Persistent Pain and Neurosensory Disturbance After Dental Implant Surgery

Pathophysiology, Etiology, and Diagnosis

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KEYWORDS

• Implant • Neurosensory • Neuropathic • Pain • Nerve injury • Sensation • Etiology • Diagnosis

KEY POINTS

- There are multiple risk factors for the development of persistent postsurgical pain; however, the incidence of neurosensory disturbance after dental implant placement is relatively low.
- Many factors probably contribute to the development of a neurosensory deficit, including variations in implant techniques, the operator's skill, the proximity to the nerve canal, and even the psychological status of patient.
- Some studies suggest that certain patients may be genetically more susceptible to neurosensory changes after nerve injury.
- Identifying the clinical features of chronic pain conditions and neuropathies after implant placement can assist in establishing a differential diagnosis.

INTRODUCTION

All dental structures are innervated by the trigeminal nerve, and common dental procedures can result in injury to one of the many branches of this nerve. These procedures, including the determination of local anesthesia,[1] endodontic procedures (Fig. 1),[2,3] suture placement, soft-tissue manipulation (Fig. 2),[4] and third-molar extractions,[5,6] can cause injury to branches of the trigeminal nerve. The nerve most

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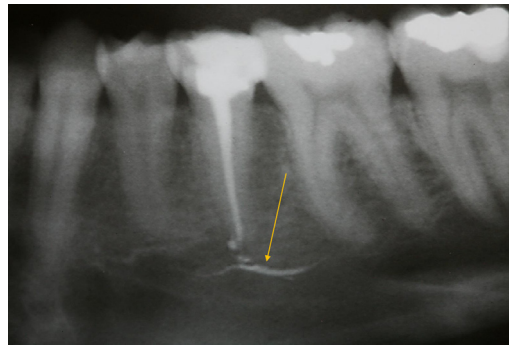

Fig. 1. Arrow in radiograph showing injury to the inferior alveolar nerve after the introduction of endodontic filling into the inferior alveolar canal.

commonly injured during dental procedures is the inferior alveolar nerve (64.4%), followed by the lingual nerve (28.8%).[7] Injuries to these nerves are most often associated with dental anesthesia.

In recent years, the great success of dental implants has led to wide acceptance of such treatment. However, nerve injury and neurosensory impairment can occur after implant placement, even after accurate evaluation and careful treatment (**Fig. 3**).[5] A recent study found that 73% of dentists have reported that their patients have experienced neurosensory impairment after surgical implant procedures.[4]

The published incidence of altered sensation after implant surgery is highly variable, ranging from 8.5% to 36%.[8,9] In addition, published reports vary greatly in the terminology used to describe patients' symptoms after nerve injury. Initially the term paresthesia was used to describe several forms of altered sensation reported by patients, including pain, warmth, cold, burning, numbness, and tingling.

The International Association for the Study of Pain[10] has more clearly defined some of the most common conditions associated with neurosensory alterations (**Table 1**). For example, anesthesia refers to complete loss of sensation; dysesthesia refers to an unpleasant form of altered sensation, such as burning, stinging, or stabbing; paresthesia refers to an altered sensation that is not necessarily unpleasant; allodynia refers to the pain produced by a nonpainful stimulus (light touch); and hyperesthesia is defined as an increased response to a painful stimuli. Although many types of neurosensory changes can occur, persistent pain after implant placement can be

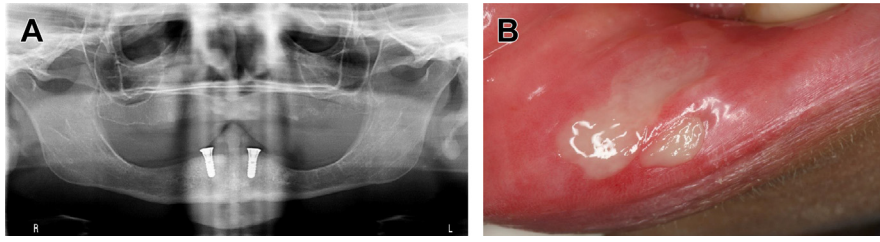

Fig. 2. (*A*) Radiograph showing implant placement with no evidence of injury to the inferior alveolar nerve. (*B*) Clinical presentation of lip biting 1 week after the implant procedure. The patient experienced analgesia attributable to flap manipulation to locate the mental foramina during the implant placement procedure.