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All-ceramic Implants

Already a full-fledged one today Alternative?

2002 Approval to practice dentistry, Hamburg
2002-2003 Assistant dentist in maxillofacial surgery 2003 Doctorate as Dr. med. dent.
Since 2003 practice partnership with Dr. Rainer Lohmann, Bremen
Since 2005, focus of work in implantology.
2007 Master of Science in implantology
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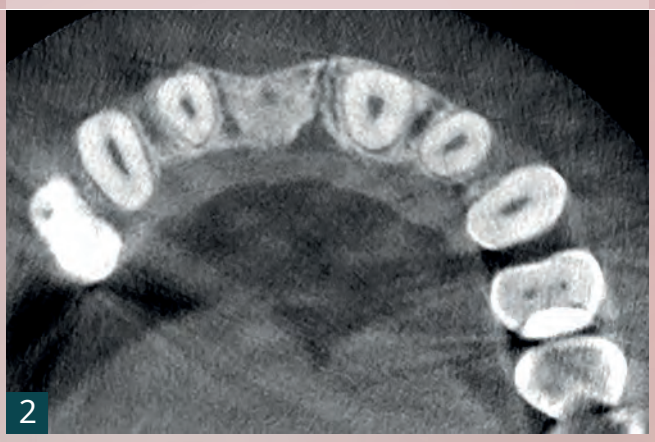

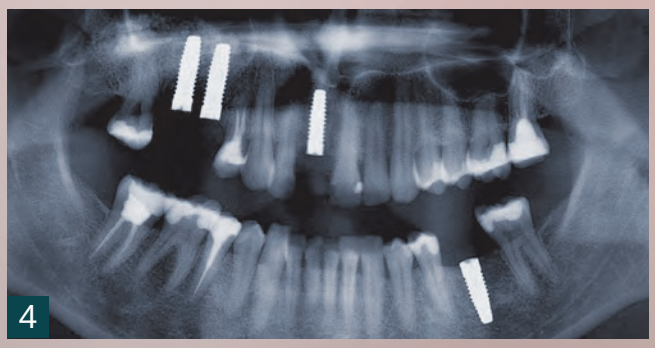

All-ceramic implant systems can represent an alternative, particularly for patients who have a statistically increased risk of titanium implant loss due to an increased immunological defense reaction to titanium oxide. However, not all available all-ceramic implant systems are on a par with titanium alternatives. If you look at the prosthetic treatment options, the all-ceramic systems differ, for example in the selection of abutment parts or due to limitations due to the implant-abutment connection.

Case report

The case presented here shows a patient who was 38 years old at the start of treatment, a non-smoker, with a good general condition and good oral hygiene. In order to ensure optimal therapy safety, the family dentist carried out a titanium stimulation test and an inflammatory predisposition test before starting therapy (IMD Berlin). The result showed inflammation grade 3, which corresponds to a 3.8-fold increased risk of titanium implant loss. A fully ceramic implant system was therefore used for the treatment (Zeramex XT, Dentalpoint AG). The present case description focuses on region 11 (Fig. 1). Clinically, slight vestibular resorption is initially evident. After radiological three-dimensional analysis using DVT (Fig. 2) and 3D bone reconstruction (Fig. 3), the course of therapy was planned based on the remaining bone width of 5.3 mm. In 2005, Grunder stated that the bone on the vestibular side should be at least 2 mm, preferably 4 mm, wide [1] and at least 2 mm of bone on the palatal side should be the aim. In order to insert a sufficiently dimensioned Zeramex XT implant (RB Ø 4.2 mm), a bone augmentation (GBR) was first carried out with a non-absorbable titanium-reinforced dPTFE membrane (Cytoplast, Osteogenics). A mixture of autologous bone served as the augmentation material,

1 Preoperative intraoral situation. The vestibular resorption is clearly visible.

2 The bone deficit is also clearly visible radiologically.

3 Preoperative, radiological situation as a 3D reconstruction.

4 Postoperative OPG with four inserted two-part ceramic implants (Zeramex XT).


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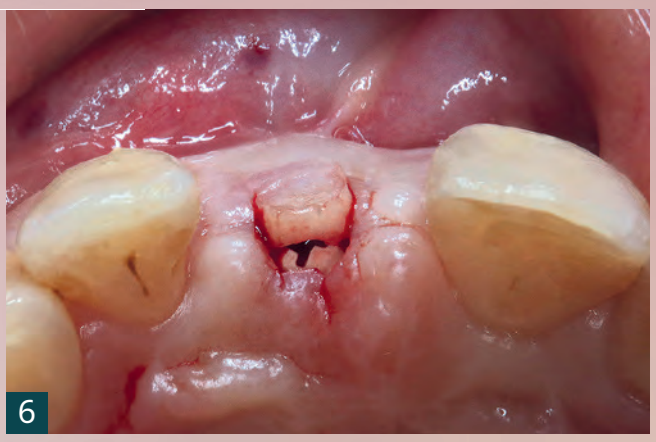
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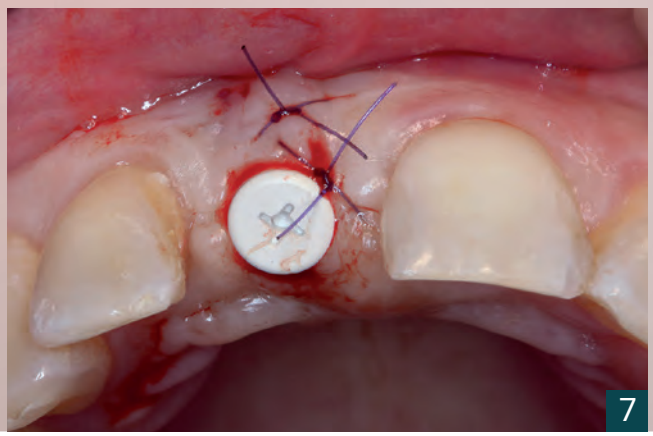
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obtained from the linea oblique of the lower jaw, and bovine hydroxyapatite (Bio-Oss, Geistlich Biomaterials) in a ratio of 1:1. To avoid wound dehiscence, the membrane was covered with a collagen membrane (Bio-Guide, Geistlich Biomaterials) before wound closure. At the same time, a sinus lift was performed in region 15/16 using a mixture of bone and coarse-grained bovine hydroxyapatite.

After a seven-month healing period, the anterior bone widened to 8.3 m. The four ceramic implants (4.2 mm, Zeramex XT) could be placed as planned (Fig. 4).

A vestibuloplasty with a free mucosal transplant and a Mucograft matrix (Geistlich Biomaterials) was used to widen the keratinized mucosa. For this purpose, an incision was made at the transition from the mucosa to the keratinized mucosa and the mucosa was thinly undermined. After a distance of approximately 5 mm, the cutting direction was changed towards the periosteum. When the periosteum was reached, it was exposed for approximately 3 mm and a thin, free mucosal graft was sewn on as a border to the keratinized mucosa. The exposed connective tissue was covered with a Mucograft matrix (Fig. 5)[3]. Figure 6 shows the postoperative result and the preparation for exposure of the implant using a rolling flap technique.

For this purpose, the tissue above the implant is deepithelialized and then incised palatalally in a crescent shape following the implant. The deepithelialized piece of tissue that is now still connected to the vestibule is detached from the implant. A tissue tunnel is prepared vestibularly under the local keratinized mucous membrane, into which the previously formed piece of tissue is inserted. The fixation is carried out with a few sutures and the insertion of the healing abutment. The increase in volume on the vestibular side is clearly visible (Fig. 7).

After the healing phase, the patient saw the family dentist (Fig. 8). To produce individual abutment parts, the intraoral situation was digitally recorded (Primescan, Dentsply Sirona) using the compatible scan bodies (Zeramex XT) (Fig. 9). The individual structure is also screwed together metal-free with a carbon-reinforced screw made of high-performance plastic (Zeramex Vicarbo) (Fig. 10). After the final restoration has been integrated, the overall result is satisfactory and safe in the long term for the patient (Fig. 11, 12).

discussion

In the present case report, a partially edentulous jaw is used with a two-part all-ceramic implant system

5 Condition immediately after vestibuloplasty. The free mucosal graft is clearly visible apical to the mucograft matrix.

6 Six weeks later, the area above the implant (Zeramex XT RB Ø 4.2 mm) is exposed.

7 The increase in volume of the vestibular tissue after exposure with the rolling flap technique is clearly visible.

8t Condition when visiting the family dentist.

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metal-free screwed abutment connection. The handling, procedure and superstructure correspond to that of two-part titanium implants. In addition to the well-known standard abutments, the system presented offers the option of having fully individual abutments made by the manufacturer using intraoral or extraoral scans (Zeramex Digital Solutions). The screwed abutment connection allows the abutment elements to be easily replaced later to adapt to a changed prosthetic situation.

However, smaller diameters are available to a limited extent. Due to the material, at least a diameter of 4.12 mm must be used for premolars, upper central incisors and canines. The recently available one Small Base Implant (Zeramex XT SB Ø 3.5 mm) is indicated for lateral maxillary incisors and the front of the mandible.

Summary

Due to the high level of therapeutic safety, implant-supported restorations with fixed and removable dentures have become established as a standard care concept. However, it has been shown that the success rate varies depending on the patient group. Since immunological reactions of patients to the implant material titanium can in some cases be a disruptive factor for success [2], the goal must be to establish proven all-ceramic implant systems as an alternative to the titanium implant.

I would like to thank the team at Praxis Dr. Kerstin Waldmann, www.dr-kerstin-waldmann.de in Bremen, for the good cooperation.

Scan me!

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to this publication

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Billing tips for this publication

9 Intraorally screwed scan body.

10 Individual abutment (Zeramex Digital Solutions) in situ.

11 Integrated dentures.

12 In the lateral profile, the final restoration fits harmoniously into the course of the dental arch.

A real alternative?

While titanium implants are discussed in great detail as to why this system is superior to another for a specific indication or in general, ceramic implants are often judged in general terms. Why attention should be paid to detail here toopip from one of the authors of this issue.

Interview with Dr. med. dent. Arnd Lohmann

Implantologist, M.Sc.

So ceramics are not just ceramics?

Of course not – especially not in terms of the material. For example, the first ceramic implants made of aluminum oxide did not become established because they had very low crack strength. Today's so-called high-performance ceramics such as zirconium oxide, and ATZ - aluminum-toughened-zirconia - which is also used in Zeramex implants, have a stability comparable to that of titanium implants thanks to special manufacturing processes, and a surface structure that is optimal for osseointegration In addition, there are the well-known biological benefits, which we will certainly come to later. In addition, there is also the question of one- or two-part design and thus the versatility of the prosthetic restoration. When it comes to two-part implants, I am personally very interested in whether the metal-free concept is consistently maintained
– Here too, I was impressed by the Vicarbo screw, which is made of a very stiff, carbon fiber-reinforced high-performance PEEK. In this combination, the ceramic absorbs the compressive forces, while the Vicarbo screw counteracts the tensile and bending forces. And I don't have any 'hidden metal'.

How important is the possibility of designing individual abutments in the prosthetic workflow for you??

A patient with immunological problems with titanium oxide is initially more interested in the material than a patient who is not affected by it - but in the end this patient is also interested in the appearance, red and white aesthetics and the durability of his dentures. The fewer compromises I have to make, the better. It is therefore very important to me that with Zeramex Digital Solutions I also have the option of a digital workflow and the production of individual abutments, especially for aesthetically demanding anterior tooth restorations, which our patients are increasingly requesting for ceramic implants. In addition to individualized abutments and monolithic crowns, Zeramex also offers a service for data preparation and for the finishing of the prefabricated raw restoration, so I can have everything from a single source. I absolutely see these workflows as the future and think that manufacturers who cannot offer these services will have a difficult time in the future.

What proportion of patients currently have proven titanium intolerance in your practice and what is your prognostic assessment?

We are not a practice that specializes in environmental dentistry or holistic dentistry, so our share of 5% is in a rather low but noticeably growing range. However, I know that specialized practices have rates of around 20%, and a very well-known practice in the Mainz area even has rates of 60%. The point here is not to stir up hysteria where there is none. These intolerances have been proven to exist and I would like to offer these patients a convincing alternative in my own practice.

Do you have any advice for our readers who want to look into ceramic implants for the first time?

A ceramic implant is not a white titanium implant. The surgical protocol is different and must first be learned by an experienced surgeon and dentist. Incidentally, Zeramex is also a real partner here with many training events and hands-on seminars. During lockdown they really excelled and released a series of online tutorials in a very short space of time. This meant that interested parties could make good use of the forced break to familiarize themselves with the topic. Even though ceramic implants may be a beneficial development for patients with intolerances, they should be in no way inferior to titanium when it comes to prosthetic care options in terms of simplicity, predictability and aesthetics. With the two-part Zeramex XT and the Digital Solutions, we have once again taken a significant step further in being able to offer ceramic implants as a real alternative.

pip: Thank you very much for this conversation, Dr. Lohmann.