Persistent Pain and Neurosensory Disturbance After Dental Implant Surgery

Prevention and Treatment

Mohanad Al-Sabbagh, DDS, MS[a,*], Jeffrey P. Okeson, DMD[b], Elizangela Bertoli, DDS, MS[c], Denielle C. Medynski, DMD[d], Mohd W. Khalaf, DDS[e]

KEYWORDS

• Implant • Neurosensory • Neuropathic pain • Nerve injury • Prevention • Management

KEY POINTS

- Although the success rates associated with implants are good, adverse events can occur.
- Disruption of normal sensation and pain can be consequence of implant placement.
- Clinicians must be aware of these adverse consequences and avoid them whenever possible; avoidance can be best achieved by careful advanced planning before implants are placed.
- When neurosensory alterations or pain results, pharmacologic management can be helpful.
- Microsurgical repair of damaged nerve tissue should be considered.

INTRODUCTION

Nerve injury associated with implant placement may occur during injections of local anesthetic, osteotomy preparation, or implant placement. One of the most common complications associated with nerve injury during implant surgery is altered sensation.[1] Patients often experience complete or partial loss of sensation, such as

[a] Division of Periodontology, Department of Oral Health Practice, University of Kentucky, College of Dentistry, 800 Rose Street, Lexington, KY 40536, USA; [b] Department of Oral Health Science, College of Dentistry, University of Kentucky, 800 Rose Street, Lexington, KY 40536, USA; [c] Division of Restorative Dentistry, Department of Oral Health Practice, University of Kentucky, College of Dentistry, 800 Rose Street, Lexington, KY 40536, USA; [d] UCSF Center for Orofacial Pain, 513 Parnassus Avenue, S-738, San Francisco, CA 94143-0476, USA; [e] Private Practice, Orofacial Pain and Oral Medicine Division, Department of Head and Neck Surgery, Kaiser Permanente, 7300 Wyndham Street, Sacramento, CA 95823, USA
* Corresponding author.
E-mail address: malsa2@email.uky.edu

Dent Clin N Am 59 (2015) 143–156
http://dx.doi.org/10.1016/j.cden.2014.08.005 **dental.theclinics.com**
0011-8532/15/$ – see front matter

perceptions of touch, pressure, or temperature. These symptoms may seriously affect a patient's ability to perform daily activities, such as drinking and eating, and may also lead to traumatic biting of soft tissues (lips or cheeks) during mastication. In addition to these symptoms, some patients may also experience severe pain that can be debilitating.

Persistent pain after implant placement can be neuropathic in nature. Neuropathic pain (NP) is defined as "pain initiated or caused by primary lesion or dysfunction in the nervous system."[2] In addition, NP may be associated with paresthesia, dysesthesia (burning, stinging, or stabbing sensations), sensory deficits, allodynia, and hyperesthesia.[3]

As described in the article by Al-Sabbagh and colleagues elsewhere in this issue, the pathophysiology of NP is complex and has not yet been completely elucidated. Treatment is complicated by the fact that NP does not normally respond well to conventional analgesics and opioids.[3,4] Currently, many therapeutic approaches are being explored, but to date none has been consistently helpful. Because NP is often intense, debilitating, and resistant to treatment, practitioners should be familiar with the basic mechanisms that contribute to NP disorders (see article by Al-Sabbgh and colleagues) so that they can plan procedure more carefully and often prevent these complications. Also, understanding that certain risk factors predispose patients to NP can help minimize its occurrence.

INITIAL THERAPEUTIC CONSIDERATIONS AND PREVENTION OF NERVE INJURY

When a nerve injury is suspected, clinicians must be able to recognize the cause, type, and extent of the injury. Local anesthetic blocks have been reported to cause trauma to nerves.[5] It has been reported that 25% to 29% of local anesthetic injections that cause nerve injuries result in a permanent change to the nerve tissue.[6] Avoiding multiple injections can help prevent iatrogenic nerve injury related to local anesthetics. The treatment of patients with nerve injury includes antiinflammatory medications (steroids or nonsteroidal antiinflammatory drugs [NSAIDs]) to reduce the neural inflammation, along with counseling and reassurance.[6]

It is important to appreciate the need for local anesthetic blocks even when surgical procedures are performed with patients under sedation. Preemptive analgesia with local anesthetics, opioids, antiinflammatories, and glucocorticoids has been associated with reduced postoperative pain, less postoperative use of analgesics, and shorter hospital stays.[7,8] Lee and colleagues[9] tested whether perineural injections of dexamethasone and bupivacaine exerted preemptive analgesic effects in a nerve injury model. They found that mechanical allodynia did not develop and that preoperative infiltration of dexamethasone and bupivacaine exerted a substantially better analgesic effect than did infiltration of dexamethasone or bupivacaine alone. Bupivacaine has been shown to reduce postoperative pain and to block sensory input beyond the duration action of the local anesthetic.[10]

Another consideration that may lead to nerve tissue injury is the heat produced by an implant drill. The pressure, speed, sharpness, time of use, and irrigation system of the drill are often directly linked to the production increased heat during implant placement.[11] The neural tissue is sensitive and easily damaged by heat stimuli. Increased temperature has been associated with a reduction in the ability of bone tissue to repair and regenerate.[11] It can also enhance osteoclastic activity, thereby resulting in the failure of the osseointegration process.[11]

Continuous contact between implant drill and bony wall occurs during the implant osteotomy procedure. Sometimes the implant drill can slip because of the presence of softer bone in the direction of drilling; such slipping can cause mechanical trauma