Medical treatment of post-dental extraction peripheral painful traumatic trigeminal neuropathy

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Pain arising from surgical procedures that damage the inferior alveolar nerve typically responds poorly to classic therapies. The present case reports the successful medical treatment of this problem with a 10-day course of a corticosteroid and a concomitant 30-day course of an anticonvulsant. (Quintessence Int 201#.##:1–4; doi: ####/j.qi.a####)

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Neurosensory alterations of the inferior alveolar nerve most commonly occur from trauma/functional injury associated with dental extraction of mandibular posterior teeth, use of local anesthetic agents administered to block the nerve, placement of dental implants, and endodontic treatment.1–6 The neuropathic pain that appears following the trauma to the nerve is termed peripheral painful traumatic trigeminal neuropathy (PPTTN).7,8 Some patients describe the pain as an electric shock, stabbing, and/or burning that results from stimulation of a trigger zone, and for others this pain arises spontaneously. While the intense component of the pain is of short duration, there is an accompanying hyper- or hypoalgesia.

Direct nerve injury resulting in PPTTN needs to be differentiated from nerve inflammation/neuritis, which usually arises from a caries lesion causing pulpal necrosis and apical periodontitis with involvement of a branch of the trigeminal nerve.9 The characteristic symptoms of neuritis include continuous dull pain and tenderness, which may increase at times. In contrast, patients with PPTTN arising from nerve injury during a dental extraction may report intense electric shock-like pain with trigger point stimulation as soon as the effects of the local anesthetic dissipate. PPTTN can initially best be managed with the administration of corticosteroids and anticonvulsants, as this case report illustrates.

CASE REPORT

A 49-year-old woman with a 30 pack-year smoking history and an otherwise noncontributory medical history presented to the Department of Oral Medicine at the School of Dentistry, University of Barcelona, in November 2009 complaining of intense pain in the right half of her face. The patient had undergone dental extraction of the mandibular right second molar one month previously. She described intense shooting pain with electric-shock sensations which radiated from the right side of her face to her chin and ear. The pain was triggered by stimulating the lip and cheek areas by such activities as the lips coming into contact with a glass or receiving a kiss on the right cheek. Additionally, symptoms occurred...
when speaking, brushing teeth, rinsing out the mouth, drinking something cold, and especially when chewing. The patient reported that these episodes of pain lasted up to 10 minutes and decreased in intensity when there was no stimulation to the area. At the termination of these painful episodes there was lingering hyperalgesia. The severe pain component had been only partially controlled with the use of narcotic analgesics and nonsteroidal anti-inflammatory agents.

In December 2008, the patient developed a dull ache in the area of the mandibular right second molar and had gone to see her family dentist, who performed a dental examination and obtained radiographs. The orthopantomogram demonstrated a radiolucency which encompassed both roots of the tooth and appeared to extend inferiorly to involve the mandibular right neurovascular canal (Fig 1). The lesion was diagnosed as acute periapical pathology and responded to treatment with antibiotics and nonnarcotic analgesics. The patient was advised of the need to obtain a computed tomography (CT) scan (Fig 2). The CT scan demonstrated that the lesion encroached upon the nerve. The patient was advised that the tooth needed to be extracted once the acute infection had resolved, and given the involvement of the inferior alveolar nerve, the patient was referred to a maxillofacial surgeon.

The patient demurred and in October 2009 sought care from another general dentist when the symptoms recurred. The dentist extracted the tooth utilizing local anesthesia, but once the effects of the anesthetic dissipated, the patient experienced intense electric shock-like pain with trigger points which was refractory to treatment with narcotic analgesics and antibiotics. These symptoms prompted the patient to seek care in the Oral Medicine clinic 3 weeks after the extraction.

Based upon the history and clinical examination which was negative and a review of the previously obtained imaging studies, the patient was diagnosed with peripheral painful traumatic trigeminal neuropathy (PPTTN). The patient was pre-

Fig 1 An orthopantomogram (cropped) obtained in December 2008 showing the mandibular right second molar with apparent periapical pathology at both roots and the associated radiolucency, which appears to involve the neurovascular canal.

Fig 2 A CT scan obtained in December 2008 with selected lateral, axial, and coronal views demonstrating the mandibular right second molar and the radiologist’s annotations (dotted line) denoting the course of the neurovascular canal and its encroachment by the periapical radiolucency.
scribed prednisone 60 mg/day for the first 5 days. The dosage was then halved and administered five additional times on alternate days. Also prescribed on the first day of treatment and continuously for 30 days was pregabalin (Lyrica, 150 mg every 12 hours).

The patient reported improvement of symptoms within the first 24 hours with complete resolution of pain episodes after 7 days of this medication regimen. She was seen for follow-up 30 days after the initial visit in the clinic. She had completed the prescribed therapy with no adverse medication side effects. Examination revealed that the alveolus had not closed completely, but that the apical portion of the socket had completely covered in mucosa. Images at this visit did not demonstrate signs of ossification within the mandibular right second molar extraction site. The patient was referred back to her dentist for oral rehabilitation. Four months after initial presentation to the Oral Medicine clinic, the patient was reevaluated and reported that she remained asymptomatic. Images obtained at this examination showed bone fill within the extraction site (Fig 3).

DISCUSSION

The present case report illustrates the successful management of PPTTN with the administration of corticosteroid and anticonvulsant medications. The traumatic nerve injury resulted from chronic infection of a number of years’ duration about the roots of the mandibular right second molar with eventual destruction of the inferior alveolar canal, leaving the nerve exposed. It is likely that during the extraction the nerve at the apex of the tooth was severely traumatized and that proximal and distal components of the nerve became inflamed.

Dental procedures conducted in close proximity to the inferior alveolar nerve present the inherent risk of injury and resultant neurosensory alteration. Procedures most commonly implicated include removal of impacted third molars, administration of local anesthesia for nerve block, dental implant placement, and extraction of erupted posterior mandibular teeth.10

Steroid and anticonvulsant medication have been empirically administered for many years to treat neuropathic pain. Recently, however, two separate animal models (one involving the compression of the trigeminal nerve root,11 and the other damage to the peripheral inferior alveolar nerve by malpositioned miniature dental implants12) have demonstrated the efficacy of these classes of medications in attenuating orofacial allodynia, hyperalgesia, and thermal sensitivity.

In the present case, prednisone was chosen for the steroid medication, and pregabalin as the anticonvulsant. Prednisone, a glucocorticoid that is converted in the liver into the active form prednisolone, is a highly effective anti-inflammatory agent. Specifically, steroid agents are known to reduce tissue damage by stabilizing cell membranes, reducing capillary permeability, and limiting release of pro-inflammatory substances.13 Furthermore, ectopic discharge from injured nerves appears to be suppressed by stabilization of axonal membranes by steroids, and this has been shown to correlate with their local anesthetic effect.14-16 Pregabalin, a gamma-aminobutyric acid (GABA) analog that inhibits abnormal neuronal excitation,17 has antiepileptic, analgesic, and anxiolytic properties.18 It has been shown effective in man-
aging acute and chronic neuropathic pain syndromes.

In the present case, timely medical therapy resulted in excellent results. This case report emphasizes the importance of considering inferior alveolar nerve exposure and injury in the postextraction healing period and timely medical management to prevent the development of a chronic pain syndrome.

REFERENCES