

Full-arch rehabilitation of the mandible: eight years of follow-up

Stable hard and soft tissue and no peri-implantitis in a compromised patient

Dr Harald Fahrenholz, Austria

Initial situation, diagnosis and treatment planning

A 70-year-old female patient presented requesting general restoration of her mandibular teeth. She had a more than 20-year-old bridge from tooth #34 to tooth #44, teeth #33 and 43 being pontics (Figs. 1 & 2). The patient exhibited failing dentition due to periodontitis marginalis profunda.

The CBCT scan showed sufficient bone volume in regions #32, 34, 41 and 44 for implant placement (Fig. 3). The treatment plan proposed to the patient was extraction of all the remaining mandibular teeth and immediate placement of two-piece implants in these regions to support a full-arch restoration. After healing, these implants would support a bar-retained removable overdenture, offering advantages in handling and cleaning for both the dentist and patient.

The challenge with this case was to use an implant system able to osseointegrate and function without biological complications despite the active periodontitis. A system was selected which has been demonstrated in a recent long-term study to achieve precisely that.¹



01
Frontal view of the initial clinical situation with the 20-year-old bridge *in situ*.

02
Occlusal view of the initial clinical situation with the 20-year-old bridge *in situ*.

03
Radiograph before tooth extraction.

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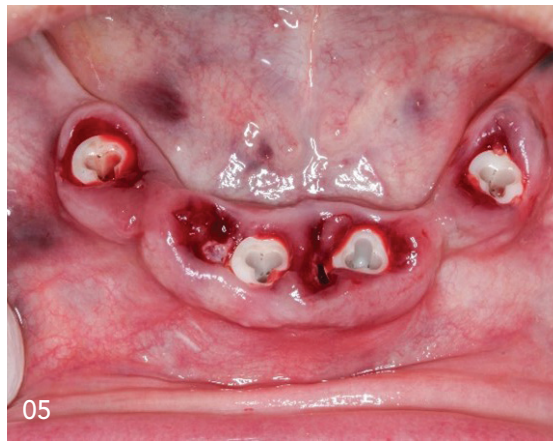


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04



05

04
Clinical situation
after removal of
the bridge and
tooth extraction.

05
Clinical situation
after placement
of the implants.



06

06
Radiographs
immediately
after implant
placement.
Evident gap
between the
extraction socket
wall and implant
#44 (left).

08
Conventional
impression of
the full arch,
including the
shoulders
and internal
connections of
the implants.



07

07
Clinical situation
after three
months of
healing.



08



09

09
Prepared glass
fiber posts on the
3D model.

Pretreatment and surgical procedure

To improve the soft-tissue condition ahead of surgery, a three-month prophylaxis treatment was performed, reducing the bacterial load. The bridge was cut into four pieces and removed, followed by the extraction of the mandibular teeth (Fig. 4). The bone quality around the extraction sites was evaluated, and four implants (4.5mm in diameter, 11.0mm in length; Patent™ Dental Implant System) were inserted without incision to a final torque of 25Ncm, according to the surgical protocol of the manufacturer (Figs. 5 & 6). A provisional denture was prefabricated based on a conventional impression taken before surgery and was relined before seating to avoid any interference with the implants during healing.

Prosthetic restoration

After three months of healing, osseointegration of the implants was confirmed using the Periotest (Medizintechnik Gulden; Fig. 7). A conventional full-arch impression of the mandible, capturing the implant shoulders and internal connections, was taken and a stone model was cast in the dental laboratory. On this model, the glass fiber posts, serving as prosthetic retention elements of the used implant system, were prepared to be parallel (Figs. 8 & 9). The correct fit of the prepared posts in the implants' internal connections was verified intra-orally before fabricating the bar (Fig. 10). The fit of the bar was also checked intra-orally (Fig. 11). Thereafter, the overdenture was produced, and a PEEK matrix was integrated as a secondary retention element inside the prosthesis (Fig. 12). The glass fiber posts, and the bar were adhesively cemented using a dual-polymerising cement (RelyX Unicem 2, 3M; Fig. 13), and the overdenture fitted to restore function and aesthetics (Fig. 14).

Result after five and eight years

Five years postoperatively, stable marginal bone levels around the implants were observed (Figs. 15 & 16). The gap between the extraction socket wall and implant #44 present immediately after placement had been completely filled with bone by the five-year follow-up.

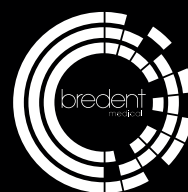
Eight years postoperatively, the bone levels were still stable (Figs. 17–20), and healthy soft tissue comparable to the baseline three months after implant placement was noted. At the eight-year follow-up, even an increase in the volume of keratinised gingiva around implants #32 and 44 was observed (Figs. 21 & 22).

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"The challenge with this case was to use an implant system able to osseointegrate and function without biological complications despite the active periodontitis."



10
Clinical situation
at try-in of the
prepared glass
fiber posts.



11
Clinical situation
at try-in of the
bar.



12
Secondary
retentive ele-
ment fabricated
from PEEK
integrated in the
overdenture.



13
Clinical situation
after cementation
of the glass fiber
posts and the
bar.



14
Clinical situation
after seating of
the overdenture.



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Discussion

In my dental office, I frequently encounter patients with compromised health, often suffering from systemic disease or chronic inflammation, such as the present case of terminal periodontitis. To help these high-risk patients with impaired healing capacity, I need an implant system that osseointegrates quickly and predictably and has minimal impact on the immune system. Being able to provide long-term aesthetics and function without biological complications for these compromised patients is incredibly rewarding.

In a recently published long-term study I conducted in collaboration with Dr Sofia Karapataki and the Medical University of Graz, we intentionally included such everyday patients. The long-term clinical performance of the two-piece implant system

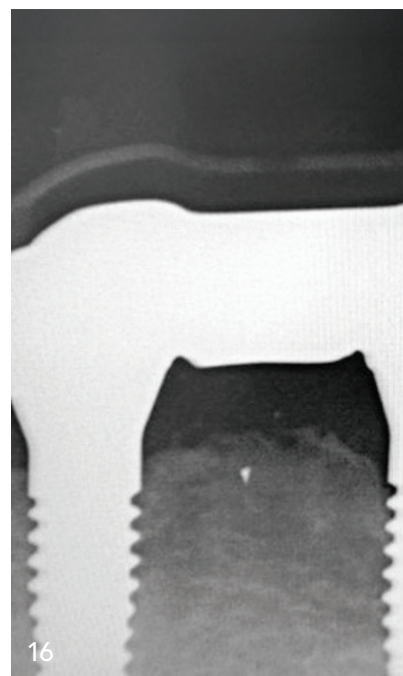
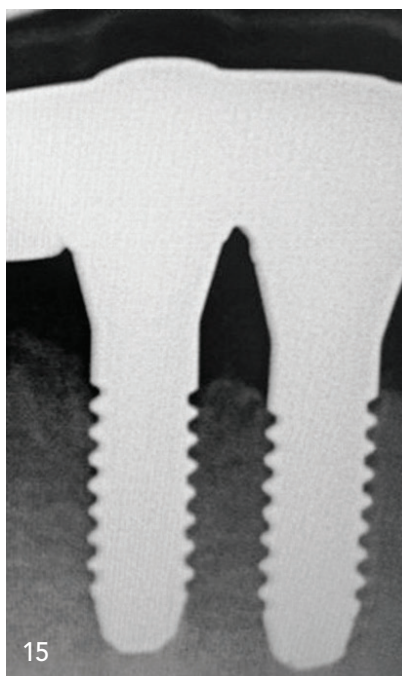
used in this case was confirmed, corroborating the findings of another such study on this system.^{1,2} The most significant finding was that no peri-implantitis was reported after the maximum follow-up period of 12 years. This is consistent with my observations from over 15 years of daily use of this system.

Conclusion

Characterised by stable marginal bone levels, healthy soft tissue and an absence of peri-implantitis, the treatment outcome achieved in this case remained satisfactory over the extensive follow-up period. This reflects what independent long-term studies have reported on the clinical performance of this implant system and underscores its viability as a reliable treatment option, even for complex cases involving patients with compromised health.

15
Radiograph of
region #41
after five years
showing stable
bone levels.

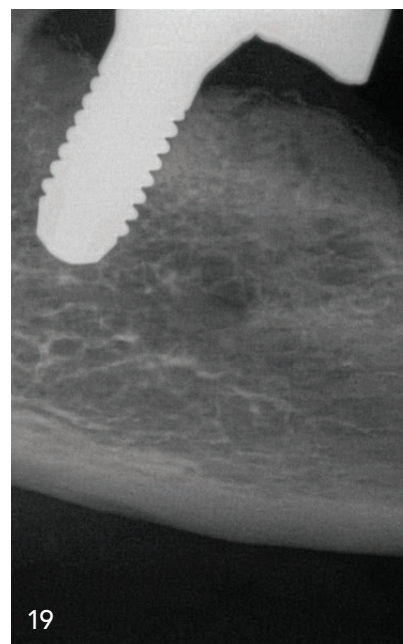
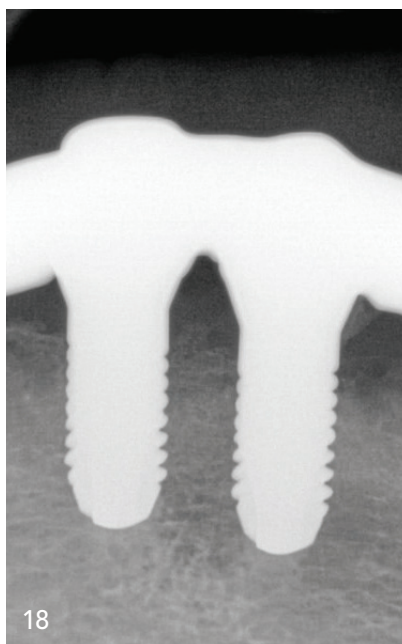
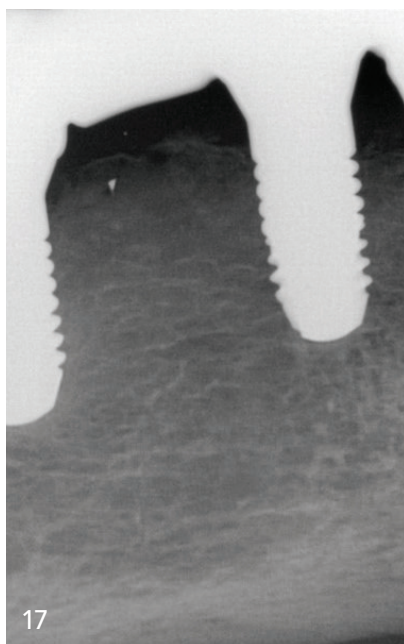
16
Radiograph of
region #42
after five years
showing stable
bone levels.

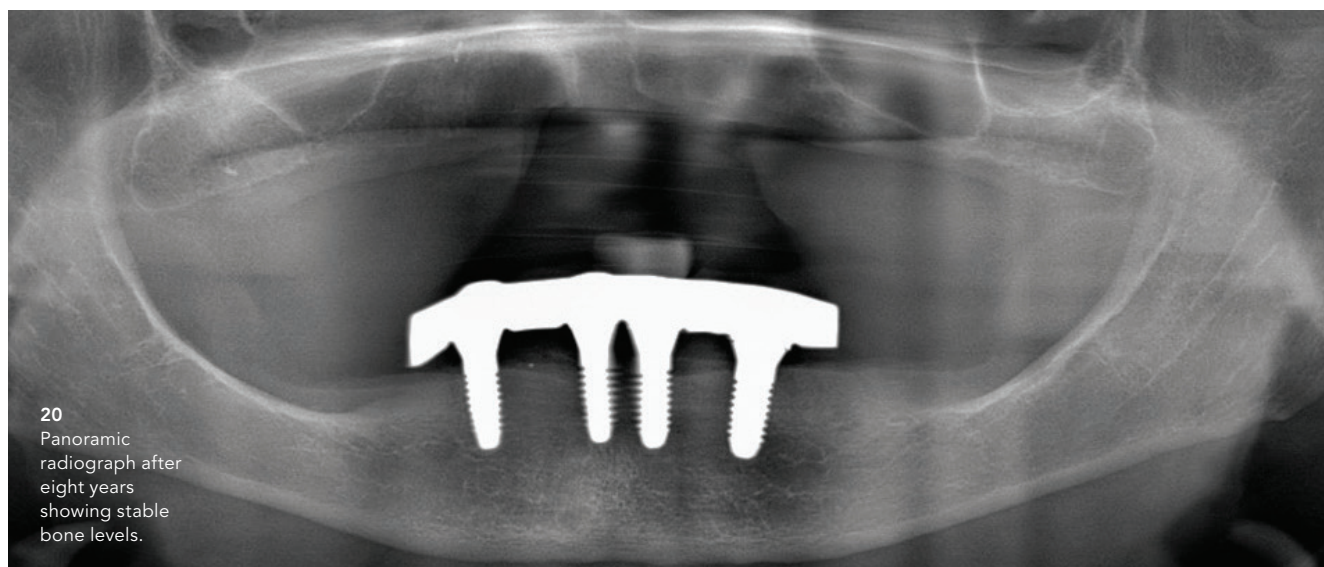


17
Radiograph of
region #42
after eight
years showing
stable bone
levels.

18
Radiograph of
region #41
after eight
years showing
stable bone
levels.

19
Radiograph of
region #34
after eight
years showing
stable bone
levels.





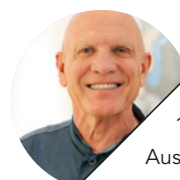
21
Left lateral view of the clinical situation after eight years showing healthy and stable soft tissue.

22
Right lateral view of the clinical situation after eight years showing healthy and stable soft tissue.

"[...] I frequently encounter patients with compromised health, often suffering from systemic disease or chronic inflammation, such as the present case of terminal periodontitis."

References:

- ¹ Karapatakis S, Vegh D, Payer M, Fahrenholz H, Antonoglou GN. Clinical performance of two-piece zirconia dental implants after 5 and up to 12 years. *Int J Oral Maxillofac Implants*. 2023 Dec 12;38(6):1105–114. doi: 10.11607/jomi.10284. PMID: 38085741.
- ² Brunello G, Rauch N, Becker K, Hakimi AR, Schwarz F, Becker J. Two-piece zirconia implants in the posterior mandible and maxilla: a cohort study with a follow-up period of 9 years. *Clin Oral Implants Res*. 2022 Dec;33(12):1233–44. doi: 10.1111/clr.14005. PMID: 36184914.



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