Implant-induced post-traumatic inferior alveolar nerve neuropathy

Dr. Tara Renton discusses nerve injury

Prevention is better than cure in all instances of iatrogenic nerve damage — but when it happens, it is crucial that clinicians take the appropriate steps to manage the condition. Management of local anesthetic (LA)-related injuries is essentially by counselling and medication for pain, if it is present.

The patient should be reassured and given their realistic expectations of recovery, with an explanation of why they are not regularly warned about this complication. However, in the author’s experience, if injury persists for more than 6 weeks, with more than 50% of the dermatome affected (i.e., the neuropathic area extends over more than half the extraoral distribution of the inferior alveolar nerve, including the vermilion lip, lip skin, and chin skin), recovery is unlikely.

Empirically, the incidence of neuropathic pain also seems high in this cohort (Renton and Yilmaz, 2012). The neuropathic pain can be managed using anti-epileptic drugs if the pain is neuralgic, tricyclic antidepressants if the pain is constant and burning in nature, or external LA patches if the lip is very sensitive to touch or change in temperature. In most cases, the nerve injury is more likely to be related to the mandibular implant. Once the injury has happened, there are two phases for managing dental implant-related nerve injuries:

- Acute phase (within 30 hours)
- Late phase

Acute phase management

There may be a limited window to maximize nerve injury resolution in relation to dental implants.

A report illustrated that early removal of implants (within 30 hours) may maximize neuropathy resolution; however, the evidence remains weak (Khawaja and Renton, 2009). The suggested protocol, based upon the available evidence, is as follows:

- The treating clinician must contact the patient between 6 and 24 hours after surgery (home check) to establish any persistent neuropathy after LA has resolved. This builds on the relationship of the clinician with the patient, which should have started with good consent process.
- Confirm the presence of neuropathy. If the neuropathy affects most of the dermatome, even if it is not associated with severe neuropathic pain, then nerve injury must be suspected.
- Say “sorry” — this is not an admission of guilt.
- Additional scanning or radiography is not essential.
- Initiate medical management: high dose oral NSAIDs (600-800 mg ibuprofen PO QDS) and a GMP prescription for prednisolone on a 5-day “step-down” dose (50-40-30-20-10 mg PO). This is not for patients with contraindications for steroids or NSAIDs.
- Patients can also be advised to take vitamin B complex (1,3,6, and 12) — there is no evidence base for this as yet, but it is commonly recommended after sports injuries.
- Prompt removal of the implant to maximize potential resolution of the injury is advised.
- Review the patient, and report to the CQC. (Editor’s note: In the United Kingdom this is the Care Quality Commission.)

There are no reports relating to neuropathy being resolved by backing the implant up or replacing it with a shorter implant, so these options are not recommended.

The most important thing to do is manage the patient’s expectations and, if appropriate, gain informed consent for any further procedures. With continued dialogue throughout this adverse event, the patient’s ability to cope will be significantly improved.

Late phase management

After 3 to 7 days, nerve injury is likely to be permanent, and therapeutic management is indicated. With patients presenting with late postoperative inferior alveolar nerve (IAN) neuropathy, the author no longer removes the implant (and based on anecdotal evidence, nor do some other specialists), as it appears to be of little value in reversing nerve damage and its associated symptoms.

Management options for post-traumatic neuropathy will depend upon the mechanism, duration of injury, and the patients’ wishes. Management options include the following:

- Reassurance and review
- Medical management (the early intervention for minimizing neural inflammation steroids or NSAIDs protocol is not evidence-based) and pain management, or management of depression
- Counselling
- Surgery

The clinician must discern exactly what he/she is trying to treat the patient for. Is it...
poor mechanosensory function (continually the focus of many surgical studies) — or more pertinently, should it be what the patient is complaining of?

Based on my research, the patients will often complain that they are struggling to cope, or to do certain things.

A key concern is disability associated with:
- Altered sensation, severe discomfort, pain or numbness
- A large neuropathic area
- Interference with eating, drinking, and so on

Many patients find accepting or coping with even minimal iatrogenic nerve injuries very difficult. This may be due to the unexpected nature of the injury, uninformed consent, poor postoperative management, and a lack of information.

Any planned treatment must address the patient’s concerns appropriately. The aims of treatment would ideally provide the following:
- Improved function (treatment will not restore function completely)
- Improved sensation: treatment will never fully restore normal sensation in the neuropathic area, general sensory area (such as mechanosensory function), or special sensory areas (such as taste)
- Reduced pain or altered sensation.

Escalating a patient from intermittent pain to persistent pain would be a negative outcome, as would causing a patient to have discomfort or pain when previously they had only anesthesia.

As previously highlighted, the management will depend on the mechanism and the duration of the nerve injury and the patient’s complaints. Many injuries have limited benefit from surgical intervention and should be managed symptomatically. Earlier intervention is required for endodontic, implant, and third molar-related nerve injuries, as discussed.

If there is a persistent large neuropathic area (more than 40% of the dermatome), then a severe nerve injury is present. If pain and/or hypersensitivity are present, these will often be the main precipitating factors of difficulty with daily function. These symptoms may not be best treated using surgical intervention; however, the patient’s inability to cope with disability is often a driving factor for seeking treatment.

Possible management tools

The timing of intervention and the mechanism of injury are paramount in decision making when it comes to treating trigeminal nerve injuries. Table 1 shows when surgical intervention is indicated.

<table>
<thead>
<tr>
<th>Cause of injury</th>
<th>Surgical intervention</th>
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<tbody>
<tr>
<td>Known or suspected sectioned or damaged nerves</td>
<td>Immediate exploration and repair</td>
</tr>
<tr>
<td>Endodontics</td>
<td>Within 24-48 hours</td>
</tr>
<tr>
<td>Implant</td>
<td>Within 24-48 hours</td>
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<tr>
<td>Wisdom teeth (inferior alveolar nerve injury)</td>
<td>Within 2 weeks</td>
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<tr>
<td>Wisdom teeth (lingual nerve injury)</td>
<td>Within 3 to 6 months</td>
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<tr>
<td>Local anaesthetic nerve injuries (LN or IAN)</td>
<td>Therapeutic management only</td>
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<tr>
<td>Orthognathic nerve injuries</td>
<td>Therapeutic management only</td>
</tr>
<tr>
<td>Mandibular fracture nerve injuries</td>
<td>Therapeutic management only</td>
</tr>
</tbody>
</table>

Surgical exploration can involve immediate repair, if the nerve section is known, and removal of the implant within 24 hours (ideally). Exploration of IAN injuries is no longer indicated for injuries older than 1 week. Counseling is the most useful tool for managing patients with permanent sensory problematic nerve injuries. Medical symptomatic therapy is indicated for patients with pain or discomfort, and for patients with anxiety or depression in relation to chronic pain. Due to the extensive side effects of chronic pain medication, less than 8% of patients remain on medication. Topical agents for pain include Versatis patches and topical lidocaine 5% (12 hours on, 12 hours off) (Khawaja and Renton, 2009; Renton and Yilmaz, 2012).

Systemic agents for pain include tricyclic antidepressants (such as amitriptyline and nortriptyline) and anti-epileptics (pregabalin or gabapentin).

None of these interventions “fix” the patients, but the aim is to manage their symptoms as best as possible — although often, this is still not very satisfactory.

Iatrogenic nerve injury has a significant and unpleasant effect on our patients. Most will experience not only pain but altered sensation and numbness too. There are some key messages that all dentists carrying out implant dentistry in particular should take to heart:
- Most iatrogenic nerve injuries cause neuropathic pain as well as altered sensation and numbness.
- Improve your consent!
- All nerve injuries are avoidable.
- Most IAN injuries in relation to implant dentistry are permanent and cannot be “fixed.”
- Improving preoperative planning, operative execution, and postoperative care can minimize and hopefully prevent these injuries.

REFERENCES