# CLINICAL ANALYSIS OF 602 IMPLANTS WITH A FLUORIDE-MODIFIED SURFACE AFTER 2 YEARS


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## INTRODUCTION

Long-term treatment outcome with TiOblast™ Implants is well-documented and shows good clinical results with high survival rates and marginal bone preservation[1,2,3]. In 2004 Astra Tech changed the implant surface. Osseospeed™ implants are grit-blasted with titanium dioxide particles followed by an additional treatment with diluted fluoride acid, which results in a nano-scale topography. Results from an experimental study indicates that osseointegration is enhanced during the first weeks of healing[4], suggesting that these implants are more reliable in demanding indications, such as immediate loading or implant insertion in compromised sites. The present study evaluates survival and bone loss after at least 2 years in function in 3 different protocols: 1/ immediate loading (IL), 2/ 1-stage delayed loading (1DL), 3/ 2-stage delayed loading (2DL).

## METHODS

A retrospective, cross-sectional analysis was performed of Osseospeed™ implants installed by one surgeon (BC) in a private periodontal practice and at least 2 years in function. Patients with known risk factors (smoking, periodontitis, diabetes, bruxism) were not excluded. Patients files were scrutinized by an external examinator (SV) to evaluate implant survival and bone loss on peri-apical radiographies from implant insertion (baseline) up to 2 years. Marginal bone level height was determined both at the mesial and distal site of the implant by measuring the distance between a reference point (Figure 1) and the marginal bone-to-implant level. Individual implant success was determined as bone loss < 1.7mm, according to the international success criteria[5]. Statistical analysis was performed using non-parametric tests with the implant as statistical unit. The level of significance was set at 0.05.

## RESULTS

In total 173 patients (108 females, 65 males; mean age 56 years old; range 18-82) with 602 implants and a mean follow-up of 30 months (range 24-58) were available for assessment. 13/602 implants failed (2.2%). 10 occurred in the posterior mandible, 3 in the anterior maxilla. Mean bone loss for all implants was 0.37mm (SD=0.7; range 0.0mm – 5.0mm). 94.2% of the implants showed less than 1.7mm of bone loss and were considered a success (Figure 2). 306 (51%) implants were loaded immediately (IL), 206 (34%) were placed according to a 1-stage delayed (1DL) and 90 (15%) according to a 2-stage delayed protocol (2DL). 362 (60%) implants were placed in de maxilla, 240 (40%) in the mandible. Survival rate and mean bone loss of IL, 1DL and 2DL were 99% and 0.32mm (SD=0.6; range 0.0mm -5.0mm), 93% and 0.33mm (SD=0.7 ; range 0.0mm – 4.9mm) and 100% and 0.67mm (SD=1.0 ; range 0.0mm – 4.6mm) respectively.

Maxillary implants showed significantly more bone loss compared to mandibular implants for IL (median 0,2mm vs 0,1mm; $p < 0,02$), 1DL (0,2mm vs 0,1mm; $p < 0,02$) and 2DL (0.5mm vs 0.0mm; $p < 0.01$). In depth analysis showed significantly more bone loss for maxillary implants 2DL compared to IL ($p < 0.01$) and 1DL ($p < 0.01$). This difference was not found in the mandible. A summary of the bone loss results is given in Figure 3.

## DISCUSSION

The Osseospeed implant system lacks long-term survival and success studies. The present study, with a mean follow-up of 30 months, shows good clinical results. Although more long-term studies are needed, these preliminary results are encouraging for the future. It has to be considered that bone level changes were assessed with the implant insertion as baseline value. Hence a mean bone loss of 0,37mm after at least 2 years can be considered very successful. Bone loss was significantly higher in the maxilla compared to the mandible. These results are in confirmation with Åstrand et al.[6] but in contradiction with others[3,7]. 10/13 failures occured in the posterior mandible. This zone is being referred as the ischemic zone because of the deficiency of vascularization, especially in elderly and edentulous patients[8]

## CONCLUSIONS

Osseospeed™ implants yielded a survival rate of 97,8% after 2 years and were highly successful. Maxillary implants showed significantly more bone loss. Probably due to selection bias, maxillary implants 2DL lost significantly more bone compared to IL and 1DL.

*References*


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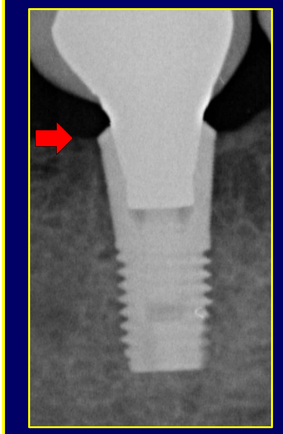


**Figure 1:** Reference point (lower border of the smooth implant collar) indicated by red arrow.

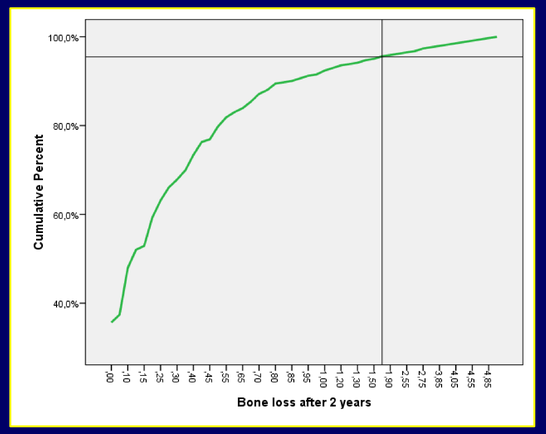



**Figure 2**: Cumulative percentage of individual peri-implant bone loss at least 2 years after implant placement (n=602). 94,2% had < 1,7mm of bone loss and were considered successful.

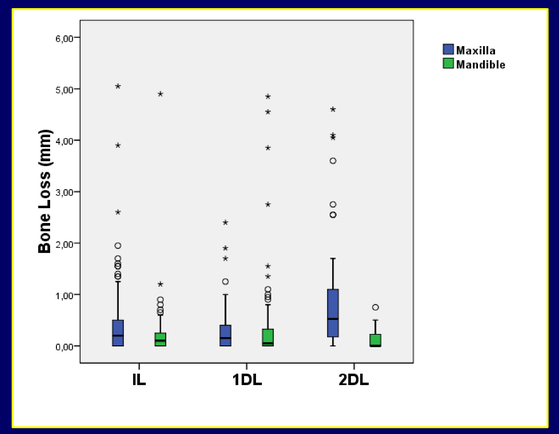
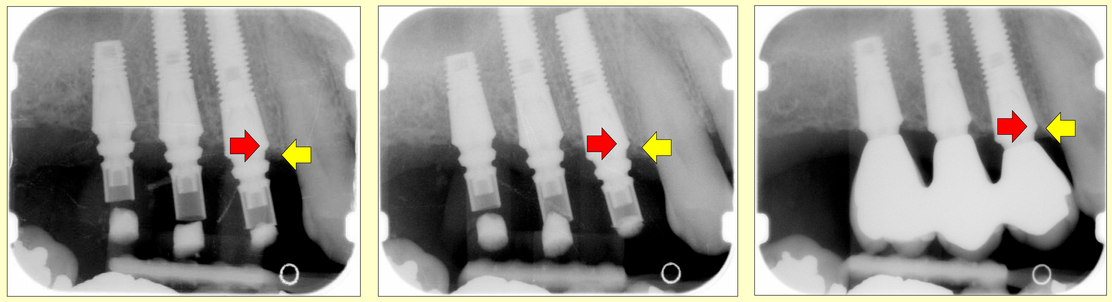



**Figure 3:** Boxplot showing individual peri-implant bone loss in the maxilla and the mandible at least 2 years after implant placement for immediate loading compared with 1-stage delayed and 2-stage delayed loading

**CASE PRESENTATION**



**a:** Radiograph 1 day after surgery at prosthesis insertion.

**b:** Radiograph 3 months postoperative.

**c:** Radiograph after 2 years.

**Figure 4:** Case presentation: Immediate loading fixed partial denture in the maxilla. Reference point indicated by red arrow. Bone level indicated by yellow arrow.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