

Marginal bone support at OsseoSpeed™ Profile implants

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BACKGROUND AND AIM

In situations where the alveolar crest anatomy is sloped in a lingual to buccal direction, the placement of a standard implant may not be optimal. A dental implant with a sloped marginal contour, OsseoSpeedTM Profile (Astra Tech AB, Mölndal, Sweden), has been developed to optimize implant placement in such situations.

The aim of the study was to clinically evaluate the maintenance of lingual/ palatal and buccal marginal bone support when placing OsseoSpeedTM Profile implants in healed ridge sites, where the alveolar crest anatomy was sloped. Objectives included evaluation of overall implant survival rate, marginal bone level alterations and peri-implant tissue conditions.

MATERIAL AND METHODS

In this prospective, open, multicenter study, 65 patients between 18 and 75 years of age with a need for a single tooth replacement in any location were included. The recipient sites presented with a lingual-buccal bone height difference of 2.0-5.0 mm and a history of edentulism of at least 3 months.

The study population demographics included the following: age (mean age 49 years; range 20-74 years), gender (32 men, 33 women) and smoking history (non smokers 86 %; smokers 14%). The mean edentulous period was 57 months (range 3-360 months). Seventy-five percent of the implants were placed in the mandible, and 25% in the maxilla. The most dominant position for implant placement was the mandibular first molar (57%).

OsseoSpeedTM Profile implants (Astra Tech AB, Mölndal, Sweden) in diameters 4.5, 5.0 and 5.0S with lengths 9-15 mm were used in the study. A one-stage surgical protocol was utilized, and healing abutments were used during the 16 weeks healing period. Lingual and buccal bone level alterations were assessed using a periodontal probe at the time of implant placement and the surgical re-entry visit 16 weeks after implant placement (fig. 13). Loading of the implants took place 21 weeks after implant placement, and TiDesignTM Profile abutments were used together with a cement-retained permanent crown. Intraoral radiographs were taken at implant placement, and at 16, 21 and 52 weeks after surgery. The mesial and distal marginal bone levels were measured from a reference point on the implant (the border beween the micro- and macro threaded portions). The patients will be followed for a total of three years.

RESULTS

A total of 65 implants were placed in the study, and no implants have been lost. Forty-three patients have reached the one-year follow-up visit.

The mean lingual marginal bone level alteration during the first 16 weeks was -0.2 mm (range: -1.5 - 2.0), while the corresponding change on the buccal aspect was -0.2 mm (range: -2.0 - 2.0) (fig.12).

The results of the radiographic measurements show that the mean mesial and distal marginal bone level change was -0.4 mm (SD 0.8) after 16 weeks and -0.6 mm (SD 1.3) after one year (fig. 11).

The complications reported in the study are limited to two loose healing abutments and one patient presenting with a 12.5 mm loss of the buccal marginal bone level from implant placement to the 16 weeks re-entry visit (not included in the analysis).

PATIENT CASE, courtesy of Dr. Keisuke Wada

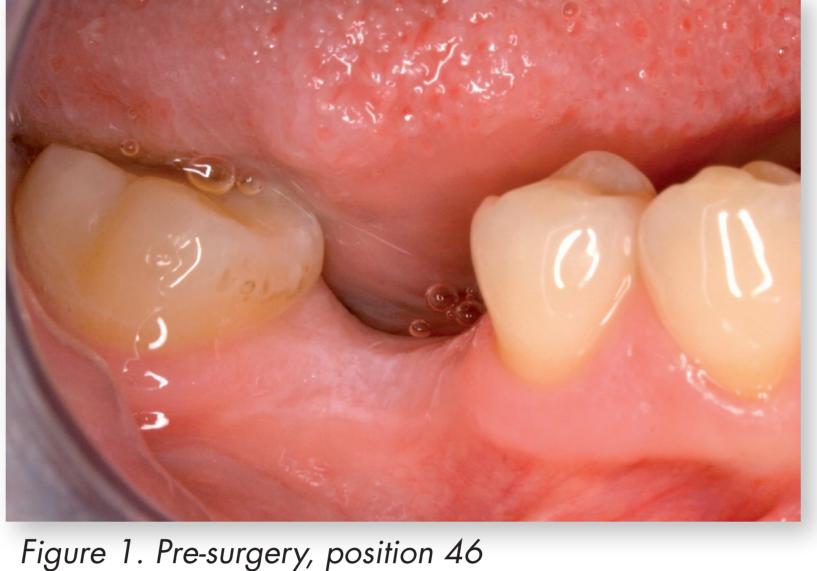


Figure 5. Re-entry, 16 weeks after surgery

Figure 7. 1 year follow-up

BONE QUALITY AND QUANTITY IN IMPLANT SITES

Figure 2. Pre-surgery, CT scan

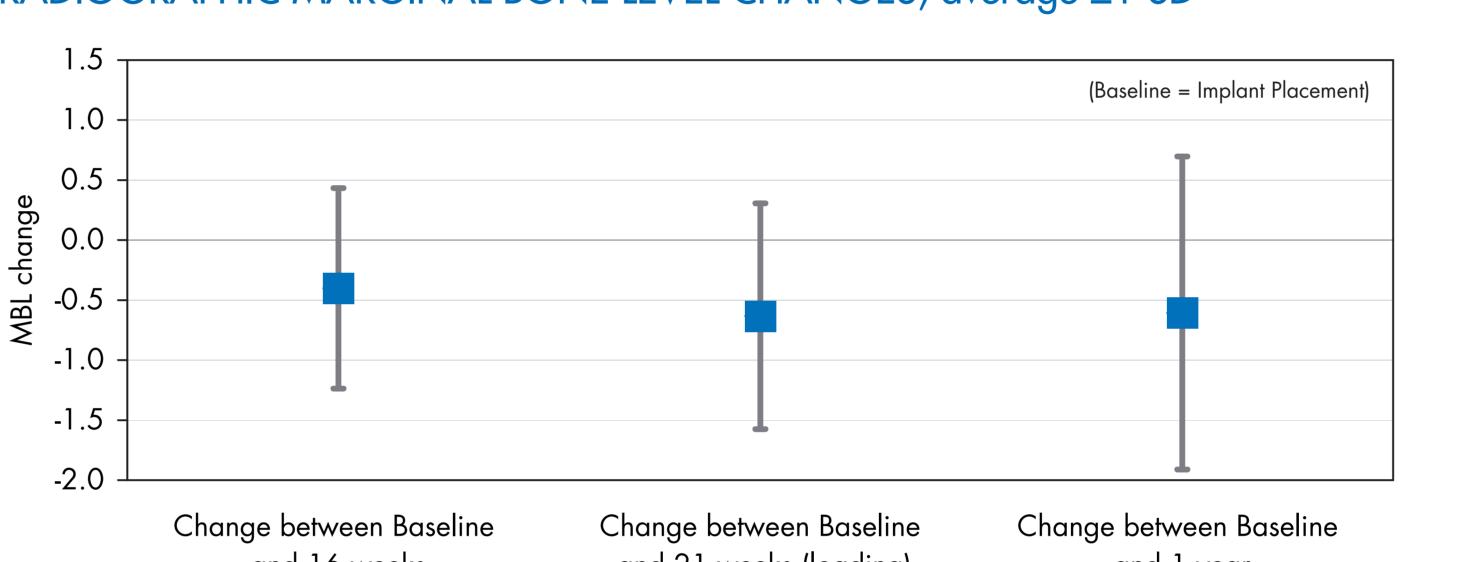
Figure 4. X-ray of an OsseoSpeed™ Profile implant

Figure 6. X-ray at re-entry, 16 weeks after surgery

Figure 8. X-ray at 1 year follow-up

RADIOGRAPHIC MARGINAL BONE LEVEL CHANGES, average ±1 SD

IMPLANT DISTRIBUTION



CLINICAL MEASUREMENT OF BONE LEVEL ALTERATIONS

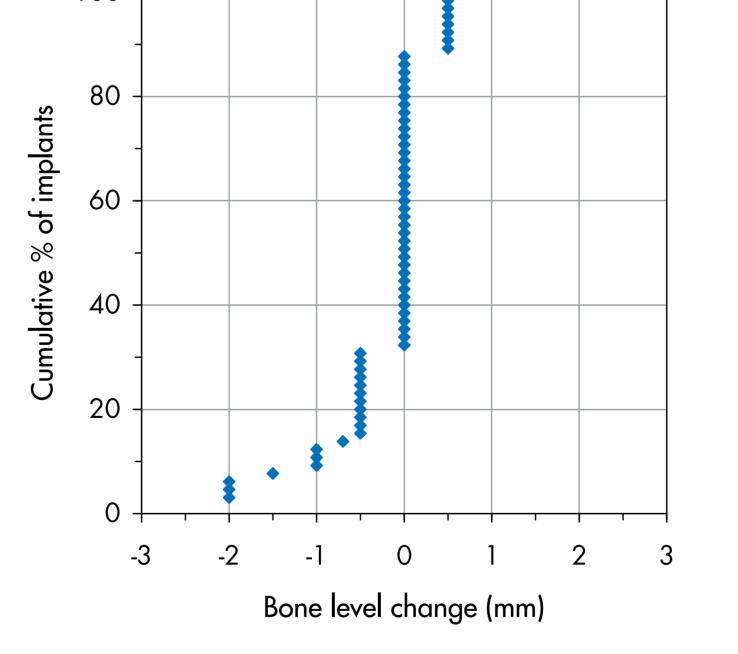


Figure 12a. Buccal alteration

C = top of bone crest, R = reference point, B = buccal, L = lingual

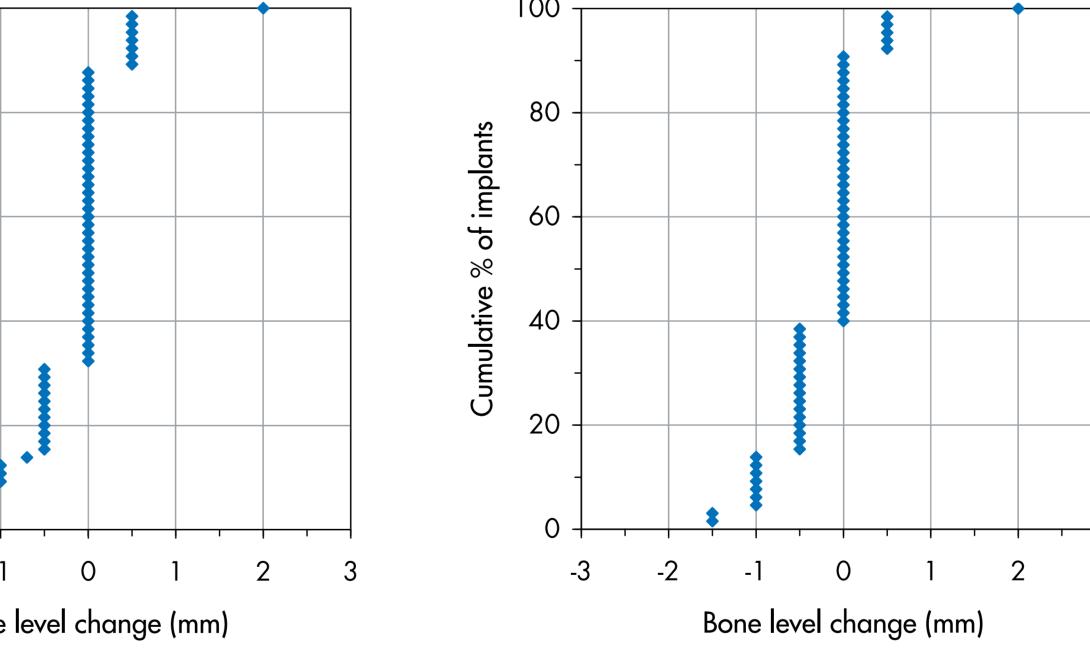
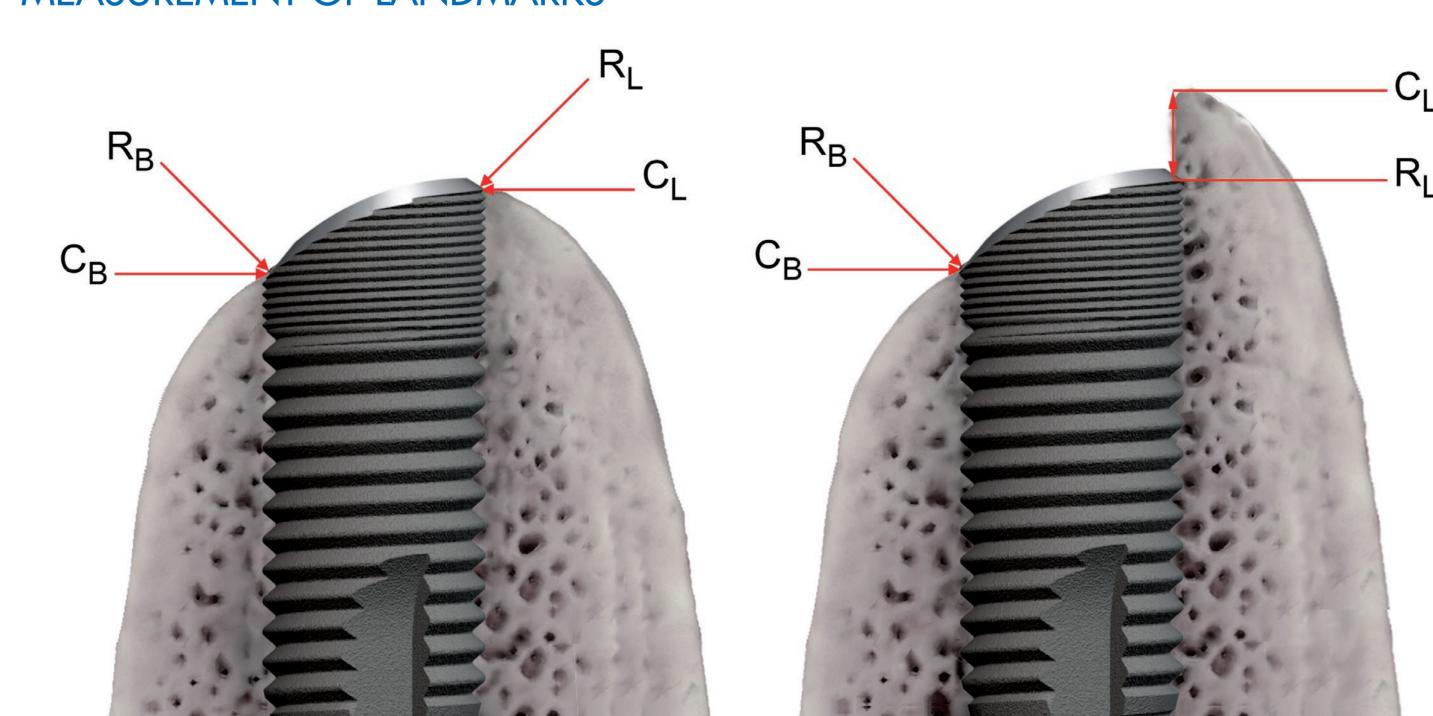


Figure 12b. Lingual alteration

MEASUREMENT OF LANDMARKS



DISCUSSION

Partially dentate patients presenting with a sloped ridge profile are commonly seen in any implant treatment setting. Until now, these patients have commonly received regular dental implants, with a flat top, leading to loss of the bone located superior to the implant border, or leaving the buccal aspect of the implant without bone support. The current study addressed the sloped ridge situation, and a new implant design for these specific cases has been assessed. The clinical results after 16 weeks indicate that this implant design may maintain the buccal and lingual bone levels, respectively.

The radiographic assessments after 16 weeks (mean change -0.4 mm) reveal results in line with the clinical assessments after 16 weeks (lingual change: -0.2 mm, and buccal change: -0.2 mm). A standardized radiographic assessment method is however difficult to apply on the Profile implant due to the specific geometry in the coronal area. The radiographic data should therefore be interpreted with care. The mean marginal bone level change one year after implant placement (-0.6 mm) indicates that bone levels are stable over time.

CONCLUSIONS

The study results reveal small marginal bone level alterations at the buccal and lingual/palatal, and mesial/distal aspects of the OsseoSpeedTM Profile, and indicate that this implant design is a predictable treatment option in cases where the alveolar crest anatomy is sloped in a lingual to buccal direction.

