

# Treatment with the Q-switched, Nd-Yag Laser in the wavelengths of 532nm and 1064nm for the Treatment of Post-endovenous Ablation and Post-sclerotherapy Hyperpigmentation: A Retrospective Case Series.

Angela Macri DO, MS, PGY-3 Dermatology Resident at Sampson Regional Medical Center  
 Mojgan Hosseinipour DO, PGY-1 Traditional Rotating Intern at Sampson Regional Medical Center  
 Jaimie Nuckolls DO, PGY-1 Traditional Rotating Intern at Sampson Regional Medical Center  
 Kamran Goudarzi MD, FACS, FICS Attending at DermOne Dermatology, Cosmetic, and Scarless Vein Center  
 Jonathan Crane DO, FAOCD, FAAD Dermatology Program Director, Sampson Regional Medical Center

\*\*The authors declare that there are no conflicts of interest

## Introduction

Varicose veins can be very problematic to patients causing a great deal of medical and cosmetic concern. Treatment of varicose veins by either sclerotherapy or endovenous ablation causes obliteration of the lumen of the vessel, fibrosis, and an inflammatory reaction that allows leakage of red blood cells into the perivascular space. When red blood cells are broken down by macrophages hemosiderin is deposited in the dermis. These procedures also cause inflammation in the epidermis and dermis, creating a reactive melanogenesis. The accumulation of hemosiderin and melanin from these mechanisms leads to unwanted hyperpigmentation of the skin. Hyperpigmentation is an important concern to patients undergoing these procedure as it can take several years to resolve, if ever. Many treatment modalities have been attempted in the past including compression stockings with topical corticosteroids, mechanical evacuation of thrombi, pulsed dye laser, Q-switched ruby laser, and intense pulsed light (IPL), all with varying results. Our study shows that the Q-switched Nd- Yag laser is an effective treatment option for post-sclerotherapy and post-endovenous ablation hyperpigmentation.

## Methods

This was a retrospective case series of a data set from the DermOne Scarless Vein Care center in Wilmington, NC. Eight patients that had post-sclerotherapy and/or post-endovenous ablation hyperpigmentation of the legs were treated with the Nd-Yag laser in 11 different locations total. Patients with Fitzpatrick skin type 2 or 3 were treated with the 532nm laser and patients with Fitzpatrick skin type 4 were treated with the 1064nm laser. Patients with skin type 1, 5, or 6 were not treated. Laser settings for the 532nm Nd-Yag included a spot size of 3 or 4, energy of 1.5-3, and hz of 10. Laser settings for the 1064nm ND-Yag laser included spot size of 6, energy of 4, and Hz of 10. Treatments were spaced anywhere from 2-5 months apart. Two clinicians graded the improvement in hyperpigmentation of the legs using a Clinical Global Impression scale of no improvement/worse, minimal improvement, moderate improvement, marked improvement, or complete resolution. Patients were asked if they had pain during the procedure. Aquaphor was applied to the treatment sites and patients were instructed to use ice packs after the procedure.

## Table and Figures

Location Number	Patient's Initials	Wavelength Used in Treatment	Improvement	Number of Treatments	Time From First Treatment to Follow Up Pictures
1	ME	532 nm	Minimal	1	1 yr. and 3 mo.
2			Complete		
3			Marked		
4	DH	1064 nm	Moderate	2	9 mo.
5	EL	532 nm	Marked	2	1 yr. and 6 mo.
6	EB	532 nm	Marked	2	4 mo.
7	VC	532 nm	Marked	3	1 yr. and 6 mo.
8	KM	532 nm	Complete	1	4 mo.
9	JC	532 nm	Moderate	2	2 mo.
10	AT	532 nm	Marked	2	4 mo.
11			Marked		



Figure 1: Location 8 before treatment



Figure 2: Location 8 after treatment



Figure 3: Location 10 before treatment



Figure 4: Location 10 after treatment



Figure 5: Location 5 before treatment

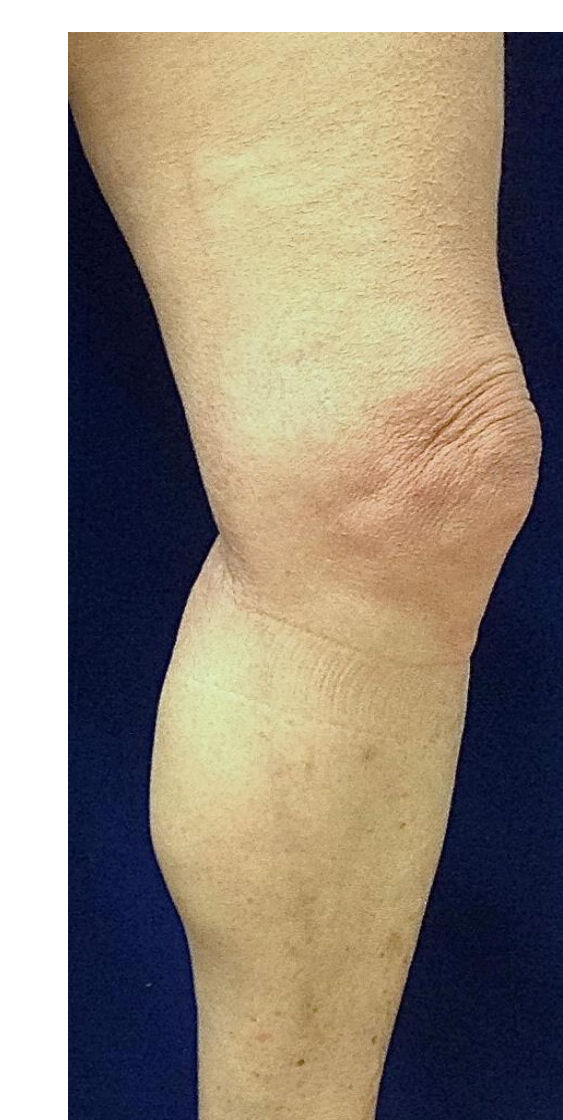


Figure 6: Location 5 after treatment

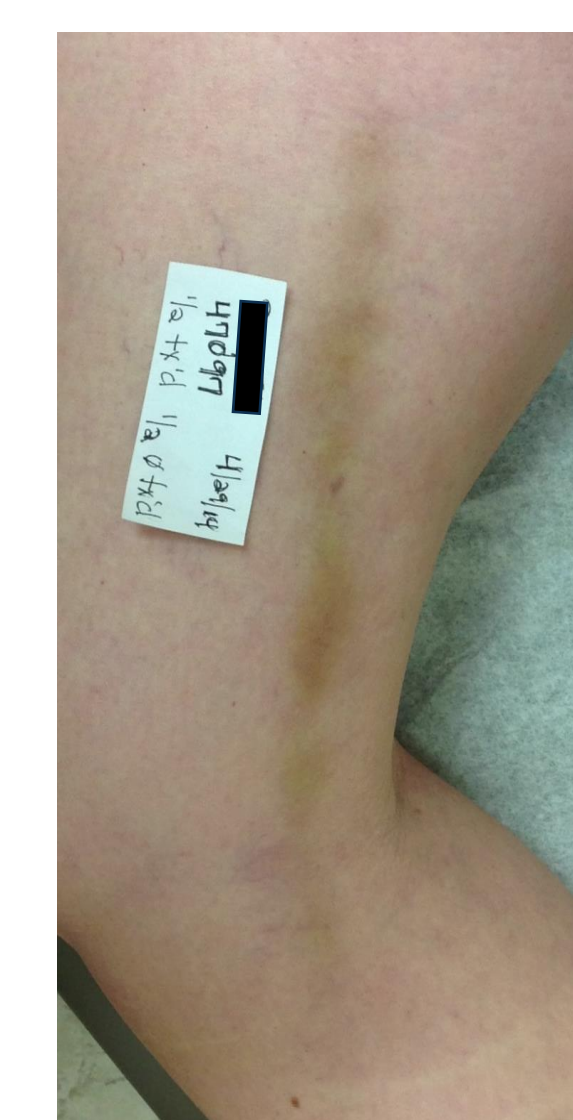


Figure 7: Location 6 before treatment



Figure 8: Location 6 after treatment

## Results

All locations showed improvement where 1 had minimal, 2 had moderate, and 6 had marked improvement while 2 had complete resolution. Two locations required only one treatment to get a complete resolution. Four sites obtained a marked improvement after 2 treatments, however, one other site with marked improvement did require 3 treatments. Two locations had a moderate amount of improvement after 2 treatments and one site had a minimal amount of improvement after only one treatment.

## Discussion

Both hemosiderin and melanin contribute to post-sclerotherapy hyperpigmentation. Hemosiderin has an absorption spectrum that peaks at 410 to 415 nm, followed by a gradually sloping curve throughout the visible spectrum. Melanin has an absorption spectrum from 250-1200 nm.<sup>1</sup> The ND: Yag laser has been known to treat pigmented lesions and has a frequency doubling device to reduce the 1064 nm light wavelength by half to 532 nm.<sup>2</sup> Although the laser does not target the peak absorption spectrum for hemosiderin there seemed to be enough photomechanical destruction of hemosiderin to improve the hyperpigmentation in our patients. The patients in our study all showed improvement with 72% having marked to complete resolution. Treatment to one half of a hyperpigmented site was done in location 8 to show that the pigment goes away quicker with a laser treatment than with no laser treatment. The laser was well tolerated by all patients. Fitzpatrick skin types 1 and 5 were excluded to ensure patients would not burn, scar, or worsen their hyperpigmentation. In some patients the erythema lasted several months but eventually faded with time.

## Conclusion

Although this was a small study subset, we believe that the Q-switched, Nd-Yag laser in the wavelengths of 532nm and 1064nm in patients with Fitzpatrick skin types 2-4 is an efficacious treatment for post-endovenous ablation

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 2. Poon VK1, Huang L, Burd A. Biostimulation of dermal fibroblast by sublethal Q-switched Nd:YAG 532 nm laser: collagen remodeling and pigmentation. *J Photochem Photobiol B.* 2005 Oct 3;81(1):1-8.