EARLY LOADING ON STRAUMANN® SLACTIVE IMPLANTS – AUGMENTATION WITH STRAUMANN® BONECERAMIC

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1-year results

The surface characteristics of dental implants are crucial for osseointegration,which represents the interaction between tissue and implant material. However, the question arises as to which surface layer achieves the best long-term results with early loading. The SLActive surface developed by Straumann offers optimal topographical and chemical characteristics.

Shortened healing times

The new SLActive surface can diminish the risk of implant loss in the critical phase of osseointegration between weeks two and four (after implant insertion) and at the same time it can ensure greater predictability and certainty.

In addition to the familiar SLA® topography, the SLActive surface has super-hydrophilic characteristics as well as chemical activity.

Various studies[1-7] confirm that the innovative SLActive surface clearly promotes osseointegration of the implant in the early healing phase. It has been shown that 60 % more bone forms at the SLActive surface compared to the SLA® surface.[1]

Thus, SLActive appears to reduce the risk of implant loss in the early healing phase, while at the same time offering greater predictability and more certainty.[5]

Implantation in active, vital bone

A precondition for rapid healing of an implant is the presence of active bone, which promotes osseointegration of the implant. If bone augmentation is indicated, Straumann® BoneCeramic assists the formation of vital bone. Through the optimized morphology and resorption characteristics, the regenerated bone is stabilized on the one hand while, on the other hand, the bone substitute is replaced successively by new bone.

The aim of treatment in the three cases presented was to create an implant bed immediately after removal of the teeth, which were largely destroyed or were not worth preserving, using Straumann® BoneCeramic as bone substitute and placing implants with an SLActive surface.

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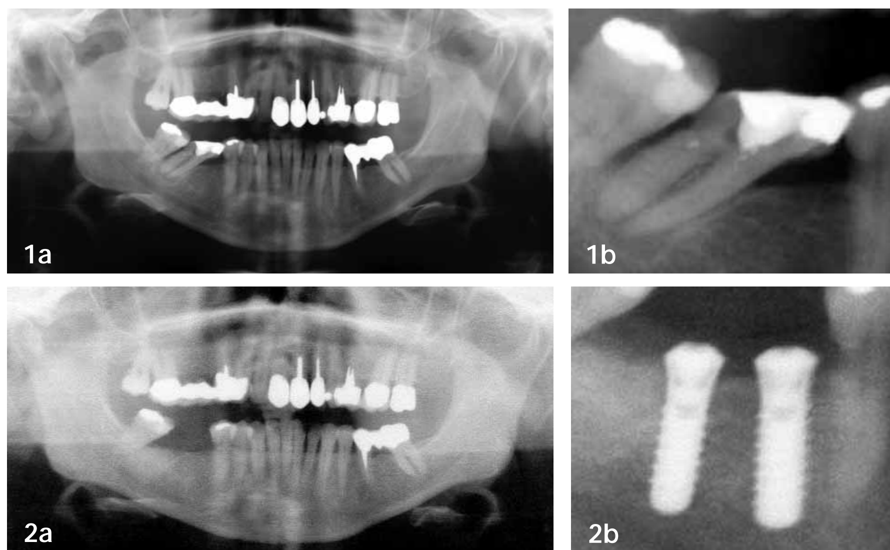
CASE 1

A 54-year old patient, non-smoker, made an appointment in March 2005 because of pain in region 47. The clinical finding was of local deep marginal periodontitis. There was grade III loosening of tooth 47.

The OPG of the initial results showed apical osteolysis in region 47 with extreme mesial tooth tilting. This situation developed following removal of tooth 46 approx. 15 years previously. After a thorough consultation, the patient opted for extraction of tooth 47. Four days later, tooth 47 and the granulation tissue were removed. The baseline situation that had been created was an ideal indication for immediate bone augmentation. 0.25 g Straumann® BoneCeramic 400-700 µm and an absorbable collagen membrane were used.

After a 6-month problem-free healing phase, documented



Figures 1a, b: Initial radiological result.
Figure 2a: Situation six months after augmentation with Straumann® BoneCeramic and collagen membrane.
Figure 2b: Insertion of two Straumann® SLActive implants.

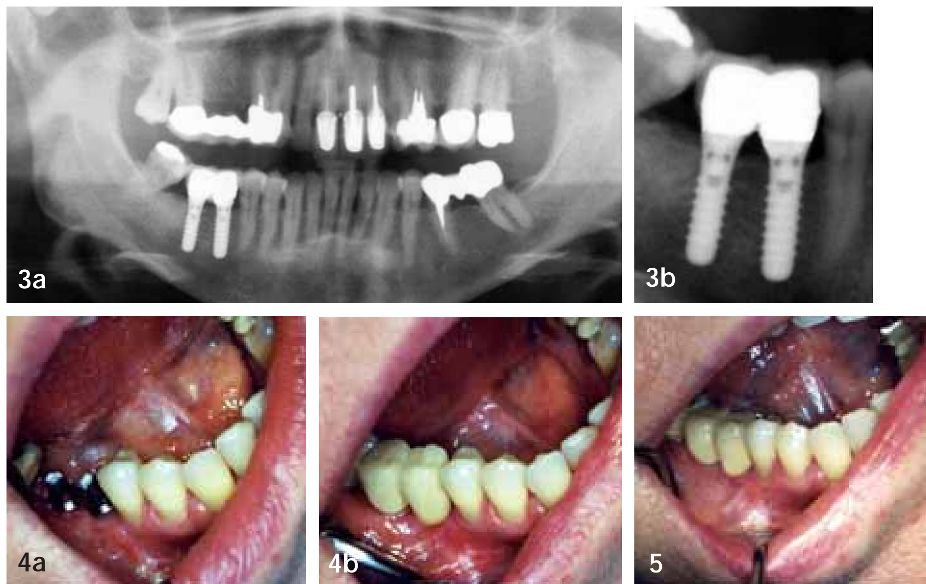


Figure 3a: Fitted metal ceramic crowns – situation 6 weeks after implantation.
Figure 3b: Ideal bone line: 18 months after bone augmentation and 12 months after definitive fitting of the AMC crowns.
Figure 4a: Clinical appearance after exposure with CO_2 laser with screwed abutments.
Figure 4b: Permanently fitted metal ceramic crowns.
Figure 5: Status after 12 months.

by postoperative radiographs, two Straumann® SLActive implants (Standard Plus, Ø 4.1 mm, Regular Neck Ø 4.8 mm, length 10 mm) were inserted.

After a further complication-free healing period, the two implants were exposed with a CO2 laser. A week later, the prosthetic restoration was completed with 2 all-metal ceramic crowns. The crowns were secured initially only with temporary cement. Final fitting took place after 3 weeks.

A year later, radiological and clinical follow-up shows no pathological deviations and the ideal straight alveolar line was preserved.

CASE 2

A 49-year old patient, non-smoker, made an appointment in April 2005 with pain and grade IV loosening of tooth 46. The orthopantomogram showed massive radiological losses of support tissue due to vertical defects. After a thorough consultation, the patient opted for removal of tooth 46 followed by augmentation with alloplastic materials. After the healing phase, the resulting gap would be filled with two implants. Within 3 days, tooth 46 was extracted, and the approx. 1.5 x 1.0 mm bone defect was filled with 2 x 0.25 g Straumann® BoneCeramic 400-700 µm and Straumann® Emdogain 0.3 ml and covered with an absorbable collagen membrane. This was followed in October 2005 by implantation of 2 Straumann SLActive implants (Standard Plus, Ø 4.1mm, Regular Neck Ø 4.8 mm, length 10 mm). The 2 implants were exposed with CO_2 laser 6 weeks later. The metal

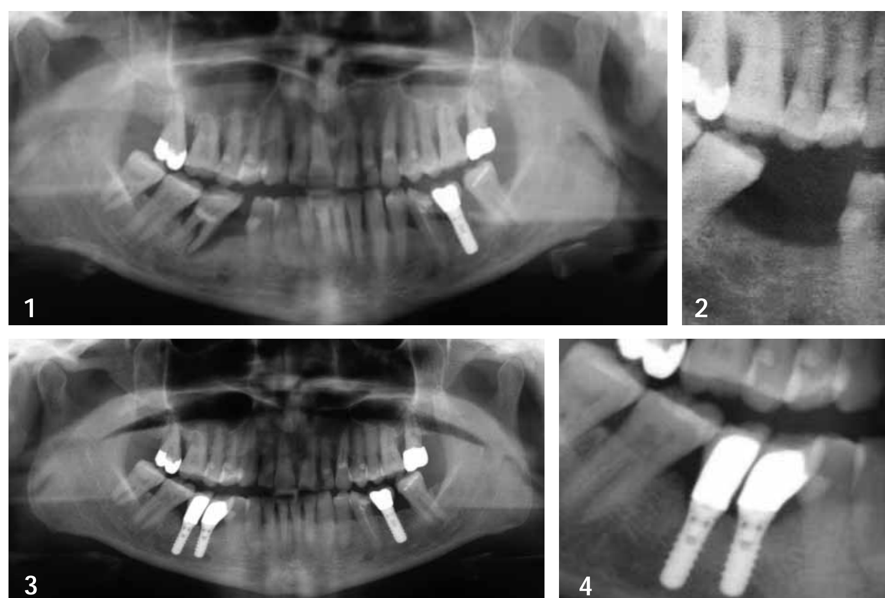


Figure 1: Preoperative radiograph.
Figure 2: Situation after removal of tooth 46; repeat radiograph 6 months after augmentation with Straumann® BoneCeramic and Straumann® Emdogain along with collagen.
Figure 3: Orthopantomogram with 2 osseointegrated SLActive implants and fitted AMC crowns.
Figure 4: Radiologic outcome: 12 months after definitive fitting of the crowns and 18 months after augmentation.

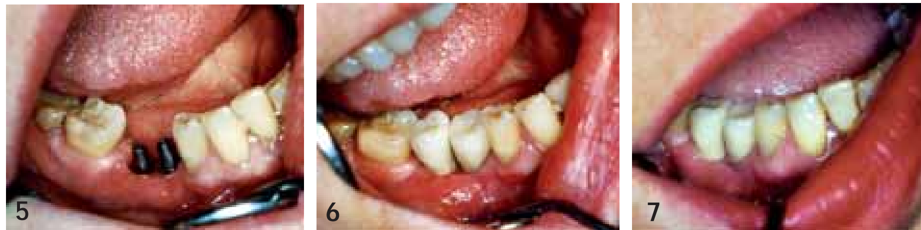
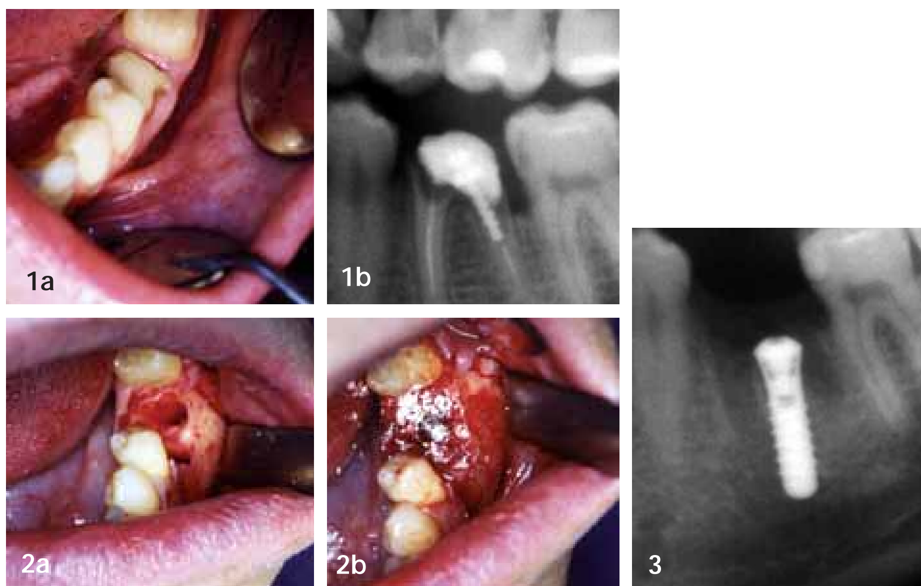


Figure 5: Situation after exposure of the 2 inserted implants with screwed abutments.
Figure 6: Definitive prosthetic restoration with metal ceramic crowns.
Figure 7: Clinical situation after 12 months.



Figures 1a, b: Initial clinical and radiological situation of the fundamentally damaged tooth 36.
Figures 2a, b: Intraoperative view – extraction and immediate implantation with augmentation of the alveolus.
Figure 3: Radiologic check following insertion.

ceramic crowns were inserted provisionally after a week and were finally secured with phosphate cement 3 weeks later.

The patient came in for a follow-up after a year. The clinical findings, repeat radiograph and above all, the patient's complete satisfaction prove that the chosen treatment was successful. In particular, the follow-up radiographs 12 months after implant insertion showed no pathological bone atrophy. The bone height appears stable. Stable fixation of the implant appears to be guaranteed.

CASE 3

A 23-year old healthy patient, nonsmoker, made an appointment in March 2005, for a crown on tooth 36. However, the radiograph showed that the tooth was fundamentally damaged by secondary caries and was not worth preserving. The aim of treatment was gentle extraction with simultaneous bone augmentation and immediate implantation with subsequent early loading. The extraction alveolus was not infected and the preserved middle part of the alveolar ridge was ideally suitable for immediate implantation.

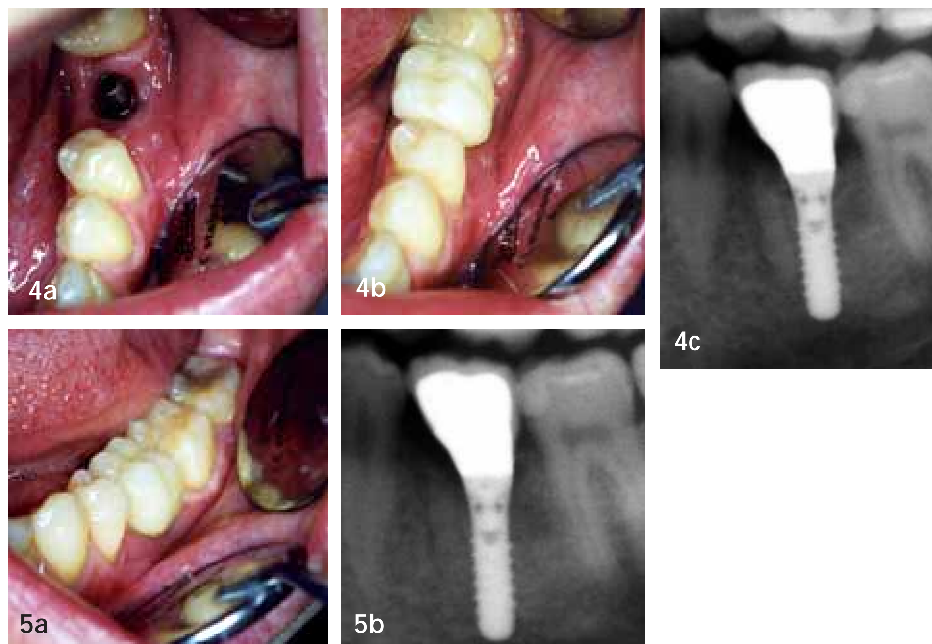
A Straumann® SLActive implant (Standard Plus, Ø 4.1mm, Regular Neck Ø 4.8 mm, length 12 mm) was inserted and the extraction alveolus was filled with 0.25 g Straumann® BoneCeramic.

After a problem-free healing period of 7 weeks, the implant was exposed with a CO_2 laser. A metal ceramic crown was inserted provisionally a week later. At the beginning of October 2005, the treatment was completed successfully by definitive fitting after a total of 12 weeks.

Follow-up in October 2006 showed perfect implant fit and healing of the alveolus radiologically. Clinically it was apparent that all the stages of the treatment had been successful.

Conclusion

The cases presented here involved patients with teeth weakened by periodontitis, which were not worth preserving because of advanced bone loss. It was possible to fill the



Figures 4a, b: Clinical finding after exposure with CO_2 laser with screwed abutment and definitively fixed crown.
Figure 4c: Radiologically documented implantation and prosthetic restoration.
Figures 5a, b: Clinical and radiologic follow-up after 12 months. Bone-implant zone shows ideal line of bone and bone contact with the implant.

resulting gaps using a certain procedure during augmentation and implantation.

Despite very unfavorable initial findings, functional and esthetic restoration was possible. Gentle removal of the teeth, which were weakened by periodontitis, with augmentation at the same time using Straumann® BoneCeramic beneath the absorbable collagen membrane were the foundations of success. Exact positioning of the Straumann® SLActive implants supported very good primary stability in the healing phase.

In all three cases, the SLActive implants in inflammation-free alveoli were loaded provisionally with crowns just 6 weeks after insertion. Final fitting took place 3 weeks later.

Radiographs after 12 months showed that the volume of the hard tissue was stable. Besides the ideal straight line of the alveolar ridge, the bone appeared free from inflammation. By using implants with the SLActive surface and Straumann® BoneCeramic, a clinical result that was successful from esthetic and functional aspects was achieved after a short treatment period.

Both materials are characterized by their innovative surfaces and chemical composition, which lead to a high degree of osteoconduction.

The augmentate is stabilized by Straumann® BoneCeramic with its optimized absorption characteristics. Active, vital bone is formed, which leads to an ideal bond between autologous bone and implant. The results of further studies will provide us with more information about the mechanisms of bone formation on these surfaces and yield long-term data.

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