

The “Ts” in implantology—of triumphs and tragedies

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Introduction

Implantology has become a commonplace in dentistry. Indeed, insertion techniques have progressed more and more in the past two decades, while the dental industry has provided users with improved implant surfaces and instruments. Hardly any other dental discipline has experienced more innovation and investments within such a short time span. These developments have been rewarded with a comprehensive product range and highly increased numbers of inserted implants that seemed out of reach only one and a half decades ago. However—despite all of this euphoria—implantology does not exclusively entail positive facets. Therefore, this article is designed

to report on the “Ts” in implantology, on triumphs and tragedies.

Triumphs

Three case examples, differing in their respective initial situation and indications, are presented: 1) Implant-based denture of a maxillary anterior tooth; 2) complete restoration of the edentulous maxilla and a mandibular with residual frontal dentition via implant-based fixed dentures; 3) complete restoration of the edentulous maxilla with removable prostheses and a partially edentulous mandibular with fixed dentures. All three patients were loaded with tissue-level implants (Straumann) and now feature a positive long-term prognosis.

Data Case 1

Implant regio 11
Insertion: April 1999
Prosthetic restoration: Juli 1999
X-ray controls: post-operatively, 2001, 2004, 2007, 2010, 2013 and 2016
Recall: bianullay
Special characteristics: none



Fig. 2



Fig. 1

Fig. 1: Initial situation. – **Fig. 2:** Impression taking.

Case 1

A female patient and teacher, 56 years old at the time of implant insertion, was facing a possible loss of tooth 11 due to a reduction in supporting tissue. Before, a progressed periodontopathy with a reduction in supporting tissue had been restored and the patient was already in the recall phase of this process. Tooth 11 thus was the last legacy of this past periodontal disease.

After tooth extraction, an implant was inserted and loaded with a crown after three months. The dental technician was able to integrate the crown harmoniously in the patient's dentition which was markedly influenced by recession and reduction in supporting tissue. The patient diligently observed recall dates every six months, which have been combined with a professional hygiene session since 2005.

X-ray controls and clinical results did not indicate any pathological findings at the implant, only show-

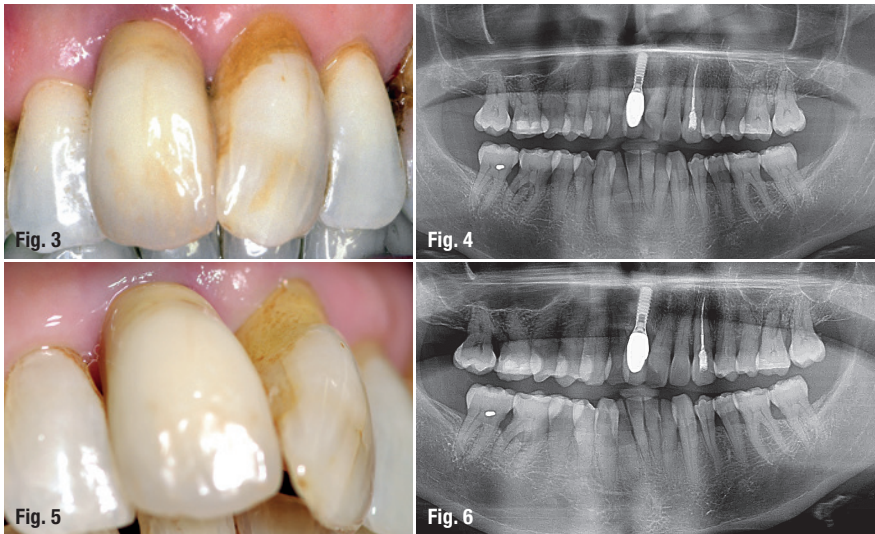


Fig. 3: After implant integration. – **Fig. 4:** OPG 1999. – **Fig. 5:** Check-up 2016. – **Fig. 6:** OPG 2016.

ing that the bifurcation at 46 and 36 had increased minimally since the beginning of the treatment (Figs. 1–6).

In conclusion, this case proved to be ideal – long-term stability and a both motivated and cooperative patient.

Case 2

Shortly before his 60th birthday, a university professor wanted to end his state of suffering from an edentulous maxilla and a partly edentulous mandible. Most of all, he wanted to exchange his total prosthesis in the maxilla and partial prosthesis in the mandible for fixed dentures.

Thirteen implants were inserted in two sessions and loaded with a continuous

bridge 16 to 26 in the maxilla and exclusively implant-based crowns and an extension bridge in the left mandible.

There were no regular control sessions, as the patient did not attend these in 2003, 2005 und 2008. In 2009, we achieved that he attended one control date and one professional hygiene session at least once every year.

X-ray controls and intraoral examinations did not indicate any decrease in the constitution of the residual dentition or implants (Figs. 7–14).

In conclusion, this case exhibits long-term stability of fixed, implant-based dentures and only partial compliance of the patient.



Fig. 7: OPG after Implantation 1996. – **Fig. 8:** Mandible after implant integration 1996. – **Fig. 9:** Maxilla after implant integration 1996. – **Fig. 10:** Frontal view 1996.



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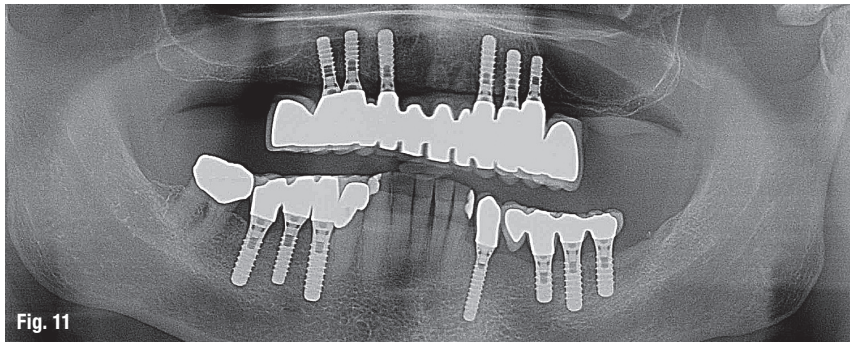


Fig. 11: OPG 2016. – Fig. 12: Maxillary situation 2016. – Fig. 13: Mandibular situation 2016. – Fig. 14: Frontal view 2016.

Case 3

A then 50-year-old female patient had suffered from an edentulous maxilla since she was 46 years old. Handling her total prosthesis in everyday life was difficult for her, especially as it covered her covered, which made singing difficult for her. In addition, she also suffered from an edentulous mandible.

Due to a reduced bone volume in the posterior region of the maxilla, a manifest atrophy, the patient chose removable dentures for the maxilla and fixed, implant-based dentures in the posterior region of the mandible. The maxilla was restored in the beginning of 1996, while the mandible was treated in the autumn of the same year. Patient acceptance for the newly integrated prosthesis was high and her compliance has proved to be exemplary. In the past two decades, she rigorously attended each biannual control and dental hygiene

date. She still wears the same prostheses, except for two artificial teeth which had to be replaced after a fall (Figs. 15–21).

In conclusion, extensive augmentations were avoided and the patient was granted chewing comfort similar to that of fixed dentures because of a milled bar in the maxilla and implantation in the extended maxillary anterior teeth. Implants were inserted as the bone volume in the posterior mandible was favourable, making fixed, implant-based dentures in the posterior region possible. A highly motivated, compliant and very reliable patient was a further beneficial factor for the long-term success of this case of implant treatment.

Tragedies

Implant restorations can fail. This failure may occur early or later after loading of the implants and

Data Case 2

Maxilla (n=6): October 1995
 Mandible (n=7): February 1997
 Prosthetic restoration: March 1996 (maxilla) and June 1997 (mandible)
 X-ray controls: postoperatively, 1999, 2001, 2004, 2007, 2012, 2016
 Recall: biannually until 2012, no controls in 2003, 2005 and 2008, since 2009 once every year
 Special characteristics: none

Data Case 3

Maxilla (n=4): January 1996
 Mandible (n=5): November 1996
 Prosthetic restoration: April 1996 (maxilla) and September 1996 (mandible)
 X-ray controls: post-operatively, 1998, 2001, 2004, 2007, 2010, 2013, 2016
 Recall: biannually
 Special characteristics: none

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its causes are manifold. This is illustrated by the two following examples:

Case 4: Augmentation failure

The following case presents early failure of an implant-based restoration. A sinus lift was performed at a maxillofacial practice in order to later insert implants for the rehabilitation of a free-end situation. Both augmentation and healing phase were uneventful.

Implant insertion was planned to be performed in the same practice. However, it was finally carried out in a different practice upon request of the patient. The graft, consisting of a mixture of synthetic bone substitute and autogenous bone was assessed to be healed and loadable following DVT control. In addition, the insertion of three implants and their prosthetic loading were uneventful and without any special occurrences.

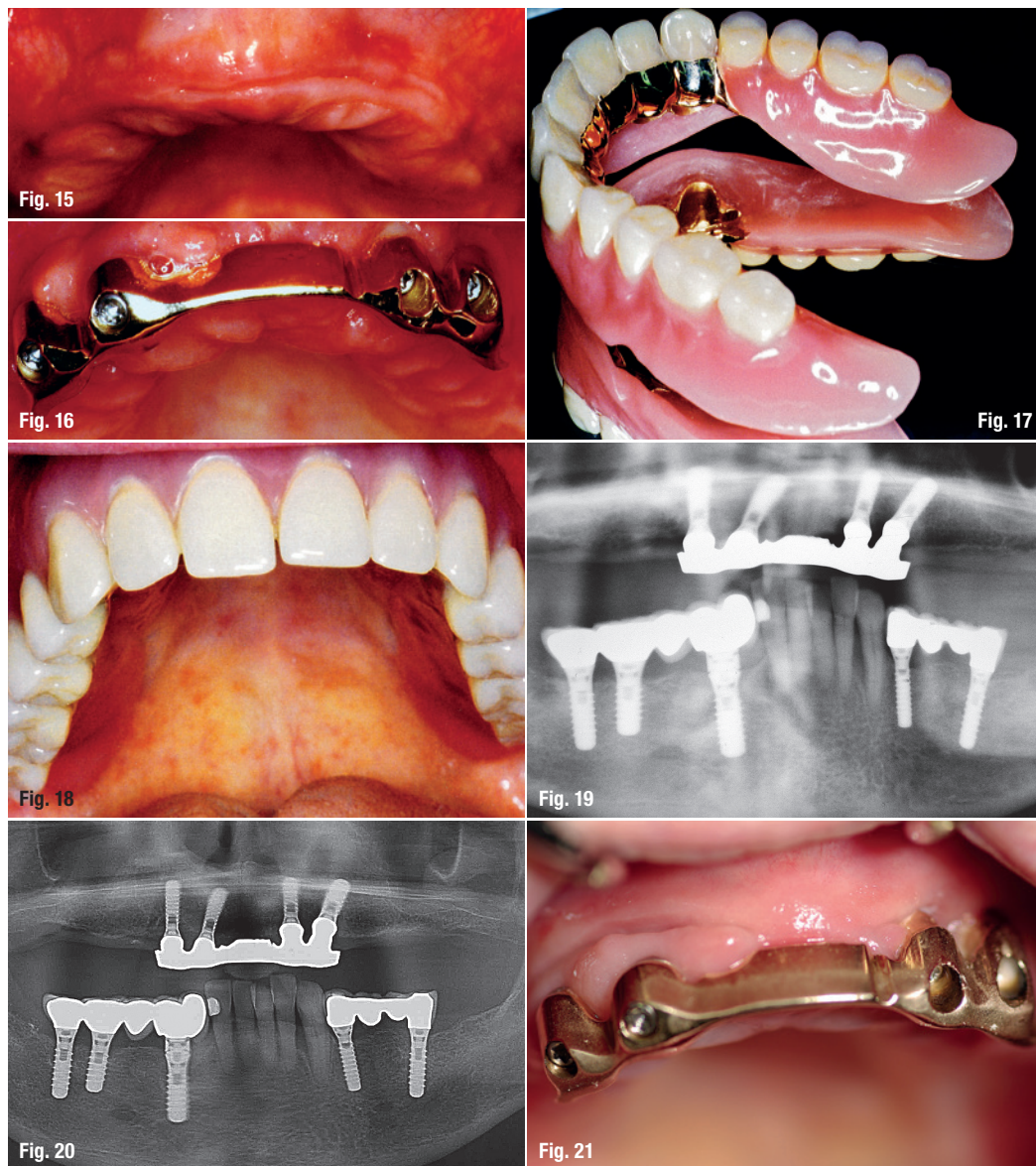
After six months, the patient experienced side effects and inflammation of the periimplant soft tissue: a complete failure of the periimplant soft tissue sleeve with the highest-possible probing depth and symptoms such as pain had occurred and ultimately lead to the removal of the implant restorations. Not only was this implantological T a tragedy, but it also can be rightfully declared a total failure (incidentally also starting with a T), moreover one at a very early stage (Figs. 22–29).

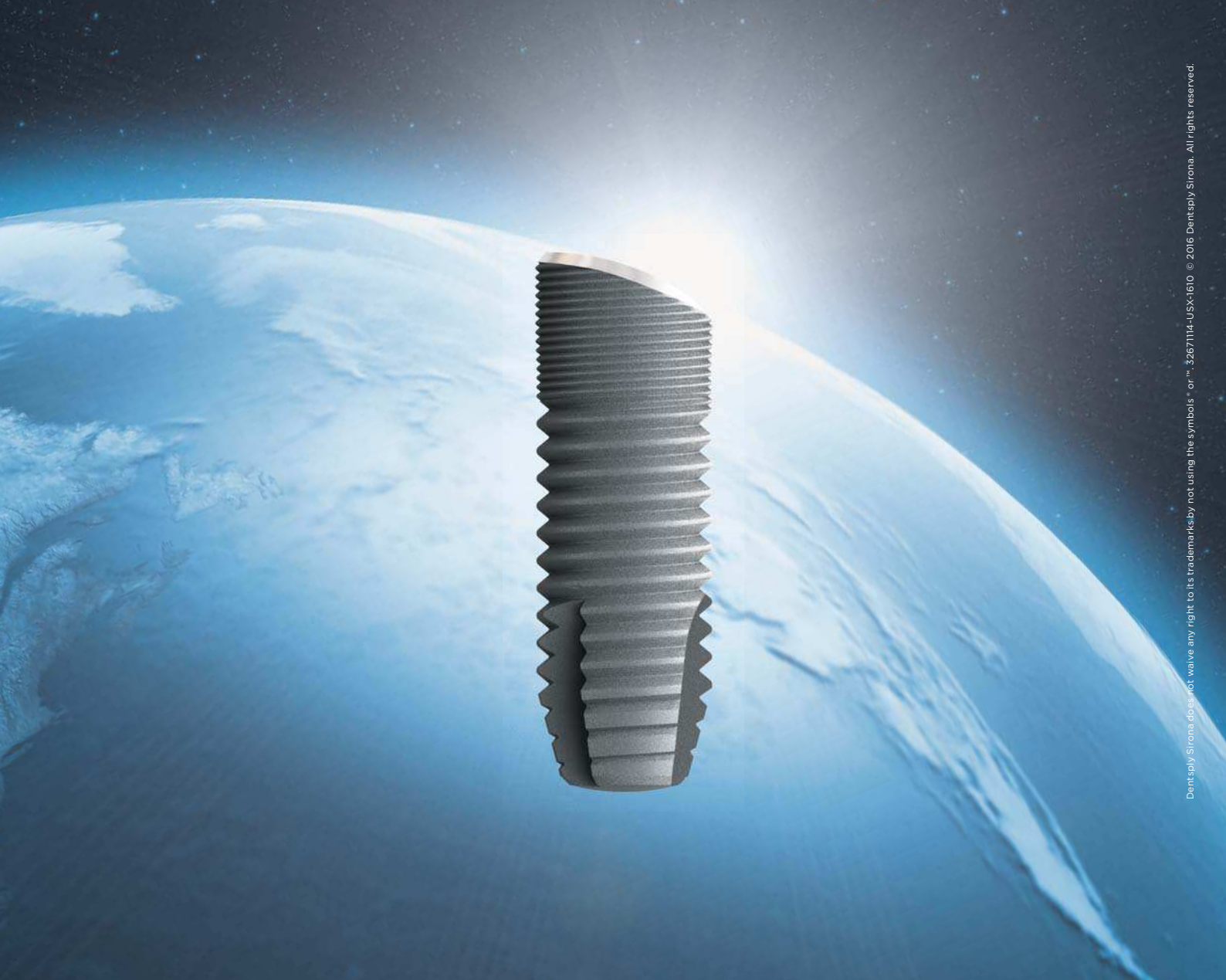
In conclusion, this case illustrates a classical early implant failure.

Case 5: Total failure

The final case presentation is an example of a late failure. The 59-year-old patient was characterised by, firstly, being constantly stressed, and, secondly, never having any time to spend for anything. His leading role in sales took its toll and was sometimes

Fig. 15: Edentulous maxilla 1996.
 Fig. 16: Bar in the mouth 1996.
 Fig. 17: Partial prosthesis before integration.
 Fig. 18: Integration.
 Fig. 19: OPG 2004.
 Fig. 20: OPG 2016.
 Fig. 21: Maxillary bar.





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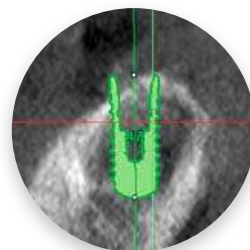
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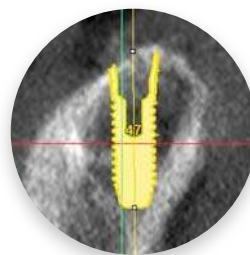
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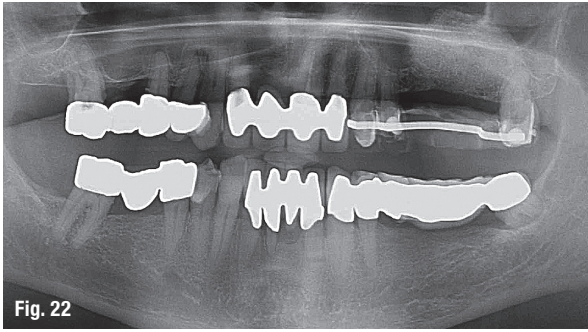


Fig. 22

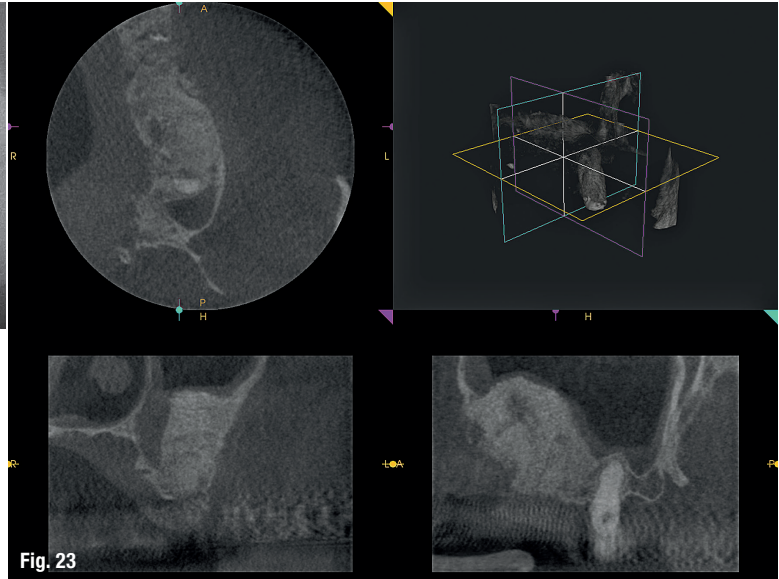


Fig. 23

Data Case 4

DVT (controls of the augmentation performed alio loco):
 October 2014
 Implantation: December 2014 (regio 25, 26, 27)
 Prosthetic restoration: March 2015
 Explantation of all three implants, including
 supraconstruction: March 2016

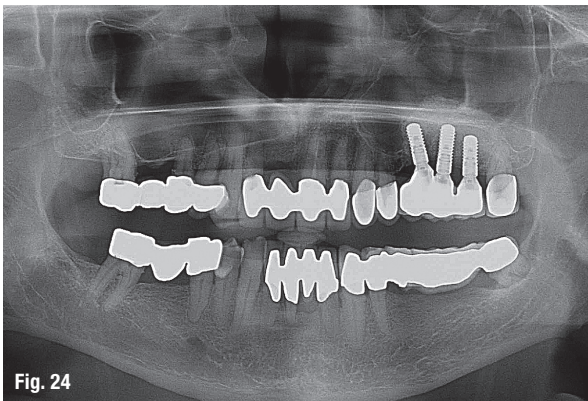


Fig. 24

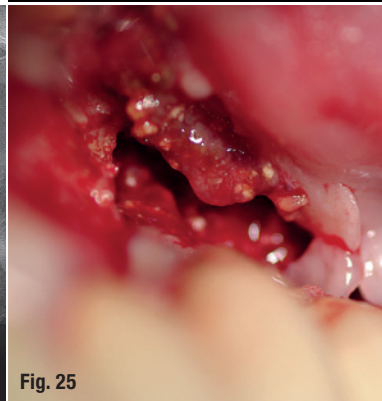


Fig. 25

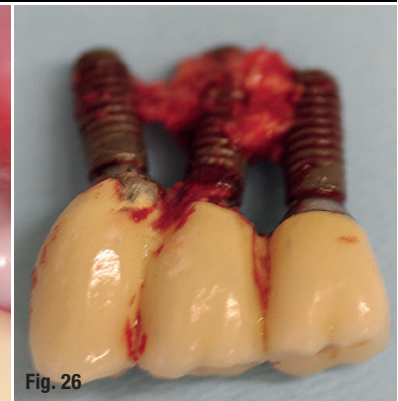


Fig. 26



Fig. 27

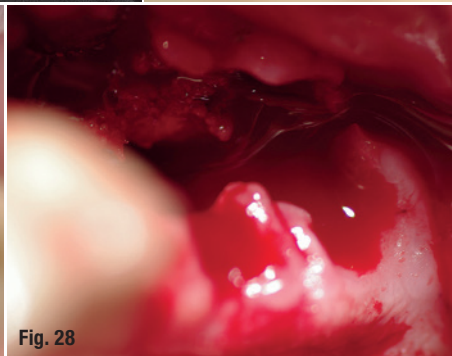


Fig. 28

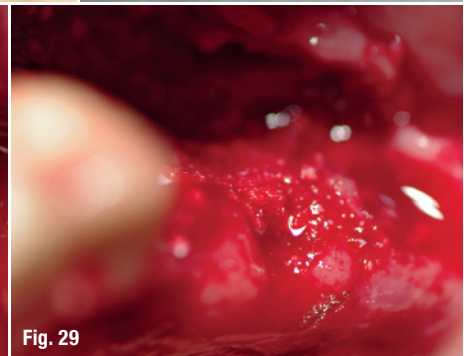


Fig. 29

Fig. 22: OPG of the initial situation.
Fig. 23: CBCT check-up of the augmentation.
Fig. 24: OPG after Implantation.
Fig. 25: Supraconstruction.
Fig. 26: Augmentation residues at the opening.
Fig. 27: Explant.
Fig. 28: Defect after explantation.
Fig. 29: After defect reconstruction.

compensated by an increased nicotine intake. The patient spent the little free time he had at his disposal by extensive travels abroad, rather than attending consultations at his dentist's, which probably made him the first patient who managed to miss twenty-two recall sessions in fifteen years.

However, there were phases of increased dental activity, mostly when he had lost one or more of his residual teeth due to periodontal lesions or inflammatory exacerbations.

Yet, the case had had a promising start, as the patient's periodontal restoration at the turn of the millennium had resulted in a restored, albeit re-

duced, periodontium. Free-end situations resulting from the extraction of non-retainable teeth in the right maxilla and mandible were treated with two implants each.

The teeth 14,12 and 44 could not be retained in the following years due to severe periodontal relapses. As a result, they were replaced by implants. At this point it became clear that the patient did not belong to the most reliable kind of patients as he missed some of his recall sessions as well as professional tooth cleanings.

In the end, this estimation proved true: Between 2008 and 2015, all contact to the patient ceased.

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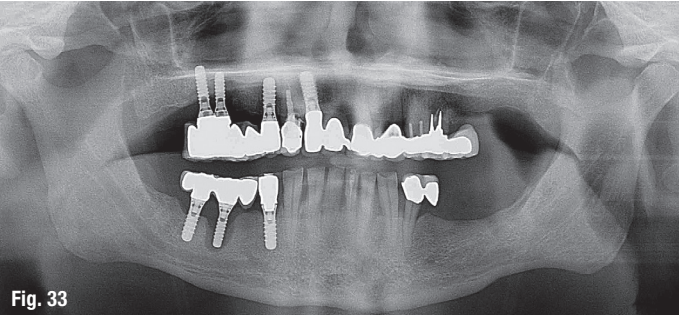
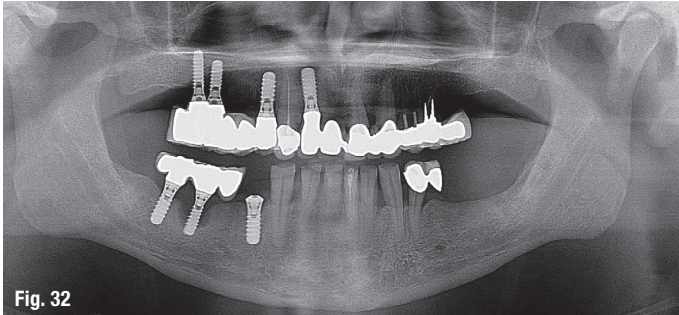
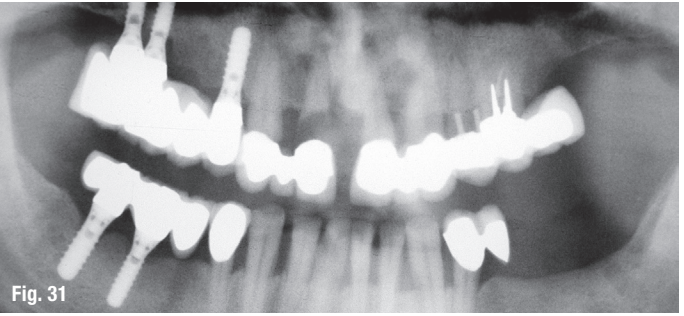


Fig. 30: OPG 2001. – Fig. 31: OPG 2004 after expansion. – Fig. 32: Peri-implantitis manifestation. – Fig. 33: Bowl-shaped defects.

In the spring of 2016, he made an appointment due to severe pain. A suspected peri-implantitis at the implants placed in 2000 was confirmed by panoramic X-ray. As a consequence, the implants had to be removed, leaving again free-end situations and two significant bone defect situations (Figs. 30–37).

Given the lack of patient cooperation, combined with meagre starting conditions and the continued presence of periodontopathy, the result is not surprising. Acknowledging shortcomings the

flawed patient selection. In addition, the insertion of the implants can be critically evaluated.

Success? Failure? Learning curves.

Implants have become a fixed component of prosthetic concepts. To what degree implantology has become established in dentistry is reflected in the high patient acceptance of this form of treatment.

Implants are actively requested by patients, as, from their points of view, their evaluation seems

Data Case 5

January 2000 (regio 47, 46, 16, 15), May 2002 (regio 14), February/April 2005 (regio 12,44)
 Prosthetic treatment: June 2000, August 2000, April and July 2005
 X-ray examinations: directly post-operative, 2001, 2004, 2016
 Recall: 2001, 2002, 2004, 2005, 2016; 2008–2015 no dental check-ups
 Special characteristics: explantation OK/UK right hand side

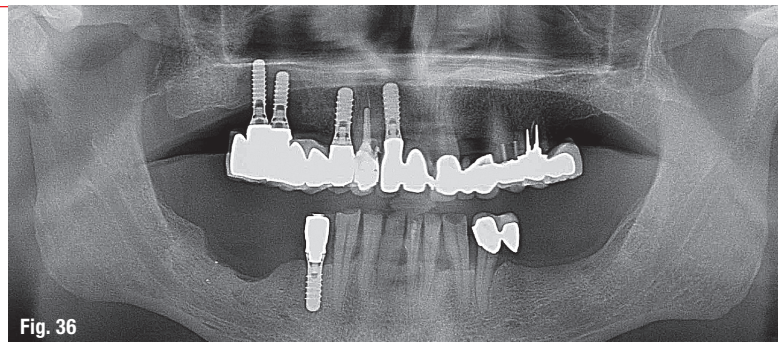


Fig. 34: Explant. – Fig. 35: After explantation. – Fig. 36: OPG after mandibular explantation. – Fig. 37: Post-explant defect.

easy: compared to an often long-lasting and painful periodontal therapy, implant therapy features the advantage of a singular, minimally-invasive implant insertion. In addition, implants are claimed to be life-long restorations. From the dentist's point of view, this estimation of implant therapy can neither be confirmed nor supported without restrictions, as it should predominantly be based on long-term results.

Long-term success of implants

The experiences of the last three years regarding the insertion of artificial dental piers and their treatment with dentures are positive. Independently of the kind of insertion, implants show very good long-term success rates. This long-term success is slightly less evident in the maxilla than in the mandible and yet compared with other forms of treatment the loss rate is low.

Risk factors

Limiting the long-term success are for example life-style factors (nicotine consumption), incorrect insertion techniques, shortcomings of the aftercare, oral hygiene as well as unrestored periodontal diseases.

Learning curves

Cases 1 to 3 confirm the positive experiences previously made in implant therapy, if an optimal indication is given, insertion is done carefully and there are regular check-ups. Even after two decades, patients are content with their implant-prosthetic restorations and there are no significant negative tendencies. From the author's point of view, it seems impressive that long-term stability seems a given even if the patient does not fulfil all requirements, for instance the low compliance in case 2. If, however, the patient disposition is mainly characterised by negative properties (insufficient compliance, bad oral hygiene, non-restored periodontal diseases, nicotine abuse), implant therapy can become a tragedy, as can be seen from case 5.

Severe complications can also be traced back to inadequate operation techniques. Hence, only one step of the treatment chain in case 4 was imperfect: the augmentation *ali loco* (sinus lift). Whereas the CBCT findings were inconspicuous, the newly-created implant site was insuffi-

cient and unable to support the inserted implants for more than a year. This resulted in the loss of three implants and the supra-contraction as well as a significant defect – a total failure!

Personal résumé

One thing is certain: Implantology epitomises the crucial development that has been taking place in dentistry over the course of the last 30 years. Thanks to the current state of implantology and the options it presents, we can now treat patients successfully that in the past were given conventional, not implant-based dentures that left them unsatisfied.

Due to much improved implant surfaces and honed insertion techniques, implantology has become established and turned into a reliable and secure procedure. Early complications that were much feared during the initial stage of oral implantology, have now become a rarity.

However, implantology still holds both highlights and lowlights. Besides the individual abilities of the implantologist and his limitations, aspects such as the correct classification of the degree of severity and the assessment of the patient and his compliance, carry a growing importance.

Furthermore, due to its large degree of invasion, the incurred costs and the fact that to place an implant is always a procedure based on choice, implantology must be – per se – committed to sustainability. Also, implantology is not as easy as it is often conveyed. It entails triumphs as well as risks.



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