Chapter 6 - The treatments for the accidental symptoms

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I. The treatment for the inferior alveolar nerve injury

A. Damages to the nerve fibers

The damages to the inferior alveolar nerves at the implantation to the mandibular molars have been noted to be created by the tools (burs), compressions from hematoma, by the implant body, and the compression with the bone.

The damaged nerve fibers can be divided into three groups depending on the extent of their conditions, neuraparaxia, axonotmesis and neurotmesis[1]. Under the clinical settings, different combinations of the nerves in these three different classes exist with the functional nerves giving rise to a variety of sensory dysfunction. Generally, the neurapraxia has been noted take three to ten weeks, and neurotmesis six months for their recovery, respectively[2]. For a case of complete neurotmesis, a neurorrhaphy or grafting would be required, but there is a risk of damages to result from the surgical procedures itself, therefore considerations must be taken.

The main symptoms for the inferior alveolar nerve injury are: sensory paralysis of the lower lip on the affected side, the mental region and the gingivae; stiffness, persistent pain; neuropathic pain such as allodynia; and pain and discomfort with occlusion.

B. Examination of the inferior alveolar nerve injury

The confirmation of the patient's complaint of the shooting pain during the procedure, confirmation of the perforation of the mandibular canal by palpation or inspection, and for whether the soft tissues become attached during aspiration of the plating cavity are necessary. Diagnosis of the condition after the surgery should be done with consideration of the complaint by the patient (Dysaethesia such as the numbness in the lips and chin, hypesthesia, or pain), the presence of sensory perceptions for touch of brush (in comparison with the unaffected side), extent of sensory perception for pain stimuli conducted with the tip of the forceps (Scored such that the unaffected side to have 10 and painless to be 0), X-ray radiography analysis with CT scan (The positional relationship of the mandibular canal with either the planting cavity or the implant body). In some cases, additional examination may be required for further assessment such as: tapping check of the teeth, electric pulp test, sense of warmth with application of warm cotton ball, and for sense of cold with alcohol cotton ball.

It is important to record the primary symptoms in order to note the progress of the sensory recovery. In order to accurately obtain the level of sensing ability of the mucosal membranes, conduct von Frey test. This is a method whereby the tip of the nylon filament of standardized thicknesses are lightly applied to the region till bending, and recording which one of these were felt with touch sensation or with pain (Fig. 3-6-1), thus generally enabling measurements of the sense of touch as well as sense of pain. The markings of the area where there is a distinction with the unaffected side in a figure should enable a clear monitoring of the progress.


Fig. 3-6-1 Von Frey filament

C. Treatment of the inferior alveolar nerve injury

In confirming that the inferior alveolar nerve has been injured during implant treatment, stop the bleeding, and discontinue the implant treatment if necessary. The location of the implant body should be confirmed using X-ray radiography. Inform the patient of the problem, the symptoms likely to manifest and the treatment for it being careful not to alarm the patient from the error explained.

In confirming with postoperative analysis with CT scan the compression of the nerves, either affected by the implant body itself, or indirectly via the bone, the procedure to alleviate the pressure should be done as soon as possible (within two weeks). Either replace the implant body to a shorter type, or lift it out of the jaw bone slightly. To avoid secondary nerve injury from its development, preventative measures against inflammation and infections are necessary with anti-inflammatory and antibiotics.

In case of significant nerve damage, the transport of nerve growth factor (NGF) would be inhibited from reaching the tips of the nerves from this point onwards therefore the nerve termini start to degenerate via wallerian degeneration. This is the main reason why the treatment needs to be conducted as early as possible. The patient should be referred to the specialist (anesthesiology or pain clinic) for an accurate analysis of the conditions and treatment. As a preparative measure, pharmacotherapy should be conducted before referring to the specialist departments. The concomitant administration of vitamin B_{12} preparations that are effective for the repair and regeneration of the nerves, and adenosine triphosphate disodium preparations are typical. This should be discontinued where the pharmacological effects have not been evident after several months of administrative course. As an additional measure, where the inflammation in the affected area has subsided, instruct the patient to apply a towel that has been wetted with hot water to the affected area for 5 - 10 minutes.

Treatments conducted by the specialists include the pharmacotherapy as mentioned above, electro-acupuncture, stellate ganglion block and infrared radiation in addition to the application of warm, moist towel. The efficacy of each of these therapeutic approaches cannot be determined separately since the level of recovery and the periods required are largely dependent on the extent of the nerve damage.

1. Electroacupuncture

This is performed with a 30 mm, No. 3 (0.2 mm diameter) disposable needle, which are applied to six to eight different areas in total including: facial acupuncture points (e.g. St-7, St-4 and St-5), acupuncture points of upper limbs (e.g. LI-10 and LI-4), and symptomatic lower lip and the chin region. The injected needled is connected to the low frequency therapeutic device in order to apply electric stimulation of 2 Hz frequency for a period of 30 minutes[3] (Fig. 3-6-2). If the treatment has been performed within a month from the nerve damage, it should be conducted every day as a preventative measure for the development of wallerian degeneration. An immediate effect cannot be expected for if the symptoms have persisted for over a year, and the treatment should be conducted weekly for a few months before the re-evaluation of the symptoms. If improvements with the treatment can be observed with the decrease in the area affected

or the extent of the damage, the treatment should be continued. The treatment of the inferior alveolar nerve injury with electroacupuncture is generally conducted to the mandibular nerves occupying the same area of as the affected area, to expect regulation of the input from the caudal part of spinal tract nucleus of trigeminal nerve of the lower lip and the mental region, as well as the humoral mechanism of analgesia. Additionally, the promotion of nerve regeneration with the improved blood flow can be expected locally.

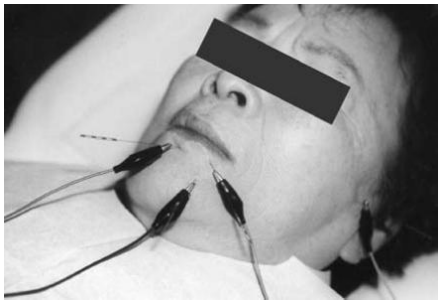

Fig. 3-6-2 Electroacupuncture

2. Stellate ganglion block

Set a 25 G injection needle in the 10 ml cylinder, and use 1% lidocaine as the local anesthetic agent (Fig. 3-6-3). It should be administered everyday if it is within a month from the time of injury, as with electroacupuncture. The treatment is usually conducted once to three times a week. This treatment aims to increase the blood flow in the inferior alveolar nerve tissues and in the brain; promotion of the regeneration of the nerve fibers; and to alleviate the neuropathic pain [4].

3. Infrared irradiation

Insert the irradiation probe of the infrared irradiation device to the affected site, and irradiate for thirty minutes per session (Fig. 3-6-4). This treatment aims to promote regeneration of the nerves.

These treatments are also adopted with the same methods for the damages to the mental nerves.

Fig. 3-6-3 Stellate ganglion block

Fig. 3-6-4 Far infrared radiation irradiator

References

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