

By Rebecca Stone

DRY SPELL

The dreaded "dry socket" can inflict intense pain and lead to infection. *Mentor* gives sales pros a look at this post-extraction condition and how clinicians provide relief for their patients

Once a tooth is extracted, if all goes according to plan, a blood clot forms in the remaining empty socket, and healing commences. Sometimes, however, things go awry and the result is alveolar osteitis, more commonly known as "dry socket."

Dry socket, a common post-operative complication, can be costly, as well as excruciating. Many patients suffering from it will need several post-operative office visits to manage symptoms.



To understand this condition, account executives might want to brush up on their tooth anatomy. The socket, in which a tooth's roots reside, is more formally known as the dental alveolus. This is lined with the periodontal ligament (PDL), which is composed of fibrous tissue that connects to the cementum of the tooth and to the alveolar bone. The PDL overlays the lamina dura, a thin lining of bone, which in turn overlays the more cancellous, or spongy, alveolar bone. Together, these structures support and retain the tooth.

Once the alveolus becomes vacant after an extraction, a blood clot will form in the empty space to protect the tooth socket and expedite gingival growth in the area. After gum tissue covers the socket, usually over a few weeks, new bone begins to grow into the socket, replacing the blood clot.

LEXICON

Allograft: Cell material from a donor of the same species, often from cadavers

Elevators: Hand instruments that provide leverage to displace teeth and roots

Erupted Teeth: Teeth that have emerged from the gumline

Flap Design: The way soft tissue is cut, positioned and sutured over the wound

Forceps: Designed in various configurations to grasp crowns

Osseointegration: The integration of bone and implant

Osteotomy: Surgical procedure in which bone is cut

Periotome: Bladed instrument used to sever the periodontal ligament (PDL) from the tooth

Rongeur: An instrument used to cut bone

THINGS GO AWRY

Dry socket occurs when a blood clot fails to form or is lost. The bone is then left vulnerable to external stimuli, and exposed nerve endings in the socket can cause intense pain. This also interrupts the healing process, as the gum tissue has nothing to grow over.

Reasons for the loss of the blood clot can vary. They range from patients not following their dentists' instructions to simply the luck of the draw. The truth is, no one really knows why dry sockets occur, although difficult or traumatic extractions are thought to be primary risk factors.

During extraction, hand instruments such as scalpels, elevators, periotomes, rongeurs and forceps are used to separate the PDL from the tooth and pull, rotate, rock and sometimes wrench the tooth out of its socket. While more sophisticated than a string tied to a door, this can place quite a load on structures surrounding the tooth, particularly in a surgical extraction.

There are two kinds of extractions. Simple extraction involves pulling erupted teeth by elevating them from the alveolus. Surgical extraction must be performed with impacted teeth, such as unerupted wisdom teeth, or those with complications such as missing crowns and fractures. This involves the cutting of tissue and the need to dig the tooth out, which can be traumatic.

One reason traumatic surgical extractions are said to have a greater tendency to result in dry sockets than standard extractions is that trauma results in the release of substances such as kinins. Kinins are proteins found in blood that cause inflammation, and are known to stimulate pain receptors. These types of proteins also vaporize blood clots. There is also more of a possibility of infection, and while debris removal is paramount, if copious irrigation is used, there is a risk that the fledgling blood clot could be washed away. Some practitioners advocate the use of antibiotics as a preventive measure.

"In my opinion, atraumatic extraction is the most important aspect in avoiding dry sockets," says Michael Sonick, DMD, who operates an implant and periodontal practice in Fairfield, Connecticut, is a guest lecturer at New York University School of Dentistry's international dental program, and is an active teacher, speaker and author on periodontal and implant surgery. "When we extract teeth in our office we use a minimum amount of force. All multirooted teeth are sectioned, therefore avoiding placing excessive force on the teeth and the surrounding bone."

Sonick also uses a piezoelectric ultrasonic surgical unit to free the tooth from the periodontal ligament. Says Sonick, "This allows us to remove teeth atraumatically with minimal force on the bone."

CONTRIBUTING FACTORS

Abtin Shahriari, DMD, operates an oral-facial surgical practice in Cumming, Georgia, and is a clinical assistant professor at Georgia Regents University, Department of Oral and Maxillofacial Surgery. Also involved in several research projects concerning maxillofacial surgery, he presents papers across the globe. He notes that, in addition to the risk presented by difficult extractions, female patients may be at higher risk due to the use of oral contraceptives. Aside from this, says Shahriari, "There are many different reasons for the development of alveolar osteitis. But the following risk factors have been reported: poor oral hygiene, tooth location, previous surgical site infection, systemic diseases, alcohol consumption, and tobacco use."

Sonick believes the condition develops due to poor blood flow to the extraction site. "Most occur in the posterior mandible where blood flow is not very good," he notes. He says that smokers, in particular, will often end up with more dry sockets due to compromised blood supply.

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BONING UP

To help foster bone growth and preserve socket structure, some clinicians add bone grafting material and membranes into the socket in tandem with implant placement. Such materials can help prevent epithelial tissue from infiltrating the area and counteracting the rebuilding of bone. They are also thought to help curb alveolar osteitis.

"In our practice we bone graft the majority of extractions using allograft and recombinant human platelet derived growth factor (rh-PDGF)," says Michael Sonick, DMD, who operates an implant and periodontal practice in Fairfield, Connecticut. He adds that this may also lead to a decrease in the number of dry sockets as blood flow is increased to the site.

Abtin Shahriari, DMD, who operates an oral-facial surgical practice in Cumming, Georgia, agrees. "There has been research regarding using growth factors such as plasma-rich growth factor (PRGF), which, when placed inside extraction sockets has reduced dry socket incidence," he says. "In my practice the majority of patients will receive PRGF, and the incidence of alveolar osteitis is minimal."

Gregori M. Kurtzman, DDS, a general practitioner based in Silver Spring, Maryland, and a former clinical professor at the University of Maryland, Baltimore, School of Dental Surgery in the Department of Endodontics, Prosthetics and Operative Dentistry, is an international lecturer and author who serves as a consultant to manufacturers. He explains, "Smokers demonstrate a higher incidence of dry socket, especially those who smoke following extractions, as the sucking on the cigarette and the chemicals in the tobacco can break down the initial clot in the socket."

Dry sockets are more common in the mandible than in the maxilla. According to Kurtzman, this is due to the denser and less vascular bone of the posterior mandible. In fact, by some estimates, up to 30% of impacted third molar extractions end up with a dry socket.¹

"Add to that chronic infections of the mandibular molars, which tend to also decrease vascularity in the surrounding bone, resulting in a higher incidence of dry socket," Kurtzman adds.

Kurtzman says any sites that demonstrate denser bone are candidates for dry socket as they tend not to bleed upon extraction. "Sockets that have no bleeding upon extraction should be scored with a bur to induce bleeding so a clot can fill the socket," he advises. He also cautions that any products that can cause blood thinning need to be avoided before treatment so that a clot can form in the socket.



IMPACT ON IMPLANT PLACEMENT

Today's clinicians often extract teeth with the intention of replacing them with implants, often immediately after extraction. This is important because the alveolar bone's reason for existence is to support the tooth. After an extraction, when the alveolar bone is no longer being used, it resorbs. This is a natural defense mechanism to guard against infection. Implants help to retain the alveolar ridge. Screwed into the bone and capable of osseointegration, implants take the place of the root. They provide the bone with ongoing functionality and help prevent resorption.

Point of Sale

TREATING DRY SOCKET

- Clinicians who have a range of instruments in their oral surgery armamentarium have a better chance of performing atraumatic extractions.
- Atraumatic extractions not only benefit the patient, who will have less chance of developing dry socket, but can save a practice money by avoiding post-op visits.
- Many clinicians ascribe to the use of medicated dressings, pastes and rinses, and routinely provide their patients with take-home products.
- Bone grafting materials should be part of the standard operatory armamentarium in today's practice.

But some clinicians feel that the development of dry socket can complicate and delay implant placement. Says Kurtzman, "To get integration of an implant it is critical for a blood clot to form between the implant and the surrounding bone at implant placement. When an osteitis occurs, that clot doesn't form because the socket's bone or osteotomy doesn't bleed and the implant typically fails."

Sonick adds, "In sites that have had dry sockets, the amount of bone regeneration is less than would occur without this complication. Therefore additional bone grafting may be necessary at the time of or prior to implant placement."

POST-EXTRACTION ACTION

Several methods have been explored to prevent dry socket. A few years ago, the thinking was that certain suturing techniques and flap designs could ward off alveolar osteitis. Today, the general mindset seems to have gone in a different direction.

"It is important to close gently," says Sonick in reference to suturing. "But I do not think that flap design and suturing techniques were ever that important in preventing dry socket."

Some clinicians feel that suturing is, nonetheless, beneficial in clot retention. "It is not so much the technique than that you want to maintain the clot in the socket," notes Shahriari, who says he always places a suture in areas 17 and 32, the two lower third molars. In this way, he believes that appropriately placed sutures can help prevent alveolar osteitis.

Kurtzman also opts for suturing to help retain the clot within the socket, and says that it may be necessary to design a flap that allows primary closure of the extraction site. "This refers to being able to completely position the flap, sealing off the socket so that we are not waiting for the tissue to grow across and seal it," he says.

Additional ways of curtailing dry socket development involve irrigation, rinses and dressings. For instance, some experts recommend

that the patient rinse with chlorhexidine (CHX) three times a day after the procedure. In fact, one recent study determined that the application of chlorhexidine gel 1% may significantly reduce the incidence of dry socket after the extraction of third molars.² Others swear by placing medicated dressings, in the form of pastes, or gauzes or sponges soaked in ingredients such as eugenol, benzocaine, clindamycin or sodium chloride over the wound. Clinicians aren't completely convinced of the effectiveness of dressings — indeed, some shun them — but many err on the side of caution. In his experience, Shahriari says, placement of medicated dressing may indeed help prevent alveolar osteitis.

Sonick irrigates the socket with chlorhexidine, but says he's unsure if it makes a difference. "It does disinfect the socket," he notes. "Also, anecdotally, it has been said that placing a small amount of doxycycline at the base of the socket will lead to a diminishment in the number of dry sockets."


Kurtzman prefers to rely on the irrigation of the socket with warm salt water via a syringe several times a day, when treating dry socket. Other than that, he says, "The tincture of time allows the tissue at the socket's gingival edges to grow down to cover the socket walls."

One thing that everyone can agree on is the importance of patients maintaining good oral hygiene, particularly after extractions.

TREATMENT

When dry socket develops, the pain can be intense, and the clinician's goal is to get the patient through it until it subsides. The most effective treatments may be some of the same strategies used in preventing the condition. For instance, Shahriari says he uses dressing on a dental sponge to relieve the symptoms. Kurtzman recommends irrigation with warm salt water five to six times a day and taking ibuprophen-type, nonsteroidal anti-inflammatory drugs.

Sonick, on the other hand, says that in his office they pack the socket with dry socket paste. "I fill a plastic syringe with a plastic tip and give it to patients to take home and self-apply. This enables them to cope during the first few days when the site is painful. But the most current treatment is time," he concludes. "Nothing really works that well. Treatment is therefore palliative."

As with bad weather, there is only so much clinicians can do to save their patients from the specter of a dry socket. But by arming customers with the right instruments and desired formulations, and keeping them up to speed on the latest product developments, forward-thinking account executives will give them the best chance of helping their patients weather any adverse conditions, including dry spells. 

REFERENCES

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TYPES OF BONE GRAFTING MATERIALS

There are four primary bone grafting methods. Their main commonality is that they are all capable of osseointegration — providing scaffolding to support the formation of new bone.

- Autografts use bone from somewhere else on the patient's body.
- Allogeneic grafts, or allografts, are made with bone material, such as that of cadavers, often from a tissue bank.
- Alloplastic grafts use synthetic material, such as bioactive glass.
- Xenografts are made from animal bone.