



Research Article

PHOTOCOAGULATION OF INTRA-ORAL VENOUS MALFORMATION, A NON-INVASIVE TREATMENT MODALITY-A CASE REPORT

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ABSTRACT

Vascular anomalies comprise a widely heterogeneous group of tumors and malformations. Venous malformations are congenital disorders characterized by dilated blood vessels and low blood flow which are seen exclusively in the venous system. The possible sites of occurrence are skin, mucosal surfaces, soft tissue, muscle, and viscera. Almost 60% of vascular anomalies have a predilection for the head and neck region including the oral mucosa. Despite being benign in origin and behavior, it is always of clinical importance to the dental profession and requires appropriate management. This case report describes a case of venous malformation on the lip and gingiva in a 26-year-old female which was treated with photocoagulation using laser.

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INTRODUCTION

As described by Mulliken and Glowacki in their classification system given in 1982, vascular malformations are localized anomalies as a result of defects in the vascular morphogenesis with normal rates of cell turnover, unlike hemangiomas that are true neoplasms characterized by an increase in the rate of endothelial cell turnover^[1]. According to their hemodynamic features, vascular malformations have been divided into low flow (capillary, venous, lymphatic, or mixed lesions) or high flow (lesions with an arterial component)^[2]. Venous malformations (VMs) are congenital disorders that are characterized by dilated blood vessels and low flow of blood^[3]. Venous malformations predominantly or exclusively affect the venous system^[4]. These lesions have an equal sex predilection^[5]. Venous malformations are the most common vascular malformation followed by capillary malformations^[4]. VMs have an epidemiological relevance of 1 in 5,000 to 1 in 10,000 births^[6] and increase in size with patient's age and are generally ill-defined, pale-to-dark blue masses that can be easily compressed on examination. Blood stasis from VMs can cause recurrent painful thrombophlebitis and cosmetic impairment. It can affect any tissue, including skin, mucosal surfaces, soft tissue, muscle, and viscera.^[2] VMs have also been described in the head and neck region, especially in the oral mucosa^[4] and lips^[7] the classic treatments for these lesions are sclerotherapy with an injection of sclerosant agents and surgery, which occasionally result in complications such as significant deformity, prolonged pain, skin necrosis, nerve damage, systemic toxicity, and hemorrhagic phenomenon.

Owing to these complications, laser therapy has recently been introduced as one of the main treatments for vascular lesions.^[8] Because of these complications, laser therapy has been recently introduced as one of the main treatments for vascular lesions.^[9,10] Different types of laser systems have been described in the literature for clinical use in the treatment of vascular malformations since the 1980s, such as carbon dioxide (CO₂) laser, argon, diode, erbium-doped yttrium aluminum garnet (Er:YAG), potassium-titanyl-phosphate (KTP), pulsed dye laser (PDL), and neodymium-doped yttrium aluminum garnet (Nd:YAG) lasers.^[11] In our case we have used a diode laser.

The aim of laser therapy for VMs is to selectively destroy abnormal vessels through the absorption of laser photons by hemoglobin molecules in red blood cells.^[8] The following case report describes a case of intraoral venous malformation treated using laser.

CASE SUMMARY

A 26-year-old female patient reported to the Department of oral and maxillofacial surgery of Jaipur Dental college with a complaint of an intraoral bluish swelling on the right side of the inner aspect of the lip and another one on the gingiva corresponding to the two incisor teeth on the right side, which she patient said had been there for 'as long as she remembers'. The swellings had recently increased in size since the past year when the patient fell on her face. The swellings were painless and not associated with any difficulty in mastication, deglutition, or speech. The swelling on the lip was visible

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during a speech which caused aesthetic concern to the patient. On general physical examination, it was found that the patient was normally built for her age with no defects in gait or stature and no relevant medical history. Family history was also non-contributory. On intra-oral examination, two bluish-colored spherical lumps were observed, one on the right-side inner aspect of the lip measuring 1.5×1 cm and another on the anterior gingiva measuring 1×1 cm. Both lumps were non-tender, soft, compressible, and dissipated under pressure. A biopsy was not performed because the swelling was initially thought to be vascular in origin, and the patient was sent for MRI. The MRI report confirmed the diagnosis of intraoral venous malformation. A decision was made to treat the lesions by photocoagulation with the help of a soft tissue laser. The patient was administered 4 mg of IV dexamethasone 1 h before the start of the procedure. A diode laser (wavelength 808nm; continuous wave, output energy 5W) was used. The tip of the laser was kept 1 mm above the lesions, and the procedure was continued until the lesions turned gray. No bleeding was observed during the intraoperative or postoperative period. The recovery period was uneventful, and the patient was recalled 14 days after initial healing. The lesion on the gingiva was completely resolved and there was a significant reduction in the size of the lip lesion. The same procedure was repeated for the lesion on the lip and after 14 days complete resolution of the lip lesion was observed.



Fig. 1 Bluish lesion on the corner of the right lip



Fig. 2 Bluish lesion on the anterior gingival

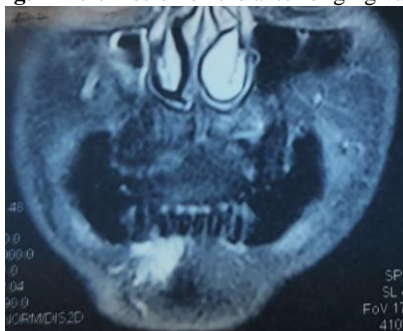


Fig. 3 T2-weighted MRI appearance of the VM depicted. The malformation appears hyperintense (brighter than the muscles)



Fig. 4 1mm distance between the tissue and the tip



Fig. 5 Immediate post op of the lip lesion



Fig. 6 Immediate post op of the gingival lesion



Fig. 7 Completely resolved gingival lesion after 14 days



Fig. 8 Reduced size of the lip lesion



Fig.9 Complete resolution of both lesions seen 14 days after the second cycle

DISCUSSION

Vascular anomalies in the head and neck region may result in clinical impairment and organ dysfunction that is associated with cosmetic issues and may represent a physical as well as psychological issue for the patient as in the case discussed above. The last classification by the International Society for study of vascular anomalies in 2018 has contributed to a better understanding of vascular anomalies, by classifying them in vascular tumors and vascular malformations. "Vascular tumors" like hemangiomas are true neoplasms characterized by proliferation and increased rates of endothelial cell turnover, while "vascular malformations" like Capillary malformations, Lymphatic malformations, Venous malformations, Arteriovenous malformations, and Arteriovenous fistula are localized anomalies due to defects in vascular morphogenesis with normal rates of cell turnover.^[1] The mean age at presentation is 19 years. They are usually solitary and are easily compressible.^[13] Rapid enlargement of these malformations as a result of trauma, infection, or endocrine changes (e.g., pregnancy and puberty) have been reported in the literature before^[12]. This was also seen in our case in which the size of the lesion increased after trauma to that area. Correct diagnosis based on clinical presentation and symptoms is a prerequisite for appropriate therapy, ranging from conservative management to a spectrum of minimally invasive treatment options. Treatment options for VMS include surgical excision, radiological intervention, laser therapy, and medical treatment. Surgical therapy poses a risk of profuse intra-operative bleeding, postoperative hematoma formation, significant functional impairments, cosmetic disfigurement, and high recurrence rates. Surgery also causes severe pain, and often requires general anesthesia and hospitalization.^[14] Moreover, wide excisions involving the

lips can have negative aesthetic and functional effects.^[7] Sclerotherapy may be used alone or as an adjunct to surgery but may be accompanied by various adverse effects such as prolonged local swelling, skin necrosis, neural damage, renal toxicity, and cardiac arrest.^[14] Taking all these into consideration photocoagulation using a diode laser was selected as the treatment of choice. A study conducted by Sarig O *et al.*^[13] showed that laser treatment of VM, when employed properly, is in fact the method of choice in some settings due to its high success rate and very low incidence of complications. Studeis conducted by Alani HM, Waner M, Apfelberg DB, Gregory R, Rosenfeld H, Rebeiz E and Lin RY^[15-26] have reported good to excellent results with decrease in the size of the lesion, low rate of scarring or other complications. The primary mechanism of action of lasers is nonspecific thermal coagulation, which results in the shrinkage of the lesions^[27]. The secondary mechanism of action is selective photothermolysis. The final aim of laser therapy is the selective destruction of tumoral vessels through the absorption of laser photons by hemoglobin molecules in red blood cells. Thermal energy of laser photons scatters radially within the blood vessel inducing selective microvascular hazardous effects, through photocoagulation and mechanical injury.^[8] In this study we have used a diode laser. Diode lasers are generally accepted as effective medical devices to treat VMs in the head and neck as providing a targeted selectivity for oxyhemoglobin, induction of photothermolysis and erythrocyte microagglutination and vessel obliteration.^[27-31] The advantages of diode laser application in oral surgery are the lack of bleeding during cutting, reduction of postoperative edema, unnecessary stitches, fast mucosal healing.^[27,29,31] The use of diode laser to treat oral VMs and VLs is associated with a shorter operating time and fewer postoperative complications as compared to the conventional scalpel surgery.^[27,31] Nevertheless, more than one session may be required as in our case. Overall, diode laser treatments have multiple benefits, being non-invasive, conservative, and repeatable as needed^[27-28]. Further studies are needed to confirm if diode lasers can be used for even large vascular malformations of the head and neck region.

CONCLUSION

In the present case, we obtained a satisfactory outcome from photocoagulation with the use of a laser, with minimal postoperative complications that are usually seen with other treatment modalities.

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