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Case Report:
Complex Rehabilitation of the Upper Jaw and the Lower Frontal Teeth After Removal of 2-Stage Implants and Placement of Strategic Implant®, Allowing Necessary Adjustments of the Plane of Bite by Correction of the Position of Upper and Lower Front Teeth

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Case Report: Complex Rehabilitation of the Upper Jaw and the Lower Frontal Teeth After Removal of 2-Stage Implants and Placement of Strategic Implant®, Allowing Necessary Adjustments of the Plane of Bite by Correction of the Position of Upper and Lower Front Teeth

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Abstract

Background: A considerable amount of patients provides unfavorable elongation of upper and lower frontal teeth at the beginning of implant treatment. This condition triggers the development of an anterior pattern of chewing and a non-natural plane of bite.

Case Presentation: A 46-year-old male patient without medical issues, non-smoker, complained about oral aesthetics and pain in the lower frontal group of teeth. His upper and lower frontal groups were elongated, which was bothering the patient due to the aesthetic appearance. In order to adjust the smile line, all teeth and implants in the upper jaw were removed and replaced by Strategic Implant®. The remaining three lower front teeth were removed and apical infections were curettaged. The three teeth were replaced by two cortically anchored Strategic Implant® and a zirconium segment bridge. This way, by making changes in both jaws, the position of the mandible was readjusted to the joint centric and the overbite was corrected. Both jaws appear now with acceptable aesthetics and the patient left the previous anterior chewing pattern instantly. His speech function was normal right away. To solve this case, the Strategic Implant® Technology was used, because no other oral implants would have allowed working in an immediate functional loading protocol and without bone augmentation.

Equipping the anterior frontal region with 2-stage implants right after removing the massive infection would not have been possible with conventional implants. The Strategic Implant® used here were anchored in more caudal and highly mineralized bone areas. This allowed immediate functional loading of these implants while the bone areas crestal to the implants' threads will have time to recover and to remineralize. The fully polished implants cannot be colonialized by bacteria. Hence, the chance for developing a periimplantitis are nil.

Conclusion: This case shows that in some jaws, partial or complete removal of teeth is necessary in order to establish an acceptable plane of bite. In other parts of the masticatory system, adjustments of the position of the clinical crowns of natural teeth are possible by grinding of the clinical crowns and removing just a few teeth.

Both options are given in many cases, especially if the vertical dimension can be adjusted in the fully implanted arch.
If the technology of the Strategic Implant® is used, all this can be done in an immediate functional loading protocol because neither bone augmentation nor an unloaded healing time is necessary for this technology.

Keywords: Immediate functional loading protocol, Strategic Implant®, anterior deep overbite, correction of an anterior pattern of chewing, full zirconium bridgework, vertical correction, occlusal correction

Introduction

The present case must be considered a complex case due to the nature of bimaxillary elongation of the front teeth and because two pre-existing posterior bridges on 2-stage implants had to remain unchanged according to the wish of the patient.
Nevertheless, the treatment providers found an acceptable solution by making adjustments only in the upper jaw and by replacing the lower front teeth.
The technology of the Strategic Implant® was developed in order to overcome all disadvantages of conventional oral implantology and its devices. This development was highly successful as the following table shows:

	Conventional Implant (ankylosed / osseointegrated)	Strategic Implant®
01	Develops periimplantitis (a huge medical disadvantage)	Never develops periimplantitis
02	Requires unloaded healing time	Usage in immediate functional loading protocol as a rule
03	Often requires bone augmentation	Never requires bone augmentation
04	Aesthetics are created by bone augmentation	Aesthetics are created by bone reduction
05	A period of healing time is typically required after tooth extraction	Implants are placed into fresh extraction socket and loaded immediately
06	Load transmission in the spongeous bone areal after "osseointegration" has happened	Load transmission into highly mineralized bone areas only
07	Due to the rough surfaces, chances for early implant loss and infection are given	Due to the polished design of the implant, no primary infections are possible
08	The prosthetic work piece will be at the area of the implant (emerging profile)	The position of the prosthetic work piece is chosen independently from the area of implant anchorage
09	Due to the size of the implant, the intraosseous supply of blood is harmed	Due to the minimal amount of bone replacement, the intra-osseous blood flow and physiological properties of bone are not changed
10	Frequent loosening of prosthetic screws or fractures of the structure of the implant or the abutment, due to biomechanical incompatibility of osseointegrated / ankylosed implant bodies in the elastic jaw bone	Single-piece, elastic design of the implant allows safe and stable integration

***Table 1**: Shows ten significant advantages of the Technology of the Strategic Implant® compared to all other implants on the market, which work according to the older method of "osseointegration".*

Typical Timeline of the Treatment

- Day 1: Clinical and radiographic evaluation, surgical intervention
- Day 2: Tooth try-in
- Day 3: Zirconium try-in; final cementation
- Day 4: Correction of masticatory function
- 3 Months: Adjustment of occlusal and masticatory surfaces
- 15 months: Routine control

Case Presentation

1. Introduction

A 46-year-old patient without medical history requested treatment in order to improve his appearance and the chewing function. He had earlier received 2-stage implants for the frontal group of the upper jaw. Before the interventions, the following pictures and x-rays were documented:

- Panoramic overview picture, Fig. 1c
- Clinical pictures, Fig. 1a and 1b

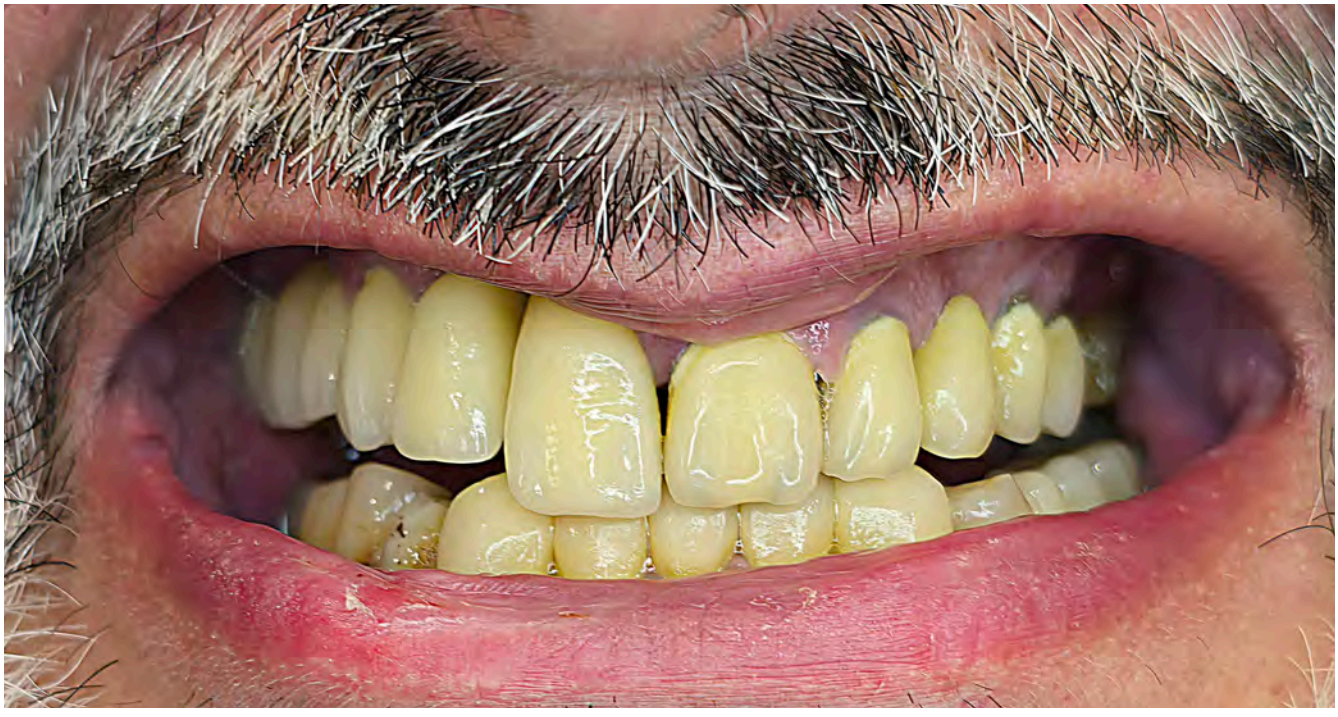

***Fig. 1a**: This picture shows the frontal view of the patient with the mandible positioned anteriorly while the lateral groups are not touching.*

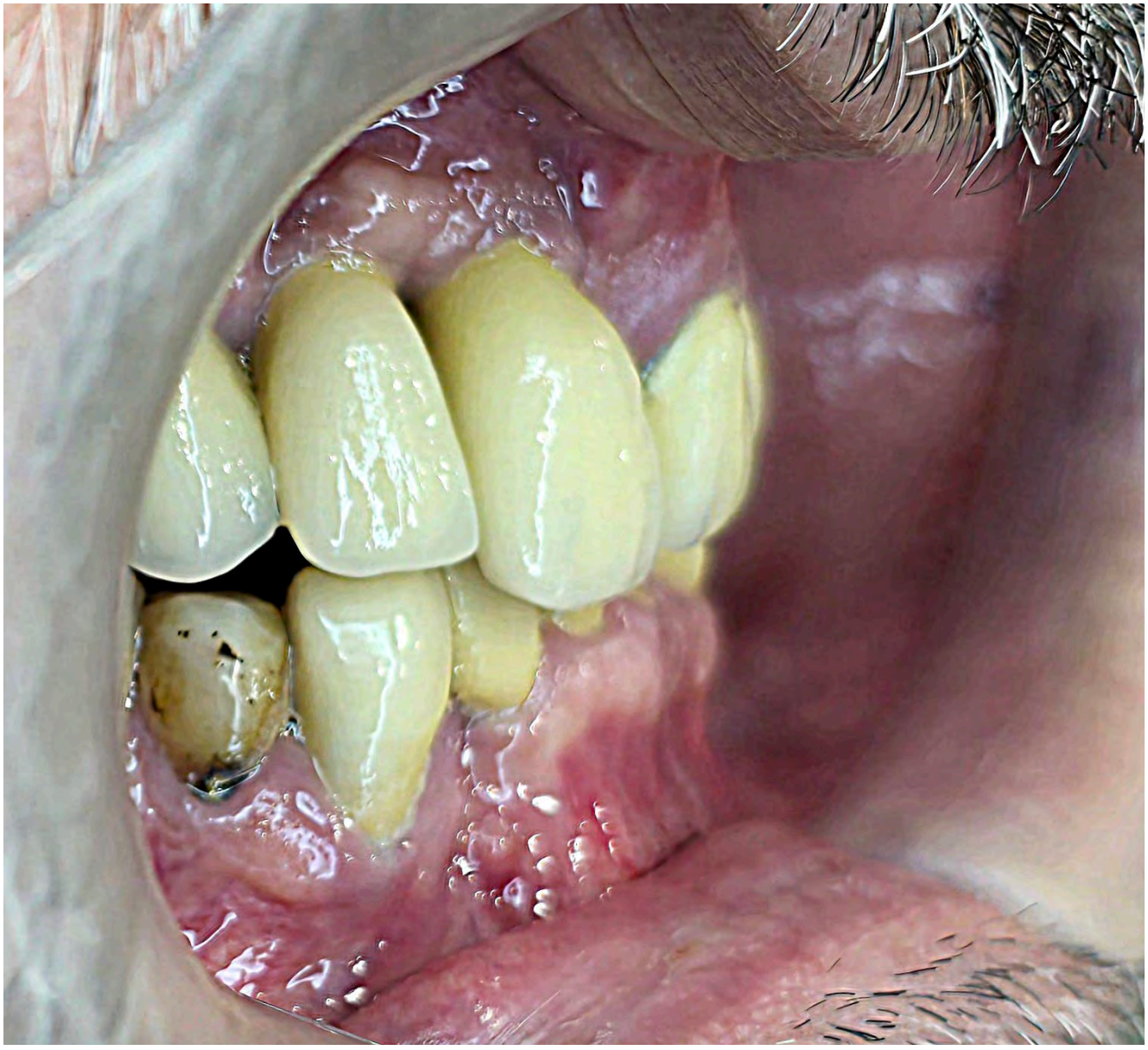

***Fig. 1b**: The lateral view of the elongated upper and lower front teeth revealed that both frontal groups were elongated. This resulted in a deep overbite with up to 6 mm. For circular implant-based bridges for immediate use, anterior overbites are unacceptable, because they will trigger an anterior pattern of chewing. This will then lead to extrusive forces on the implants in the distal maxilla. Implants can become mobile if placed in areas where extrusive forces prevail.*

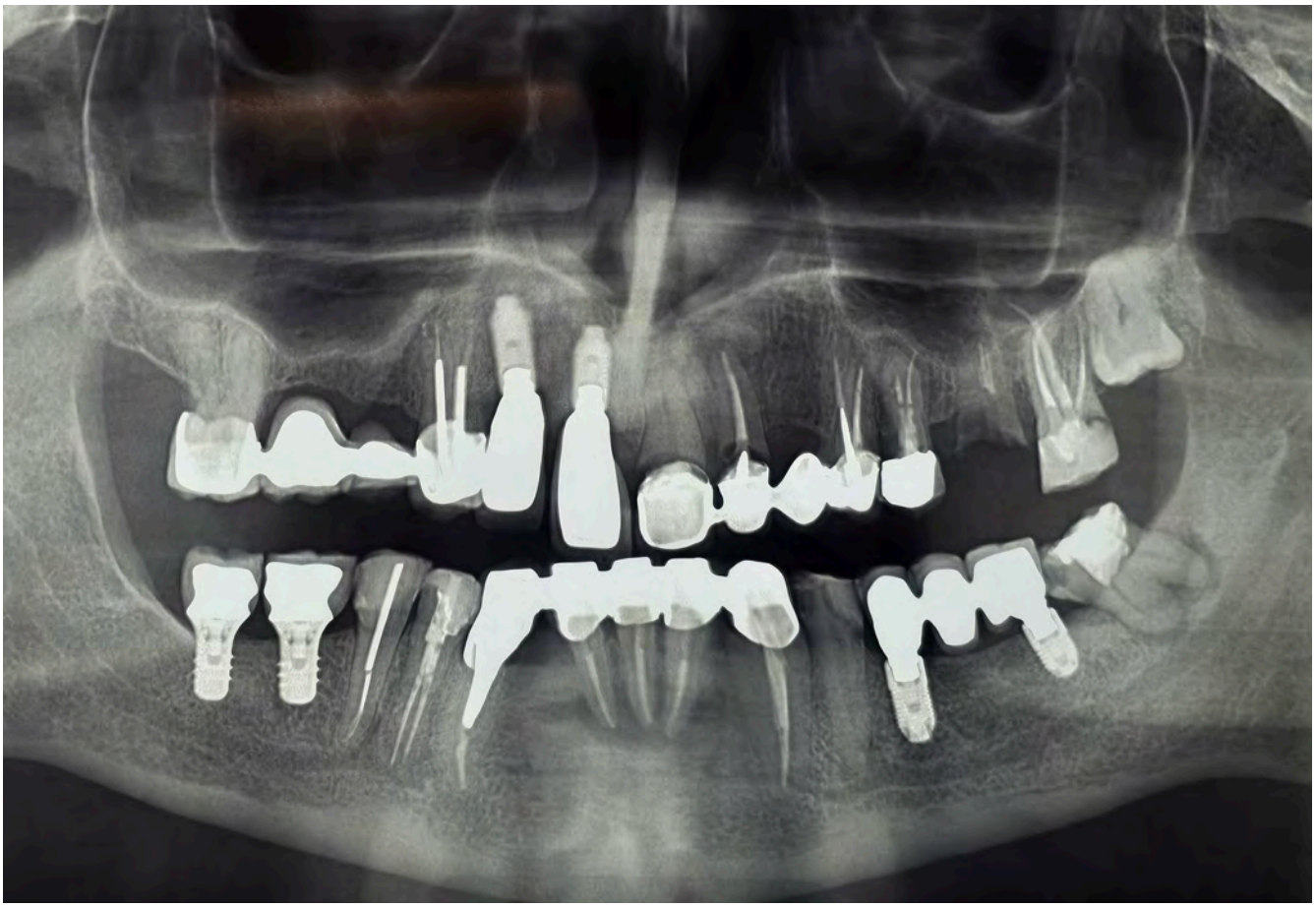

***Fig. 1c**: Pre-operative panoramic picture showing two short osseointegrated implants in the upper frontal group. The crown to implant ratio was quite extended.*

Material and Methods

1. Surgical Intervention

Mandible

The surgical intervention was done in local anesthesia. As a first step, we tried how far we could reduce the vertical height of the crowns on the lower canines. As an alternative to the reduction of the height by grinding, the replacement of the canines could have been done. We found that the vertical thickness of these crowns was sufficient to simply grind the crowns down to an adequate height, Fig. 2a.

***Fig. 2a**: This picture shows the lower front after reduction of the vertical crown height on both canines. The vestibular fistula indicates an active infection around the apex of tooth 41.*

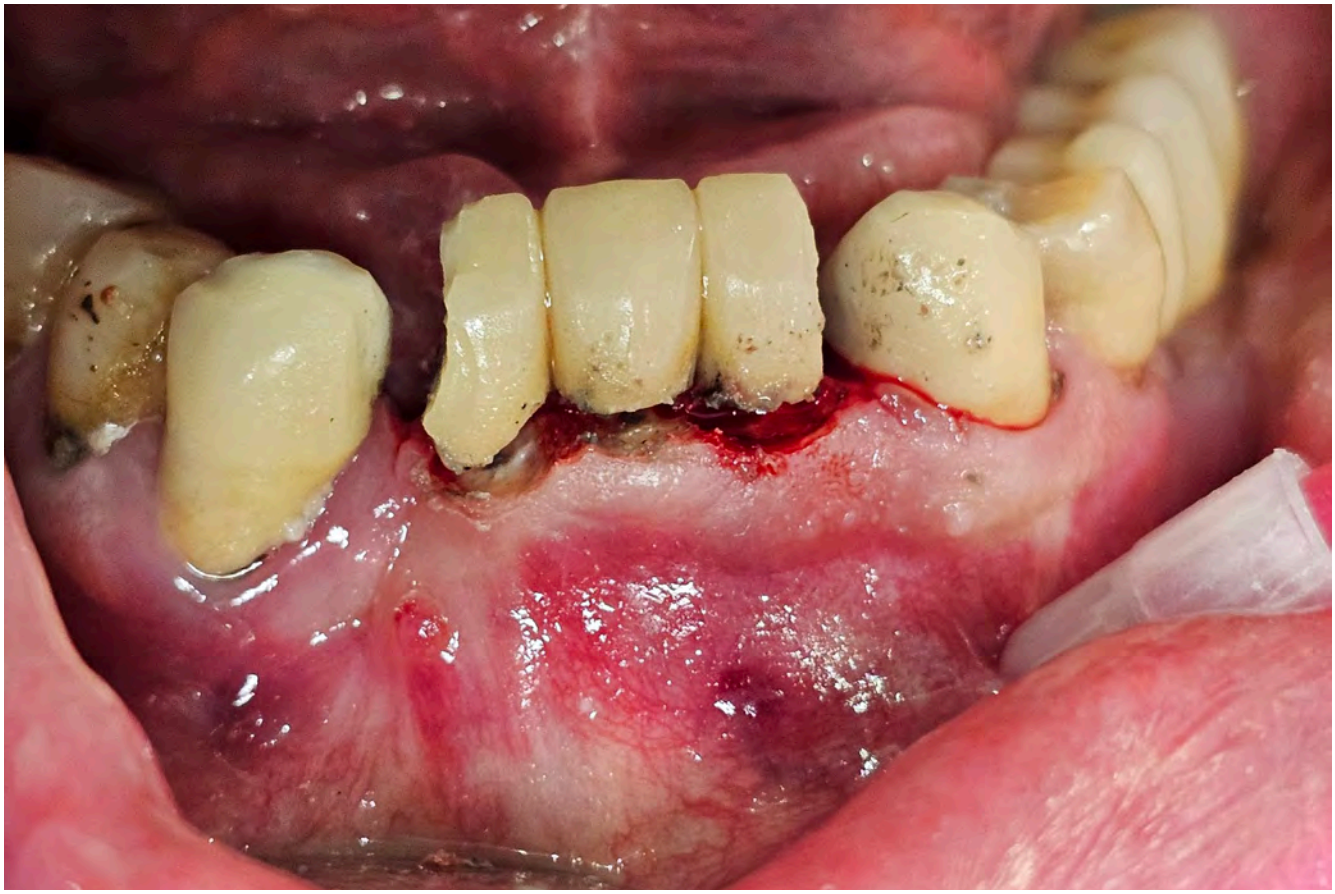

***Fig. 2b**: After both canines where shortened, the frontal group was separated off in order to allow a careful extraction of the remaining three lower front teeth.*

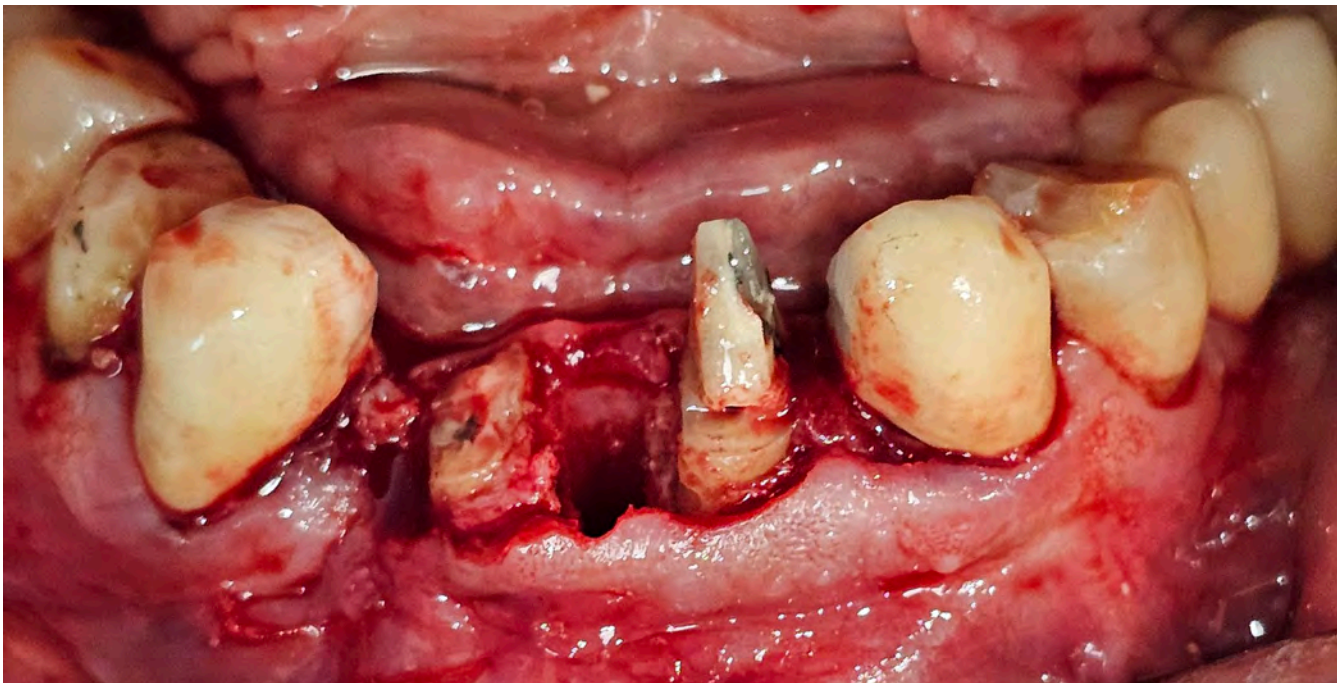

***Fig. 2c**: The lower front teeth were extracted one by one.*

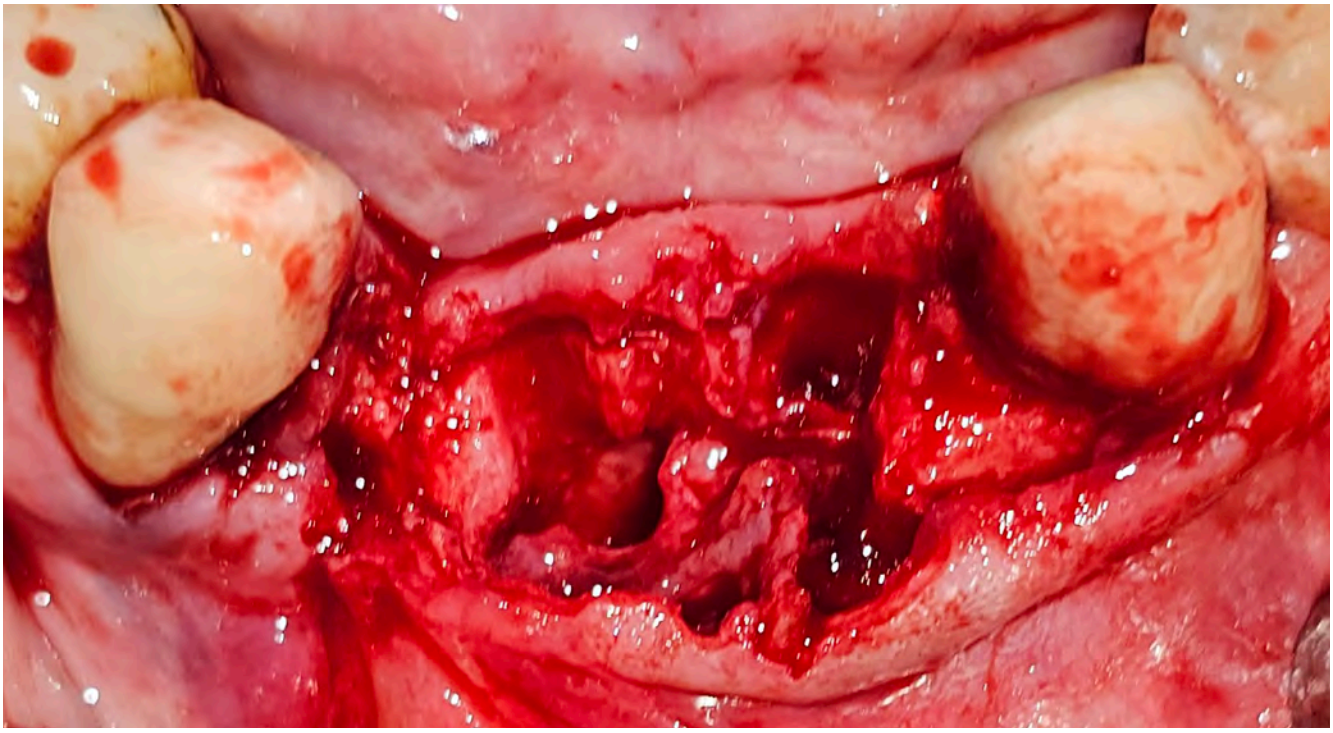

***Fig. 2d**: In the area of the apex of the frontal teeth, a large amount of infected soft tissues had accumulated. These soft tissues had to be removed.*

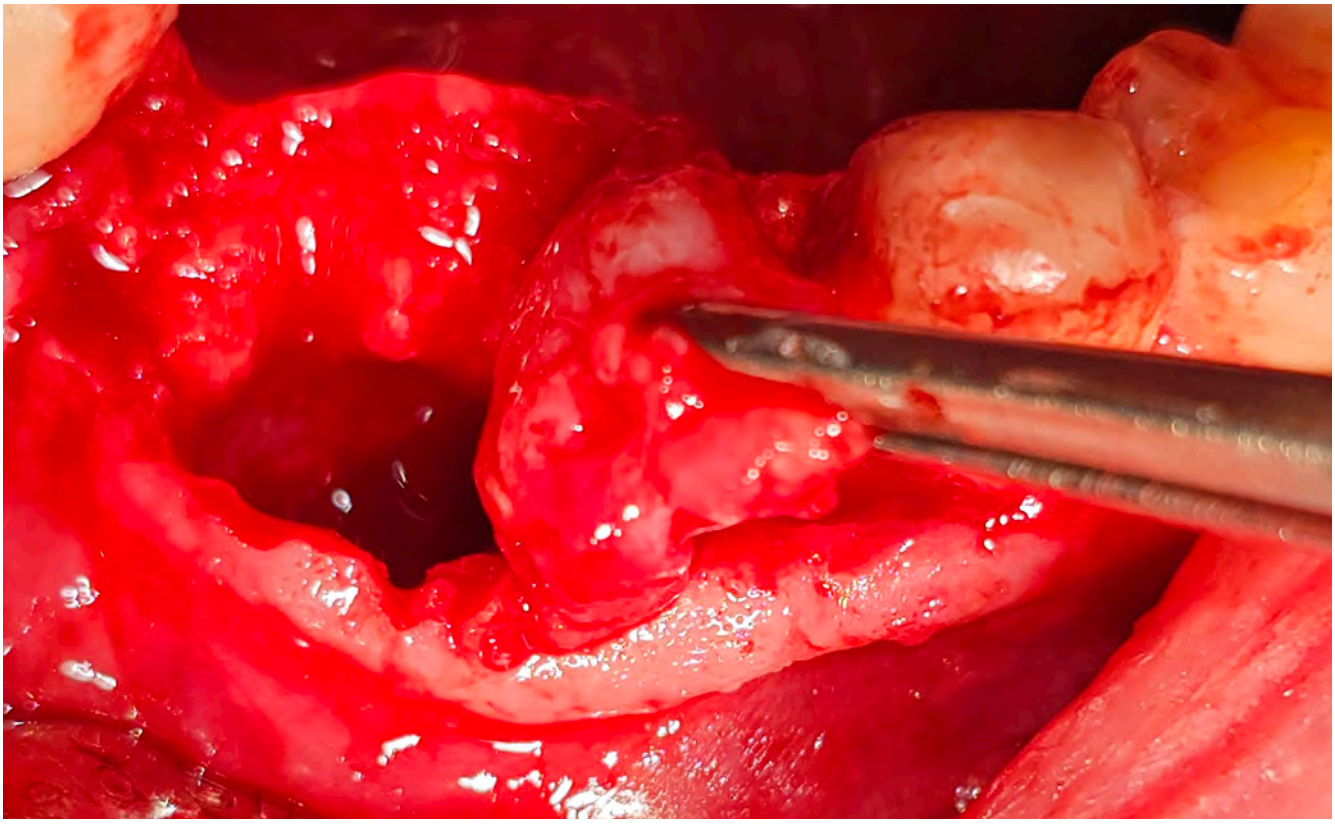

***Fig. 2e**: The soft tissues that had developed in the bone defects were curettaged and fully removed.*

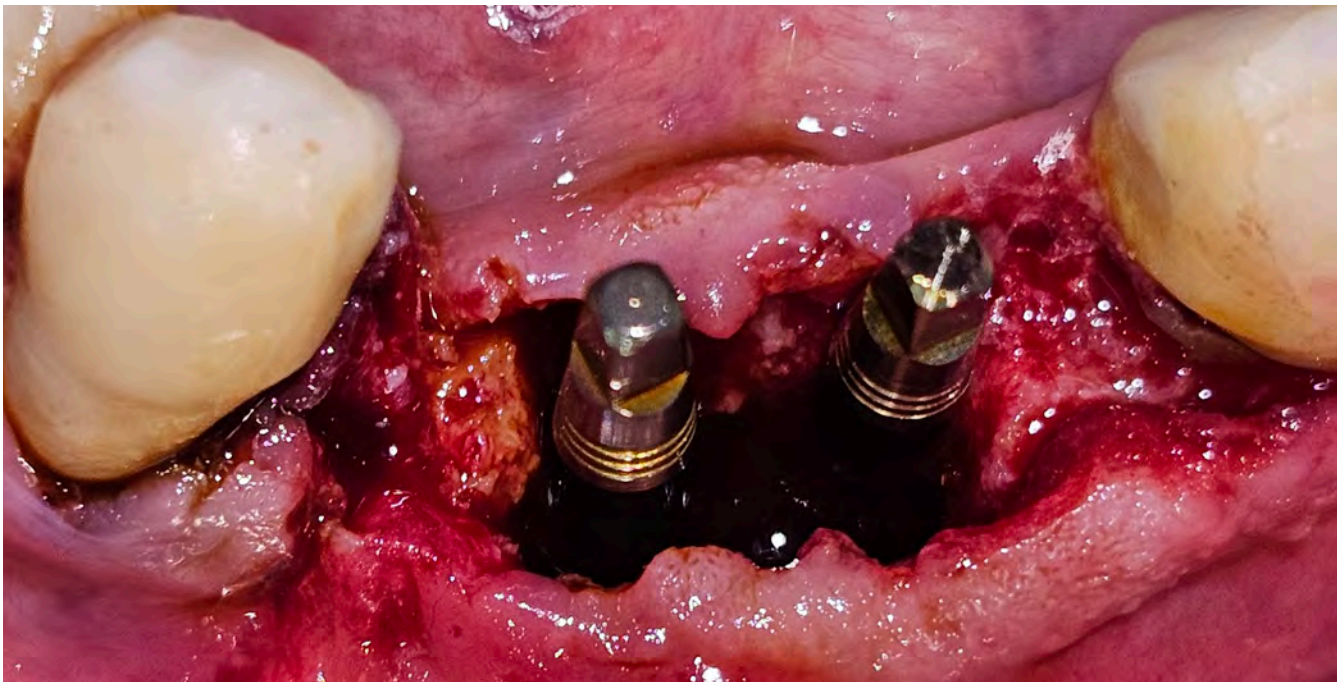

***Fig. 2f**: After two BECES® 3.5. 20 mm and 3.5 23 mm respectively had been placed, the site was closed with 2.0 Silk suture. Sutures were removed after two days, right before the cementation of the bridges.*

Maxilla

All teeth and 2-stage implants were removed from the upper jaw. Ten BECES® polished single-piece Corticobasa|® implants and three BECES® EX (polished compression screw implants) were placed and impressions were taken from both jaws. The inter-maxillary relationship was registered.

2. Prosthetic Treatment

After a tooth try-in and subsequent zirconium try-in, the final cementation of both bridges was done one day 3, using Fuji Plus definitive cement.

In two separate subsequent appointments, the bite and the masticatory function were adjusted in order to align the joint centric with the occlusal centric and to level the bite.

3. Control Appointment

After three months, a control appointment was scheduled. Small adjustments of occlusal contacts and masticatory slopes were necessary. The patient expressed very high satisfaction with the results of the treatment. Neither pain nor mobility of bridges was found. The sites where implants had been placed appeared healthy and there was no bleeding observed.

The panoramic overview picture showed the beginning of the bones healing in all extraction sites.

The bite was taken after relaxing the chewing muscles manually. Care was taken to install the bridge in a relaxed joint centric, which equaled the occlusal centric. To maintain a stable position of the lower jaw where both centrics are the same is the aim of all later control appointments.

***Fig. 3a**: Intra-oral view of the new prosthetic reconstructions in the upper and the lower jaw and the patient's natural teeth.*

***Fig. 3b**: Overview of the upper and lower jaw in occlusal centric. Both bridges are fixed with definitive cement (Fuji Plus: GC, Japan), however, soft tissue healing is not yet completed.*

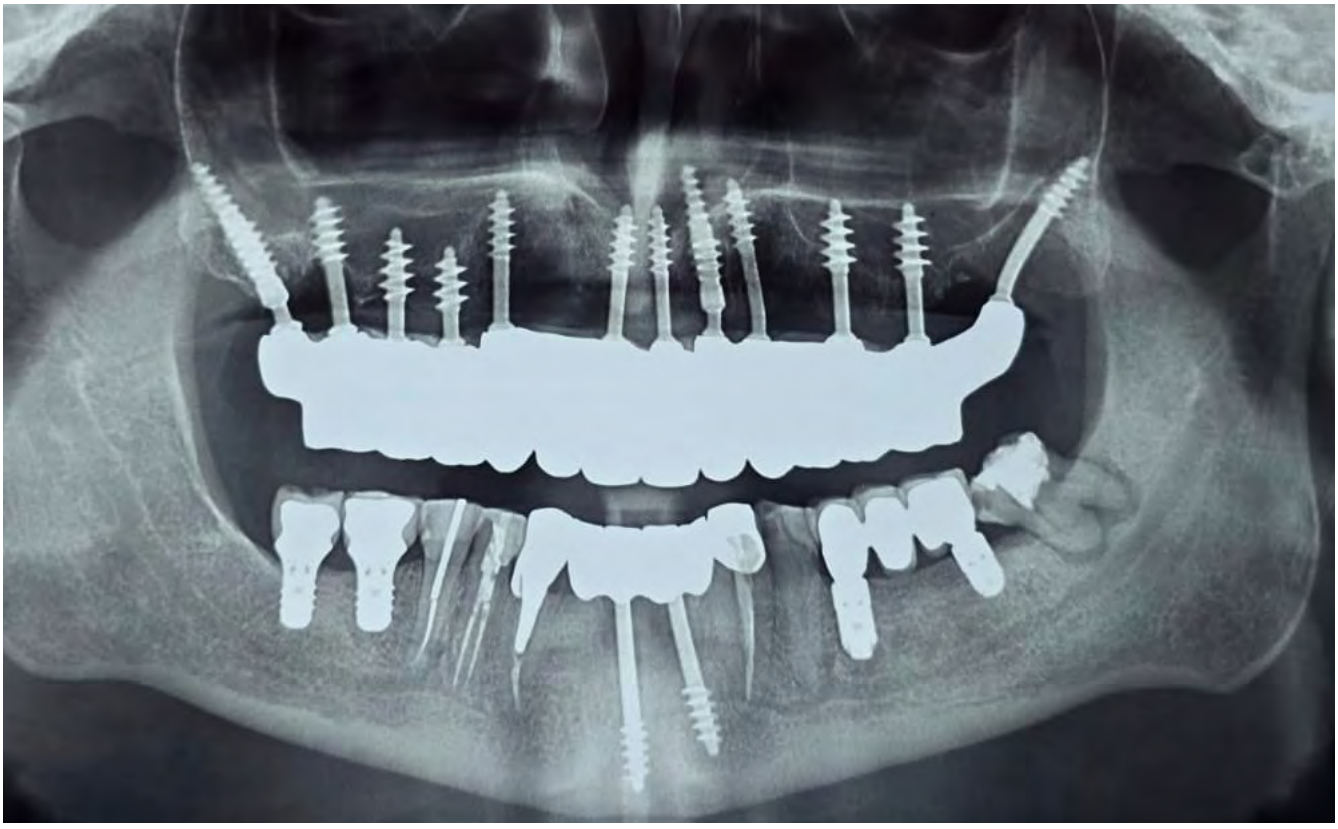

***Fig. 3c**: Post-operative panoramic overview picture after cementation of both bridges. The patient did not agree to remove tooth 38. Areas of bony defects are still visible after tooth and implant removal. Bridges were produced from solid zirconium and cemented onto the abutments.*

Discussion

This case shows the large potential for a complete treatment of all pre-existing problems in an immediate loading protocol. Although in the anterior mandible, severe osteolysis and fistula were found, implants were placed right after extraction. Such an intervention would not be possible if the technology of osseointegration had been used. This technology would have demanded infection-free sites and well-healed bone up to the level of the crest. Therefore, the treatment would have been delayed for months and intermediary prostheses would have been necessary.

Any conventional implant treatment in the upper jaw would have been delayed because of "healing times" such as

1. Time for the bone's healing, after root and implant removal
2. Time for maturing of the bone augmentation as well as for the results of the sinus lift procedure,

and finally

3. Time for the conventional implants' osseointegration.

Such a "conventional" (slow motion and process-oriented) implant treatment in both jaws (considering the complex problems of the case) could be done within 12 - 18 months by using traditional methods of implantology.

Four conventional 2-stage implants were left in function in the lower jaw. Typically, all 2-stage implants are removed if we incorporate Strategic Implant® reconstructions. This is done due to the low expectation of survival (without complications) for all 2-stage implants, as well as due to their low compatibility with elastic implant types like the Strategic Implant®. In this case, we decided to leave 2-stage implants in because they were not covering large areas of the lower jaw, they were not connected to teeth, and their survival was more likely, considering the atrophy of the bone into which they were placed. We also decided not to raise the bite (e.g. by inserting new (higher) crowns on them), because the correct height of the bite was established by renewing the full upper dentition by an implant borne bridge.

How Does This Case Compare With Existing Literature?

Our findings are in line with the results of Lazarov (2019)[1], Dobrinin et al (2019)[2], Palka & Lazarov (2019)[3], which showed excellent results for this technology over a time period of up to five years, as well as with our publication on long-term results (Ihde S., Sipic O., Ihde A., 2024[4]), which showed excellent results over a time-period of up to twelve years. The last mentioned study reported on a cohort of 1860 full jaw restorations on the Strategic Implant® with a failure rate of 1.1 % of the BIPS® during the observation period of up to twelve years. Noteworthy in the last mentioned study is that no failures occurred more than four years after the incorporation of the implants and the fixed bridges. Given that such large groups of patients show extremely good results in the long term, we consider it adequate to report this case even without long-term observation. The emphasis of this report lies clearly on the technical details.

What Is the Clinical Significance of This Case?

This case shows that by applying standard procedure from the field of the technology of the Strategic Implant®, standardized and stable clinical results can be achieved within three days. Implant placement according to the "16 Methods IF® Consensus Document" as published by the International Implant Foundation IF® (Munich) yields reliable clinical results. If aesthetics are compromised, the technology of bone reduction is the preferred method for correcting aesthetic issues – it yields better results compared to the (alternative) technology of bone augmentation.

The technology of the Strategic Implant® is never used in combination with bone augmentation because all patients provide enough bone for the stable anchorage of the Strategic Implant®. In cases with very compromised amounts of jaw bone, zygomatic implants are placed in combination with the Strategic Implant®, however, augmentations are never necessary. We estimate that this is the case in one out of 500 upper jaw cases. From this, we can conclude that the technology of the Strategic Implant® is ideal for being executed in the regular dental office by specifically trained general dentists (with a good amount of experience in dento-alveolar surgery).

Maxillofacial surgeons and oral surgeons are neither required nor are they ideal treatment providers for this modern oral implant procedure. Surgeons must have a thorough understanding of the prosthetic rules. Specialized clinics that work with this technology can put the emphasis on good aesthetics and staying within the timeline of the bone, which requires stable splinting within 72 hours after the placement of the new implants.

It has to be mentioned here that, due to the fact that not all teeth were removed, another round of implant placement will be required sooner or later. This is connected to a few additional appointments, additional pain and additional costs. In our case, the patient requested that a few teeth stay in. Patients must be informed that leaving teeth in will lead with high probability to more interventions in the future, and these interventions trigger more costs.

Conclusion

Whenever a complex situation is given pre-operatively, the main emphasis should be put on treating the whole case, even if this includes the removal of quite a number of teeth that might seem worthwhile to keep from the point of view of a dentist. Pre-existing 2-stage implants should never be included into prosthetic constructions with the Strategic Implant®, however, they may be left in on independent constructions.

Anterior pathologic patterns of chewing that persist only due to elongated front teeth should be treated by reducing the length of the crowns of the frontal group of teeth or by simply extracting these teeth in combination with a bone reduction, implant placement and installation of new crowns in a more favorable position[4]. “Saving teeth” is not the aim of this technology: The treatment aim is to establish a life-long standardized masticatory function without any deviations. We know today that teeth are more and more unreliable foundations of dental restorations.

This clinical case shows that even if not all teeth in both jaws are removed, a sufficient correction of the plane of bite is possible in selected cases.

The technology of the Strategic Implant® is an immediately effective therapy for restoring unrestricted fixed chewing ability.

As this technology differs from conventional oral implant therapy, highly trained specialists (typically after a training period of around 24 months, including theoretical training and practical work under supervision) are required for delivering successful treatments.

Key Takeaway Message or Learning Point(s) – Recommendations for Clinicians or Researchers

For a number of good reasons, the old method of osseointegration is not the specialist standard today anymore:

1. Osseointegrating (ankylosing) oral implants typically do not work in immediate functional loading protocols because osseointegration takes time. Today, the process-oriented technology of osseointegration is not necessary anymore.
2. Osseointegrating implants – due to their method of use – tend to be designed in a 2- or multi-piece way and their large volume leads to otherwise unnecessary bone augmentations, because the large bullet-shaped implant bodies must be inserted into the bone.
3. Because (unnecessarily) large implant shapes were chosen by the treatment provider, bone augmentations or even bone transplants are required. The technique to choose implants larger than the bone, and then to perform a bone augmentation, is widely considered a "Cinderella technique". Such bad practices should no longer be considered nowadays.

Patient Perspective

After the incorporation of the implant-supported bridges, the patient reported that he can perfectly speak, and that the sound is very good. Before the treatment, he had a number of letters that he could not pronounce with a sufficiently good sound.

Furthermore, the patient pointed out that he appreciates that more space is available for the tongue in general and that due to this, pronunciation is better and easier.

When asked if he feels a difference because there are no frontal contacts any more, he did not answer the question, probably because he did not understand it.

We concluded that he did not miss the frontal contacts, which anyway (pre-operatively) appeared only during the protrusion of the mandible.

Informed Consent

The patient gave a written statement that allowed us to publish his case including the pictures for scientific purpose.

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