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IN THIS ISSUE

Autogenous Block Grafts for Maxillary Reconstruction Prior to Implant Placement

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Alveolar defects of the anterior maxilla are commonly encountered when treatment planning for dental implants. Frequent causes for these defects are infection, trauma or congenitally missing teeth. There are currently many different techniques available to the implant surgeon for reconstructing the alveolar ridge for placement of dental implants. Among those are autogenous bone grafts, guided tissue regeneration using particulate grafts and barrier membranes, ridge osteotomies and rhBMP-2.

The author has had success reconstructing the anterior maxilla using autogenous block grafts harvested transorally from the mandibular symphysis and ramus. Three cases are presented where block grafts were used successfully to reconstruct the anterior maxilla prior to dental implant placement. The cases are presented with an emphasis on the bony reconstruction prior to implant placement.


Fig. 1

Case 1

A healthy16 year-old female was referred for implant evaluation of the upper right lateral incisor site.

She reported a history of congenitally missing maxillary lateral incisors. She had prosthetic lateral incisors held in place by an orthodontic arch wire. In examination she had healthy, adequate keratinized gingiva at the site, with a horizontally deficient ridge **[Fig. 1].**


Fig. 2

Panoramic and Cone Beam CT (CBCT) studies were performed. The panoramic radiograph revealed unerupted, developing teeth numbers 1,16,17 and 32 **[Fig. 2].** The CBCT showed a ridge width of approximately 3.52 mm at the #7 site **[Fig. 3].**

The treatment plan was to perform extraction of tooth #32 in con-

junction with a block graft harvest from the right ramus, under general anesthesia in the office.

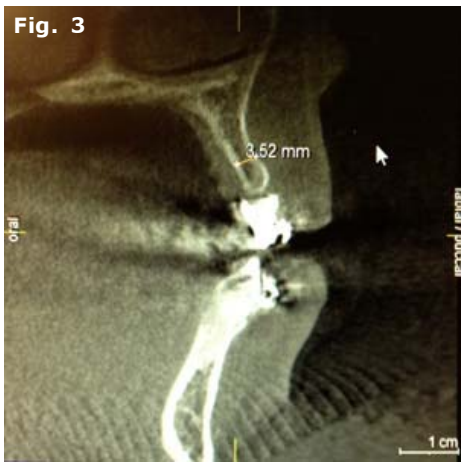
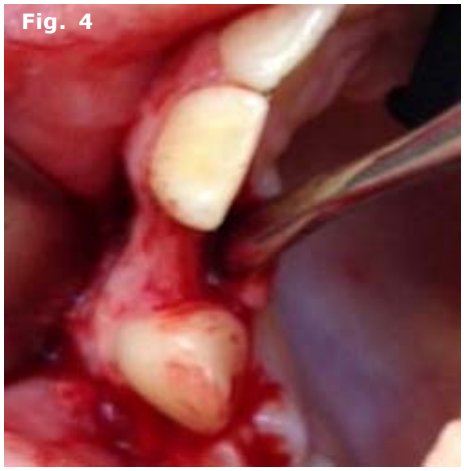


Fig. 3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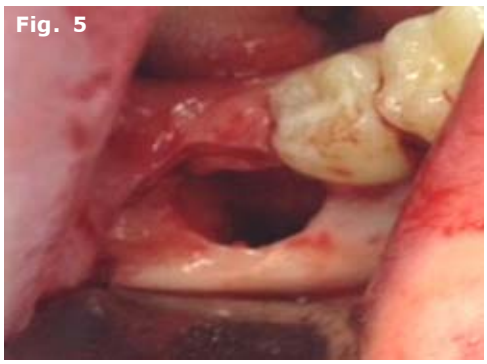


Fig. 5


Fig. 6

Technique

A crestal/sulcular incision with two vertical releases was made, followed by a buccal and palatal subperiosteal dissection revealing the deficient ridge **[Fig. 4]**. A standard buccal release/sulcular incision was made to approach the #32 area. The tooth was elevated and delivered without any loss of bone **[Fig. 5]**. Osteotomies were made through the cortical bone using a round bur. The graft was mobilized using chisels and delivered **[Fig. 6]**. The donor site was irrigated, packed with gelfoam and closed. The graft was trimmed to fit the defect and any sharp areas were reduced.

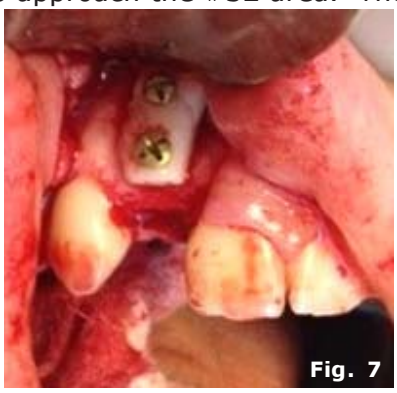
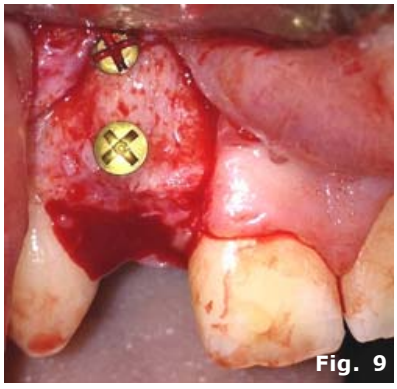


Fig. 7


Fig. 8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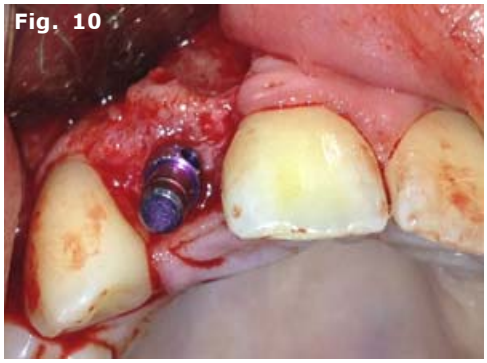


Fig. 10


Fig. 11

A lag technique was chosen for two reasons to fixate the graft. The first was to create slight compression of the graft to the recipient site to prevent micromotion. The second reason is so that when the fixation screws are removed the threads do not engage the graft, and risk avulsion. This was performed by over drilling the graft so that the fixation screw threads do not engage the donor bone, and only the native site. The graft was held in place with slight compression, by the screw head engaging the donor cortex. Two screws were used to prevent rotation of the graft **[Fig. 7]**. The periphery of the graft was then packed with cadaveric corticocancellous particulate. The wound was closed with a 3-0 vicryl suture **[Fig. 8]**.

Implant Placement

The patient was evaluated at 6 months and on examination found to have adequate width of bone. The area was approached using a similar incision. The graft was integrated and stable with bleeding bone seen **[Fig. 9]**. The fixation screws were removed and the graft was stable. The implant was placed with excellent stability **[Figs. 10-12]**. The site was closed with a 3-0 chromic gut suture. The implant was restored after 4 months.

Case 2

A 45 year-old healthy male, non smoker, was referred for replacement of teeth #'s 8 and 9 with dental implants. Tooth #8 was lost many years ago due to infection. Tooth #9 was discolored, necrotic and non restorable. A CBCT was obtained which showed a horizontally deficient ridge at the #8 site **[Fig. 13].** The treatment plan was to reconstruct the #8 site with an autogenous symphysis block graft and extraction of tooth #9 with socket grafting using allograft, under general anesthesia.

A crestal/sulcular incision was used exposing the defect **[Fig. 14].** After the defect was evaluated and measured, the wound was packed during the harvesting of the graft.

Donor Site

A sulcular incision from canine to canine was performed, followed by a subperiosteal dissection to the inferior border of the mandible.

A round bur was utilized until bleeding marrow space was seen throughout the osteotomy. Straight and curved chisels were used to complete the osteotomy and deliver the graft **[Fig. 15].** Bone wax and gelfoam were used to control bleeding prior to closure with a 3-0 chromic gut suture.

Recipient Site

The graft was then trimmed and fixated to the site using a lag technique **[Fig. 16].**

Particulate allograft was grafted into the #9 socket after atraumatic extraction. The wound was closed using a 3-0 vicryl suture. At 6 months the area had healed with adequate width of the ridge seen on examination and CBCT **[Figs. 17-18].** The site was exposed using a crestal incision. The grafted sites had healed well **[Fig. 19].** The fixation was removed and the graft was stable. Two implants were placed with excellent stability **[Fig. 20].** The wound was closed with a 3-0 chromic gut. The implants were later restored at four months.


Fig. 12 - Case 1

Fig. 13 - Case 2

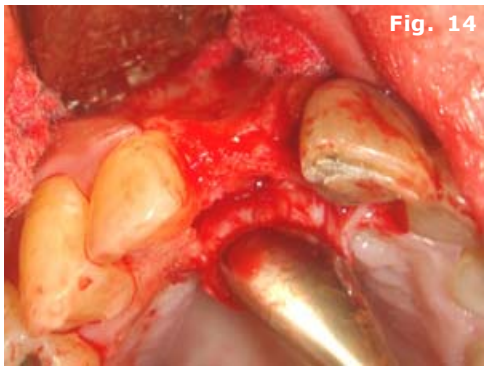
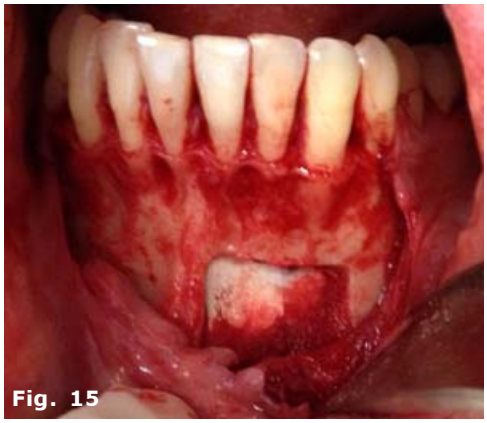


Fig. 14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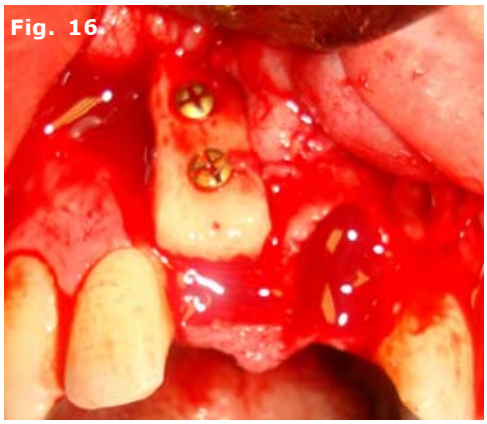
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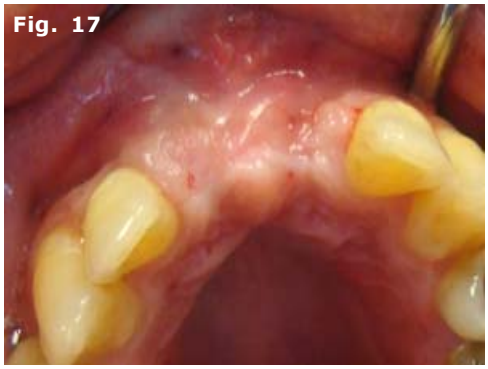


Fig. 17

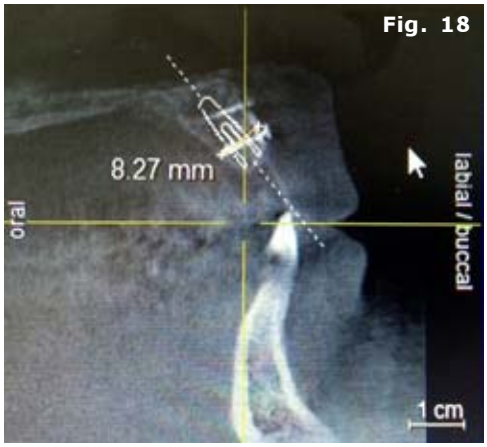


Fig. 18

Case 3

This is a 40 year-old healthy female, non smoker who had an implant placed outside of the country, which failed and was removed by a colleague. The patient was later referred to me for implant evaluation at the #10 site. Periapical radiographs were provided which showed the implant and site just prior to and after implant removal **[Fig. 21].**


Fig. 19 - Case 2

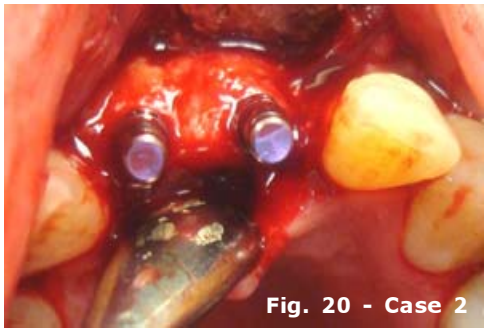


Fig. 20 - Case 2

On examination the width of the ridge was severely deficient. A CBCT was obtained which showed minimal alveolar bone present in the area **[Fig. 22].** A symphysis block graft was harvested and fixated to the site as described in the previous cases. At six months a CBCT was taken and showed more than 7mm of width of bone **[Fig. 23].** The area was approached using a crestal incision and the graft was found to be bleeding, with minimal resorption **[Fig. 24].** The fixation was removed and the graft was integrated and stable. An implant was placed with excellent stability and the site was closed with a 3-0 chromic gut suture **[Figs. 25-26].** The implant was restored 4 months after placement.

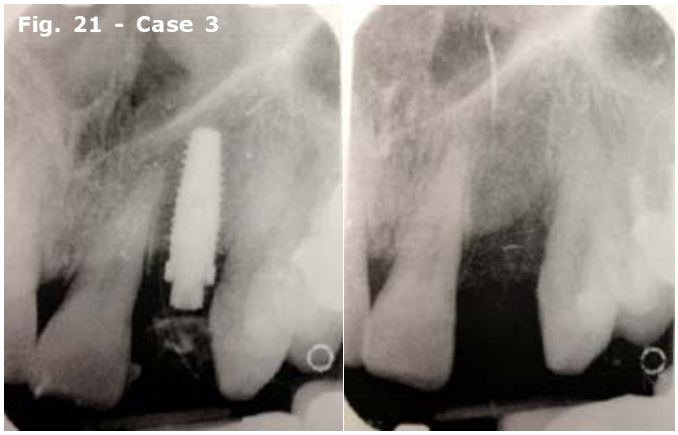
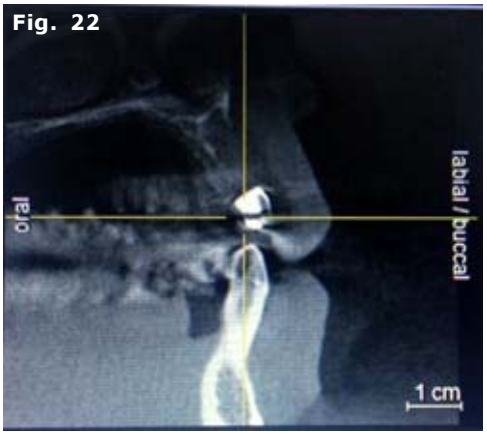


Fig. 21 - Case 3

Discussion

Reconstruction of anterior maxillary alveolar defects can be accomplished using many different techniques. All cases must be assessed on an individual basis to determine the best method. Many factors have to be taken into account when deciding the best technique for a patient. A comprehensive medical history should be taken. A thorough physical examination of the area must be performed to evaluate the vascularity and quality of the soft tissue as well as the height and width of the ridge. The adjacent dentition should be evaluated to rule out any local disease that could affect any reconstruction.



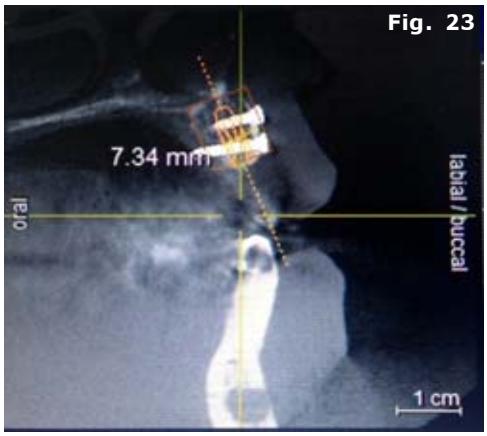



Fig. 24

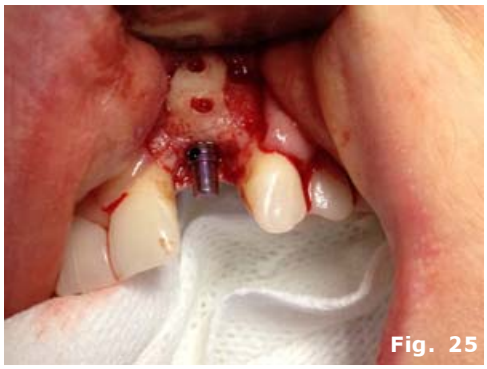


Fig. 25

Though not mandatory for all cases, when available CBCT can be especially useful to not only study the defect, but to also study the anatomy of the donor site when mandibular block grafts are planned.

Mandibular block grafts do have the disadvantage of the increased morbidity associated with harvesting. Patients should be informed of all risks associated with harvesting these grafts such as paresthesia, infection and mandibular fracture. These procedures are time consuming and each step from incision design to graft harvesting, graft fixation and closure are essential for a successful outcome.

When there is great attention to detail in the workup and performance of these techniques, mandibular block grafts can be used to predictably reconstruct the anterior maxillary alveolus prior to dental implant placement.


Fig. 26

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Dental Risk Management

Observations of an Expert Witness

Olivia C. Palmer, DMD, JD

This is not legal advice; what follows are my observations as an expert witness. I have served as an expert witness in dental malpractice cases since 2006, and I want to share what I have learned in an effort to assist good practitioners from becoming embroiled in a lawsuit. Recent years have seen a dramatic increase in dental malpractice litigation; the enormous emotional and financial toll that a lawsuit can exact makes the effort to proactively avoid litigation well worth any dental practitioner's time and effort.

In my review of dental records as an expert witness, I have seen cases involving overfilled root canals, mistaken extractions of permanent teeth instead of deciduous teeth, puncture of the facial artery, improper diagnosis of dental decay, failure to know patient was on bisphosphonate therapy, and failed dental implants. In most of these cases, the patients report that they wanted their doctor to tell them what happened, and to express sincere regret and caring.

It is important to for the doctor to address patients concerns and issues. Often a lawsuit can be avoided by just informing the patient, without admitting any guilt, that their outcome was not a beneficial as you had expected, but that you are there for them if any problem arises. Always be sure to thoroughly document these conversations in the patient's chart.

Written Procedures

Always practice defensively; have proper procedures in writing in your offices that protect you and your staff from devastating litigation. The most common fatal error that I see in dental charts is not what is there, but what is not there. In the legal arena, if it is not written in the chart, it did not happen! Gone are the days when you could tell a patient what they needed, go over options, and proceed to treatment with little or no documentation.

Patients have short memories, and as a busy practitioner, so do you. You simply must document in the chart all the options, the risks and benefits of each treatment plan, and what your recommendations are. It is not acceptable to write, "All questions answered". What questions, what answers?

Medical History

Medical histories must be thoroughly reviewed with the patient by the doctor. Ask the patient if they have had bisphosphonate therapy, or chemotherapy, or do they take aspirin daily. Patients are often intimidated and forget or make wrong entries. The few minutes you take going over their history may mean the difference in a lawsuit or not.

Consent

The failure to give adequate informed consent is another area that is a frequent source of litigation. The doctor should obtain the consent prior to the surgical treatment, not immediately preceeding the procedure.

Remember that consent cannot be obtained from a sedated patient, nor can financial arrangements be made. In one case, the doctor left the duty to obtain consent with the receptionist. She forgot to have the patient sign the box indicating the patient understood she could have permanent nerve damage from her

local anesthetic injection or her surgical procedure. Unfortunately, her inferior alveolar nerve was injured and she sued. There are recorded cases on this with verdicts ranging from $300,000 to $400,000 (Not including legal fees!).

Witness

Always have a staff member in the operatory with you at all times. You not only need a witness to what you say, but you need a witness to protect yourself from "He said, she said" issues. Form relationships with your patients, and follow up with a phone call. If you have a procedure that did not go as well as intended, gently inform the patient, and express caring. This alone can do more to avert a lawsuit than just about anything else you can do. If your patient contacts you by phone with a concern, return the call promptly, not a week later. Be sure that your staff understands the importance of notifying you as soon as possible of any expressions of patient dissatisfaction or upset. Many patients in litigation have expressed to me that they just wanted to know what went wrong.

Referrals

Stay current on procedures and techniques. Have good relationships with specialists. If you can perform a specialty procedure to the same degree of care and skill as the periodontist or the oral surgeon, then go ahead. But remember, if you are not capable or qualified to handle any subsequent complication, then you should have referred the patient. Remember if you do refer a patient, copy the referral slip to the patient's chart and follow up with the patient and the specialist. Failure to follow up can be grounds for malpractice.

Responsibility

Beware of weekend courses, particularly in the realm of implant dentistry. This is the fastest growing area of dental litigation. If you refer your surgical cases, be sure to properly treatment plan them and obtain diagnostic records. It is the responsibility of the general dentist to provide the oral surgeon/periodontist with diagnostic mounted study models, diagnostic wax-up, and a written request delineating what your restorative goals are. In one of my cases, the general dentist, who was highly skilled but not trained in implant dentistry, referred his patient to a periodontist to see if she could have implants placed in the number 2 and 3 position. The patient's chief complaint was that she could not effectively chew her food due to the missing maxillary molars.

The general dentist, on intraoral examination, saw there was inadequate space between the arches to restore a dental implant. His fatal error was in not recording that finding in the patient's chart. Nor did he take diagnostic study models and mount them on an articulator, which would have clearly shown the lack of sufficient interarch space. The periodontist failed to check this as well.

An unnecessary sinus lift was performed and two non restorable dental implants were placed. My examination of the patient showed she was occluding on a 3mm healing abutment. **[Figures 1-3].** The patient, understandably upset, sued the periodontist and the general dentist. It was my testimony that the general dentist was not at fault, because he was not trained in implant dentistry, yet he still was subjected to several years of litigation and many sleepless nights.


Fig. 1


Fig. 2


Fig. 3

Documentation

It all could have been avoided by proper documentation of the chart as to his clinical findings and a set of mounted, diagnostic study models. The moral of this story; document all of your clinical findings, send mounted study models and treatment planning goals, and call your specialists and meet with them to discuss the case; document what was said. Let your patients know you have met with the specialist to whom they were referred.

In another case involving mini dental implants, the general dentist placed four minis in the anterior mandible to support a denture; the implants became infected and fell out. The dentist replaced them, and

these too failed. He replaced them a third time, and this time when they became infected he placed the patient on predisone for six months; The boney destruction of the mandible was so severe that the patient can not only not have dental implants, he cannot wear a prosthesis. Referral to an oral surgeon was indicated, but it did not happen. That case resulted in litigation as well. A failed dental implant that is actively infected must be removed.

Technology

If you are performing dental implant procedures but not using CT scan technology where indicated, you may be leaving yourself open to liability. Legally, if you have the technology to improve a patient's outcome and you fail to use it, this may be malpractice. In a recent case, the periodontist noted in the patient's chart at the time of extraction of tooth #8 that the buccal plate was gone, and there was only 2mm of ridge width. Clearly this is an indication for a pre-surgical CT scan.


Fig. 4

The scan would have easily shown the need for a block bone graft prior to implant placement. Yet the periodontist failed to take a scan, instead placing an implant so high in the buccal vestibule that the resulting esthetics was totally unacceptable. The patient, after getting three independent opinions from other periodontists stating that the implant would have to be removed, block grafted, and then replaced, sued her periodontist **[Figure 4]**.

Records

Never, never, never alter a chart. It happens all too frequently, and the results can be financially devastating. If you are not computerized, get computerized. Record your clinical notes on the computer so they are legible. Make sure that your staff records all patient contacts in the computer chart, including reminder calls and follow up calls.

Protocol

Take vital signs on all new patients and before administering anesthesia. Record your anesthetic dosages in milligrams, not "carps." A carp is a fish; A carpule is not a dosage but a quantity method of delivery; if you have an emergency and the EMS asks how much Lidocaine and Epinephrine you gave the patient, you need to know the answer. Your credibility will be completely destroyed on the witness stand if you are asked how many milligrams you gave, and you either don't know or answer in "carpules". Or suppose the patient with coronary artery disease has a massive heart attack on his way out of your office. How will you explain your failure to take a blood pressure prior to administering a local anesthetic on a patient on medication? It's just not defensible.

On the other hand, proper documentation of the dental record, forming relationships with your patients (beginning with reviewing their medical history), and a sincere attitude of caring go a long way towards keeping you out of dental malpractice litigation. Take the time to educate and train your staff to properly document all telephone calls and inform you of patient's concerns promptly. If you do find yourself served with a summons and complaint, inform your professional liability carrier immediately, and do not discuss it with your staff. Let your attorney guide you. While a dental malpractice suit can be devastating in time, energy, and resources, a well documented patient record is your best defense.

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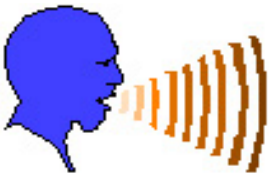
Happy Holidays



Guest Editorial

Risks of Corrosion with Titanium Dental Implants

Sammy S. Noumbissi DDS, MS

For more than four decades, a variety of materials have been used to manufacture dental implants and orthopedic devices. Titanium has been the material of choice for implantable devices in dental implantology and medical orthopedics. As such, dental implants made of titanium have been and continue to be mainstream in implant dentistry. Most dentists today are trained to use and offer titanium and titanium alloy dental implants which are all metal. However there are increasing clinical reports and scientific research on instances of allergic reaction to titanium implants with spontaneous immediate or delayed implant failures. Other studies have investigated the stability of titanium dental implants and the crowns and bridges placed over them in the oral environment[3].

Thanks to the stability of the TiO2 layer (oxide layer) on their surface, titanium alloys are exceptionally resistant to corrosion but they are not inert to corrosive attack. When the oxide layer is broken down and then fails to reconstitute itself, titanium can be as corrosive as many other base metals. There is increasing evidence that titanium implants when exposed to the oral environment can corrode and result in compromised structural integrity of the implant but also lead to implant loss and potentially life threatening health conditions.

What is Corrosion?

Corrosion can be defined as the graded degradation of materials by chemical or electrochemical attack. This phenomenon is of concern particularly when metallic implants, metallic/silver fillings, or orthodontic appliances are placed in the hostile electrolytic environment provided by the human mouth. Corrosion can severely limit the fatigue life and ultimate strength of dental materials leading to mechanical failure.

What Type of Corrosion Occurs in the mouth?

The type of corrosive reactions that occur in the oral cavity are *electrochemical* and are also called *wet corrosion***.** Electrochemical corrosion requires the presence of water or some other fluid electrolytes and in the oral cavity saliva plays that role. This general mode of corrosion is prevalent in dental restorations[2], implant-to-abutment joints and abutment-to-restoration (crown, bridge, retentive bars etc) connections[3]. The complexity of the electrochemical process involved in the implant-to-implant superstructure joint and/or connection is linked to the phenomenon *of galvanic coupling* and *stress and pit corrosion*. Also potentially occurring in the oral cavity as a result of electrochemical activity is microbial corrosion.

Galvanic Corrosion

Galvanic corrosion is an electrochemical corrosion, it is the most common form of corrosion that occurs with dental implants. The use and connection of dissimilar metallic restorative materials is called galvanic coupling and may also generate corrosion[9]. Therefore there is a great amount of concern regarding the types of materials used for suprastructures and crowns over titanium dental implants[12]. When two or more dental prosthetic devices/restorations made of *dissimilar alloys* come into contact while exposed to oral fluids, the difference between their corrosion potential results in a flow of electric current between them.

A galvanic cell is formed in the mouth and the *galvanic current* induces acceleration of corrosion of the less noble metal[13]. High noble gold alloys are generally chosen as the material of choice for superstructures because of their excellent biocompatibility, corrosion resistance, and mechanical properties. However, these materials have become very expensive and as a result new more affordable less noble alloys such as Ni-Cr, Ag-Pd, and Co-Cr alloys are used instead. These alloys have good mechanical properties, they are less noble than titanium and their biocompatibility and corrosion resistance are of concern.

The galvanic current passes through the metal/metal junction and also through tissues, which causes inflammation and pain in the soft tissue and bone. In such cases saliva and other fluids in bone and soft tissue become electrolytes and allow the corrosive galvanic currents to take hold. These events trigger immune responses and ultimately possible implant loss.

Stress and Pit Corrosion

This is the second type of corrosion that occurs at the joint of the implant and the implant superstructure. Implant restorations and abutments can have small microscopic pits and crevices on their surface as a result of prosthetic micromovement, scratching by insertion tools etc. With chewing cycles, implant and implant teeth (abutments and crowns) endure high forces stress of various types such as torsional compression and elongation and as a result **stress and pit corrosion** occurs in the stressed and pitted areas.

Microbial Corrosion

Although not fully proven, microbial corrosion is another type of corrosion that can occur in the oral cavity. Titanium and the various alloys that are used to make restorations on implants are prone to retain a great amount of plaque compared to ceramic/zirconia implants. Wherever there is plaque there is bacteria and microbes living in it, and these bacteria release by-products that destroy bone and make natural teeth loose over time if not removed. In the same manner with titanium implants, those microbes and bacteria by-products are acidic in nature and can potentially corrode the titanium and the metal alloys used for restoration over the implants. Such corrosion occurs and is almost always accompanied by galvanic activity.

Clinical Observations when Corrosion Occurs in the Mouth

As long as metallic dental restorative materials are employed, there will be galvanic currents associated with electrogalvanism in the oral cavity. For some patients, especially after the placement of a base metal restoration, pain caused by galvanic currents can occur and be a source of discomfort and ultimate implant failure. Corrosion leads to roughening metal surfaces, release of ions from the metal or alloy, and toxic reactions. The liberation of elements can produce discoloration of the soft tissues around the implant and allergic reactions such as oral edema, perioral stomatitis, and gingivitis. Extraoral manifestation such as eczematous rashes in susceptible patients can occur. In a study by Kirpatrick, et al, it was found that the pathomechanism of poor wound healing is modulated by specific metal ions released by corrosion[8].

Conclusion

The mouth is the portal entry of the human body. It is also the habitat of a host of microbial species. Oral tissues are exposed to a veritable bombardment of both chemical and physical stimuli as well as metabolism of about 30 species of bacteria. Teeth and dental implants function in one of the most inhospitable environments in the body, they are subject to the most extreme temperature variations, enduring temperatures as low as 0°C to hot foods and beverages. Multiple factors such as temperature, saliva, plaque, pH, and the physical and chemical properties of food and liquids as well as oral health conditions may influence corrosion. Yet, for the most part, oral tissues remain healthy. The combination of stress, ongoing corrosion, and bacteria contribute to implant structural failure and loss of bone integration.

As it has been the case in orthopedics for over two decades, we now have alternatives in implant dentistry. Metal-free and metal alloy-free solutions are available for teeth replacement, from the implant embedded in bone, to retentive bars and fixed prosthetic frameworks, to the visible crown in the oral cavity are now available. With recent advances in implantable biomaterials research and technology, bioceramics such as zirconia (zirconium dioxide) are now available and a new generation of modern implants is made of zirconia.

Zirconium Silicate ($ZrSO_4$) is mined from the earth, treated and transformed into a tetragonal crystal called zirconium dioxide also known as zirconia. Therefore zirconia is not a metal and also presents exceptional physical and biological properties. Furthermore bioceramics accumulate very little plaque if at all thus reducing bacteria habitat, multiplication and by-products. Given the rise in reports of patients developing sensitivities to titanium and titanium alloy metals, available and alternative implant materials such as zirconia should be considered and studied more closely by dental implantologists as a means of root and tooth replacement.

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Edentulous Ridge Expansion Using Innovative Sonic Tips

Dr. Ivo Agabiti

Of the criteria that need to be met to achieve highly aesthetic and functional implant dentistry, one of the most important is placing an implant in the correct prosthetically-planed position. However, the residual alveolar ridge may be insufficient in height or width, and may require additional bone augmentation procedures. Nowadays, different techniques are available to increase the volume of the residual ridge, such as the edentulous ridge expansion (ERE).

ERE is the ideal technique for cases in which the height of the residual ridge is sufficient but the width is not. This technique was originally performed with discs and rotary and oscillatory instruments, which are considered extremely dangerous for the soft tissue, blood vessels and nerves (Scipioni A, Bruschi GB, Calesini G, 1994).

The SFS sonic tips (Komet Dental) for Sonosurgery recently replaced the conventional instruments, making ERE a simple and reliable technique (Chiapasco M, Zaniboni M, Boisco M, 2006). SFS sonic tips have the advantage of using sonic vibration, already well known in dentistry for its applications in endodontics, periodontics and prosthodontics. These tips vibrate at a frequency (6 kHz) that is not visible to the naked eye, providing a very efficient and precise cut. The particular frequency used for the activation of these instruments allows practitioners to work safely in close proximity to delicate structures such as blood vessels and nerves.

Fig. 1: A pre-operative view of the area requiring an implant-supported restoration.

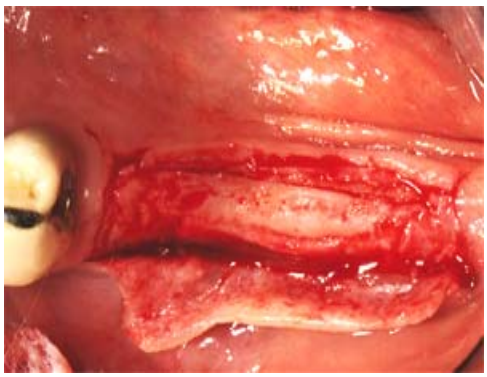

Fig. 2: Leaving the periosteum attached to the buccal bone avoids trauma and preserves the blood supply to the thin cortical plate.

Indications

The SFS sonic tips for Sonosurgery, designed in collaboration with this author, can be used for several oral surgery applications, including split crest, creating a sinus window, and the gentle removal (luxation or syndesmotomy) of a tooth's periodontal ligament in its alveolar compartment for extractions. The SFS sonic tips prepare extremely fine cuts of only 0.25mm and guarantee maximum conservation of bone structure.

They are to be used in the anterior and posterior regions of the upper and lower jaws, and where tight conditions do not allow the practitioner to work with any other instruments. Even in these situations, the SFS sonic tips can cut more than 10mm deep into the bone with ease because of their lateral cutting function. The SFS sonic tips are also helpful cutting 10mm deep into the bone ridge, following a rotating bone cutter that opened cortical structures but did not provide adequate cutting depth.

The clinical example in this article describes one application for which one can use SFS sonic tips and the Komet SF1LM sonic handpiece.

Case presentation

The patient was a 36-year-old female who was interested in replacing her missing teeth **[Fig. 1]** with an implant-supported restoration. The alveolar bone crest presented a concavity on the buccal aspect and required an augmentation, to provide adequate bone dimensions for proper implant placement.

The patient was anesthetized with lidocaine 2% with epinephrine 1:100,000. A crestal incision was performed in the edentulous areas of teeth #'s 18,19,20. To avoid a vertical releasing incision and the apical repositioning of the flap, the incision was extended mesially and distally submarginal to the adjacent teeth. The partial thickness flap was lifted buccally, leaving the periosteum attached to the buccal bone, which avoided trauma and preserved the blood supply to the thin cortical plate **[Fig. 2]**.

A crestal osteotomy was performed with the angulated point of the SFS101 axial tip to the established depth of 10mm **[Fig. 3]** – one notch on the SFS sonic tips corresponds to 1mm. With the perpendicular blade (SFS100 sagittal tip), two vertical releasing incisions were performed on the buccal plate for the entire

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thickness of the cortical plate (usually 1mm to 2mm). The buccal plate can be gently transposed with osteotomes or other hand instruments.

Two tapered titanium implants were inserted into the artificial socket, expanding the alveolar ridge. The gap was filled with a collagen sponge without the need for bone grafting materials **[Fig.4]**. The flap was repositioned apically and sutured in place. After eight weeks, the implant was ready for prosthetic rehabilitation. The final prosthetic rehabilitation restored function and aesthetics **[Fig. 5]**.

Conclusion

ERE is an efficient and reliable alveolar ridge augmentation technique that can be performed simultaneously to implant placement. Using SFS sonic tips instead of conventional rotary instrumentation reduces the risk of iatrogenic damage to delicate structures such as blood vessels and nerves. The vibration of the SFS sonic tips in the SF1LM sonic handpiece provides a fast and efficient osteotomy of the alveolar ridge, removing only a minimal amount of bone. This allows the practitioner to work in maximum safety and for the patient to be comfortable.

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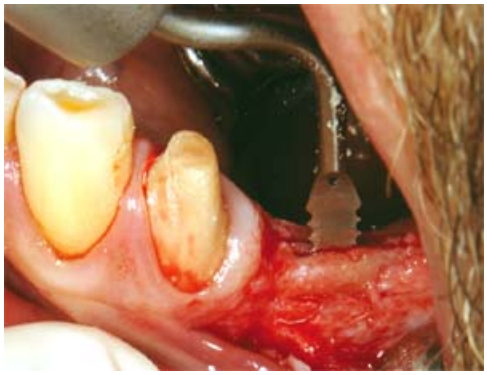

Fig. 3: A crestal osteotomy is performed with the angulated point of the SFS101 tip to the established depth of 10mm.

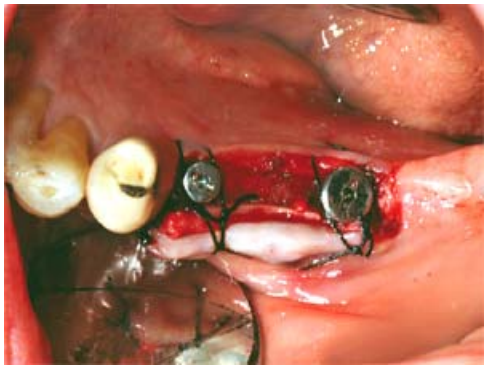

Figure 4: The gap is filled with a collagen sponge without the need for bone grafting materials.

Figure 5: The final prosthetic rehabilitation.

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Dr Ivo Agabiti practices in Pesaro, Italy, focusing on surgery and implantology. Over the past decade he has been utilizing the edentulous ridge expansion and localized management of sinus floor techniques, as well as the anatomically modified abutments technique for dental prostheses developed by Drs. Gianni Bruschi, Agostino Scipioni and Gaetano Calesini. Dr. Agabiti developed the Sonosurgery system to meet the requirements of these techniques. He can be reached at ivoagabiti@sonosurgery.it