

Non-Surgical Treatment of Lip Venous Lake using a 980nm Diode Laser: Report of a Series of 10 Cases

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Abstract: Introduction: Venous lake (VL) is characterized by vascular proliferation, clinically evidenced as a soft tumor with red-bluish color. If traumatized VL are prone to hemorrhage and their treatment usually requires caution to prevent bleeding. In the last decade lasers have changed the treatment options of VL permitting the application of non-surgical techniques that reduced the hemorrhage risks and unpleasant tissue deformities. Aim: The aim of this study was to evaluate the clinical outcome after non-contact laser assisted technique for management of VL. Materials and methods: Ten patients (3 men and 7 women) with VL on the lip were treated using a non-contact mode and power output of 2-3 W in continuous wave). The laser used in this study is a diode laser (LiteMedics, Italy, 980nm) selected due to its great affinity to hemoglobin. Results: After only one session, all lesions were successfully treated. Healing was completed in approximately 2 to 3 weeks, and none of the patients experienced complications. Postoperative discomfort and scarring were not present. Conclusions: Non-contact photocoagulation with diode laser is an effective, minimally invasive procedure for the treatment of VL. As usual in laser surgery to optimize the results and to reduce the risks and disadvantages, principle knowledge on laser devices and laser-tissue interaction is conditional.

Keywords: Venous Lake, Diode Laser, Photocoagulation

1. Introduction

Venous lake (VL) is a common vascular lesion caused by dilatation of venules, usually appearing as soft, compressible, dark, blue to violaceous papules, occurring more often in elderly patients and on the lips [1]. Histological, a single layer of flattened endothelial cells and a thick wall of fibrous tissue line the lesion [2]. Once formed, VL persists throughout life. Except for occasional associated hemorrhaging and cosmetic problems, the lesion's course is uncomplicated [1].

Treatments include cryosurgery with liquid nitrogen, [3] surgical excision, [4] laser photocoagulation, [5, 6] laser vaporization, [7] infrared coagulation, [8, 9] and sclerosing agents [10]. In the mouth, mainly on the lip, there is an aesthetic challenge when surgery or sclerosing agents are used, particularly in large lesions and in hemangiomas. Treatment with high-energy lasers is an option [11, 12]. The 810- to 980-nm diode laser beam is selectively absorbed by hemoglobin (the penetration depth vary from 4 to 5 mm). As it passes through the tissue, the laser beam generates heat when absorbed by hemoglobin and thus coagulates tissue (depth of approximately 7–10 mm) in a process characterized as photocoagulation. The noncontact diode laser technique is delivered using a flexible optic fiber that makes it easy to handle [13].

For these reasons, the use of high-intensity diode laser has grown over the past decades in the treatment for vascular lesions [13, 14]. Accordingly, the purpose of this study was

to evaluate the effectiveness of diode laser in the treatment of VL lesions.

2. Material and Methods

A total of 10 patients (3 men and 7 women) aged 37 to 71 were included in this study. All lesions were located on the lips (1 on the upper lip and 9 on the lower lip); the diagnosis was made on a clinical basis, sometimes with the aid of the vitropression technique. All patients had small lesions, with surface diameters of approximately 0.5 to 1.5 cm. An 980 nm diode laser (LiteMedics, Italy) was used in noncontact mode, and only topical anesthetic gel was used. Irradiation was delivered using a flexible fiber 300 µm in diameter, kept 2 to 3 mm away from the lesion, in continuous wave mode, 2-3 W, for 10 s, proceeding with quick circular movements. The endpoint of treatment was blanching and visible shrinkage of the lesion. When necessary, another cycle was performed after a 60 s interval to prevent thermal damage. The patients were instructed to raise a hand if any discomfort occurs during the procedure. All lesions were photographically documented at all stages of treatment and healing (Fig. 1 A–D), (Fig. 2 A–D).



Figure 1: (A) A patient, 37-year-old man with a venous lake on the vermillion border of the lower lip before procedure. (B) Photocoagulation with diode laser - CW, 2 W, for 10 s. (C) Immediately after the photocoagulation. (D) Photograph after 7 days of follow-up.

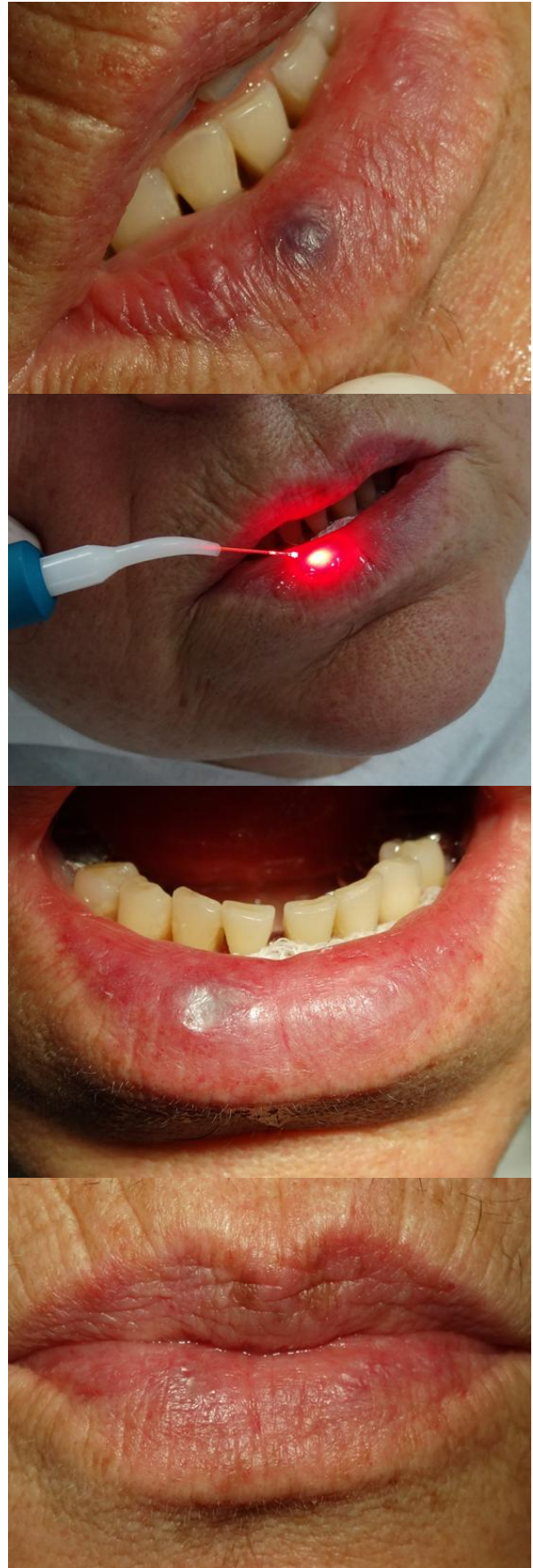


Figure 2: (A) Venous lake on the lower lip in a 60-year-old woman. (B) Photocoagulation with diode laser - CW, 2 W, for 10 s. (C) Photograph taken immediately after photocoagulation. (D) After 2 weeks of follow-up with complete clearance of the lesion.

3. Results

Patients received only one irradiation exposure. Postoperative pain was minimal in most patients, and just one patient felt it was necessary to use analgesic medications (Fig. 3 A–D). None of the patients experienced bleeding. The tissue sloughing occurred within 2 to 3 days, and healing with reepithelization was complete 2 to 3 weeks after treatment with no scarring. None of the typical adverse effects (significant scars, hyper- or hypopigmentation, atrophy, or wrinkled texture) were observed after complete healing.



Figure 3: (A) Venous lake on the upper lip in a 45-year-old man. (B) Photograph taken immediately after photocoagulation. (C) Four days after the treatment; note the ulcer formed. (D) After 3 weeks of follow-up with complete clearance without tissue deformity or cicatrization.



4. Discussion

Various therapeutic modalities are available for benign vascular diseases, depending on their type and location and the depth and progression of the lesions. Clinical uses of various modalities of laser treatment such as Nd:YAG laser [6], CO₂ laser [7], and diode lasers [5, 13 and 14] have been found to be safe and effective for the treatment of vascular lesions. The high-intensity diode laser is preferable for VL because it penetrates deeper than most of the other lasers. Additionally, the high-intensity diode laser does not generate pigmentary or textural changes in treated areas, which are commonly seen when using defocused continuous CO₂ laser. The use of cryosurgery, as an alternative treatment for VL, may result in aesthetic scarring, mainly in lesions located on the vermilion border of the lips [3, 15].

In the present study, the diode laser photocoagulation technique was effective in the treatment of VL, requiring only one session. In addition, the postoperative problems resulting from this noninvasive and bloodless technique was limited to minimal discomfort. This technique is also practical because diode lasers devices are portable and have a significantly lower cost than other high-power lasers, namely Nd:YAG, and CO₂ lasers. Electrocautery, which also acts by means of coagulation, and is a low-cost surgical device, may cause severe scarring, particularly on the lip border.

5. Conclusion

Laser photocoagulation is an effective method for treatment of VL. Lower morbidity, minimal patient discomfort and satisfactory aesthetic results are favorable for patients. However clinicians should be attentive when using high-intensity diode laser because it can generate excessive tissue coagulation, leading to severe thermal damage of the normal tissues around the lesion. As usual in laser surgery, to optimize the results and to reduce the risks and disadvantages, principle knowledge on laser devices and laser-tissue interaction is conditional.



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