

## TOPIC

# Safe, predictable and stable rehabilitation of a complex case



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More predictable clinical outcomes

# SurfLink surface treatment of implants placed in the posterior maxilla after sinus-floor elevation

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Challenging situations are part of the dentist's daily practice. The development of new devices and technologies should increase the predictability of treatment outcomes and patient satisfaction. SurfLink-treated dental implants (Nano Bridging Molecules, Switzerland) were shown in a pilot randomized controlled trial (RCT) to have the potential to increase the predictability of osseointegration (Esposito et al, EJOI 2013; 6(3): 227). Previous in-vivo studies have shown that the "bone-like" surface of SurfLink-treated implants facilitates early osseointegration (Rechenberg et al, in preparation). On SurfLink implant surfaces, osteoblasts quickly start the mineralization process directly. Improved bone-to-implant fixation is the main novel characteristic obtained with SurfLink. In a clinical situation this will allow the implant to be loaded and restored more quickly, while obtaining a stable clinical long-term outcome with a lower risk for biological hard- and soft-tissue complications.

## Objective

In this case study, SurfLink-treated implants were used in the elevated sinus of a smoker with a history of peri-implantitis to show that successful osseointegration can be achieved.

## Patient background

A 68-year-old patient with a history of peri-implantitis (Fig. 1a, asterisks) required rehabilitation of the posterior maxilla. She reported smoking more than eleven cigarettes per day, which places her in a "high-risk" group for a less successful implant outcome. The patient was in a supportive peri-implantitis treatment prior to the further implant-planning procedure.

## Results and discussion

The preoperative examination (Fig. 1a, RoI) revealed a 12 mm-wide ridge while the height of the ridge at

site 16 was insufficient for a standard implant (Fig. 1b). Thus, a sinus-floor elevation was planned and performed by opening a lateral window and using granular inorganic bovine bone (Bio-Oss; Geistlich, Wolhusen, Switzerland) and a resorbable collagen membrane (Bio-Guide; Geistlich) (Figs. 2a to f). No complications occurred during healing.

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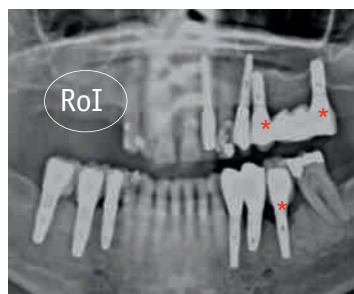
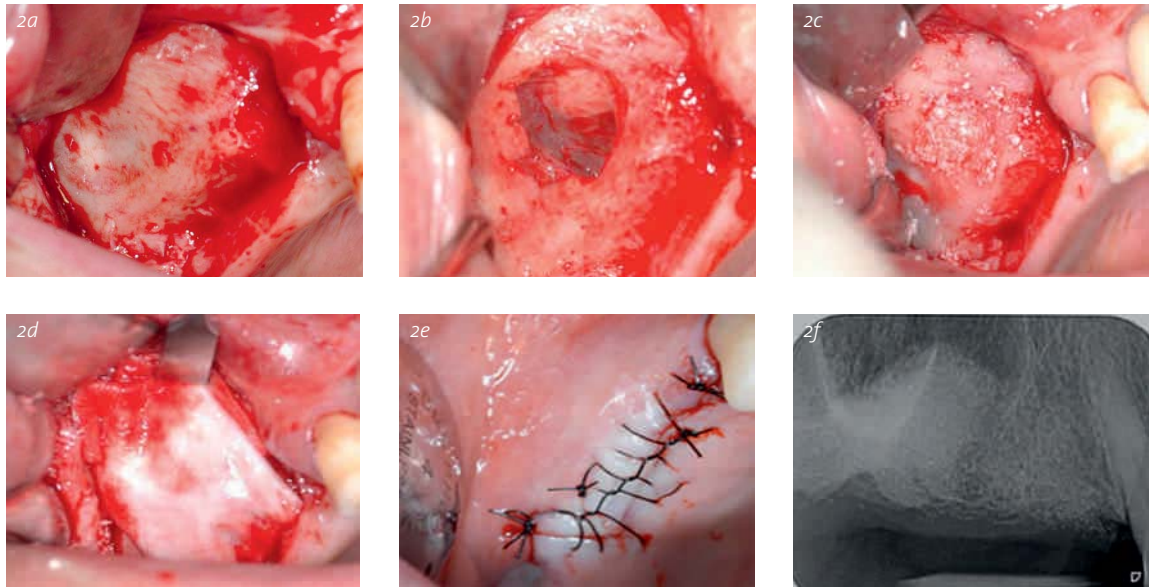


Fig. 1a Preoperative radiograph showing the region of interest (RoI) for this case report. The asterisks indicate existing implants with peri-implantitis.



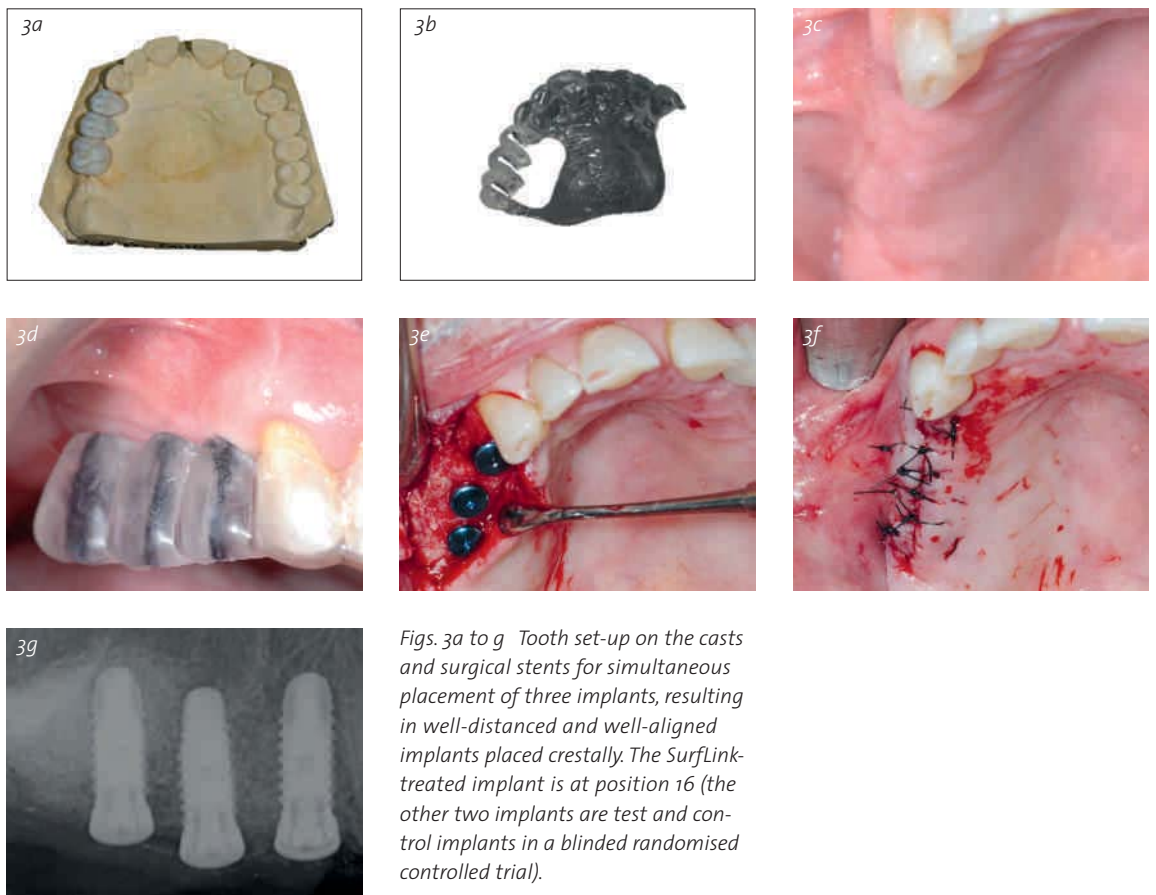
Fig. 1b Radiograph showing the posterior maxilla with a minimal vertical bone height of the ridge before the sinus-floor elevation.

\* This case is part of a randomized controlled trial at six centres. In addition to the University of Bern, the following centres also participate: School of Dental Medicine, Department of Prosthodontics, University of Geneva, Switzerland; Clinique Dentaire Ardentis, Vevey and Lausanne, Switzerland; clinic of Dr Markus Schlee, Forchheim, Germany; clinic of Mueller-Hotopp & Blume, Munich, Germany; clinic of Cacaci and Ranzelzhofer, Munich, Germany.



*Figs. 2a to e Sinus-floor elevation with inorganic bovine bone and a resorbable collagen membrane using a lateral window technique.*

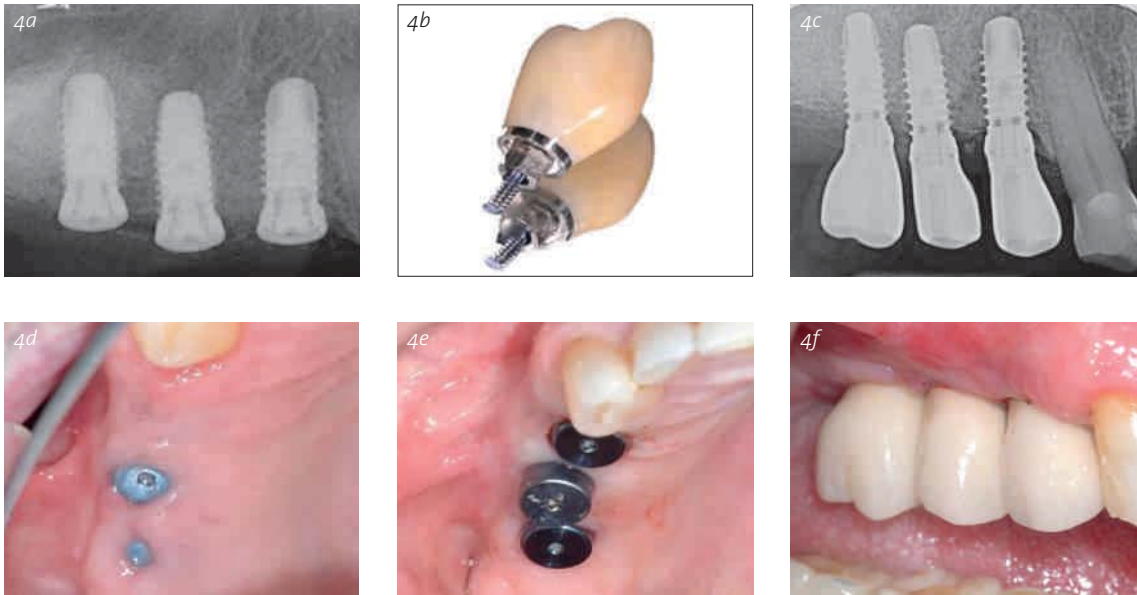
*Fig. 2f Radiograph of the resulting augmented area.*



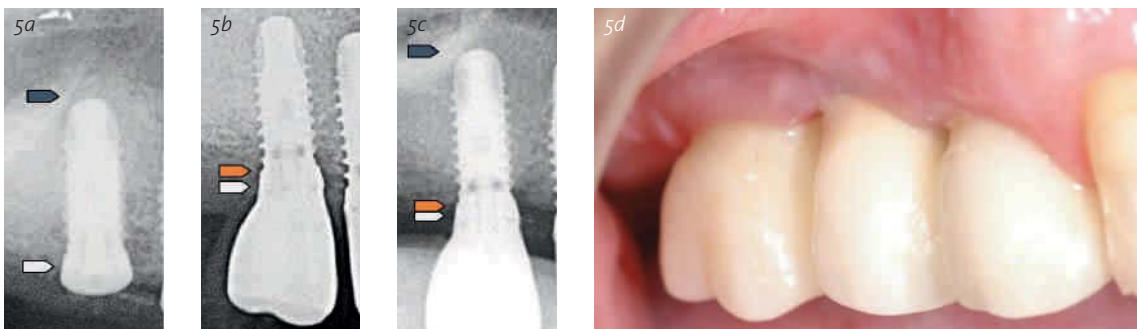
*Figs. 3a to g Tooth set-up on the casts and surgical stents for simultaneous placement of three implants, resulting in well-distanced and well-aligned implants placed crestally. The SurfLink-treated implant is at position 16 (the other two implants are test and control implants in a blinded randomised controlled trial).*

After six months of healing, two cylindrical SurfLink-treated implants and one non-treated implant (SPI Element, diameter 4.2 mm, length 11 mm; Thommen Medical, Switzerland) were placed at sites 16, 15 and 14, aided by a surgical stent (Figs. 3a to g). The implants were properly aligned and remnants of

inorganic granules could be observed radiographically. One SurfLink-treated implant and one non-treated implant are currently followed in a quadruple-blinded RCT, whose results will be reported later. The second SurfLink-treated implant at site 16 is discussed in this report.



Figs. 4a to f Restoration with CAD/CAM-fabricated screw-retained single crowns after three months of healing. Crestal bone levels are observed at the edge between the smooth implant collar and the roughened and SurfLink-treated implant body. At the tip of the implant, newly remodelled bone seems to be present on and adjacent to the SurfLink-treated implant. A nice soft-tissue contour is observed at the time of loading.



Figs. 5a to d From placement (5a) to restoration (5b) to one year post-loading (5c) the crestal bone levels around the SurfLink-treated implant are well preserved (grey arrow: augmented area; white arrow: bone level at placement; orange arrow: bone level at measured time point). The soft tissue is healthy and shows no signs of bleeding.

Re-entry by means of CO<sub>2</sub> laser surgery was performed three months after implant placement. As far as can be judged from the bone density in the x-ray, very good osseointegration was obtained and new, remodelled bone was in close contact with the implant surface all the way from the root to the neck of the implant.

Screw-retained veneered titanium crowns were produced with a CAD/CAM laser scanner (NobelProcera; Nobel Biocare, Zürich, Switzerland) (Figs. 4a to f).

The radiograph and clinical photographs at one year post-loading show an excellent preservation of apical and marginal bone levels. The implant was stable, and no bone loss was observed after loading. No bleeding on probing was observed (Figs. 5a to d).

## Conclusion

Successful osseointegration was obtained with a SurfLink-treated medium-rough (SLA-type) implant placed in the posterior maxilla after sinus-floor elevation in a heavy smoker with a history of peri-implantitis and medium bone quality. ■

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