IOSR Journal Of Pharmacy And Biological Sciences (IOSR-JPBS)
e-ISSN:2278-3008, p-ISSN:2319-7676. Volume 20, Issue 3 Ser. 1 (May. – June. 2025), PP 29-35
www.Iosrjournals.Org

Lesion With Rhyma Deviation In An Individual Undergoing Facial Endolift-Treatment Therapy

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Abstract:
In a multicenter case report, it was observed that the marginal mandibular branch of the facial nerve is the most affected during facial Endolift procedures (980–1470nm), due to its superficial trajectory close to the mandibular ridge and individual anatomical variations[1],[2]. Iatrogenic thermal injury, as well as anatomical ignorance, can trigger neuropraxia, characterized by temporary dysfunction of nerve conduction without axonal rupture, resulting in paresthesias and paralysis of the depressor anguli oris and orbicularis oris muscles. Clinically, this translates into deviation of the labial rim ipsilateral to the lesion, evidenced by perioral asymmetry when smiling or pursing the lips[1].
***Objective**: Describe the anatomy of the face through cadaver dissection, highlighting the anatomical knowledge that is essential in the technical execution of the endolaser, minimizing complications.*
***Materials and Methods**: Anatomical dissection is a fundamental step in the validation of innovative procedures, serving as an essential guide for professionals in the field, thus avoiding injuries to vascular and nervous structures. In this study we will report a case of rhyme injury caused by endolaser and the correct therapeutic management.*
***Conclusion:** Injury to the marginal mandibular branch of the facial nerve is one of the most frequent causes of complications in endolaser procedures. Anatomical knowledge is essential, and cadaver dissection is essential to qualify new professionals. When injury occurs, the prognosis is favorable in most cases, with complete recovery within three weeks to a few months, especially when the therapeutic protocol is initiated early and conducted intensively.*
***Key Word:** Endolaser, endolift, rhyme deviation, intercurrence, laser, 980 nm, 1470 nm*

Date of Submission: 01-05-2025 Date of Acceptance: 10-05-2025

I. Introduction

When using endolaser technology for facial rejuvenation, it is necessary to understand the various anatomical layers, from the deepest to the most superficial layers of the face, with emphasis on the region where the rhyme deviation will be discussed. Above the bone tissue, we have the muscular tissues with their respective fascia, fat pads, SMAS, subcutaneous tissue and dermis, duly illustrated in Figure 1. (20)

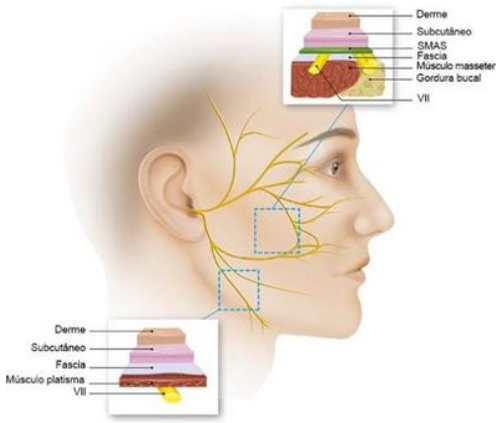

Fig. 1 Anatomical illustration showing the tissue layers of the face (20).

Anatomical knowledge is essential in the technical execution of the endolaser; knowing the nervous, vascular and muscular structures of the face can minimize complications (21). Therefore, the muscles involved in a rhyme deviation can be cited among them: orbicularis oris, zygomaticus major and minor, depressors of the angle of the mouth, levator labii superioris and depressor labii inferioris, shown in Figure 2. (20,21)

Fig. 2: Orbicularis oris, zygomaticus major and minor, depressor labii inferioris, depressor anguli oris, levator anguli oris, levator labii superioris (all in frontal view). Anatomy of facial expression, 2017 ed. Anatomy next

According to Goldman, complications with endolaser in regions close to nerve branches and superficialization in the region of the base of the jaw occur due to injury to the marginal mandibular nerve. In his study, there were two cases of facial asymmetry. (19)

Facial nerves of mimicry responsible for mouth mobility

Anatomy of the Motor Innervation of Lip Mimicry

The marginal mandibular nerve is a branch of the facial nerve, originating within the parotid gland, deepening towards the neck through the Platysma muscle. At this point, it continues towards the lower margin of the jaw, emerging superiorly and forward, where it will supply the depressor muscles of the lower lip and the mentalis muscle. (2,17)

Therefore, it is necessary to have anatomical knowledge in order to reduce cases of complications with endolaser. Mouth movements are controlled exclusively by the motor branches of the facial nerve (cranial nerve VII), which is responsible for the movement of the facial muscles and ear muscles, among others. There is also a portion responsible for the sensitive part of 2/3 of the tongue. It emerges from the brainstem at the cerebellopontine angle, passes through the stylomastoid foramen, and penetrates the parotid gland. Within the gland, it divides into its terminal branches: temporal, zygomatic, buccal, mandibular and cervical nerves, thus forming the parotid plexus (16,17). Among them, the two main ones responsible for lip movements are:

Buccal branch

– Innervates the orbicularis oris, which is essential for lip occlusion and lip protrusion.

– Supplies the buccinator, which helps to contain food against the teeth.

– Provides branches to the risorius, the levator labii superioris and the levator anguli oris, key structures for elevating the upper lip and smiling.

Marginal mandibular branch

– Provides motor supply to the depressor anguli oris, the depressor anguli labii inferioris and the mentalis, allowing depression of the lower lip and retraction of the angles of the mouth, essential movements for expressions of joy, sadness, doubt and articulate speech.

In addition, the zygomatic branch indirectly contributes to the muscles involved in smiling (zygomaticus major), while the cervical branch innervates the Platysma, which tenses the cervical skin and pulls the labial commissure laterally. The integrity of these branches is essential not only for the static symmetry of the perioral region, but mainly for the dynamics of facial expression — dysfunctions lead to asymmetries of rest and movement, impairing functions such as speech, swallowing, saliva retention and emotional expressiveness. (17)

Endolaser action mechanism

When using the equipment with a wavelength of 1470nm, the optical fiber generates heat between 65 and 70°C, where this temperature is said to be capable of remodeling collagen, but on the surface of the skin it presents as a temperature increase of 40°C. (18; 22)

II. Material And Methods

Anatomical dissection is a fundamental step in the validation of innovative procedures, serving as an essential guide for professionals in the field, thus avoiding injuries to vascular and nervous structures. In this study we will report a case of rhyme injury caused by endolaser and the correct therapeutic management.

Facial marking for endolaser/endolift

Photo 1: Photo of anatomical dissection of the facial region exposing the marginal nerve of the mandible and the branch that migrates to the most superficial portion of the path and that can cause a high rate of complications in this region. Dissection by anatomist Professor João Neto/CTA Brasil.

Anatomical mapping and pre-procedure marking

In approximately 80% of cases, the marginal branch runs deep to the plane of the platysma muscle, along the body of the mandible, becoming superficial only at the anterior edge of the masseter[1]. In 20%, it is located up to 1–2 cm below the mandibular ridge, very close to the labial commissure. (1, 3,18)

Draw a line on the patient from the angle of the mandible to the chin, marking a "half-line" 1.5 cm below this line to delimit the risk area. Avoid inserting the fiberoptic or applying laser energy within a radius of at least 1 cm around the labial commissure (2).

Identify the Jolws region, marking and isolating the energy release in this region.

Application parameters and thermal control

Use pulsed laser mode (e.g., 25ms emission/50ms pause) at moderate power (≤5W) for gradual dispersion of energy and less thermal confinement. (4)

Keep the "retro-withdrawal" movement of the fiberoptic constant, without pauses over the same area, and introduce the fiber at a shallow angle (<30°) to a depth of approximately 2–3mm.

Monitor skin temperature with infrared thermography, ensuring that it does not exceed 42°C on the surface to avoid burns and nerve damage. (3,4)

Exclusion zone near the corner of the mouth

Avoid applying energy directly to the "corners" of the mouth: both the introduction of the fiber and the passage of pulses should occur beyond 1cm from the corner of the mouth, preserving the nerve path. (3,5)

If it is necessary to act in close proximity, further reduce the power and amount of accumulated energy (e.g., ≤200J in the perioral region) and perform multiple passes with intervals for local cooling. (4)

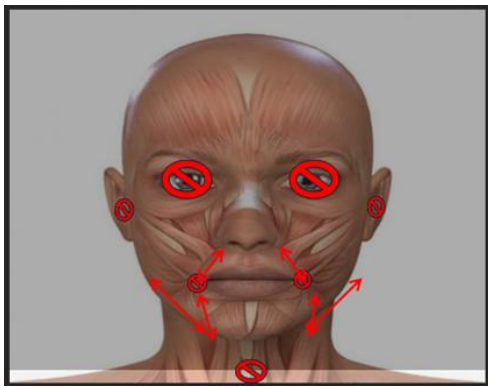

Figure 3: Marking risk areas for endolaser/endolift, Planning by author Dr. Daniela Moleiro.

Clinical aspects and diagnosis

Hypoesthesia and paresthesia in the mandibular region, observed in up to 3.45% of cases of eyelid treatment with Endolift. (1)

Paresthesia of the depressor anguli oris and orbicularis oris muscles, leading to deviation of the labial commissure and difficulty in closing the mouth completely. (2)

Photograph and video of perioral movement confirm the asymmetry, especially in the voluntary contraction of the orbicularis oris. (1)

Photo 2: Patient 1 week after endolaser with mimic changes, left side, photodocumentation in mouth inflating movement.

Photo 3: Patient 1 week after endolaser with mimic changes, left side, photodocumentation of lip eversion.

Photo 4: patient 1 week after endolaser with mimic changes, photo documentation in frontal view at rest

Photo 5: Patient 1 week after endolaser with mimic changes, photo documentation in left lateral view with a posed smile.

Asymmetry at rest

In the resting state, the labial commissure deviates to the unaffected side due to loss of tone in the depressor and levator muscles of the labial commissure on the affected side. At the same time, there is atrophy of the facial folds and smoothing of the frontal wrinkles on the side of the temporary paralysis.

Dynamic deviation during mimicry (speaking or smiling)

When smiling or voluntarily contracting the perioral muscles, the labial commissure on the healthy side rises and moves laterally, while the affected side remains immobile or shows only slight retraction. This generates an asymmetric smile and flattening of the nasolabial fold on the paretic side.

Functional impairment
– Epiphora (excessive tearing)
– Hyperacusis
– Loss of taste sensitivity in the anterior two-thirds of the tongue
– Inability to completely close the labial rima, with risk of sialorrhea. (3)

Functional impairment
Phonation: difficulty in articulating bilabial consonants (p, b, m) and dispersion of air through the lips.
Swallowing and saliva retention: salivary incontinence and tendency to drool, due to the inability to completely close the labial rima.
Facial expressions: inability to hiss, whistle or purse the lips; “slurred” speech (dysarthria).

Associated findings
Bell’s sign: elevation of the eyeball (Bell’s phenomenon) when trying to close the eyelid on the affected side, with exposure of the sclera.
Sensory changes: gustatory hypoesthesia in part of the tongue (branches of the chorda tympani) and, sometimes, auditory hypersensitivity (hearing hyperacusis). (2)
Synkinesias: involuntary contractions of facial muscles that do not normally contract together (e.g., eyelid closure when smiling). (1,2,18)

Therapeutic management
Multimodal physiotherapy: application of low-intensity laser 4 joules cm2 (690nm), microcurrents, radiofrequency for 1 minute maintaining the temperature at 40 degrees and kinesiotherapy to stimulate nerve regeneration.
Local ozone therapy: injection of ozone (10µg/mL) along the nerve path, with punctual insertions with a needle at 45º and proving effective in chronic paralysis.

Adjuvant pharmacotherapy:
- Corticosteroid therapy (prednisolone) for inflammatory control, oral use 12h/12h for 5 days.
- Neuromodulators such as cytidine5′diphosphate for neuroprotection.
- Vitamin supplementation ADEK² 100 20,000UI + 100,000UI + 10UI + 1300mcg/2ml AMP 2ml ADEK² 600 20,000UI + 600.
- Supplementation of vitamins B_1 and B_{12} to accelerate axonal recovery.

Pharmacology of ADEK

These are known as fat-soluble vitamins, which, after being absorbed, tend to be stored in our body, associated with fat molecules, in moderate quantities for longer periods, and are not eliminated in the urine.

Vitamin A (retinol): After absorption, it usually combines with a fatty acid molecule and, upon entering the circulation, is stored in approximately 50% to 90% in liver cells (Kuper and parenchymal). Normalizes the keratinization process, leaving the skin smooth and soft, reduces epidermal thickening, and normalizes dry skin.

Vitamin D3 (cholecalciferol): Important in controlling osteomineral physiology, especially calcium metabolism. It is involved in maintaining several cellular processes, including production by defense cells.

Vitamin E (alpha-tocopherol): is a fat-soluble antioxidant substance, important in protecting cell membranes against lipid oxidation and neutralizing superoxide and hydroxyl free radicals.

Vitamin K2 Mk7 (menaquinone-7): Widely used for calcium reabsorption. Helps with photoaging and treats fine wrinkles, reducing epidermal thickening. (PHD Supplier of Brazil)

Contraindications for the drug:
Pregnant women, nursing mothers, pediatric use (we have no scientific evidence of efficacy in children); hypersensitivity to any component of the formulation). Concomitant use with warfarin or other anticoagulants is not recommended, as it may inhibit the effect of these drugs.

III. Results

Evolution and prognosis

The prognosis is favorable in most cases, with complete recovery in weeks to a few months, especially when the therapeutic protocol is initiated early and carried out intensively. (1)

In general, this is neuropraxia, with the potential for recovery in weeks to months.

If left untreated, synchronous movements (spasms and contractures) may occur and, in chronic cases, muscle atrophy and the risk of permanent contractures.

Evolutionary results after 3 weeks of therapy

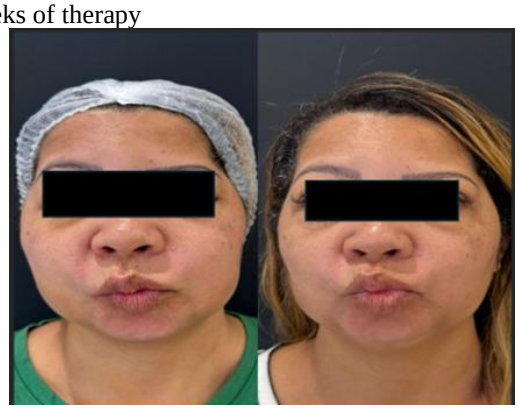

Photo 6: comparison of evolution after 3 weeks of treatment.

Photo 7: comparison with 3 weeks of treatment.

IV. Conclusion

Injury to the marginal mandibular branch of the facial nerve is one of the most frequent causes of complications in endolaser procedures. Anatomical knowledge is essential, and cadaver dissection is essential to qualify new professionals. When injury occurs, the prognosis is favorable in most cases, with complete recovery within three weeks to a few months, especially when the therapeutic protocol is initiated early and conducted intensively.

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