Autologous bone grafting using extracted teeth

Armin Nedjat explains how using the patient's own extracted teeth can provide a readily-available and effective grafting material

Figures 1-3: The extracted teeth are cleaned. Amalgam, composites, and endodontic filling material are removed from the teeth with a diamond, under water cooling, and with a turbine. The tooth fragments are then thoroughly dried and placed in the chamber

Figures 4-6: The chamber is tightly closed. The 'grind' setting is adjusted to three seconds and 'sort' to 20 seconds before the grinding process begins. The unit sorts the granules into two filtration chambers

In Germany alone, more than about nine million adult teeth are extracted every year, which all need replacing.

When socket preservation is not performed after extraction, the hard and soft tissues can lose up to 50% of their volume. Consequently, delayed implantation is often associated with bone grafts.

For decades, bone grafts have been scientifically documented to achieve good results. A variety of graft materials, from autologous bone (derived from the chin, the ramus, or from the hip of the patient) or synthetic bone (Beta-TCP), to xenogenous bone have all seen some measure of success.

Figure 7 and 8: The ground and filtered material is immersed in a cleanser solution for 10 minutes. The cleanser, which is bactericidal, consists of sodium hydroxide with 20% ethanol

A new technique has been developed that allows the clinician to transform extracted teeth into autologous bone graft material, which when used correctly will ankylose and undergo a direct attachment with bone.

A win-win situation

For some time, this author has incorporated this concept in his practice. The concept,

Dr Armin Nedjat is founder and managing director of Champions Implants. He is also the developer of the MIMI ('minimally invasive method of implantation') procedure.

For more information, visit www.gbr.championsimplants.com.

Figures 9-11: The resulting particulate is carefully dried, before being neutralised in a buffering solution for three minutes and then again dried with sterile swabs. A third optional stage, involving the use of EDTA solution for one minute, can be added between cleansing and neutralising if so desired. After the tooth has been ground and processed, the resulting 'sticky bone' can be used as graft in the alveolus. In practice, the graft does not crumble and exhibits a capacity to bond. A membrane and sutures do not seem to be necessary when the patient is advised not to drink, rinse, or brush their teeth for two and a half hours after the procedure

which originates from the USA and Israel, is deceptively simple: instead of discarding extracted teeth, the latter are bio-recycled at the chairside and cleaned directly after extraction in order to use them as osteoinductive autologous bone graft.

The tooth fragments contain important bone growth factors. Many studies have confirmed the benefits of the natural teeth material as bone graft, and the cost-efficient restoration for the patient can be easily and quickly fitted in any dental office.

Socket preservation techniques, as an alternative to immediate implant placement, are also suitable for use with this technique. In socket preservation procedures a graft is placed at the time of extraction but the implant is typically not placed for another three to four months.

It is the belief of this author that the Champions Smart Grinder Concept (CSGC) has the potential to be a win-win situation for patients and dentists.

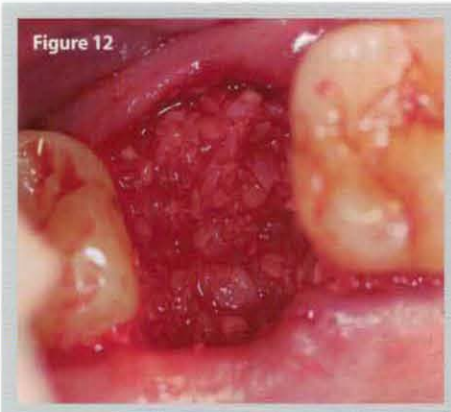
Discussion

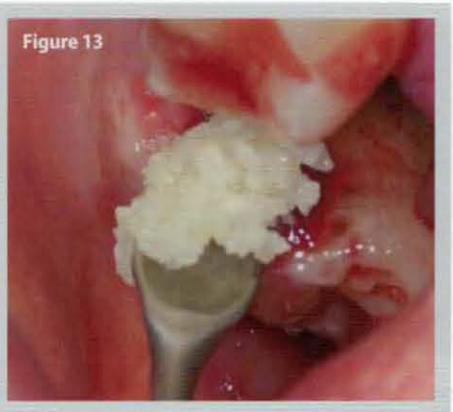
In immediate placement cases, the graft can be prepared while the implant is placed.

It is recommended that the implant be placed first (ideally, at a primary stability of 30Ncm), and then the graft added to fill the bone-implant cavity. A prospective study by Barone documented stable soft tissue with a success rate of 95 % after seven years following an immediate implantation and immediate restoration (Barone et al 2016).

The palatinal/lingual position of the implant in the 'biological envelope' seems to contribute to success.

For about 15 years, as has been said in clinical studies, this author has postulated that it is paramount to prevent the graft and/or the implant from applying pressure on the buccal bone lamella (even if it





Figures 12 and 13: The resulting 'sticky bone' can be used as a grafting material

is very thin, with an intact periosteum) (Slagter et al 2016a; Slagter et al 2016b; Cochlidakis 2016; Khoury 2016).

The buccal resorption is independent of the biotype. With a minimally invasive method of implantation (ie, without raising flaps), there is likely to be resorption of only 0.3mm (Merhab et al 2016), which is a satisfactory and even long-term aesthetic clinical result!

In addition, a significant correlation of lasting aesthetic results with the vestibular bone thickness has not been found.

A prospective study found that for immediate implantation, it was not significant whether the vestibular bone wall measured 0.4mm or 1.2mm (Arora and Ivanovski 2016).

If a graft is placed in the cavity between the bone and the implant, the buccal lamella can be stabilised (Arora and Ivanovski 2016). A meta-analysis has shown that a connective tissue graft for immediate implantation is not more aesthetic in the long term and is therefore questioned (de Oliveira-Neto et al2016).

Another randomised study showed there was not a difference between the peri-implant soft tissue volume increase in the group with xenogenous collagen matrix and the group with a connective tissue graft (Thoma et al 2016).

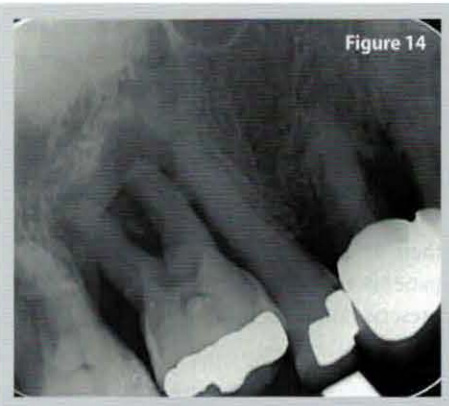
In a study conducted by Kim et al (2016) with 30 patients, it was shown that demineralized and ground autologous teeth, in combination with PRP, were suitable for sinus lift.

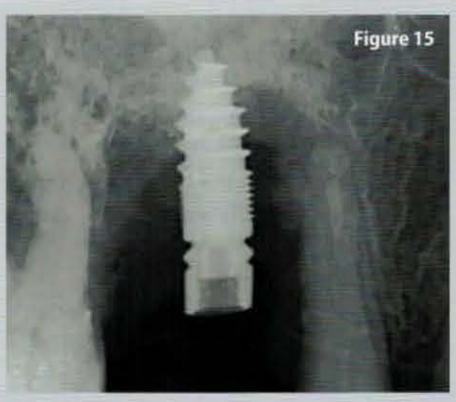
A study conducted by Pohl et al in Austria (2016) also demonstrated the use of ground third molars in sinus lift procedures.

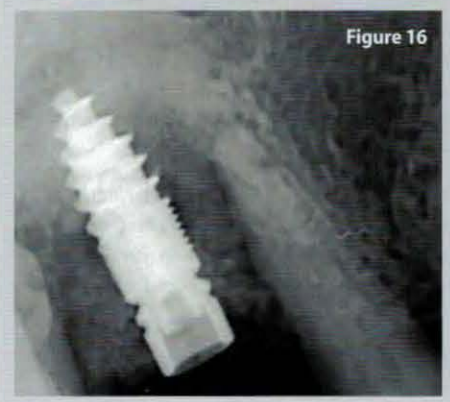
In the author's experience, the Smart Dentine Grinder has been very successful, providing 100% physiologically/biologically compatible material, without incidence of dehiscences and clinical complications. Psychologically, patients do not need to be informed about foreign material anymore – since their own teeth can be reused.

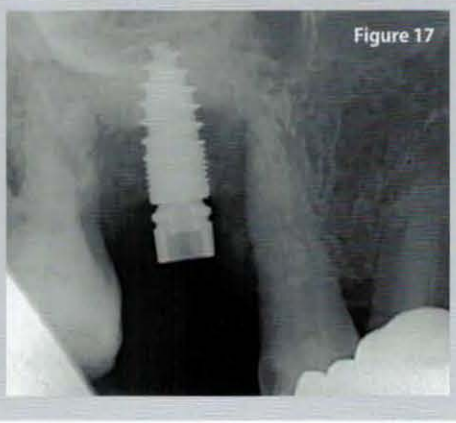
Conclusion and economical considerations

The general dentist, during the treatment of his/her patients, will typically extract teeth that cannot be preserved and go on









Figures 14-17: The tooth at UR6 could not be preserved (Figure 14). After antibiotic treatment, it was extracted. During immediate implant placement of a Champions (R)evolution 10x4mm implant, the tooth was cleaned and prepared. After placing the implant at a primary stability of 30Ncm (Figure 13), the particulate was placed in the alveolus (Figure 14). After only 10 weeks, very satisfactory results were achieved (Figure 15) with the autologous graft using the Champions Smart Grinder Concept, also in combination with immediate implantation or during an efficient and cost-efficient socket preservation. Additionally, the distal bone at UR5 seemed to regenerate well.

to fit a prosthesis of some description.

As clinicians we know that tackling an alveolar resorption rate of around 50% after extraction requires an efficient, non-traumatic treatment that can be carried out at the chairside and without a big investment in laboratory material.

In the author's opinion, the Smart Dentine Grinder device, which has been validated by the EC and approved by FDA 510 (K) in the United States, fits this bill.

In Europe the machine is distributed by Champions Implants, a company whose philosophy is that non-traumatic, reliable treatment, requiring fewer surgery sessions should be a priority.

With a Smart Dentine Grinder, grafting treatment is quick, efficient, reliable – and also affordable.

From an economical point of view, compared to 'classical' socket preservation that uses bovine or alloplastic material, the cost of a chairside procedure using the patient's own teeth is significantly lower.

This author suggests that all clinical colleagues should look at the potential afforded by no longer discarding extracted teeth from the patient.

Instead, implant dentists can reuse them as bone graft material, inform their patients about it, and simplify their socket preservation techniques. **IDT**

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