CLINICAL BULLETIN

NO. 3

Laser Treatment of Hemosiderin Staining Secondary to Sclerotherapy for the Treatment of Lower-Extremity Varicose and Spider Veins

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Introduction

As a peripheral vascular surgery practice, we use the gold standard treatment, sclerotherapy, to treat telangiectatic (spider) and reticular (varicose) veins in the lower extremities. These superficial veins enlarge from non-functioning venous valves that allow the veins to become engorged, causing pain, swelling and ulcers in the lower legs.

Telangictatic and reticular veins may be congenital or acquired. Their development is promoted and aggravated by pregnancy, obesity and occupations that require prolonged standing.

In our practice, we use fiber-optic Illumination and/or ultrasound to identify the affected veins before we inject an FDA-approved sclerosant into the reticular, or feeder veins. Direct compression is applied, the vein collapses, and the flow of blood is shut down. Over a period of weeks, what was a hollow tube becomes a solid thread of scar tissue.

The disappearance of the vein is accompanied by the formation of a brownish discoloration or stain in the area of the treated vessel.

Such staining of the treated skin is a common indicator of a positive treatment outcome. This stain represents an accumulation of hemosiderin, iron-based degraded hemoglobin from red blood cell necrosis.

This stain often resolves without intervention. However, if a stain has not resolved in a two-year time period the patients basically have been tattooed by their own blood, and the iron stain is permanent. Some patients with long-standing varicose veins already may have staining simply from the amount of blood that is in close contact with the skin.

By treating these stains with AlexTriVantage® as one would for pigmented lesions or tattoos, we are able to provide our patients with a total solution, sclerosing the vein as well as removing the persistent staining.

Background

Varicose veins are enlarged, twisted superficial veins most commonly observed in the lower extremities.

Hemosiderin stains usually resolve without intervention over a course of several months. In some instances, the iron compound becomes resident in interstitial space in the same manner as tattoo pigment, and the stain becomes permanent. In these instances, patients often return seeking resolution of the stain.

A 2001 article in the *Journal of Dermatologic Surgery*[1] discusses sclerotherapy and hyper-pigmentation. The authors used a Q-switched ruby laser at a 694 nm with a 4 mm beam size and a fluence range of 5.6–10.5 J/cm^2 in an attempt to lighten the post-sclerotherapy lesions. In the article, they report that 92% of lesions “lightened” after being treated in this manner.

AlexTriVantage®

Method

Patient 1

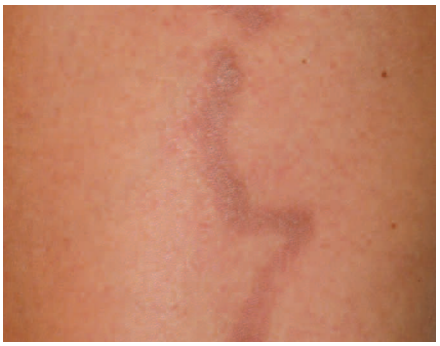
Sclerotherapy Treatment Day:
A 40-year-old female patient presented with reticular veins measuring 2 mm to 3 mm bilaterally and telangiectasia measuring < 1 mm bilateral lower extremities. Sclerotherapy of reticular veins was done using 0.5 cc of 1% sodium sulfate (STS) per injection and 0.15% (STS) for telangiectatic veins of the lower extremities, with graduated compression hose applied post injection.

14 days post sclerotherapy treatment:
Follow-up showed 90% resolution of veins injected but noted that bruising was still present, though minimal, on the right posterior mid calf and thigh.

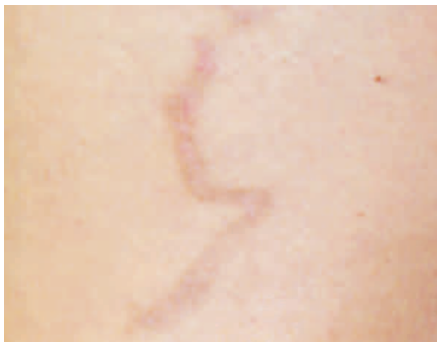
7 months post sclerotherapy treatment:
The patient returned to our offices with hemosiderin staining on the posterior calf and upper thigh of her right leg. With a Fitzpatrick Skin Type III, the patient was treated using the 50 ns Q-switched output of the AlexTriVantage laser system at 755 nm. Using a 4 mm treatment spot and 5 Hz repetition rate, treatment began at 3 J/cm^2 and increased to 4 J/cm^2 where we began to produce an ash color over the treated area. A total of 245 pulses were administered according to the AlexTriVantage Treatment Guidelines and the user interface recommended settings for epidermal lesions.

12 days post laser treatment:
We examined the areas treated with the laser and noted flaking of skin with pink tissue present. We also noted that the upper end of hemosiderin stain, treated with 3 J/cm^2, did not flake or peel as did the lower area which was treated at 4 J/cm^2. The patient had no complaints of pain and was excited about the results.

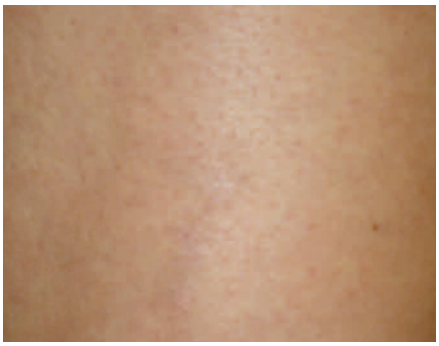
At 30 days, post laser treatment, we saw the patient for follow-up and noted that the hemosiderin stain was gone with resultant pink tissue present. The hemosiderin stain had been treated once with complete resolution.



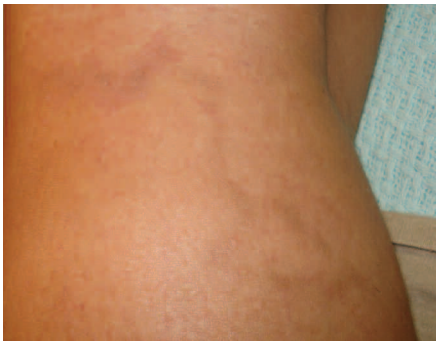
Patient 1 — Thigh, post sclerotherapy showing hemosiderin staining.



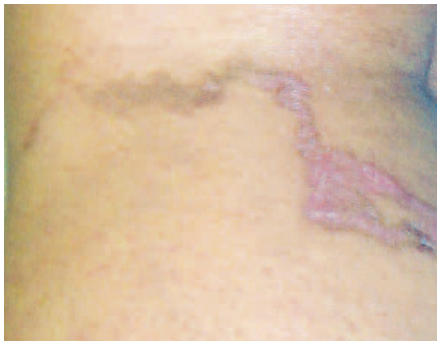
Patient 1 — Thigh, 12 days post laser treatment.



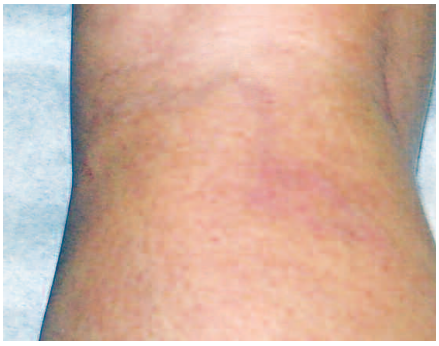
Patient 1 — Thigh, 30 days post laser treatment. Hemosiderin stain is cleared.



Patient 1 — Calf, post sclerotherapy showing hemosiderin stain.



Patient 1 — Calf, 12 days post laser treatment.



Patient 1 — Calf, 30 days post laser treatment. Hemosiderin stain is cleared.

Patient 2

Sclerotherapy Treatment Day:
A 68-year-old female patient underwent sclerotherapy for reticular and telangiectatic veins on the bilateral lower extremities. Ranging in size from 4 mm using 1% (STS) to 0.2 mm using 0.15% STS with graduated compression hose applied immediately following treatment.

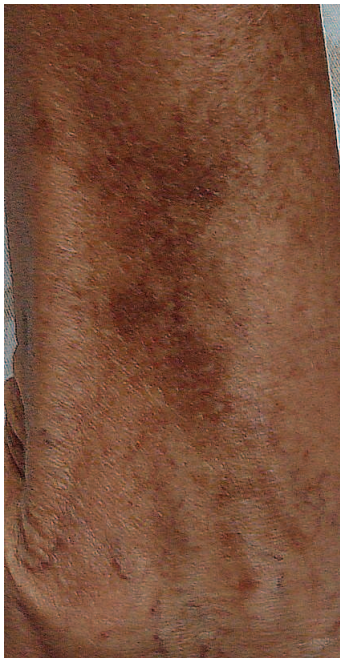
90 days post sclerotherapy treatment:
The patient returned for follow-up treatment using the Candela GentleYAG® for remaining telangiectasia. At this time, we noted hemosiderin staining present on areas of the right ankle and, in general, multiple sites bilaterally.

11.5 months post treatment:
With a Fitzpatrick Skin Type III, the patient's right ankle hemosiderin stain was treated with the 50 ns Q-switched output of the AlexTriVantage laser system at 755 nm. We used a 4 mm treatment spot, 5 Hz repetition rate and 3.5 > 4 J/cm2 fluence as recommended by the AlexTriVantage Treatment Guidelines and user interface settings for epidermal lesions. A total of 680 pulses were administered.

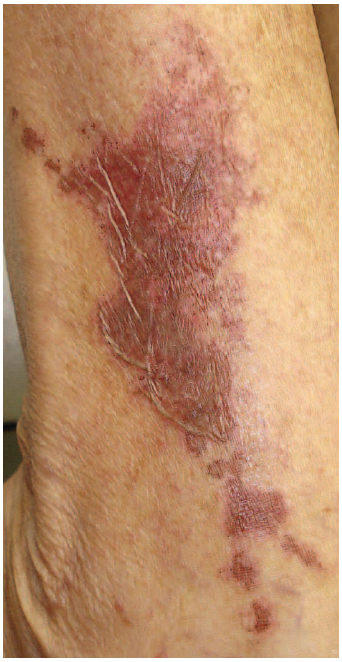
7 days post laser treatment:
The patient returned with a blister on the treated area with serious fluid present. We aspirated the blister using a sterile 30 gauge needle. The area was cool to the touch.

Skin Ceuticals PHYTO+ Corrective Gel was given to the patient with instructions to apply it twice daily. The patient was also Instructed to use Skin Ceuticals Ultimate UV DEFENSE SPF 30 sun screen day and night as well, due to the healing properties of ZINC Oxide in its formula.

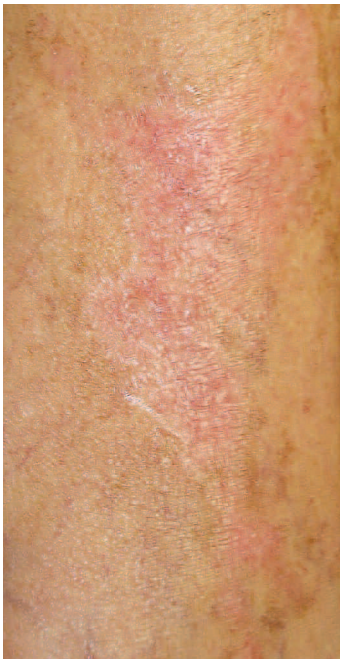
22 days post laser treatment:
Follow-up showed the patient's hemosiderin stain completely resolved after being treated once.



Patient 2 — Ankle, Post sclerotherapy showing hemosiderin stain.



Patient 2 — Ankle, 7 days post laser treatment showing blister.



Patient 2 — Ankle, 22 days post laser treatment. Hemosiderin stain is cleared.

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Discussion

The AlexTriVantage provides a slightly longer Q-switched pulse duration than other Q-switched lasers, and is more gentle to the skin. We believe the laser's action in this application to be the breaking of the hemosiderin pigment into smaller, more easily absorbable particles and the causing of a selective thermal injury that furthers the absorption of the pigment.

With the AlexTriVantage, hemosiderin staining is no longer a detriment to sclerotherapy. Having used the laser to treat hemosiderin stain since 2007, we routinely see the resolution of the stain within one month of treatment.

Conclusion

After treating 50 patients, we are confident that a system like the AlexTriVantage, with its 755 nm alexandrite output and a pulse width ≥ 100 μs, is a very useful tool for the treatment of lentigines and other melanin-related lesions, with minimal post-inflammatory hyperpigmentation (PIH).

With this long pulse mode, physicians may move beyond providing simple "dermatological" procedures that provide high efficacy without much attention to adverse effects toward more "cosmetic" procedures differentiated by a reduced incidence or duration of adverse effects, such as edema, erythema, or PIH. To achieve this goal, a microsecond pulse mode is ultimately necessary as a treatment option.

References

1. Alireza Tafazzoli, Elizabeth F. Rostan, MD, Mitchell P. Goldman, MD; Q-Switched Ruby Laser Treatment for Post Sclerotherapy Hyperpigmentation Journal of Dermatologic Surgery 26:653-656.

Andrews SC. Iron Storage in Bacteria. Adv Microb Physiol. 1998;40:281-351.

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