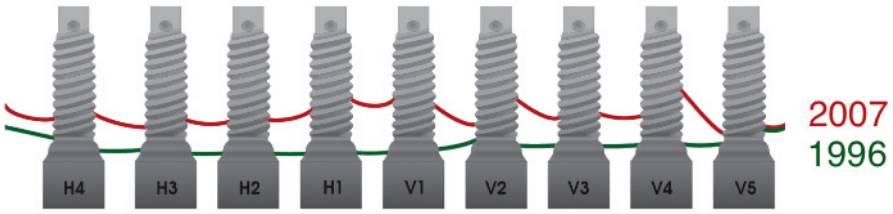

Figure 4. After 12 years the loss of bone height around the nine fixtures was in average of less than 2 mm.

Figure 5. The patient was pleased with reliability, function and aesthetics.

for each of the nine fixtures individually tested. She had no infections or inflammations despite insufficient oral hygiene the last years and she was pleased with reliability, function and aesthetics (Figure 5).

Comment and conclusion

The porous titanium granules were used as a filling material following a split crest procedure in our case of a severely resorbed maxillary dento-alveolar ridge and allowed for cross arch bridge installation. The procedure was less time-consuming than bone-grafting and the stability (tested for each of the nine fixtures individually) was still maintained after 12 years. The clinical results in this single case using titanium granules in a mixture of bone-suction material and blood should be supported by histologic data when available. In conclusion, for patients who have narrow buccolingual ridges, the ridges can be expanded to allow fixture location by the disjunction of buccal and lingual compactplates; and the placement of porous titanium granules in between seems to be an attractive option to improve bone regeneration.

Refererences

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Corresponding author:
Leif Holmberg, DDS, Senior consultant in Restorative Dentistry
Ädelfors Kungsgård 1
SE-570 15 Holsbybrunn, Sweden
E-mail: gulfholm@hotmail.com