



## Treatments for Paresthesias after Orthognathic Surgery: Literature Review

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### Abstract

Orthognathic surgery is a procedure of choice for the treatment of skeletal deformities; however, it is common to observe a change in sensitivity called paresthesia, in cases where the nerves are injured. For the patient's sensitivity to return, it is necessary to perform treatments such as the use of low-power laser, acupuncture and drug treatment. This work sought to identify these treatments and describe them, in order to guide the clinical management of dental surgeons.

**Keywords:** Orthognathic Surgery; Paraesthesia; Acupuncture

### Abbreviation

IAN: Inferior Alveolar Nerve

### Introduction

Orthognathic surgery is a procedure of choice for the treatment of severe deformed skeletal deformities, aiming at the rehabilitation of functional deficiency and resulting in aesthetic changes in the patient [1]. The surgery aims at the harmony and balance of the facial pattern and, for the performance of the surgical procedure, a precise diagnosis is necessary with detailed planning aiming at improving the patient's function and aesthetics [2].

The dental surgeon should be aware that this type of surgical intervention possibly leads to complications such as: pain, local edema in the postoperative period and paresthesia of the inferior alveolar nerve (IAN), which is a sensorineuronal disorder with changes in sensitivity and numbness in the mandibular region, lower lip and mentum, often found in surgical powders in patients undergoing orthognathic surgery [3].

The complication in IAN is a frequent outpatient disorder found in the postoperative period, this neurological lesion results in a reduction in sensory function in the anatomical regions of the skin of the lip and chin. The mandibular region contains sensitive nervous structures such as IAN, the lingual nerve and the buccal nerve, which make it an area frequently affected by paresthesias [3].

Paresthesia can be temporary or permanent, which is caused by bilateral sagittal osteotomy of the mandible, a very common procedure in orthognathic surgeries, which consequently exposes the nervous bundle [3].

On the other hand, Dentistry has been advancing in studies and methods for the treatment of paresthesia, the treatment may vary according to its etiology, being included as outstanding therapies: laser therapy, acupuncture and drug treatment such as the systemic administration of drugs [4].

Given the importance of the topic, studies are needed that seek to inform the therapeutic methods used in paraesthesia caused

by orthognathic surgery. In this sense, this study aimed to report, through a literature review, the therapies that can be used in cases of paresthesia after orthognathic surgery.

### Low power laser

In the case of paresthesia of the IAN, the low-power laser, also called therapeutic, is used, which is responsible for cell biostimulation, providing nerve stimulation and recovery effects. The application of the laser accelerates tissue regeneration and wound healing, decreasing inflammation, pain, and also increasing local microcirculation [5].

This treatment was first described in 1978, for the regeneration of injured nervous tissue, since then it has been widely studied [6]. Tissue stimulation with low-level laser is not only painless, but also has the advantage of being non-invasive, non-traumatic and easily performed by a qualified professional, the recovery of the affected nervous tissue prognosis varies considerably according to the degree of injury and the proposed treatment [3].

The devices used are those of low power, with photochemical effect, that allow an emission of light in the spectrum range from 600 to 1000 nm. These wavelengths can have positive biological effects. Laser therapy has the effect of accelerating the wound healing process, reducing pain and neural restoration after injury. This being the main mechanism in cases of IAN injuries, promoting a regenerative action and restoring normal neural function, becoming advantageous, mainly because it is not painful and traumatic, in addition to not having an adverse effect [7].

This type of treatment proves to be effective in cases of paresthesia of the IAN, making a sensory improvement, with the application of irradiation in the region of the retro molar trigone to the lower central incisors. The application should be done two or three times a week, there is usually an improvement of approximately 60% [6].

Valdivia., *et al.* [8] reported that the laser should be applied at least ten sessions, during three times a week, where the low intensity laser can be used in intra and extra buccal points, using the light for 90 seconds directly in the affected area of point.

The extra buccal points to be irradiated, which are from the region of the mandibular angle to the chin, afterwards the linear points with a distance of one centimeter in the same direction of the mandibular canal. The intraoral points range from the body region of the mandible, the external oblique line to the vestibular fold in the region of the lower incisors, in addition to the lower lip mucosa and points distributed in the affected areas [9].

### Acupuncture

Another treatment option for paresthesia that is important to highlight is acupuncture, which has brought good results. This Chinese medicine where organic, sensory, mental and emotional functions are analyzed in an integrated manner emphasizing their constant interaction with the environment, and the disease results from energy imbalances caused by environmental (external) or emotional (internal) factors [3].

This therapy consists of the application of metallic needles in specific points of the body, in order to treat different diseases or to provide anesthetic effects, and consists of inserting needles in specific points of the body to promote local and systemic effects, acting in the restoration of the balance between the various systems of the body [3]. It is known that acupuncture supplies pain through neurological and humoral mechanisms [10,11].

The inserted needles act on the nociceptive receptors generating an electrical action potential and a small inflammatory process at the site [6]. Thus, neurotransmitters are released, such as bradykinin and histamine, and stimuli are conducted to the central nervous system by A-delta fibers and C fibers, which are located in the skin and muscles. The A-delta fibers, when terminating in the posterior horn of the spinal cord, stimulate the encephalinerigic neurons through synapses to release enkephalin, a substance P blocker (the neurotransmitter that stimulates pain), thus inhibiting the painful sensation. The stimuli continue through the lateral spinothalamic tract, until they reach the brain, releasing serotonin which is responsible for the increase in endorphins and adrenocortotropic hormone, consequently, there is a decrease in painful sensation [10].

Florian., *et al.* [12] reported a case of a patient, who suffered from paresthesia of the IAN on the left side, lasting two years. He

had already undergone treatment with ten sessions with laser therapy and administration of vitamin B complex, however no results were observed. Thus, acupuncture therapy was proposed and during the tenth session the patient showed satisfaction with an 80% improvement and reported using the side that suffered from paresthesia to exercise chewing, an action that she had not previously performed.

### Drug treatment

In drug therapy, the removal of the cause is expected, which corresponds to the control of inflammation, hematoma, edema and infection [6]. Antibiotics, non-steroidal anti-inflammatory drugs and corticosteroids are responsible for each change in the system and vitamin B stimulates the repair phase of the lesion [13].

For the control of inflammatory reactions in the injured nerve, a proposal is the administration of non-steroidal anti-inflammatory drugs, such as ibuprofen 800 mg three times a day for three weeks [14].

The use of corticosteroids is also recommended as a therapeutic treatment in the case of sensitive nerve dysfunctions caused by compressions, resulting from edema due to postoperative trauma, when there is no return of spontaneous absence of sensitivity [15]. Miloro., et al. [16] evaluated that the use of corticosteroids induces an improvement in the results when treating paresthesia, after extraction of the third molar or implant installation, due to the reduction of perineural edema caused by the local reaction to the nerve injury.

The degree of nerve damage must be precisely assessed in order to obtain good results. The B complex vitamins are normally used for promoting the regeneration of nerve fibers [17], in this case methylcobalamin contains vitamin B12 in its formulation, being used 1.500 mg, once a day, for four weeks, causing analgesic effects and favoring the regeneration of nerve fibers [18].

### Conclusion

It can be concluded that the therapies commonly used for the treatment of paraesthesia resulting from orthognathic surgery are low-level laser, acupuncture and drug treatment.

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