

MANAGEMENT OF SMALL ORAL VASCULAR ANOMALY WITH DIODE LASER: A CASE REPORT



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ABSTARCT

Introduction: Vascular abnormalities are prevalent vascular lesions identified by raised, usually dome-shaped papules. These papules display varying colors, ranging from dark blue to dark purple, and are more commonly found in elderly individuals. They typically manifest as solitary lips, cheeks, and tongue lesions. While generally asymptomatic, these lesions may experience bleeding if subjected to injury. **Objective:** This article discusses the efficacy of a 980-nm diode laser in treating vascular abnormalities in the oral cavity. **Case report:** This case involves a 65-year-old woman referred for the assessment of an oral bluish lesion. Clinically, we identified this lesion as a small oral vascular anomaly. Under local anesthesia (Mepivacaine), we conducted photocoagulation of the lesion using a 980-nm diode laser in non-contact mode. A 300-nm fiber was employed in continuous waves, with a power of 1.5 W, for 1 minute until the lesion whitened. The patient underwent only one session. Follow-up at 10 days revealed the persistence of an ulceration, which resolved after 6 weeks. **Conclusion:** The patient experienced no complications during the laser session, and the postoperative period was uneventful. Consequently, we concluded that the diode laser represents an excellent therapeutic alternative for treating vascular malformations in the oral cavity.

Keywords: Vascular abnormality, Hemangiom, Venous malformation, Photocoagulation, Diode laser.

1. INTRODUCTION

Vascular anomalies are one of the most common congenital and newborn dysmorphogenesis. A distinction is made between hemangiomas and vascular malformations [1]. The first classification of vascular lesions was given by Mulliken and Glowacki in 1982 based on endothelial characteristics, and this classification was accepted by the International Society for the Study of Vascular Anomalies (ISSVA) in 1996. Vascular lesions are classified into hemangiomas and vascular malformations based on natural history, cell turnover, and histology. The ISSVA updated the system in 2014 and classified vascular abnormalities into proliferative vascular neoplasms and non proliferative vascular malformations. Vascular neoplasms are also subdivided into benign, locally invasive/confined, and malignant, while vascular malformations are further subdivided into simple, complex, large vessel malformations, and malformations with other abnormalities. This updated classification was finally approved by the General Assembly in Amsterdam, The Netherlands in May 2018 [2,3].

Hemangiomas are lesions which are usually an infantile (common) or congenital (rare) forms of benign tumor with vascular tissues that arises from the rapid proliferation of endothelial cell population. Hemangiomas typically emerge during infancy and are marked by a phase of active growth (proliferative phase) followed by spontaneous regression (ingressive phase) [2,3]. Vascular malformations were further classified into (a) arterial, (b) arteriovenous, (c) venous, (d) capillary, and (e) lymphatic malformations according to the vessel associated with the lesion. Treatment of vascular lesions may involve surgical resection, embolization, cryotherapy, medical therapy (cortisone, beta-blockers), sclerotherapy, [3]. Laser treatment offers an excellent treatment option and involves the least invasive method, avoiding scarring or discoloration in most cases. From a clinical point of view, it is a simple and quick procedure, and small lesions usually require only one appointment. The non-contact mode using a diode laser (980 nm) is a safe and effective method to treat these lesions [4]. Our aim is to report a case of oral vascular abnormalities treated with a 980-nm diode and to show that this laser is a suitable tool for the treatment of oral cavity vascular malformations and that it delivers very efficient results without complications such as hemorrhage, pain, and scarring.

2. MATERIALS AND METHODS

2.1 Patient

A 65-year-old female patient with a 5 mm diameter soft round lesion in the buccal mucosa of her lower lip was referred to the Department of Oral Surgery for diagnosis and treatment. The patient had no significant medical history.

2.2 Clinical Examination

The extra-oral examination revealed respected facial symmetry. The intraoral examination revealed a soft, round, compressible, elevated, and well-limited, non-pulsating lesion with a bluish-red color.

2.3 Laser Treatment

Under local anesthesia, a 980-nm diode laser in non-contact mode was used to perform photocoagulation of the lesion. A 300-nm fiber was used in continuous waves, with a power of 1.5 W, for 1 minute until the lesion whitened.

2.4 Postoperative Care

One gram of Paracetamol every 6 hours was prescribed over the course of 3 days. The patient was seen 2 months later and was free of recurrence.

3. RESULTS

3.1 Case report

A 65-year-old female patient, with no particular medical history, was referred to the Department of Oral surgery for diagnosis and treatment of a soft round lesion of 5 mm diameter approximately in the buccal mucosa of her lower lip. The extra-oral exam has shown respected facial symmetry. According to the clinical examination, the lesion was soft, round, compressible, elevated, and well limited, non-pulsating. The color of lesion was bluish red (Figure 1).



Figure 1: Slightly raised, round vascular malformation of the inner side of lower lip.

Clinically, we diagnosed this lesion as being a small oral vascular anomaly. Under local anesthesia (Mepivacaine), we performed a photocoagulation of the lesion using a 980-nm diode laser in non contact mode. We use a 300-nm fiber in continuous waves, with a power of 1.5 W, for 1 min until the lesion whitens (Figure 2).

One gram of Paracetamol every 6 h was prescribed over the course of 3 days. After 6 weeks, the healing process was completed uneventfully (Figure 3). She did not report any postoperative complications such as pain or swelling. The patient was seen 2 months later, and was free of recurrence.



Figure 2: Postoperative photo depicting the bleaching of the lesion.



Figure 3: **A:** Follow up after 10 days show the persistence of the ulceration. **B:** After 6 weeks, the wound had completely healed.

3. DISCUSSION

There is currently no generally accepted regimen for the treatment of hemangiomas and vascular malformations. They can be treated with liquid nitrogen cryosurgery, surgical excision, laser photocoagulation, laser vaporization, infrared coagulation, or sclerosing agents. In the oral cavity, high power lasers represent an excellent treatment option for such lesions. In fact, lasers have several biological effects related to the degree of temperature increase: ablation (100°), coagulation (60-70°), PDT and photobiomodulation (low-intensity laser therapy). Their coagulation properties allow for surgery to reduce the risk of bleeding, promoting a better healing pattern and a differentiated postoperative appearance [5,15].

Different laser systems have been used clinically in the treatment of hemangiomas, vascular malformations similar as carbon dioxide (CO₂) laser, argon laser, diode laser, erbium doped yttrium aluminum garnet (Er:YAG) laser, potassium titanyl phosphate (KTP) laser, pulsed dye laser (PDL), and neodymium doped yttrium aluminum garnet (Nd:YAG) laser [6]. There are two different techniques for treating vascular lesion, which have been widely discussed in different literatures : (a) the trans-mucosal thermocoagulation (TMT) and (b) the intralesional photocoagulation (ILP).

TMT is achieved when laser irradiation is delivered at a distance of 2-3 mm from the surface without the fiber touching the tissue (non-contact mode). As the laser light passes through the tissue, heat is generated by photocoagulation to a depth of about 7-10 mm, which causes the tissue to coagulate and other processes can take place. It is immediately visible and recognizable by simple observation. This technique was chosen to treat our case. Another advantage is that for patients receiving anticoagulant therapy, laser treatment is even less invasive because no drug suspension is required [7]. Similar results were observed in another study using a diode laser to treat venous lesions, which showed a complete healing response after 2 to 3 weeks. Only one session was required. The intralesional photocoagulation (ILP) is achieved by delivering laser radiation, bringing the tip of the fiber into contact with the tissue and successively releasing energy directly to the lesion.

Therefore, puncture of the lesion is encouraged, which also forces its contents (usually blood) to be removed. This particular technique is very useful for lesions located on the lips, tongue, cheeks and mucous membranes, which are large and deep in nature [3]. The color-Doppler ultrasonography is an important tool for diagnosis and postoperative evaluation of results. It is a useful imaging modality that provides both morphological and vascular information. This imaging technique should be recommended for routine preoperative and postoperative hemangioma surveillance [8,9,10]. In addition, many other parameters such as pulse duration, spot size and energy density must be evaluated for correct laser treatment. Short pulse durations are desirable for small diameter vessels, whereas long pulse durations must be used for larger diameter vessels. Spot size selection should be based on lesion depth and size [12]. Finally, the choice of energy density should be based on lesion color. Purple and bluish lesions absorb more laser energy than pink and red. Therefore, less flow is required [11]. In their experience, Umberto, Romeo and others confirm that lasers are the gold standard in the treatment of benign oral vascular lesions with venous flow [13,14]. On the other hand, in order to use the device with all the necessary safety precautions, it must be handled by an authorized and qualified professional [15]. Azevedo LH et al. highlighted the efficacy of diode laser photocoagulation in treating extensive vascular malformations of the lip. Overall, he required four sessions, approximately 1.5 months apart. This allowed the patient to recover and shrink the lesion between sessions.

In our case, only one session was required to completely remove the lesion during the entire treatment [10]. Some authors have used systemic propranolol treatment in combination with a 940-nm diode laser to treat severe hemangiomas. Propranolol treatment alone reduced hemangioma volume and color. Laser treatment continued to improve appearance in the 84% of patients who had no residual volume. Comparing this to the original color, 89% was reduced to 0-20% of the original color. There were no side effects associated with laser treatment [5,16].

5. CONCLUSION

The diode laser technique is a beneficial technique for small vascular malformations, with many advantages, such as providing coagulation, excellent healing, no postoperative complication, no need for suturing, and less risk for scarring. Besides all, it is also a low-cost procedure, small lesions usually require only one appointment, and this procedure is also better accepted by the patients. For all the reasons above, the diode laser is an advantageous treatment technique for these types of lesions.

Conflict of interest: *The authors declare that they have no conflict of interest.*

Ethical approval:

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