

# Treatment of Venous Malformation of the Oral and Lip Region with Nd:YAG Laser

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## ABSTRACT

**BACKGROUND:** An increasing number of studies report on the efficacy of Nd:YAG laser treatment of oral vascular lesions.

**AIM:** A case of such treatment is presented.

**METHODS:** A woman with venous malformation of the lip and buccal region located intra and extra-orally was treated with a Fotona Nd:YAG laser in 9 consecutive sessions with 1 month intervals between each session initially and 6 month intervals for the final two treatment sessions.

**RESULTS:** Edema of the lower lip and a superficial wound on the top of the lower lip (skin part) were observed after each session and lasted for a few days. The patient reported minimal discomfort and was very satisfied with the result and the overall treatment approach.

**CONCLUSION:** In this case report we have witnessed that Fotona Nd:YAG laser treatment of vascular malformation of the oral and lip region can enable a complete lesion elimination, and represents a safe, easy and effective method of treatment. With an appropriate laser technique and parameters, the treatment can be patient friendly, does not require anesthesia or the adjustment of a patient's lifestyle.

**Key words:** venous malformation, Nd:YAG laser, oral lesion, vascular lesion.

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## I. INTRODUCTION

Vascular lesions are common pathological findings of the face and neck area. They are divided into two categories: hemangiomas and vascular malformations. Hemangiomas can be congenital or infantile and are made up from proliferated blood vessels. Vascular malformations on the other hand are a congenital

deformity of normally pre-existing vessels. Unlike hemangiomas, which tend to regress after birth, vascular malformations never involute spontaneously and grow proportionally with age and under the influence of hormones, trauma, infections and major illnesses. They are further classified by the predominant vessel type into subcategories (capillary, venous, arterial, AV, complex)[1, 2].

Hemangiomas and vascular malformations are found commonly in the oral cavity where they can represent a cosmetic disturbance, a source of pain, vulnerability to ulceration, bleeding and infection or may even cause functional limitations of the adjacent oral structures [1, 3, 4].

Treatment options for intraoral vascular lesions are numerous and the choice of treatment depends on the lesion size, location and growth dynamics. The methods are divided into surgical and non-surgical. Non-surgical techniques are preferred and include systemic or local corticosteroids, interferon-alfa, propranolol, sclero/cryotherapy, laser photocoagulation and others. Laser photocoagulation can be used as an adjuvant to traditional techniques or even as an effective alternative, especially in the case of superficial oral vascular anomalies [3–6].

An increasing number of studies report on the efficacy of Nd:YAG laser treatment of oral vascular lesions. A study published in 2015 reported a complete resolution rate with 15 smaller oral vascular lesions of the lip and tongue, which were treated with a Fotona Nd:YAG laser [3]. Nd:YAG laser has better properties in comparison to CO<sub>2</sub> and PDL lasers since it works at a 1064 nm wavelength and penetrates deeper (up to 5-6 mm) into the tissue, which makes it especially suitable for eliminating deeper vascular lesions of the skin and mucosa. Due to the high absorption in hemoglobin, it promotes coagulation action and leads to apoptosis of the endothelial cells of the selectively targeted vascular lesions. This enables confinement of injury to the diseased lesion, sparing damage to adjacent or even overlying healthy structures, a very beneficial property when superficial oral structures are treated [2–4].

The possible side effects of laser treatment are

transient swelling, local necrosis, local post-inflammatory infection of the treated tissue, atrophy, hyperpigmentation or scarring [3]. To avoid these side effects and to achieve good results, the parameters and technique must be well chosen by the physician.



Fig. 1: Before treatment

## II. CASE

A healthy, 53-year-old woman with a solitary, fairly large vascular lesion in the oral and lip (Figure 1) area reported to our clinic with the desire to completely remove the lesion. She had the lesion since birth, but it had grown bigger during her first and second pregnancy and even more so after menopause. The lesion was asymptomatic but represented a cosmetic and functional disturbance for the patient. She had even been rejected for dental treatment by the dentist due to the size of the lesion and the risk of bleeding. Despite the desire to eliminate the lesion, she had been rejected for treatment by different specialists and had therefore not undergone any treatment. She claimed to have no known allergies or other diseases.

Family history was negative for vascular lesions.

Based on the medical history, the lesion was diagnosed clinically as venous malformation of the lip and buccal region. The lesion was located intra and extra-orally. Externally it was present on the right lower lip, it extended laterally from the vermilion all the way to the right lip corner and from there approximately 5 cm inwards on the buccal oral mucosa. The overall length of the lesion was 8 cm (Figure 1). The patient had no other pathological lesions in the oral cavity.



Fig. 2: Six months after the last treatment

## III. RESULTS

To achieve complete removal of the lesion, we treated the patient in our clinic in 9 consecutive sessions with 1 month intervals between each session initially and 6 month intervals for the final two treatment sessions. Longer intervals were chosen due to the great distance the patient had to drive each time to visit our clinic. In 9 sessions we managed to completely eliminate the lesion. However, 6 months later a small part of the vascular malformation recurred extra-orally in the right corner of the lower lip, measuring 10 mm in diameter. The recurrent lesion was eliminated in an additional treatment. Since then, there was no recurrence.

We treated the patient with a 1064 nm Nd:YAG laser (SP Dynamis, Fotona, Slovenia) using the R33

handpiece and parameters which are listed in the table below (Table 1). Multiple passes with no overlap were done in each session. The passes were done until signs of coagulation (shrinkage and greyish discoloration of the lesion) appeared. The lesion was treated gradually from its lateral borders towards the center and the area was irradiated slightly outside of the lesion borders. No local anesthetic was used, however cooling and ice-packs were applied at all times to minimize the pain. There were no special preoperative instructions.

**Table 1: Laser treatment parameters:**

DATE	SPOT SIZE	FLUENCE	PULSE DURATION	FREQUENCY
11.4.2011	2 mm	130 J/cm <sup>2</sup>	50 ms	1.7 Hz
9.5.2011	4 mm	100 J/cm <sup>2</sup>	30 ms	1.7 Hz
8.6.2011	4 mm	120 J/cm <sup>2</sup>	30 ms	1.7 Hz
1.7.2011	4 mm	120 - 150 J/cm <sup>2</sup>	30 ms	1.7 Hz
28.7.2011	4 mm	150 J/cm <sup>2</sup>	30 ms	1.7 Hz
30.9.2011	4 mm	150 J/cm <sup>2</sup>	25 ms	1.7 Hz
11.11.2011	4 mm	150 J/cm <sup>2</sup>	25 ms	1.7 Hz
28.5.2012	4 mm	120 J/cm <sup>2</sup>	30 ms	1.7 Hz
26.11.2012	4 mm	150 J/cm <sup>2</sup>	30 ms	1.7 Hz
	4 mm	130 J/cm <sup>2</sup>	15 ms	1.7 Hz
20.12.2013	4 mm	150 J/cm <sup>2</sup>	30 ms	1.7 Hz

The patient reported mild transient pain during the treatment, but stated that the pain was easy to tolerate due to the short duration of each session. Analgesic therapy with NSAID was needed only after the first treatment session.

Edema of the lower lip and a superficial wound on the top of the lower lip (skin part) were observed after each session and lasted for a few days. The patient protected the lip area with a bandage and used a straw when drinking in public areas in order to avoid an infection. She could perform all everyday activities and she went to work normally throughout the treatment.

#### IV. DISCUSSION

In this clinical case we have managed to achieve complete elimination of a fairly large, 8 cm long venous malformation of the oral and lip region with the Fotona Nd:YAG laser. The treatment has proven to be safe, easy and effective.

Besides complete elimination of the lesion, our aim was to minimize the patient discomfort while treating the lesion without the use of a local anesthetic. The overlying mucosa was preserved at each session and there was no ulceration. This was achieved with a

gradual approach by treating the lesion in multiple sessions, each time from the lateral borders towards the center and with proper adjustment of the laser parameters (gradual increase of spot size and fluence). With this technique it was sufficient to ease the pain by using ice packs and simultaneous cooling only. Except for the expected transient oedema, no short or long-term side effects were observed. The patient reported minimal discomfort and was very satisfied with the result and the overall treatment approach.

The small recurrence, which in fact confirmed the clinical diagnosis of a venous malformation, was easily treatable in one session, as is also expected in the case of any future recurrences.

#### V. CONCLUSIONS

In this case report we have witnessed that Fotona Nd:YAG laser treatment of vascular malformation of the oral and lip region can enable a complete lesion elimination, and represents a safe, easy and effective method of treatment. With an appropriate laser technique and parameters, the treatment can be patient friendly, does not require anesthesia or the adjustment of a patient's lifestyle.

#### REFERENCES

1. Kumar V, Abbas AK, Aster JC. Robbins basic pathology. Philadelphia: Elsevier Inc; 2013. 910 p.
2. Ulrich H, Baumler W, Hohenleutner U, Landthaler M. Neodymium-YAG Laser for hemangiomas and vascular malformations - long term results. *J der Dtsch Dermatologischen Gesellschaft*. 2005;3(6):436–40.
3. Medeiros R, Silva IH, Carvalho AT, Leão JC, Gueiros LA. Nd:YAG laser photocoagulation of benign oral vascular lesions: a case series. *Lasers Med Sci*. 2015;30(8):2215–20.
4. Zheng JW. Treatment Guideline for Hemangiomas and Vascular Malformations of the Head and Neck. *Head Neck*. 2014;36(10):1391.
5. Frigerio A, Tan OT. Laser applications for benign oral lesions. *Lasers Surg Med*. 2015;47(8):643–50.
6. Chinnadurai S, Sathe NA, Surawicz T. Laser treatment of infantile hemangioma: A systematic review. *Lasers Surg Med*. 2016;48(3):221–33.

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