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VASCULAR LESIONS MANAGEMENT AND TELANGIECTASIA CAUTERIZATION WITH INNOVATIVE LONG PULSE ND - LASER 1064 nm AND HIGH-DENSITY PULSE IPL

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Clinical study

Vascular Lesions Management and Telangiectasia Cauterization with Innovative Long Pulse ND - laser 1064 nm and High-Density Pulse IPL

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Introduction

The superficial vascular lesions in aesthetic medicine practice include majorly hemangiomas, telangiectasia, spider nevus (spider angioma) and varicose leg veins. These lesions consist of dilated blood vessels with a linear or spider appearance. They usually measure between 0.5 and 1 mm and can be associated with a variety of conditions such as rosacea, scleroderma, dermatitis, chronic alcoholism, pregnancy, etc. Predisposing risk factors of spider angiomas and facial telangiectasia include bright skin photo-types (I – III), a history of significant sun exposure and longstanding rosacea. The distribution of spider angiomas is usually focal, with single lesions on the face, neck, chest or other sun exposed areas. A central feeder arteriole with branches leads to a “spider like” appearance of these lesions. The vessel diameter is around 0.1 – 0.5 mm. Leg veins anomalies arise from gravitational dilatation, reflux and incompetent venous valves. They include spider veins, reticular veins, perforators, tributaries and varicose veins arising within the system of greater and smaller saphenous vein.

The treatments by laser technologies include most patients who present these vascular lesions seen in cosmetic dermatologic surgery and aesthetic medicine. The most commonly used laser devices for these treatments include the 532 nm potassium titanyl phosphate (KTP), 595 nm pulsed dye laser (PDL) and the 1064 nm neodymium yttrium aluminum garnet laser (Nd:YAG). Their mechanism of action is based on the theory of selective photothermolysis. For an effective treatment, the laser needs to penetrate to the depth of the target vessel. In addition, the laser exposure needs to be long enough to cause sufficient coagulation of the vessel. The selective absorption of the light energy by the target chromophore at specific wavelengths of light is

converted into thermal energy, allowing for selective denaturation of hemoglobin with only minimal damage to the surrounding tissues. This allows a selective destruction of superficial vascular lesions with minimal scars formation.

The long pulse 1064 nm ND like laser shows a significant deeper penetration in comparison to the green light above mentioned lasers with a discrete selectivity for hemoglobin. However, the prevalence of the scattering optical phenomenon over the absorption one confers the 1064 nm ND laser superior and safer performance in the treatment of deep vessels and dark skin types.

The goal of this study is to verify the efficacy and safety of the Magma platform (Formatk Systems, Israel) on a wide range of facial and body vascular problems. The Magma platform houses various technologies for the treatment of vascular lesions, the LP 1064 nm ND laser and the high-density pulse IPL with the F-SR 530 nm - 1200 nm applicator.

Materials and methods

10 patients were treated for a variety of vascular lesions as follow:

Patient N.	Type of lesion	N. Of Treatments	Setting	Tip
01	Nose telangiectasia	1	190J/cm², 55ms	3mm
02	Nose telangiectasia	1	190J/cm², 55ms	3mm
03	Face telangiectasia	1	200J/cm², 60ms	3mm
04	Face telangiectasia	1	180J/cm² - 210J/cm², 55ms-65ms	3mm
05	Rosacea + telangiectasia	1 ND 3 FSR	190J/cm², 55ms 18J/cm², 5ms	3mm FSR
06	Leg veins	1	340J/cm², 50ms	3mm
07	Leg veins	1	340J/cm², 50ms	3mm
08	Leg veins	1	340J/cm², 50ms 190J/cm², 55ms	3mm 5mm
08	Leg veins	1	340J/cm², 50ms 190J/cm², 55ms	3mm 5mm
09	Leg veins	1	180J/cm² - 210J/cm² 55ms – 60ms	5mm
10	Cherry angioma (truncal)	1	200J/cm², 60ms	3mm

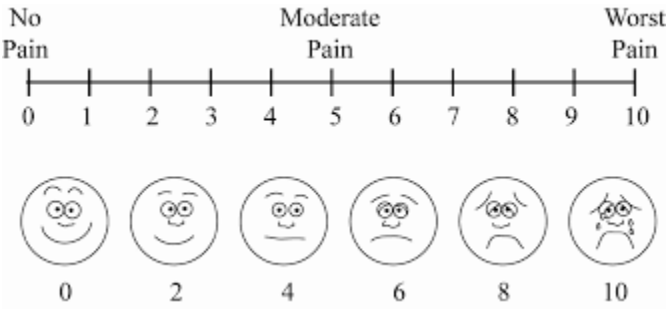
A high peak power, long pulse ND 1064nm laser (Magma – Formatk Systems, Israel) was used with different tips and settings based on the lesion criteria as shown in the table above. In addition, an IPL applicator 530 nm – 1200 nm (F-SR, Magma – Formatk Systems, Israel) was applied during the treatment of the rosacea lesion (case N. 5). The 10 patients were selected from the habitual patients of Dr. Shohat Medical Center, who have offered themselves as

volunteers for this study. They all signed an informed consent and were informed about the risks and benefits of the laser therapy. Patients underwent treatments at different dates, based on an individual medical examination and scheduled visits. Post-treatment photos have been chosen, diversifying the time interval after the treatment to highlight, in some cases, the results within a variable follow-up and in some other cases to show the immediate improvement and the total disappearing of the lesions as a demonstration of the achievement of the clinical endpoint. For each patient photos of the lesion were taken before treatment and afterwards at variable intervals. All patients were asked to evaluate the level of pain experienced during the session on a scale from 0 to 10 (VAS). No local anesthetic or numbing cream was given prior to treatment. Immediately after treatment, the lesion area was cooled by application of cold packs. Side effects were monitored and treated immediately after the laser session. No unexpected adverse events were reported, in few cases of accentuated edema and / or erythema, a cortisone cream (Betacorten) was applied and the effects faded out spontaneously within a couple of hours.

Results

The results shown here below highlight the excellent cauterizing action that the laser has on the superficial vessels. In some cases, the photographs were taken immediately after the treatment to show the endpoint and the immediate disappearance of the lesion. In other cases, long-term results are shown, especially in the case of mixed lesions caused by rosacea dermatitis, in this case (N. 5) the Magma IPL applicator was also used in conjunction with the laser. The last case (N. 10) demonstrates the clear reduction of cherry angioma lesion, after 6 weeks, a re-epithelization process is observable.

All patients have evaluated their level of pain perceived during the treatments indicating a vote from 0 to 10 (VAS):

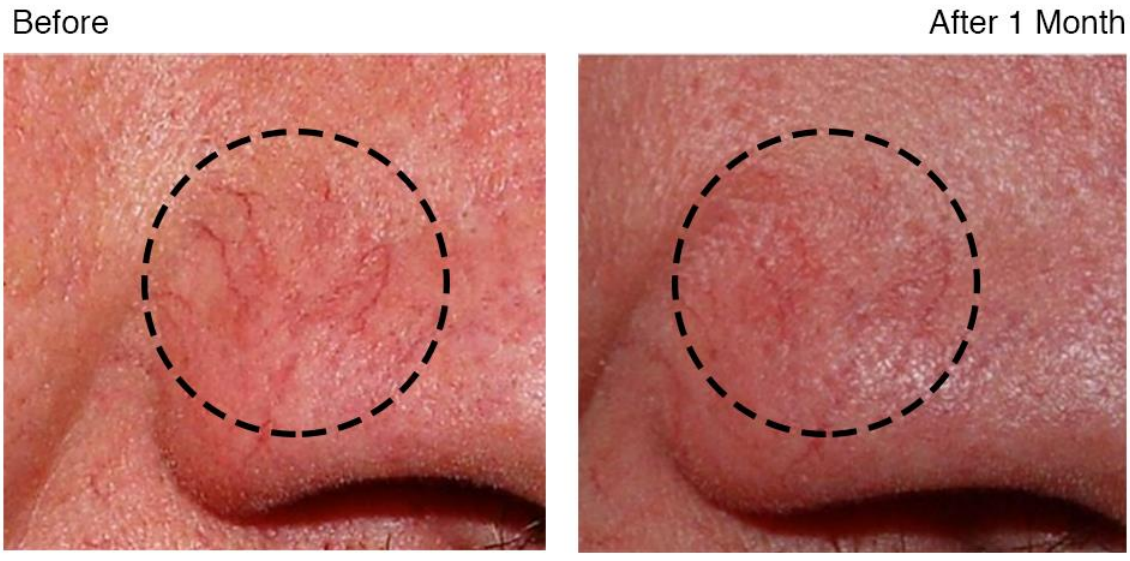


The votes summarized in the table below show a direct correlation between fluence, extension of the lesion and pain level. On the face, where relatively low fluences were used, the perception of pain was rather moderate, while in extensive lesions and large vessels diameter, in the lower limbs, the pain level was significantly increased.

Case N.	Pain level (VAS)
1	4
2	4
3	3
4	5
5	3
6	7
7	6
8	8
9	9
10	3
Average	**5.2**

Few cases of transitory side effects such as erythema and edema were treated with a single-dose application of Betacorten G (Betamethasone AS VALERATE 0.1%). These side effects were all disappeared within two hours after the treatment. No adverse events were recorded during the study and in the follow-up period.

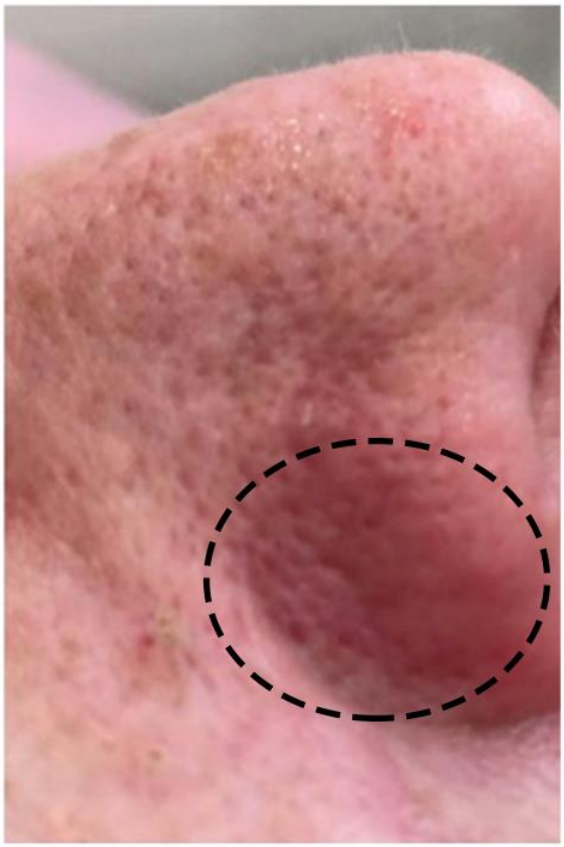
Case 1



Case 2

Before

Immediately After



Case 3

Before

Immediately After

Case 4

Before

After 3 Months

Case 5

Before

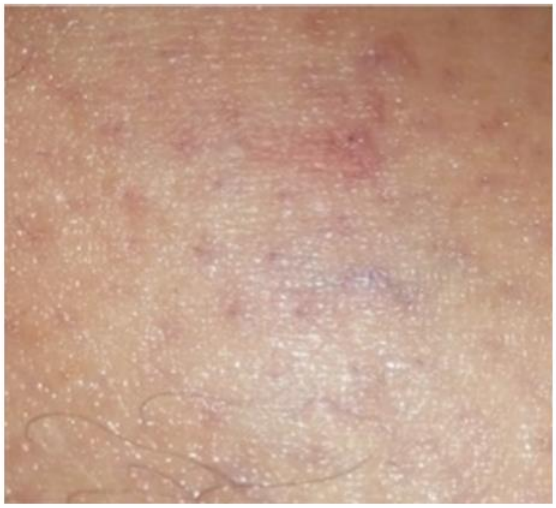
After 3 Months

Case 6

Case 7

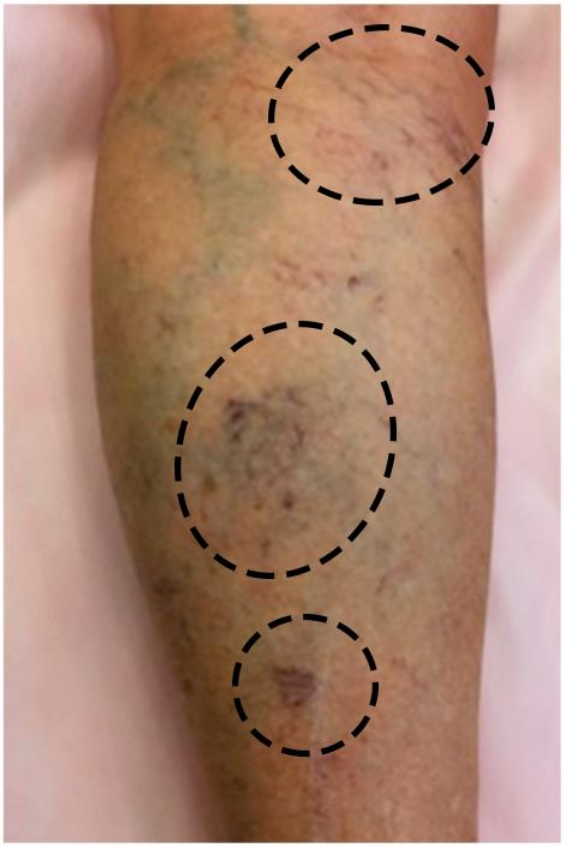
Before

After 1 Month

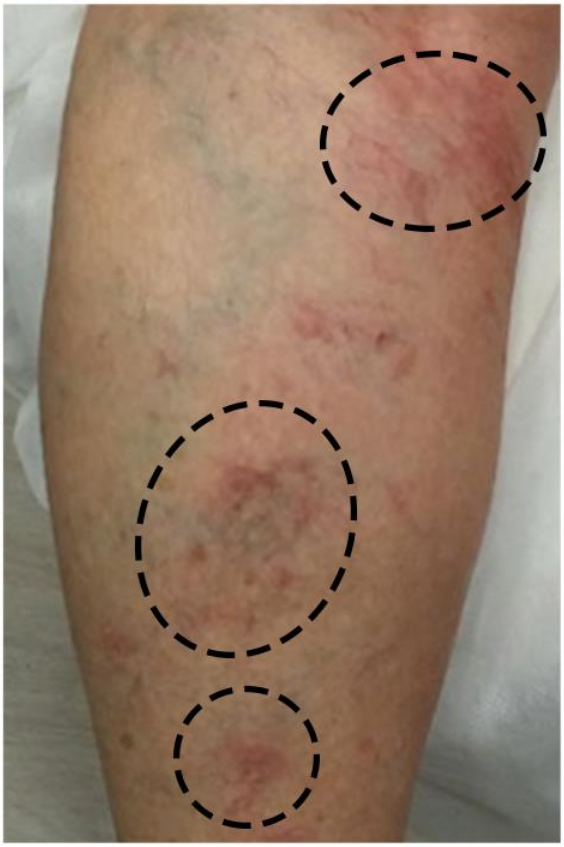


Case 8

Before

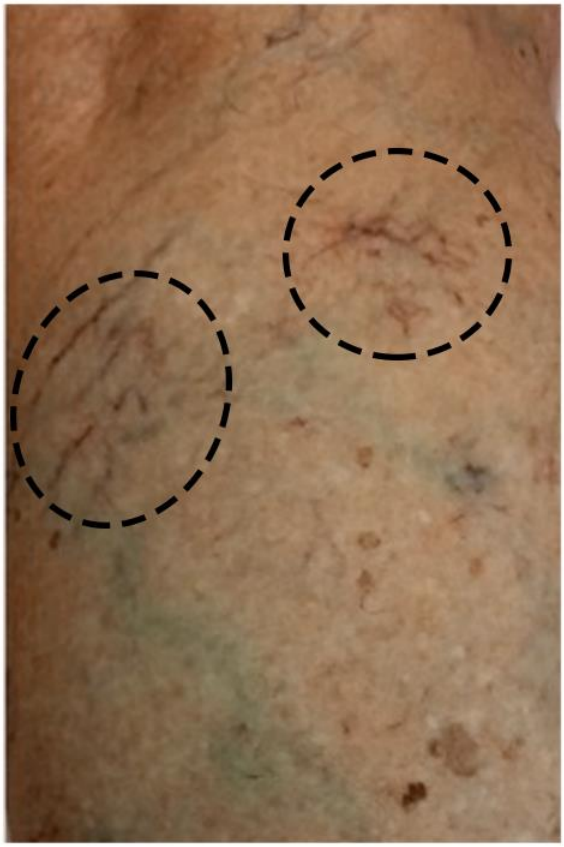


Immediately After



Case 8

Before



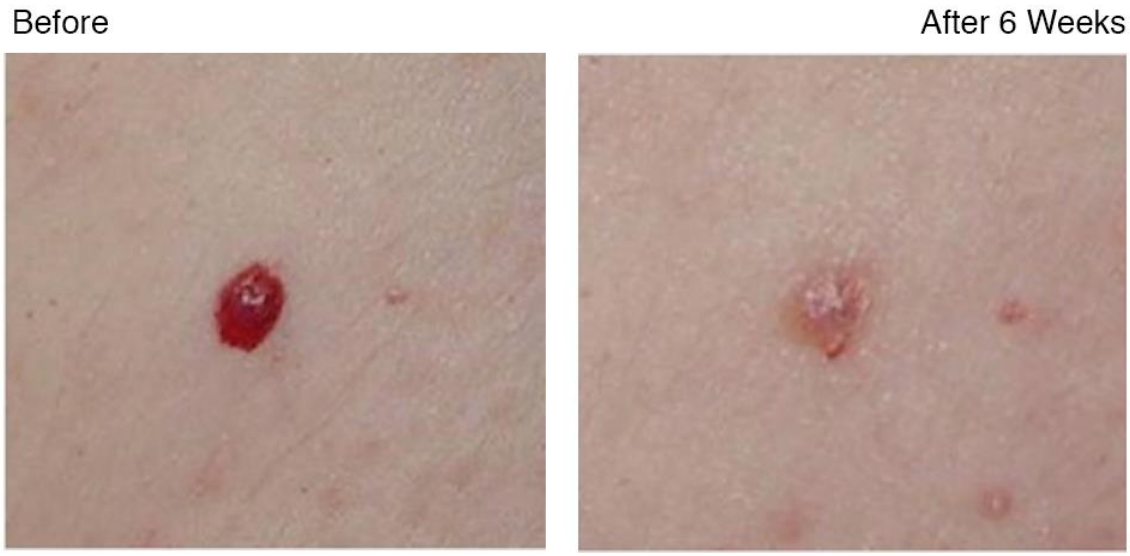
Immediately After

Case 9

Before

Immediately After

Case 10



Discussion

The sample of the 10 treated patients, represents a large casuistry of very common surface vascular lesions. Body and face telangiectasia, with a vessel diameter less than 3 mm, find an efficient non-invasive response using the ND 1064 LP laser. It in fact allows to treat a remarkable variety of different vessels, both in diameter and depth (reddish and bluish). The Magma system (Formatk Systems, Israel) setting enables the variation of the laser electrophysical parameters according to the following scheme:

Tip size	Fluence range	Pulse duration range
3 mm	120J/cm² - 440J/cm²	40 ms – 80 ms
5 mm	50J/cm² - 220J/cm²	30 ms – 80 ms

In this way, a customized setting for each lesion can be easily obtained; In fact, the variety of treatable cases associated with a wide and different individual responses needs a continuous adjustment of the setting so that the end- point can be reached properly without exceeding the energy. An acceptable and desirable end-point can be described as the spontaneous and immediate disappearing of the vessel with a sort of bleaching effect, as passing over it. In other cases, it is possible to observe a darkening of the treated blood vessel with consequent redness tract but with the disappearance of the vessel itself. A digital pressure above the treated vessel may be used as an indication of the cauterization of the endothelial wall that would prevent the

blood from flowing into the vessel regularly and fill it. To demonstrate the immediate reaction and endpoint, some before and after photographs shown above were taken immediately after treatment (Cases: 2, 3, 8 and 9). The Magma platform includes IPL system with a peculiar pulse shape, considering a high-density pulse, able to deliver up to 22 J/cm² in less than 6 ms in total respect of the TRT value, so the procedure becomes safe and precise; the F-SR applicator has a band-pass filter of 530 nm - 1200 nm which can suitably be used for the treatment of rosacea dermatitis characterized by a diffused redness in the zygomatic area with some small capillaries that were treated separately with the ND applicator . The administration of the high density polychromatic short pulse was demonstrated to be efficient after few treatments. Case N. 5 shows the improvement and therapeutic benefits on rosacea lesions after 3 sessions only, occurred once a month. A positive outcome was also highlighted in the last case by treating a cherry angioma with a single and short application with the ND laser. At 6 weeks after we can observe the disappearance of the lesion and a wound healing process still in place.

Pain level detection has demonstrated the need for management especially where strong fluences are applied as in the leg region. Since lidocaine administration locally can induce a vasoconstrictor effect as well as cold application, it is preferable to proceed without applying these methods prior to the treatment and if necessary use the cold pack at the end of the treatment. However, If the level of pain becomes unbearable during the treatment it is recommended to proceed by short intervals, applying from time to time an ice pack for few seconds.

Conclusion

The results confirm the validity, effectiveness and safety of the Magma platform (by Formatk Systems – Israel) in treating a wide range of surface vascular lesions. The ability to use either the 1064 nm laser technology or the IPL one allows the operator to optimally treat vascular problems such as rosacea, spider veins, face and truncal telangiectasia, cherry angioma, erythrosis, and so on.

References

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