Diode Laser Treatment of Perineural Tumors in the Oral Cavity

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Purpose: To present a recent case study (from 2002 to 2004) for the treatment of oral tumors with nervous derivation.

Materials and Methods: From 2002 to 2004, we treated 6 patients (1 female and 5 males) presenting pathologies classified as tumors with nervous origin, in particular 4 myoblastomas with granular cells (ex Abrikosoff tumor) and 2 schwannomas. All tumors were localized on the tongue; the myoblastomas were on the dorsum, and one schwannoma was on the right side of the tongue and the other on the left side. All patients were treated in a single session by excisional biopsy with 808 and 830 ± 10 nm diode laser. A surgical suture was placed in only one case. Local anesthesia was not needed in any case.

Results: The average healing time was 2 to 3 weeks. There were no postoperative complications.

Conclusion: Diode laser treatment was effective. Its penetration depth and its excellent hemostatic ability even allow the treatment of rare benign neoformations, such as tumors with neuroectodermal derivation, realizing the total excision of the neoformation and obtaining an excellent healing result within a few days.

Key words: diode laser 830 ±10 nm, surgical laser treatment in oral cavity, benign tumors, perineural tumors.

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Peripheral nerve sheath tumors rarely occur in the oral cavity, and include schwannoma, myoblastoma, neurofibroma, and palisaded encapsulated neuroma.[1] Their histogenesis is a highly controversial subject: some authors think that all these tumors originate from Schwann cells and perineural connective cells (in the past they attributed the term schwannoma to all of them), while others think that neurofibromas originate from perineural cells, and schwannomas from Schwann cells.[2,3] Although there is some speculation about a nonneural origin of myoblastomas, supporting evidence is lacking.

The most commonly encountered nerve sheath tumor of the oral cavity is the schwannoma, also known as neurilemmoma.[4,5] It accounts for 8.5% of all intracranial tumors; more than 90% arise from the 8th cranial nerve.[6] It is a benign, encapsulated perineural tumor of neuroectodermal derivation that originates from the Schwann cells of the neural sheath of motor and sensitive peripheral nerves.[3,7] It can arise from any peripheral, spinal, or cranial nerve, with the exception of the olfactory and optic nerves.[2,7] The tumor is normally solitary, smooth surfaced, well circumscribed, whitish gray colored, slow growing, and generally

Table 1 Patients and tumor type

Patients	6
Females	1
Males	5
Total	6
Type of tumor	
Myoblastomas with granular cells	4
Schwannomas	2
Localization	
Tongue	6

asymptomatic.[3,7] It may develop at any age, although it occurs most frequently during the second or third decades of life. There is no gender predilection.[3] It is well known in otorhinolaryngology as a benign tumor of the neural sheath,[4] for example, as a neuroma of the acoustic nerve. It is seldom found on other peripheral nerves of the head. Intraoral development is quite uncommon. It accounts for just over 1% of benign tumors reported in the oral cavity.[8] In this area, the mobile portion of the tongue, and – in decreasing order – the palate, buccal mucosa, lip, and gingiva are the most frequent locations.[8,9]

Schwannomas generally appear as a single encapsulated nodule whose presentation is usually asymptomatic, but focal neurological signs and symptoms may be associated with nerve compression that occasionally causes pain or discomfort.[9] Its etiology is still unknown and, although it originates from the nervous tissue, in only 50% of the cases is a direct relation with a nerve demonstrated.

The granular cell tumor, formerly known as granular cell myoblastoma, is a common benign tumor that more commonly affects the oral cavity, but can also occur at other sites, such as head and neck. It develops between the second and sixth decades of life, with the mean usually in midlife.[9-11] It is a much-discussed lesion for several reasons. The etiology and pathogenesis are still unknown. The majority of myoblastomas are found on the dorsum and the borders of the anterior two-thirds of the tongue.[10] Presentation is typically as an uninflamed asymptomatic mass less than 2 cm in diameter. The clinical aspect of the neoformation is a swelling covered by mucosa of normal appearance.[12]

MATERIALS AND METHODS

From 2002 to 2004, we treated 6 patients (1 female and 5 males) presenting pathologies classified as tumors with nervous origin: 4 myoblastomas with granular cells (ex Abrikosoff tumor) and 2 schwannomas (Table 1). All tumors were localized on the tongue; schwannomas were on the right or left side.

All patients were treated in a single session by excisional biopsy with 808 nm and 830 ± 10 nm diode lasers, always using the continuous wave (CW) setting. The optical fiber used was 300 μm in diameter. The applied power ranged between 2.0 W and 2.6 W (Figs 1 to 5). We always use 2.0 W power in a defocused mode before the actual excision to desensitize the tissue. This anesthetic effect of the laser allows us to work without local anesthetics. In this way, we obtain a further anesthetic action throughout surgery. The cutting action is always in contact mode, directed axially to the muscle's bundle. Low penetration and the hemostatic properties of diode laser combined with low power use enable good control of the depth and high accuracy, and usually make it possible to avoid placing surgical sutures[13] for wound closure. In the case of the large schwannoma on the left side of tongue, a surgical suture was necessary. Here, we increased power (2.6 W), because the tissue was more fibrous than in the other lesions treated.

All excised specimens underwent histological analysis.

RESULTS

The average healing time was 2 weeks, with the exception of the large schwannoma on the left side of tongue, which required 3 weeks to heal. Healing progressed faster than after traditional surgical excision. Pain and postoperative edema were limited. Postoperative complications occurred in none of the cases, and in all of them the restitutio ad integrum was perfect, without any kind of scarring (Figs 6 to 10).

Up to now, none of the patients has had a recurrence of the tumor.

It was possible to analyze all of the histological specimens, because the tissues were burned only on the cut margins.

Fig 1 Schwannoma of the right side of tongue before diode laser (830 ± 10 nm) treatment.

Fig 2 The schwannoma highlighted by the incision of tongue surface.

Fig 3 The length of the schwannoma after excision with diode laser.

Fig 4 The wound immediately after the excision. Note absence of bleeding.

Fig 5 The healing of the tongue margin after only two weeks.

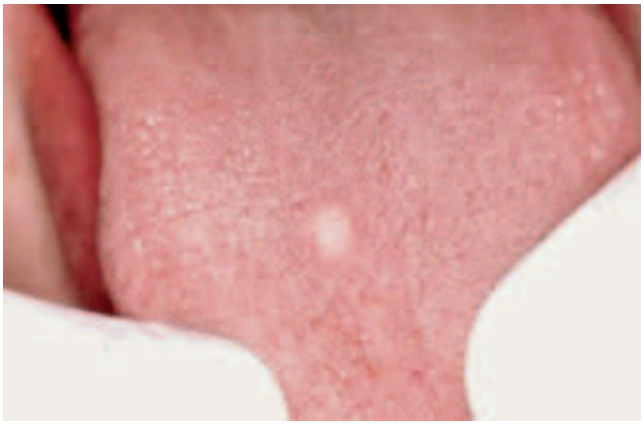

Fig 6 A myoblastoma of the back of the tongue before treatment.

Fig 7 The diode laser in action: the excision of the myoblastoma.

Fig 8 No bleeding after the excision. Muscle fibers are clearly visible.

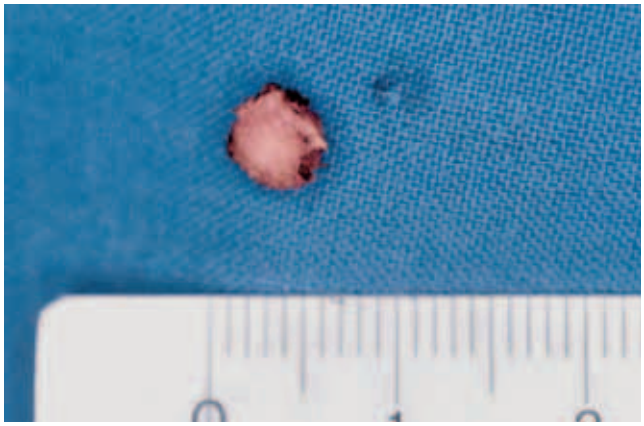

Fig 9 The length of the myoblastoma. Note the burned cut margins.

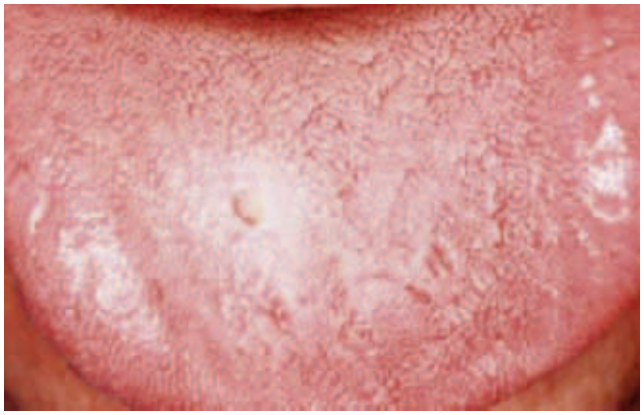

Fig 10 The healing of the wound after two weeks.

CONCLUSIONS

Our results again show that diode laser treatment is effective and conclusive.[13] If diode laser is used according to the protocol, it is a relatively simple and very safe method. Handling ease of the fiber combined with the properties of diode laser make it possible to obtain a clean, thin, and fast cut, often without bleeding or scarring.

Its action depth and its excellent hemostasis even allow the treatment of rare benign neoformations, such as tumors with neuroectodermal derivation, realizing the total excision of the neoformation. Because of the sterilizing and tissue-growth-stimulating properties of this laser, we can obtain excellent healing in a few days, even without surgical suturing.

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