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case report

Rehabilitation of the anterior maxillary area with immediate implant placement

industry

More room for new bone formation

news

Fifty years of implantology to be celebrated in Cologne

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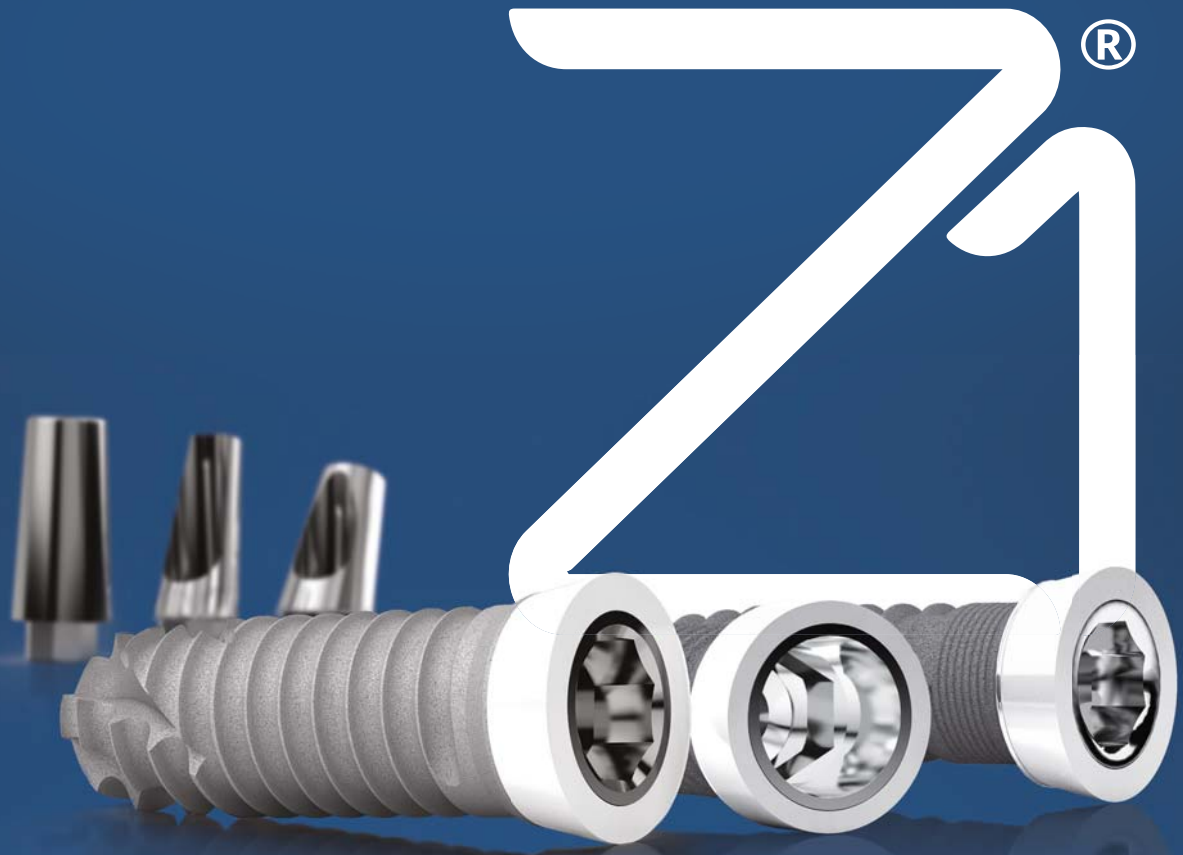

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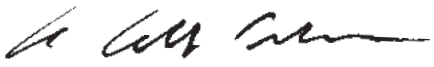
The agony of choice: To bone graft or not to bone graft?

Dear colleagues, in dental implantology, we are quite often faced with cases involving reduced bone volume. When treating these challenging cases, we need to ask ourselves whether to employ bone augmentation techniques or not. Let us take a look back at the founding years of our association: In the seventies, we placed implants in sites where the jawbone would allow it. During this time, especially quite narrow blade implants were utilised, according to the principle of "implant follows bone". In the eighties, there was a shift towards a "bone follows implant" approach, meaning that, during that time, clinicians tried to create the ideal implant positioning by means of bone grafting in sites when there was only little bone or none at all. This method, however, was found to be rather time-consuming with regard to overall treatment time and was especially prone to certain risks.

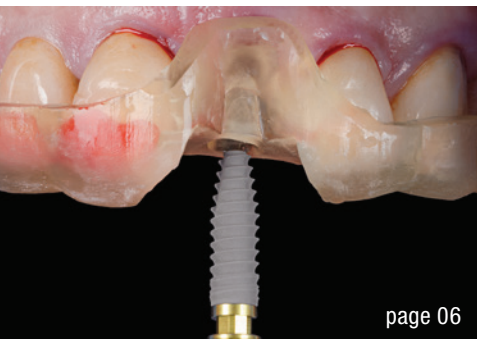
The logical conclusion from past experiences is that nowadays there is a tendency to perform bone augmentation procedures rather in areas where it is necessary for aesthetic reasons. In this context, we utilise autologous bone blocks, for instance, or materials of allogenic and xenogenic origin—always with a view to the optimal prospective outcome. Modern digital technologies aid in implant placement by means of guided surgery, and it is even possible to fabricate customised blocks from allogenic material based on corresponding CBCT data, for example, and to insert these into defects in a custom-fit way. In some cases in which coverdenture prostheses and screw-retained protheses according to Malo's principle are to be fabricated, one can refrain from employing augmentative measures altogether without compromising on cosmetic aspects and aesthetics.

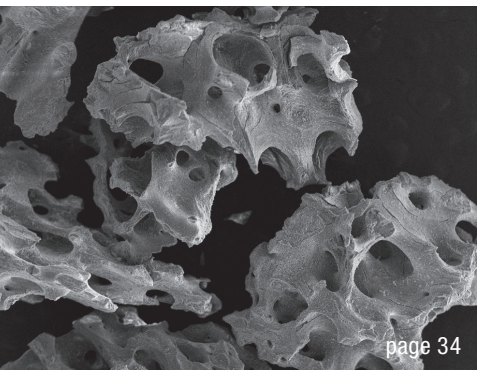
Ultimately, we as implantologists must always decide between one or the other solution, based on the individual indication. With this in mind, I hope you enjoy reading the new implants—**international magazine of** oral implantology, and I am looking forward to meeting you in person at our third Future Congress for Dental Implantology, which is to be held in October in Cologne, where we will be celebrating the 50-year anniversary of the German Association of Dental Implantology (DGZI).

Sincerely yours,



Dr Rolf Vollmer





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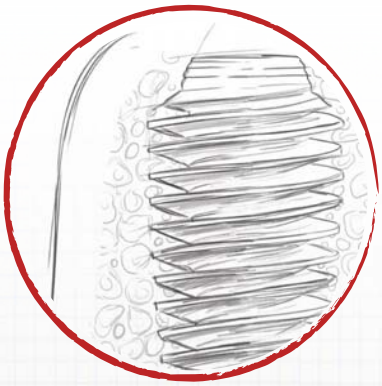

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Successful immediate implant loading—According to the Socket Shield Technique

Dr Ramón Gómez Meda, Spain

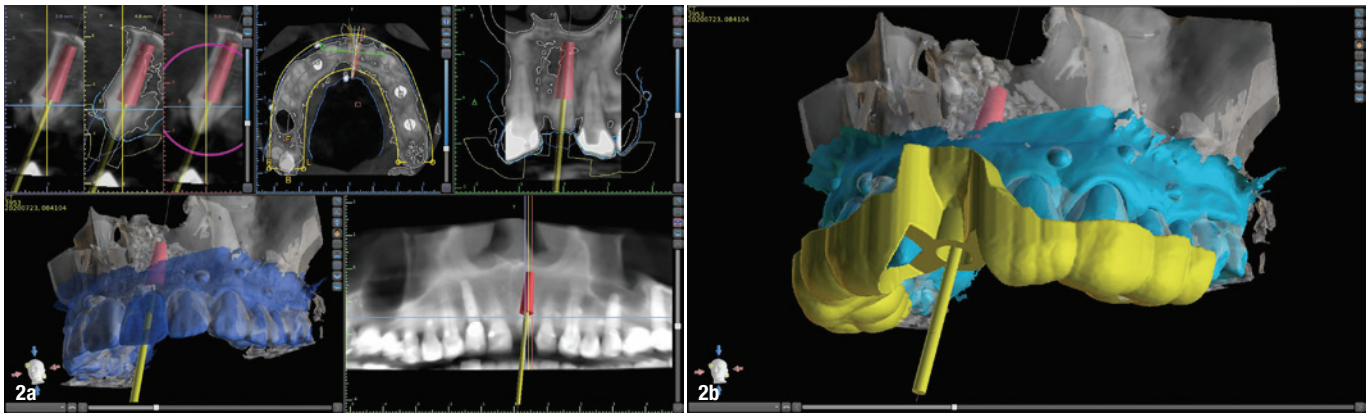
Figs. 1a & b: Initial situation before partial extraction of the fractured tooth and immediate implant placement. The epigingival fracture made a horizontal reduction of the root unnecessary.

Introduction

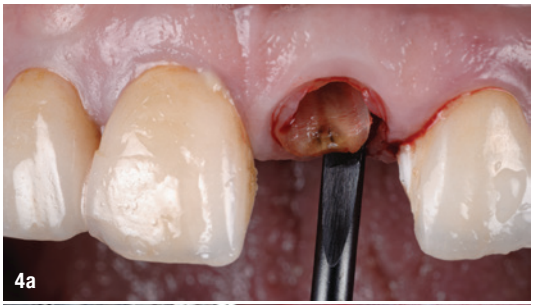
In 2010 a novel approach to preserve the soft and hard tissues following tooth extraction was reported.[1] Clinical studies had suggested that retaining roots of hopeless teeth may avoid tissue alterations after tooth extraction. The authors proposed the retention of a buccal aspect of the root during immediate implantation to prevent alveolar bone loss following tooth extraction. The proof-of-concept study in beagle dogs showed that retaining the buccal aspect of the root during implant placement does not appear to interfere with osseointegration and may be beneficial in preserving the buccal bone plate. Since then, the Socket Shield Technique has been further evaluated clinically in its application as originally described by Hürzeler et al. or in complex situations such as multiple adjacent implants with pleasing aesthetic results.[1–4] The latest critical literature review by Blaschke et al. about the clinical data support on the Socket Shield Technique summarised promising outcomes with the Socket Shield Technique, its high potential to reduce the need for invasive bone grafts around implants in the aesthetic zone, but also concluded that clinical data to support is very limited.[5] Nevertheless, this technique cannot be implemented in routine dental practice without caution as it is quite technique-sensitive and thus, should be reserved for the experienced surgeon. The following case report describes an immediate implant placement, fully guided applying the Socket Shield Technique as an efficient treatment concept, with a favourable cost-benefit ratio and highly aesthetic outcome.

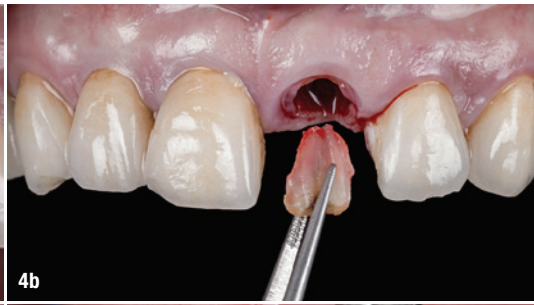
Clinical case

In the following case a 69-year-old male with good health condition (ASA I) presented in the office with a fracture of a central incisor. The full mouth had been previously restored with lithium disilicate crowns due to the severe attrition the teeth suffered as a consequence of the intense bruxism and clenching the patient reported. Anterior crowns were



Figs. 2a & b: The DICOM files as well as the intra-oral STL files were imported into a software (Blue Sky Bio) to plan the ideal implant position. Finally, a surgical guide was printed.





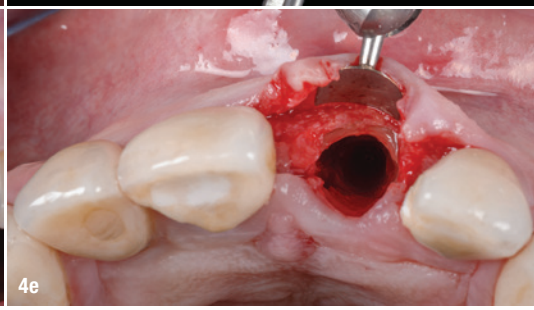
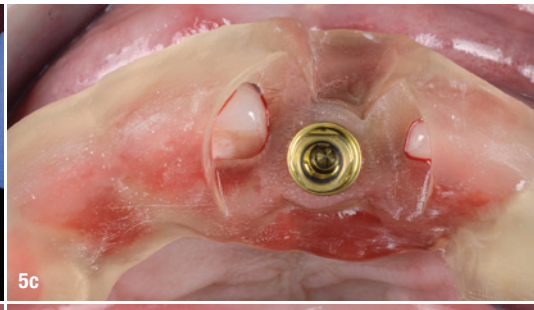
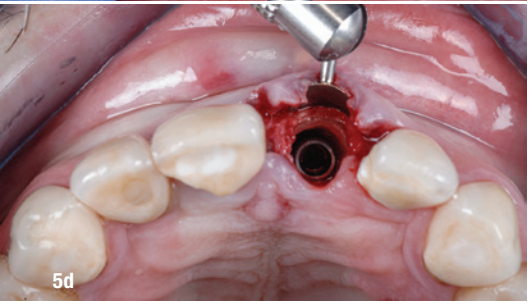


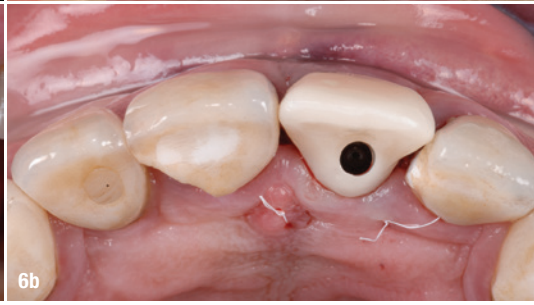
Fig. 3: After impression taking, the fractured crown was sent to the laboratory technician to copy the shape and colour. **Figs. 4a–e:** Partial tooth extraction with Socket Shield approach: bisection of the root, extraction of the palatal parts and contouring of the buccal shield.

splinted but even so the crown of the tooth broke horizontally at gingival level. The pulp sensitivity test of the fractured tooth with CO_2 snow was negative, the peri-coronal tissue was irritated, but showed absence of active purulent infections. Hard and soft tissue showed no signs of bone loss or recession, in comparison of the soft tissue and bone support of the two maxillary quadrants there was no difference from one quadrant to the other. Radiologically the root remnant showed no alterations or signs of fracture (Figs. 1a & b). Oral hygiene was good. Tooth conservation was assessed to be feasible but seemed rather unpredictable due to the lack of enough dentine to predictably support a crown in the long term. Another alternative was to extract the root and to retreat the adjacent teeth with a fixed bridge. After a discussion of the treatment options and the respective risks and benefits, the patient agreed to substitute the tooth by an implant. The crown of the fractured tooth was temporarily positioned in place with the help of flowable composite.

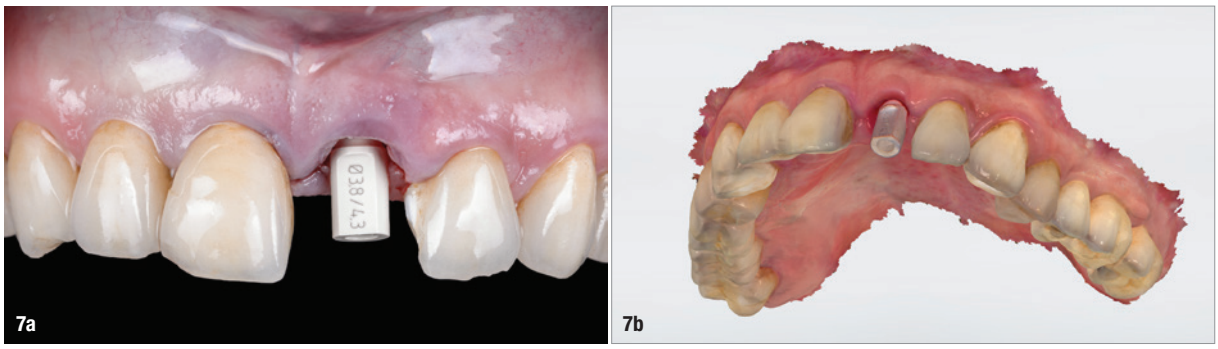
An intra-oral scan of both maxillary and mandibular jaw (3Shape, TRIOS) to produce the guide template was taken. For planning of the implant position a CBCT scan was done







Figs. 5a–d: Fully guided placement of the implant into the exact 3D prosthodontic position, in distance to the root shield. Care was given to not change the position of the buccal root shield. **Figs. 6a & b:** The interim restoration had been designed based on the intra-oral scan. It could be screwed onto the implant immediately after the surgery to close the extraction wound and preserve the soft tissue.

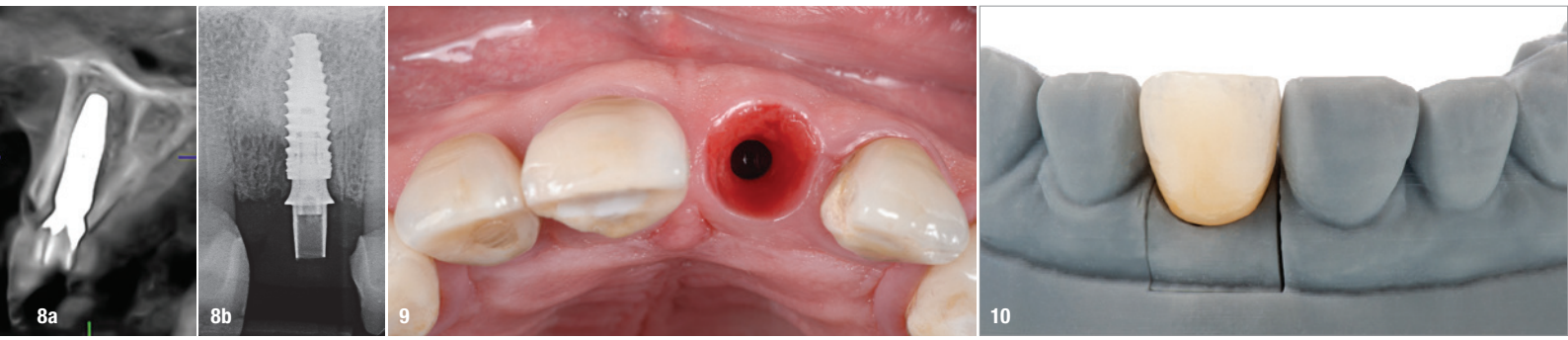


Figs. 7a & b: A scan body is used to immediately register the 3D position of the implant.

(Planmeca Promax 3D Plus) paying special attention to the integrity of the cortical plate and the quantity of bone present in the apical area to be able to properly stabilise the implant. The DICOM files as well as the intra-oral STL files were imported into a software (Blue Sky Bio). These files were superimposed and a virtual wax-up helped to create the exact virtual position of the implant with an ideal prosthodontic emergence profile. Finally, a surgical guide was designed and immediately printed at the office with the help of a high-quality 3D printer (Nextdent 5100, 3D Systems; Figs. 2a & b). An alginate impression was taken to elaborate a thermoplastic vacuum formed provisional and the patient was released with a crown integrated into the removable template to temporarily solve the aesthetic problem. Antibiotics and AINEs were prescribed for the day of the surgery. Also, the patient was advised to rinse his teeth with an antiseptic solution (0.2% chlorhexidine, DENTAID) the day before the surgery to reduce the bacteria load in the mouth. The crown of the fractured tooth (Fig. 3) was handed to the dental technician for orientation to build the screw-fixed temporary restoration on the implant for day of surgery.

The guide template—previously designed by superimposing the intra-oral scan. STL file and the CBCT.DICOM files—was tested for exact fit and after local anaesthesia (4% articaine with 1:200,000 epinephrine) partial tooth extraction was performed. Weighing tissue resorption due to flap mobilisation against good overview on the surgery site, a very small dimensioned buccal full thickness flap preserving the papilla was mobilised in order to better control later tooth fragment preparation and the surrounding tissue. Before implant bed preparation, the root was bisected vertically and the palatal aspect of the root was removed (Figs. 4a–e). Further dentine parts were removed in individual pieces, focusing to extract the entire root tip. The guide template was seated to prepare the implant bed through the root remnants. Sterile saline coolant was used during the entire drilling procedure. Only a small part of the root in the crestal area on the buccal side was intentionally left in place preserving the facial part of the periodontal ligament and as a consequence the bundle bone (Fig. 4e). As accurate tooth fragment preparation and implant placement is the key to successful treatment with the Socket Shield Technique,[6] the buccal root piece needed a little reshape with a lancet drill to thin it and such to guarantee that the dentine would not be in direct contact with the implant for proper bone formation.

A PROGRESSIVE-LINE (CONELOG 3.8 x 13 mm) implant was placed fully guided in the palatal part of the extraction socket in the correct 3D prosthodontic position (Figs. 5a–d). As being an apically tapered implant and threads down to the apex, this implant was chosen for the surgery as it enables to anchorage well within the basal bone but still not endangering the buccal lamella in the apical area. Also, the pronounced thread design makes it easy to reach very good primary stability even in situations with poor quality bone. Reaching an insertion torque of more than 35 Ncm, the implant qualified to be restored immediately with a screw-



Figs. 8a & b: Radiological control of the position of the buccal root remnant and the implant. **Fig. 9:** After 8 weeks and removal of the provisional restoration the peri-implant region impresses by a voluminous and healthy soft tissue. **Fig. 10:** The final zirconia crown was produced following a fully digital workflow.

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