According to a recent study, peri-implantitis is currently the main reason for dental implant failure.

By DTI

ZURICH, Switzerland: Dental implants have become a great treatment option to replace missing teeth, and various treatment concepts have reported high success rates. Nevertheless, like in every medical procedure, biological complications can occur which may lead to complete implant failure and, consequently, in the worst-case scenario, to the removal of the implant. A recent study by researchers from the University of Zurich has revisited the reasons for implant failure and compared different removal techniques.

A literature search included 28 studies which had been conducted up to 2018. The studies assessed titanium implant failure, removal techniques and the reinsertion of implants in a previously failed site.

The research team identified different categories of factors causing implant failure: biological factors include peri-implantitis and failure to attain or to maintain osseointegration. Implant fracture is an example of a mechanical factor. Medical errors causing implant failure include bone overheating, site contamination and malpositioning. Functional reasons for implant failure include design of prosthesis and functional overload.

The researchers found that early implant failure is normally caused by the lack of attaining or maintaining osseointegration, or bone overheating or site contamination. Late implant failure is triggered by implant fractures, malpositioned implants and progressive peri-implantitis. The last causes 81.9% of late implant failures. Early implant failure results in implants that are normally mobile and easy to remove. Late implant failure means the implants can be at least partly osseointegrated and, therefore, more difficult to remove.

As options for implant removal, the study determined tooth extraction, trephine burs, piezo-surgery, laser surgery, the counter-torque ratchet technique (CTRT) and electrosurgery. Even though trephine burs seem to be the best-known method for implant removal, the CTRT method, alone or combined, should be the first choice for the clinician because of its low invasiveness.

Furthermore, the research team found that implantation in previously failed sites, irrespective of early or late failure, results in a 71–100% survival rate over five years. Regarding zirconia implant removal, little data is available. Because of zirconia’s physical properties, it is supposed that these implants require a different approach to removal compared with titanium implants.

If removal is required, interventions should be based on considerations regarding minimally invasive access and management as well as predictable healing. (Post) operative considerations should primarily depend on the defect type and the consecutive implantation plans,” concluded the authors in their paper.

The study, titled “Removal of failed dental implants revisited: Questions and answers,” was published online in Clinical and Experimental Dental Research on 21 August 2019, ahead of inclusion in an issue.

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An intelligent treatment concept for the implant-supported individual tooth crown

By Dr Oliver Schubert, Germany

For good healing success and predictable gingiva management during implantation, the soft tissue needs as much rest as possible. Gingiva former, which also act as a scan body, provide the opportunity to perform a scan without disturbing the healing process. In this case, Dr. Oliver Schubert, M.Sc. (Munich, Germany), shows how he implements such a process. He also explains why he uses a hybrid ceramic blank (VITA ENAMIC IS, VITA Zahnfabrik, Bad Säckingen, Germany) with an integrated interface to a titanium base. He shows how the abutment crown made of hybrid ceramic directly after the removal of the gingiva former supports the final shaping of the emergence profile.

1. The patient case
A 55-year-old female patient presented with complaints regarding tooth 26. After careful clinical and radiographic diagnosis, the molar proved unsustainable. After extraction, the gap was to be closed with an implant and a monolithic abutment crown made of VITA ENAMIC IS.

Due to the dual network structure of the polymer-infiltrated feldspar ceramic, the material shows a comparably high elasticity, which allows the material to absorb masticatory forces. This property could be very beneficial in the long run for restorations on rigidly anchored implants. In addition, laboratory tests show that microcracks caused by a potential point overload can be stopped, thanks to the integrated polymer structure, which minimum fracture risk.

At the patient’s request, the restoration of the previously root canal-treated tooth 25 was to be done later.

2. Implantation and scan
After bone-sparing extraction and sixteen weeks of healing, the area was microsurgically sutured.

The edentulous space should be restored with the 3i Try-Etched implant (Zimmer Biomet, Warsaw, USA). After the formation of a full flap, the bone bed was prepared accordingly and the implant inserted and aligned with the prosthetic system. A primary stability of 35 Ncm could be achieved. Subsequently, the two-part, scannable gingiva former BellaTek Encode (Zimmer Biomet, Warsaw, USA) was fixed on the implant and the wound area was fixed with microwigual sutures.

Eight weeks after implant insertion, the intra-oral scan of the gingiva former and the digital implant impression were performed. With its specific notches on the surface, the screw-in and left-in gingiva former now also served as a scanbody. The upper and lower jaws were digitized using the 3M True Definition Scanner (3M, Seefeld, Germany).

3. Fabrication and integration
The scan data was transmitted to the Zfx 3D milling center (Munich, Germany) and downloaded there as STL dataset. Then the scan record of the gingiva former was decrypted and the digital implant impression was transferred to the Zfx Application Manager. This automatically reduces the gingiva former, and the shape of the emergence profile is displayed in the digital software. The abutment crown made of VITA ENAMIC IS has now been designed virtually with an idealized emergence profile. After CAM-based manufacturing, the hybrid ceramic abutment crown was bored to the industrially produced titanium base. Immediately after unscrewing the gingiva former, the abutment crown could be screwed in to immediately support the soft tissue and provide it with its final shape. The screw channel was finally closed by Teflon tape and composite.

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Prevention 0: The best way to prevent peri-implant disease?

By Prof. Magda Mensi, Timothy Ives & Dr Gianluca Garzetti, Italy

The philosophy of prevention in all medical professions is increasing from a global perspective. In fact, prevention of chronic non-communicable diseases, the major burden of illness and disability in almost all countries in the world, has been strengthened in recent years. The motivation is to ensure a better quality of life for people and to reduce public health expenditures.

In dentistry, periodontitis is one of the major chronic non-communicable diseases. World experts in periodontics and science have published several principles regarding the prevention of periodontal diseases.

Peri-implantitis is a twenty-first-century version of periodontitis and is characterised by inflammation in the peri-implant mucosa and subsequent progressive loss of supporting bone. The main reasons for concerns in this area are an aetiology in which several risk factors can play a determining role and a lack of a gold standard therapy. Primary and secondary preventative measures are really important to prevent mucositis and peri-implantitis and to avoid recurrences, but there are many details to consider before placing implants to mitigate iatrogenic problems. There are many different prosthetic solutions besides implants that dental professionals could propose to patients if consideration is given from the beginning to the entire situation. Implants may not always be in the best interest of the patient.

For these reasons, every clinician, before placing an implant, should consider not only patient- and site-specific aspects, but also surgeon, prosthodontist, dental hygienist and dental technician skills in order to minimise the possibility of peri-implantitis in the future.

The following should be considered before primary and secondary prevention, and it is the proposal of the au-thors that this approach be called “Prevention 0”.

Site-specific considerations

The healing process after tooth loss leads to a variable reduction of the alveolar process, inducing hard- and soft-tissue deficiencies. The clinician must evaluate carefully all sites exposed to the following factors, because they have the potential for major healing deficiencies: loss of periodontal support, endodontic infections, longitudinal root fractures, thin buccal bone plates, buccal/lingual tooth position in relation to the arch, extraction with additional trauma to the tissue, injury, pneumatisation of the maxillary sinus, medications and systemic diseases reducing the amount of naturally formed bone, agenesis of teeth and pressure from soft-tissue-supported removable prostheses.

Other site considerations relate to anatomical knowledge and in respect to the suitable anatomical structure of the area (maxillary sinus, inferior alveolar nerve, endodontic and periodontal health of adjacent teeth, and patient phenotype. According to Linkevicius et al. there is significant evidence that this soft tissue leads to increased marginal bone loss compared with thick soft tissue around implants. Lack of bone has led to the development of various alternative surgical techniques to avoid large bone regenerations or grafts, such as short implants, tilted implants, pterygoid implants and palatal implant mesh, with questionable results, but definitely decreasing the cleanability and maintainability of implants and prostheses.

Dental hygienist skills and devices

This professional figure plays a key role in disease prevention and oral health promotion. Dental hygienists should not limit their activities to being an oral cleaner, but act as the patient’s dental coach or personal oral trainer, motivating patients not only in dental habits but also in lifestyle, for example regarding smoking cessation and diet. This is...
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Surgeon skills

Nowadays, especially in Italy, a new professional figure has appeared: the implantologist, who is a graduate dentist, generally a co-worker, and goes to different dental offices or clinics and mainly places implants, often without sufficient expertise in periodontal and prosthetic fields. That means, in some cases, implant complications resulting in reconstructive and maintenance problems. In order to avoid fabrication of specific prosthetic parts, unrestored implants and surgical interventions to remove or reposition them in favourable prosthetic positions, this surgical intervention should only be performed by an elite clinician. This is an expert dentist with the necessary surgical skills to manage both soft and hard tissue (before and after implant placement) perfectly and with adequate expertise in the prosthetic field to allow a prosthesis-guided implant surgery and, subsequently, a functioning, not overload ed, patient-tailored, cleanable and aesthetically pleasant rehabilitation.

Prosthodontist skills

Skilled clinicians know that there is no such thing as a gold standard prostheses, but every patient needs a tailored rehabilitation, which takes into consideration his or her resources and requirements and which has to be planned before surgical intervention. After data collection and decision planning regarding the numbers of implants requested, to ronto versus overdenture, cemented versus screwed work, with a motivated and aware patient, the surgical and prosthetic work with careful load management can start. Only careful and considerate planning can prevent poor outcomes (Fig. 6).

Prosthesis fabrication and cementation

Dentists should work in direct contact with prosthodontists in order to create aesthetically pleasant, patient-tailored and comfortable spaces. After dental hygienist instruction and training, patients should be able to clean their prostheses daily with minimal effort to maintain healthy mouths. For this reason, an accurate protocol, loupes and meticulousness. For all these reasons, an accurate protocol, dependent on cement composition, should be published (Figs. 7 & 8).

Conclusion

Implant rehabilitation provides a therapeutic alternative that is more similar to natural teeth than other alternatives. Nevertheless, while an implant-supported prosthesis can be a permanent successful solution, it lasts only if carefully planned with the patient, properly surgically performed, correctly loaded, and constantly maintained by the patient and the dental professionals. Successful results can be achieved only by an expert, patient-centred dental team.

Editorial note

This article was originally published in implants international magazine of oral implantology, Issue 4/2018.