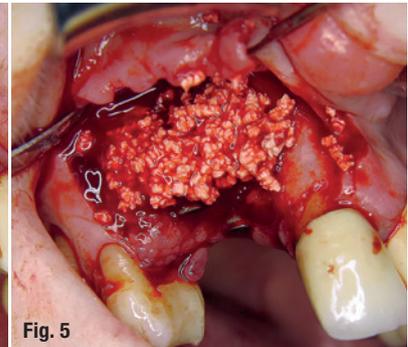
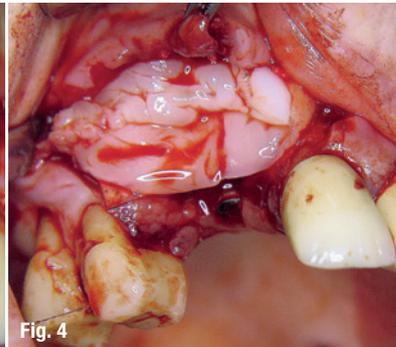
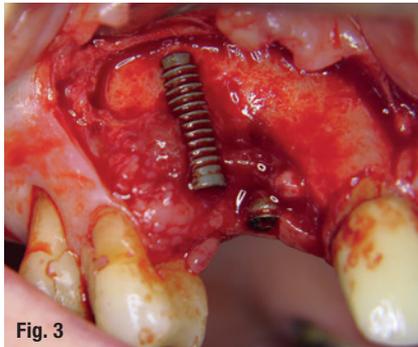
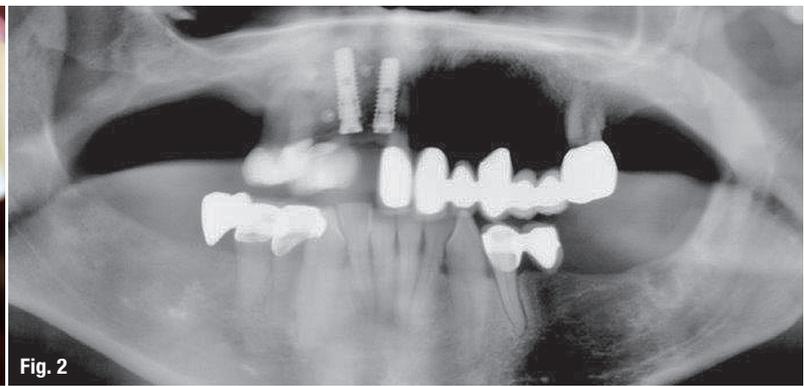


# Implant treatment of heavy smokers with critical bone situations

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In today's dentistry, the use of implants is a common modality for treating patients with missing teeth. Therapeutic options and aesthetics heavily depend on the treatment concept. Problematic situations include insufficient bone volume, poor bone quality, periodontitis and, of course, heavy smoking. Smoking reduces the possibility

of successful implant integration. In this article, we present two cases in which the patients were heavy smokers with anatomically critical bone situations in the form of atrophy of the jaws. Both patients were treated according to the new protocol that we have developed especially for extreme smokers. Four implants were inserted in total. Despite



**Case 1—Fig. 1:** The intra-oral examination revealed extreme atrophy. **Fig. 2:** Pre-op radiograph with view of the implants and pins. **Fig. 3:** View of the completely exposed implant with visibly missing bone material. **Fig. 4:** A membrane was used for augmentation purposes. **Fig. 5:** View of the bone graft material. **Fig. 6:** View of the highly aesthetic final result. **Fig. 7:** Final post-op radiograph.

being heavy smokers, both patients were in good physical condition and maintained relatively good oral hygiene.

## On smoking

Reports in the literature indicate that dental implants placed in smokers have lower survival rates compared with dental implants placed in non-smokers. One possible mechanism by which smoking might affect osseointegration is a lower blood flow rate owing to increased peripheral resistance and platelet aggregation. In addition, inhaled tobacco directly affects osteoblast function. In general, smoking is a major risk factor for implant failure. Moreover, for smokers to be treated with implants, good bone quality is necessary. Excellent primary stability was able to be achieved in both cases discussed in the following case reports.

## Case 1

The first patient, a 65-year-old woman, was a heavy smoker, smoking about 45 cigarettes per day. Upon examination, prominent atrophy in regions #12 and 13 was observed, with complete loss of the buccal bone lamella. Augmentation was necessary in the lateral and vertical regions. NanoBone granulate (Artoss) was used. A membrane (imperiOs) was fixed with titanium pins. Two DENTAL RATIO implants (DRS International), 10 and 12mm in length and with a diameter of 3.75mm, were simultaneously inserted.

## Case 2

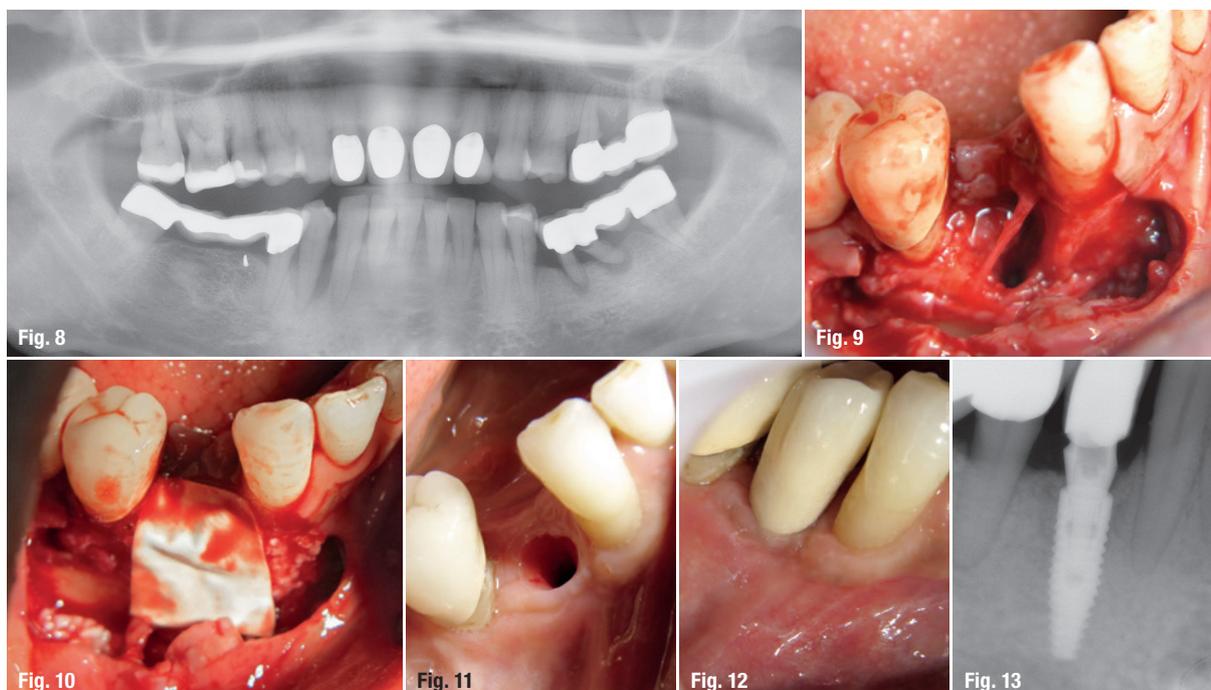
The second patient, a 52-year-old woman, was a heavy smoker as well, smoking 30 cigarettes per day. Upon examination, severe damage of tooth #43 with extreme circular bone loss was detected. NanoBone granulate and an imperiOs membrane were used for augmentation purposes as well. In this case, two DENTAL RATIO implants with a length of 12mm and a diameter of 3.5mm were chosen.

## Patient diagnostics

The two patients were treated by the same surgeon in our private practice. Neither of them suffered from uncontrolled severe diabetes, drug addiction or alcoholism. Pre-implantation diagnostics were performed.

## Surgical phase

Both patients were treated with HELBO laser therapy (bredent medical) in order to reduce the amount of harmful bacteria. Implant placement was performed under local anaesthesia after premedication with antibiotics. The osteotomies were extended gradually up to the intended implant diameter. After the incision, the sites were cleaned and necrotic or inflammatory tissue was removed. The osteotomy sites were prepared according to the drilling sequence recommended by the manufacturer. The implants were then inserted into the prepared osteotomies at an insertion torque of 45 Ncm. As a result,



**Case 2—Fig. 8:** Pre-op radiograph revealed extreme vertical and horizontal bone loss. **Fig. 9:** View of alveoli with severely damaged walls. **Fig. 10:** View of the augmentation material and the membrane used. **Fig. 11:** Post-op examination revealed the excellent health of the peri-implant region. **Fig. 12:** Post-op view showing the highly aesthetic final result. **Fig. 13:** Post-op radiograph showing that new bone had formed around the implant.

adequate primary stability was obtained. Sutures were done with a 4/0 RESORBA thread (Advanced Medical Solutions).

### Guided bone regeneration technique

In both cases, a HEART Pericard Membrane (imperioS) and NanoBone granulate were used for augmentation. The latter is an efficient nanostructure nanocrystalline hydroxyapatite embedded in a highly porous silica gel matrix. It is a medically safe product and stimulates the formation of collagen and bone. As a result, a high number of osteoblasts are usually seen in the early stages of regeneration. NanoBone is completely substituted by bone and no foreign substances will influence natural biomechanics.

### Medication

After the microbiological examination, an antibiotic (Clindamycin Aristo, 600mg; Aristo Pharma) was prescribed and administered three times a day and later twice a day until the day of surgery. Right before the surgery, mouth rinsing with Chlorhexamed (GlaxoSmithKline) was performed. Local anaesthesia was then performed using Ultracain D-S forte (Sanofi-Aventis Deutschland). Before the insertion, each implant was covered either with hyaluronic acid or with the patient's own plasma. After successful completion of the surgeries, 40mg of Dexamethasone (Dex-ratiopharm) was injected. At the very end of the appointment, 20mg of Prednisolon (Jenapharm) was prescribed and the patients were advised to take one tablet three times a day, then half a tablet three times a day and finally a quarter of a tablet three times a day. In order to minimise swelling, five arnica globules were given.

### Postoperative treatment

In both cases, digital radiographic images were taken at the time of surgery, 24 hours after surgery and one month later in order to evaluate the success of the implant restoration adequately. The patients were advised to refrain from smoking for a duration of least eight weeks after the implantation in order for the healing phase of the osteoblasts to successfully take place without any disturbance.

### Follow-up examination

Follow-up examinations were conducted according to the criteria of Albrektsson et al.<sup>1</sup> and Buser et al.<sup>2</sup>. These criteria for implant success are widely cited and generally accepted. A lack of osseointegration is commonly distinguished by implant mobility and radiolucency. The criteria used described the absence of persistent subjective complaints from the patient, such as pain, foreign-body sensation and/or dysaesthesia; absence of recurrent peri-implant infection with suppuration; ab-

sence of mobility; absence of continuous radiolucency around the implant; and possibility of restoration.

### Conclusion

In both cases presented here, good results were observed even years later. Dental implant therapy has evolved in great leaps and bounds over the last 30 years, and in the last decade in particular, which is why it is now possible to treat even heavy smokers with complicated anatomical situations successfully.

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