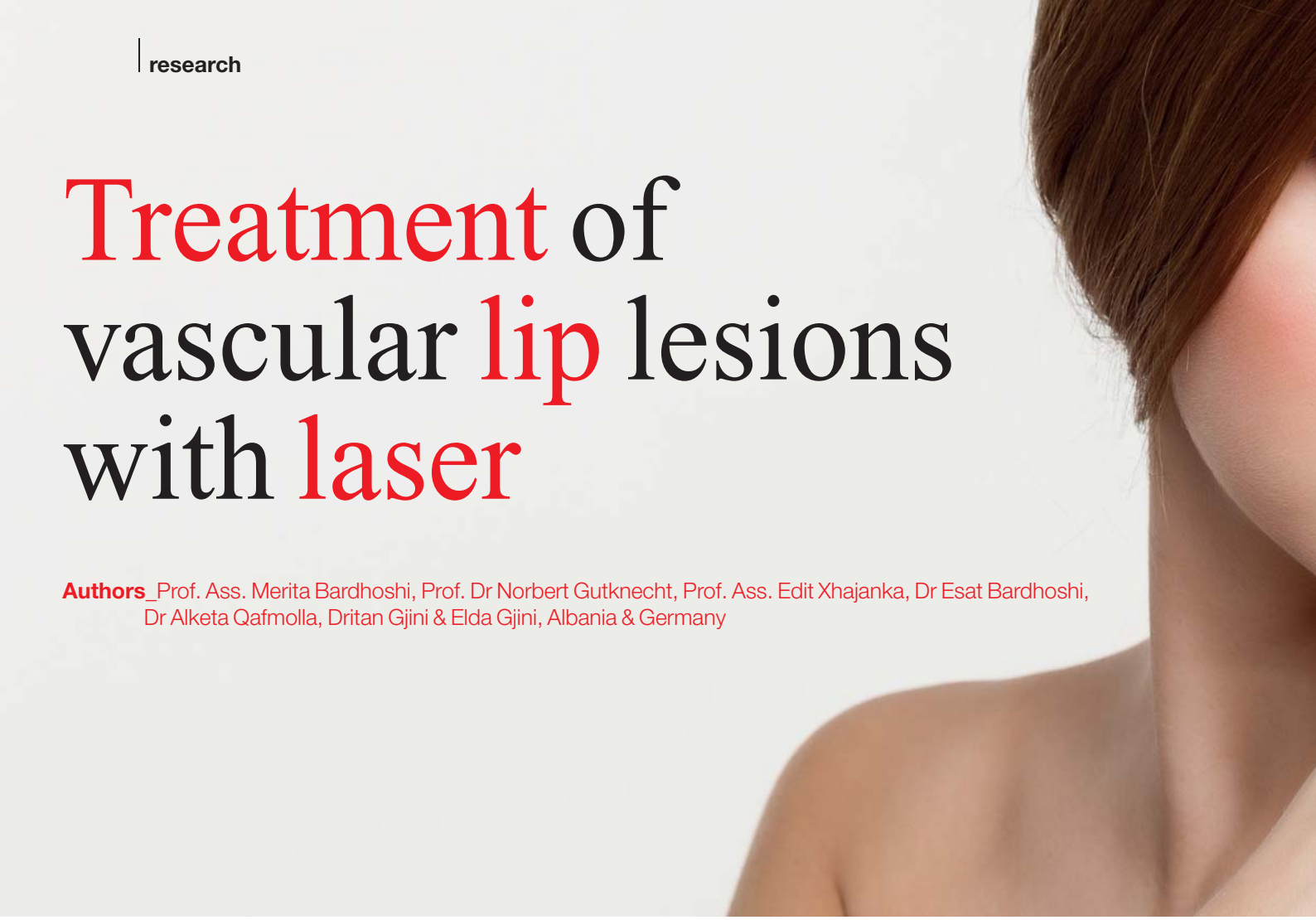
Treatment of vascular lip lesions with laser

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[PICTURE: © VERYULISSA]

_In 1982, Mulliken and Glowacki introduced a simple classification that was based on the clinical, histochemical and cellular criteria to distinguish between the various vascular anomalies (Genovese et al., 2010). They described two distinct entities—hemangiomas and vascular malformations. Acquired lesions may be traumatic or idiopathic in origin. Hemangiomas present with a variable morphology: Some are small and hardly noticeable whereas others are large and disfiguring. Hemangiomas that are flat and appear reddish are considered superficial. Those that are deep beneath the skin and appear bluish are called deep hemangiomas (Thurnherr et al., 2000). When a hemangioma is superficial and deep it is called "compound hemangioma".

The correct diagnosis is critical for a proper treatment than. Vascular malformations are always present at birth though some may not be apparent until a later stage. Furthermore, they never proliferate or involute. Instead they expand slowly and relentlessly throughout life, in pace with the growth of the patient. Thereby, trauma, puberty and pregnancy can cause an accelerated growth. These lesions are sub-classified according to the predominant type of the vessel and the characteristics of flow like capillary malformation, venous malformation and arteriovenous malformation. Initially, they present as flat pink macules and are usually soft, compressible and enlarge in size when venous pressure is increased.

Some lesions such as venous lakes and varicosities are part of the normal ageing process. The congenital anomalies may be further subdivided according to the vessel type. They can be situated in different areas of the oromaxillofacial region: tongue, lips, palate, buccal mucosa or gingiva (Romanos, 2012). One option of managing these lesions is the application of laser. Because of the aesthetic importance of the lips, the discrete anatomic borders such as the vermilion border and their functional importance, laser treatment in this region has some important benefits (Romanos, 2012). Several laser systems have been developed using principles of selective photothermolysis (DeBiase et al., 2006). The targeted chromophore in case of a vascular lesion is oxyhemoglobin present in the red blood corpuscles which circulate in the blood vessels. Laser therapy is a good method to treat such a lesion. Among different laser systems, we choose the application of a 980 nm diode laser for the management of a vascular lip lesion since the wavelength of 980 nm is well absorbed by haemoglobin. This characteristic makes it possible to achieve a very good coagulation and haemostasis that is very important for treating vascular lesions.



_Patients and methods

Patients

This study comprised 60 patients (32 males and 28 females) aged 10 to 80 years treated for vascular lesions of the lip (Figs. 1–3). The research protocol was performed in two groups: The first group with 30 patients was treated with a 980 nm diode laser whereas the second group, the control group with 30 patients, was treated with a cold scalpel. The treatment was conducted from May 2007 to May 2012 at the Department of Oral Surgery, Dental Clinic of the University of Tirana, Albania. All patients were provided with clinical files. In the laser group, 20 patients were medically free and 10 were compromised (each 3 patients with diabetic and cardiopathy and 4 patients under anticoagulant therapy). In the control group, 18 patients were medically free and 12 were compromised (each 4 patients with diabetic, cardiopathy and under coagulant therapy).

In all patients, the lesions were considered to be vascular lesions based on their medical history, age, thorough extra- and intraoral examination and findings of ultrasonography. All patients were given written and verbal information on the nature of laser treatment and were asked to sign informed consent forms prior to the treatment. The follow-up periods were defined one month, six months, one year and three years after treatment in order to evaluate the characteristics of wound healing as early and long term results. All stages of treatment and follow-ups are photographically documented for a comparative long-term evaluation.

Method

Treatments were performed on an outpatient basis under local anaesthesia. For the laser group a 980 nm diode laser was used. The laser energy was delivered through a fibre optic with a gauge of 300 micrometre and an average power of 3 W in a continuous mode from 10 to 60 seconds according to the size of the lesion in contact and non-contact mode. The laser tip was placed in a non-contact mode 2 mm away from the treated area.

The actual treatment started with working around the border of each lesion by circling around it several times all in one direction. Changes in colour and visible shrinkage were taken as signals for the end point of the treatment, until blanching of the treated area and photocoagulation was completed. In the contact mode, the fibre was in contact with the mucosal surface of the lesion using gentle

Figs. 1–3_Vascular lip lesions.


Fig. 1


Fig. 2


Fig. 3


Fig. 4

Fig. 4_The treated surgical area was bloodless and the intralesional photocoagulation was completed.

pressure. It was extended into the substance of vascular lesion to the periphery for such passes are required.

The treated surgical area was bloodless and the intralesional photocoagulation was completed (Fig. 4). The treated areas were iced for 3 to 5 minutes. After treatment (Fig. 5), an analgesic medication was prescribed to be used if necessary—no antibiotics were given. Instructions for post-surgical behaviour treatment consisted of an ice compress for 2 hours, abstention of warm food and drinks intake, placement of a vitamin E ointment on the lased area and avoidance of sun exposure for one month.

The patients of the control group were treated with conventional removal techniques by means of blades. Excision as surgical technique was performed to fully enucleate the lesion and the wounds were sutured. Antibiotics were prescribed for all patients—those patients who were under anticoagulant therapy had interrupted their therapy prior to the surgery. The follow-up visits for the research protocol for both groups (laser and control group) were scheduled in intervals of 10 days, one month, six months, one year and three years after treatment. Hereby, pain, bleeding, swelling, scar formation, functional disturbance, aesthetic result, recurrence as well as wound healing characteristics were evaluated.

Fig. 5_Immediately after the treatment.


Fig. 5

_Results

In this study, according to the research protocol the results from two groups were compared. The first one was a group of 30 patients with different vascular lip lesions treated with 980 nm diode laser (Sirona Dental Lasers). A second group considered as the control group was treated with conventional surgical blade techniques. The results were evaluated as early and long-term results. The patients of the laser group were treated in one session. In this study, a case with a vascular lesion of the entire lower lip was included in which different sections were treated in five sessions.

Another special case within the laser group was a patient with a vascular lesion at the lower and upper lip which was treated in different sessions with a distance of 2–3 weeks each. The surgery time for the laser group was very short – for the benefit of the patients. Furthermore, no sutures were required and the wounds healed in two or three weeks depending on the lesion size. During the wound healing, none of the patients reported complications, which also included the compromised patients. In contrast, 3 to 30 patients of the control group showed delay times in the wound healing due to local problems particularly among the compromised patients. The parameters evaluated are the following:

Bleeding

Bleeding during the surgical removal of vascular lesions can be considered a typical feature of such treatments. During the laser treatment, no bleeding was observed in all patients. In the control group, after the excision with scalpel a prolonged packing was needed and sutures were used to close the surgical wound.


Fig. 6


Fig. 7

Figs. 6 & 7_Four weeks after the treatment with 980 diode laser. Wound healing was completed without scarring.

Pain

The second parameter evaluated was the pain post-surgery. Out of 30 patients treated with laser only one patient reported pain after the effect of local anaesthesia had stopped. The other patients had an optimal post-surgical comfort and did not refer pain at all. Among the patients treated with conventional blade surgery 22 out of 30 (70 per cent of the patients) referred pain which was solved with analgesic drugs for some days.

Swelling

Another parameter evaluated in the follow-up visits during the first week after treatment was swelling. None of the patients treated with laser reported swelling. In contrast, 20 patients out of 30 (66 per cent of the patients) from the control group referred swelling in the first week after the surgical excision.

Scarring

A common problem related to lip lesions is scar formation. Scar formation was evaluated within the control visit one month after the treatment. In all patients treated with a 980 nm diode laser scar formation was not observed (Figs. 6 & 7) whereas in all patients treated with conventional blade surgery scar formation was observed on the site of the performed excision.

Functional disturbance

The parameter functional disturbance was evaluated six months after the treatment. For the laser group, no functional disturbance was recorded and the lip looked normal in colour and consistence. In contrast, in the control group 6 cases out of 30 (20 per cent of the patients) reported a functional disturbance.

Recurrence

Recurrence was evaluated as long term result in the follow-ups one year, two years and three years after the treatment. According to the clinical data reported by patients treated with laser, no recurrences were observed. In the control group only one case reported recurrence of the lesion during the first year after the excision.

_Conclusion

The clinical application of a 980 nm diode laser for the management of vascular lesions of the lip has some beneficial effects due to the good absorption of haemoglobin. Laser treatment versus scalpel surgery provides minimal invasive and minimal aesthetic results. Compared to the patients treated with conventional methods, the laser treated patients felt more comfortable in the post-operative phase due to less pain and swelling. Patients under anticoagulant therapy were treated without substitution prior to laser surgery. During the treatment, there was no bleeding in this patient group. The laser application was performed comparatively fast and was also well-accepted in all age groups. The surgically lased wounds healed within a short time without scar formation and functional disturbance._

_contact laser

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