Thieme

Implant-supply-with-ZERAMEX-XT-for-autoimmune-disease:-a-case-report-

Elisabeth Jacobi Gresser

Two years ago, a patient in her early 40s presented herself with the question of metal-free restoration in the left upper jaw from an environmental dentistry perspective. Our practice was recommended to her by a doctor specializing in environmental medicine/metal toxicology.

There is a history of ulcerative colitis (UC) for just over 20 years. In addition to the significant psycho-emotional stress in childhood and adolescence in this individual case, the literature generally discusses the interaction of several promoting factors such as genetic predisposition and environmental stress, which lead to a dysregulation of the intestinal immune system [1].

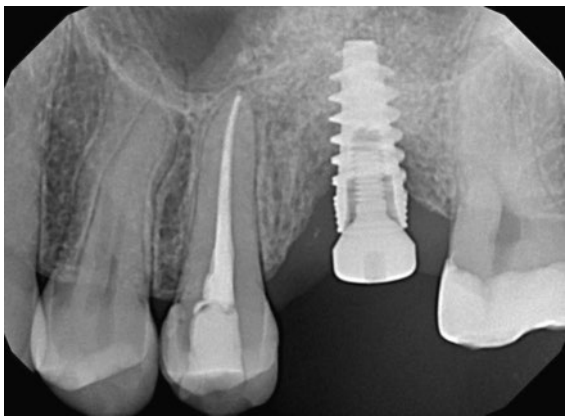
The disease manifests itself primarily between the ages of 20 and 40, but the initial diagnosis can also be made in later decades of life. Males are somewhat more commonly affected by ulcerative colitis (men:women; 1.4:1). Extraintestinal manifestations include skin and mucous membrane changes, arthralgias and arthritis, and inflammatory eye manifestations. The determination of calprotectin in stool is a relatively inexpensive, sensitive and specific parameter for the detection of intestinal inflammation in patients with inflammatory bowel disease (IBD) and is therefore a reliable, non-invasive diagnostic method [2]. Particularly in the presence of UC, high sensitivity and specificity can be demonstrated with regard to the risk of developing an acute attack. Although calprotectin hardly correlates with clinical symptoms, many studies have shown that there is a strong connection between calprotectin and endoscopically measured inflammatory activity of the intestine. For this reason, calprotectin has the potential to replace endoscopic follow-up checks to determine UC activity [3].

Special dental history: 11 years ago, a titanium implant with sinus elevation and simultaneous augmentation with KEM (BioOss) was implanted to replace 26. According to the patient, a chronic inflammatory reaction began very soon around the implant, which could not be successfully treated. Due to the chronic inflammation that has lasted for several years

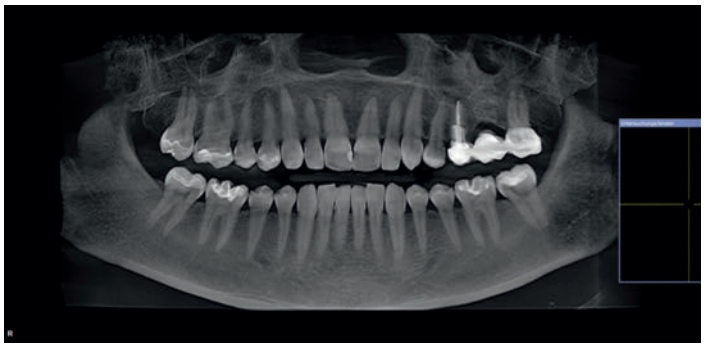
Due to the damage to the implant and the associated deterioration of their overall immunological situation with frequently recurrent respiratory infections and a significant drop in performance, the surgical removal of the implant alio loco took place a few years later, which had a positive effect on the health restrictions (!Fig. 1).

After the implant was removed, the gap-limiting teeth 25 and 27 were treated with a metal-ceramic veneer bridge to replace the gap 26. The non-vital pillar 25 developed an increasing pattern of symptoms over the years. Otherwise, the patient showed no periodontitis findings with excellent oral hygiene in addition to a good tooth status treated with conservative metal-free treatment (!Fig. 2).

Environmental medicine laboratory findings at the time indicated contamination with toxic metals, which had been specifically treated for several months by the environmental medicine specialist in metal toxicology with elimination therapies and laboratory analysis-based micronutrient replacement.



!Fig. 1X-ray image of the implant before explantation. Source: Practice Dr. C. Schulz



!Fig. 2Screenshot OPG from DVT. Source: Practice Dr. J. Lechner

the. In addition, a moderate allergic sensitization to nickel had been demonstrated, which is rarely taken into account when fitting titanium implants and nickel-containing structures (Ti grade 5).

The calprotectin measured during gastroenterological checks 3 years ago showed increased values in the clinical attack (281 mg/kg), values in the normal range (< 50) after the first metal eliminations and a few months later a slightly increased calprotectin due to stress (118 µg/g, change in the reference range). During the attack, therapy with mesalazine 500 mg was given every 2-3 days. No calprotectin was determined during further checks in subsequent years.

For patients with chronic illnesses and autoimmune diseases, it is generally recommended to at least determine the mineral status in the whole blood and analyze the vitamin supply, especially vitamin D, before implantation3-Supply, preferably free vitamin D3(fD3). If there is an undersupply, appropriate substitution should be made in order to improve the conditions for bony osseointegration of ceramic implants.

At the initial consultation, the patient urgently wanted removal of the apically abnormal 25 and a metal-free implant prosthetic treatment with ceramic implants as a more biologically compatible material alternative to titanium [4].

To rule out allergy-related intolerance to the KEM (BioOss) that was introduced at the time, a blood analysis (lymphocyte transformation test LTT) was also carried out, which showed no evidence of sensitization.

The affected tooth 25 was surgically removed and at the same time a biopsy of the augment in region 26 was taken for histological assessment, which did not reveal any pathological findings.

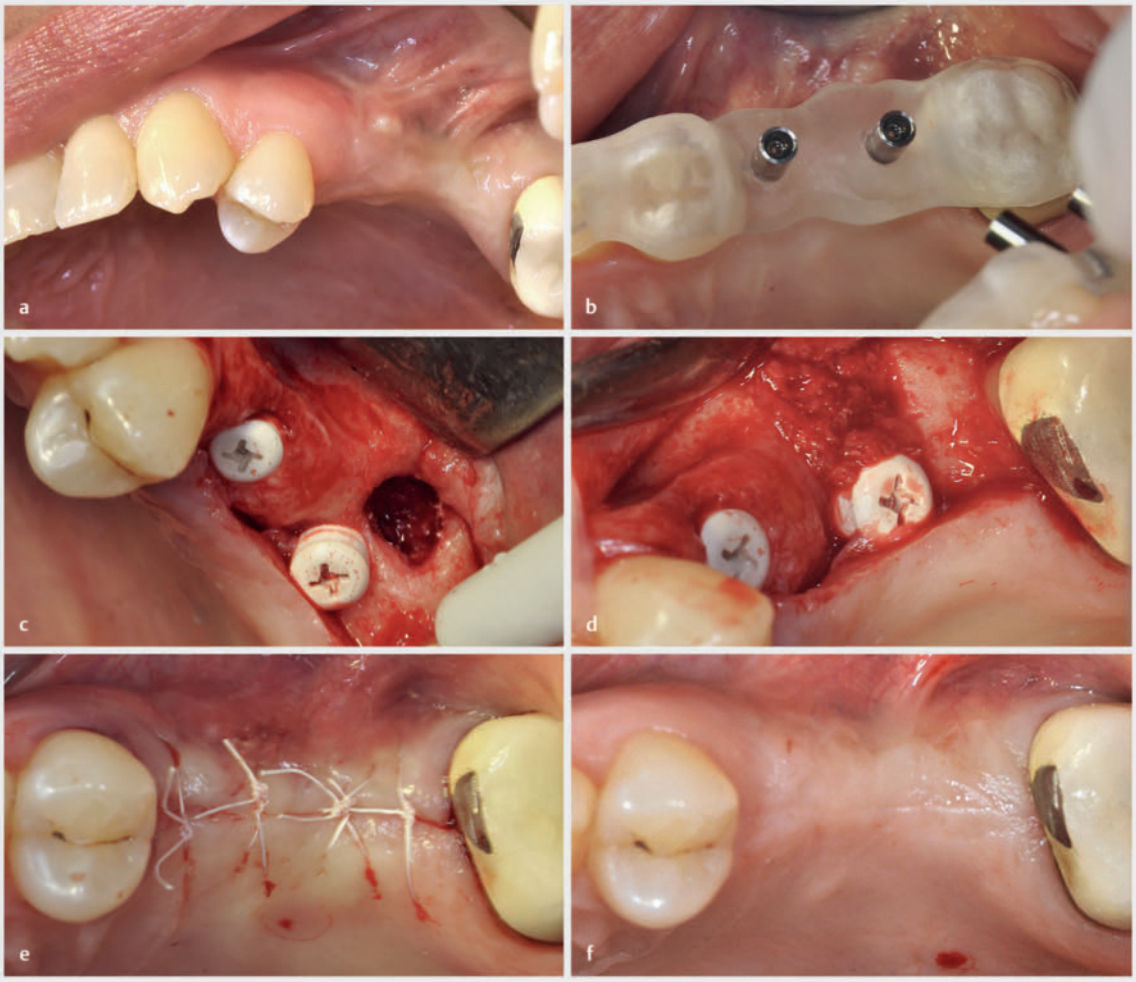
The double gap was treated with a Valplast prosthesis. After bony consolidation and further stabilization of the state of health, two-part zirconium oxide implants (ZERAMEX XT®4.2 x 10) carried out in regions 25 and 26. At the same time, parts of the augment that did not clinically appear to be viable bone replacement tissue were removed in region 26. To improve and support wound healing, a PRGF concentrate (Endoret®) made from the venous blood and mixed with autologous bone particles, which were obtained using a trephine cutter when creating the drilling tunnel for the implant in region 25, and introduced into the defect.

After healing without any complications, the two-part reversible screw-retained ZERAMEX XT implants could be exposed 4 months later for further treatment with e.max individual crowns and the metal-based veneer crown on 27 could also be replaced by a monolithic ceramic crown (e.max) (!Fig. 3, Fig. 4).

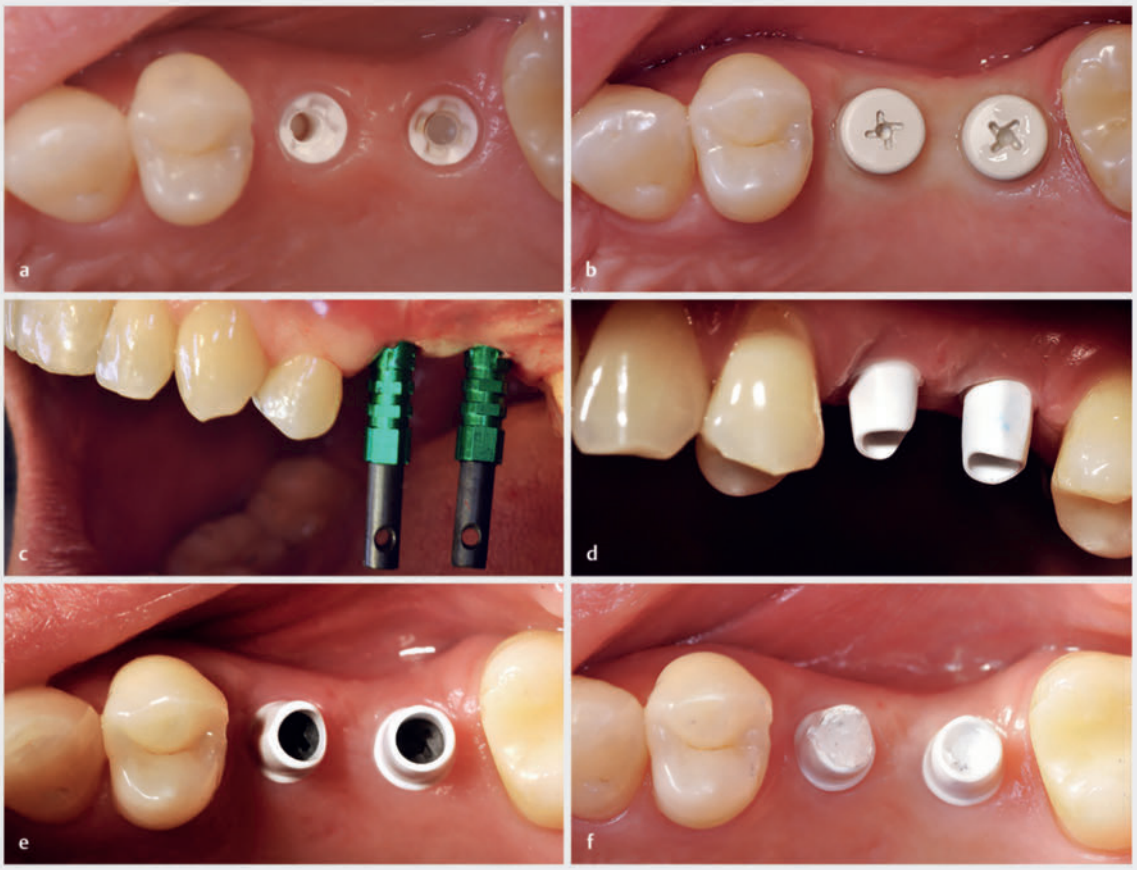
Due to the suspected chronic increased pro-inflammatory reaction due to the underlying UC, oral hygiene is monitored at 4-month intervals with absolutely competent home hygiene measures supported by the local application of an essential oil mixture that has been tested to be compatible.

As periodontal early detection markers for inflammation, initially aMMP-8 (with 20.7 ng/ml in the inflammatory area, reference range < 8.0 ng/ml) and later the newly introduced calprotectin, which is more sensitive than aMMP8, were determined pooled from the sulcus. The laboratory values at the beginning and after daily use of the oil mixture for a few weeks show a reduction in oral calprotectin values as an expression of an effective anti-inflammatory effect on the gingival structures (before periodontitis oil application 2265.3 ng/ml vs. 1425, 0 ng/ml after several weeks of oil application; < 1800 ng/ml normal, 1800 - 3000 ng/ml mild to moderately increased inflammation in the removal area, 3000 - 4500 ng/ml significantly increased area, acute inflammation in the removal area, > 4500 ng /ml greatly increased).

Jacobi-Gresser E. Implant restoration with ZERAMEX...ZWR – The German Dental Journal 2020; 129: 415–420 | © 2020. Thieme. All rights reserved.

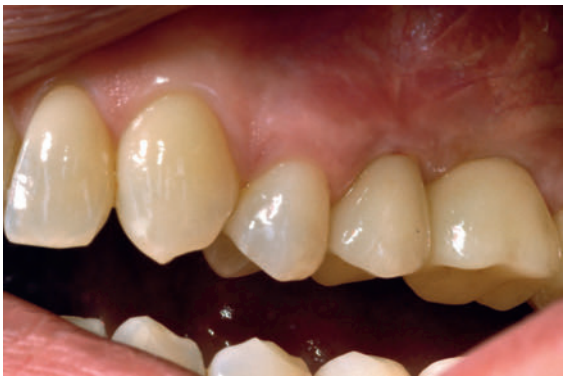


!Fig. 3Surgical phase.aAlveolar process regions 15 and 16 before implantation.bPositioning template.cInsertion ZERAMEX XT 25 and 26 with lateral bone defect.dDefect augmentation.eCondition after seam closure.fCondition after healing.



!Fig. 4Prosthetic phase.aImplant supervision after exposure.bImplants with healing caps.cZERAMEX XT Transfer open in situ.d ZERAMEX XT Abutments RB straight from the lateral.eAbutment fixed with VICARBO screw in top view. fScrew accesses sealed with Teflon tape.

To date, there are no literature data available on the correlation of fecal calprotectin values compared to those determined orally at the same time. An interdisciplinary network would be desirable here in the future for the benefit of patients. The annual check-up shows a completely irritation-free peri-implant mucosa with unrestricted functional loading of the implant-supported prosthetic restoration (!Fig. 5, Fig. 6Implant X-ray checks). Overall, the general state of health continued to stabilize over the control period of one year.

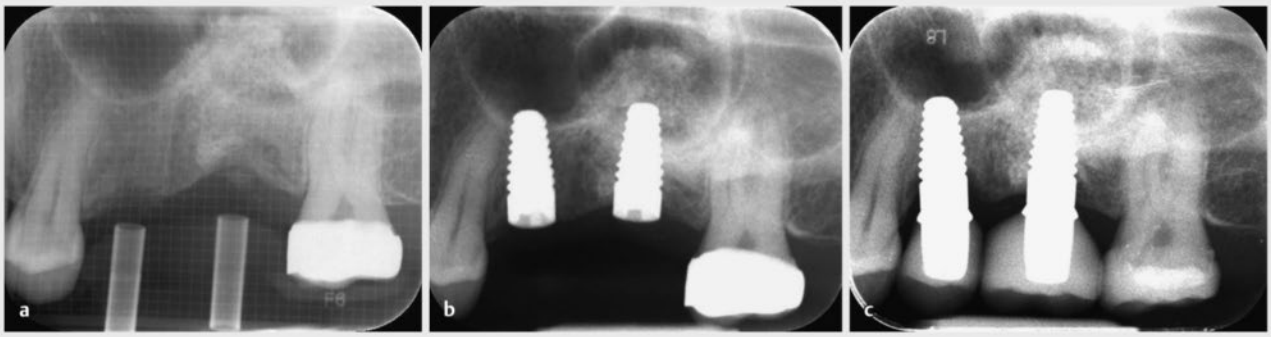


!Fig. 5Intraoral view after 1 year in function.

Conclusion

The use of foreign materials to be permanently incorporated should be done with particular caution and preference for more biologically compatible materials, both in the implant and in the prosthetic abutment structures, in patients with autoimmune diseases and a deficient immune state due to the compromised immunity and impaired immune tolerance. Due to tribocorrosion of the implant

Particles released into the tissue from the surface as well as possible sensitization reactions to metals from alloys in dentures can negatively trigger the deficient tolerance and defense skills and contribute to the permanent deterioration of the immune system [5].



!Fig. 6aX-ray measurement image with positioning template.bX-ray control postoperatively.cX-ray check 1 year after insertion of e.max crowns.

The use of ceramic implants reduces the risk due to a more corrosion- and abrasion-resistant surface [4] and lower microbial plaque adhesion at the implant penetration to the mucosa [6,7]. The stability of ceramic implants, especially those made from ATZ ceramic, has now been scientifically proven for clinical use and is comparable to that of titanium implants [8]. Basically, the aesthetic advantage due to the light color speaks for itself for all implant restorations in the front area [9]. The one since 2½Abutments that have been available for this product line for years and can be reversibly fixed with a carbon fiber reinforced PEEK screw are another pioneering development on the way to a metal-free, comfortable, compatible and functioning implant-supported denture.

The increasing introduction of CAD!CAM technology in the production of the abutment structures for the ZERAMEX XT system has now made it possible to produce individual abutments (ZERAMEX Digital Solutions). This allows optimization of the adjustment to the individual emergence profile by enabling an adjustment to the required profile diameter and the desired position of the crown step according to the course of the gingival margin. This ensures safe removal of excess adhesive during oral cementation. Another advantage of the abutment, milled according to individual specifications from high-strength zirconium ceramic, is the optimal crown production in terms of a perfect material layer thickness of the ceramic crown. This is of particular importance when producing more voluminous molar crowns or

Necessary axle compensation in unfavorable conditions. Another consistent development is the production of a monolithic, individually milled abutment-crown complex made of zirconium oxide ceramic, which can be reversibly screwed into the occlusal position. This allows for further reduction in the use of potentially incompatible composite luting adhesives and provides a preferable option for the patient with allergic predispositions.

Conflict of interest

The author declares that she has received lecture fees from Dentalpoint.

Authors

Dr. Elisabeth Jacobi-Gresser

Studied dentistry at the Johannes Gutenberg University in Mainz, has been a specialist in oral surgery since 1981, specializing in implantology, practiced in a group practice from 1982 to 2018, has been employed since leaving the practice; Green-Member of the German Society for Environmental Dentistry (DEGUZ 2009), main areas of activity: implantology, environmental dentistry; numerous articles in specialist journals and publications in scientific journals (peer-reviewed), speaker work nationally and internationally, lecturer work in curricula, 2014–2017 conception and scientific management of the "Integrative Dentistry" curriculum LZK RLP.

Correspondence address

Dr. Elisabeth Jacobi-Gresser c/o GP
Igiel, Knierim and colleagues
Heidesheimer Straße 20
55124 Mainz
Germany
0613143355
mail@jacobi-gresser.de

literature

[1] Holtmann M, Neurath MF. The intestinal immune system. In: Hoffman JK, Kroesen AJ, Klump B, eds. Inflammatory bowel diseases - The IBD manual for clinic and practice. Stuttgart: Thieme; 2004: 46

[2] Canani RB, Terrin G, Rapacciuolo L et al. Faecal calprotectin as reliable non-invasive marker to assess the severity of mucosal inflammation in children with inflammatory bowel disease. Dig Liver Dis 2008; 40: 547–553

[3] Costa F, Mumolo MG, Bellini M et al. Role of faecal calprotectin as non-invasive marker of intestinal inflammation. Dig Liver Dis 2003; 35: 642–647

[4] He X, Reichl FX, Milz S et al. Titanium and zirconium release from titanium and zirconia implants in mini pig maxillae and their toxicity in vitro. Dent Mater 2020; 36: 402-412

[5] Jacobi-Gresser E, Huesker K, Schütt S. Genetic and immunological markers predict titanium implant failure: a retrospective study. Int J Oral Maxillofac Surg 2013; 42: 537–543

[6] Roehling S, Astasov-Frauenhoffer M, Hauser-Gerspach I et al. In Vitro Biofilm Formation on Titanium and Zirconia Implant Surfaces. J Periodontol 2017; 88: 298–307

[7] Al-Ahmad A, Wiedmann-Al-Ahmad M, Fackler A et al. In vivo study of the initial bacterial adhesion on different implant materials. Arch Oral Biol 2013; 58: 1139–1147

[8] Spies BC, Maass ME, Adolfsson E et al. Long-term stability of an injection-molded zirconia bone-level implant: A testing protocol considering aging kinetics and dynamic fatigue. Dent Mater 2017; 33: 954-965

[9] Thoma DS, Ioannidis A, Cathomen E et al. Discoloration of the Peri-implant Mucosa Caused by Zirconia and Titanium Implants. Int J Periodontics Restorative Dent 2016; 36:39–45

bibliography

ZWR – The German Dental Journal 2020; 129: 415-420 DOI 10.1055/a-1240-4140
ISSN 0044-166X