



KYLE KIELINSKI

# TREATING TELANGIECTASIAS

Dual wavelength lasers target facial spider veins. By Joe Niamtu, DMD

**THERE'S A BOUNTY OF LIGHT DEVICES** and wavelengths capable of treating vascular facial lesions. With any device comes pros and cons as well as decisions on how to integrate it into your office. In my practice, a dual wavelength laser fits my patients' needs and the operational structure of my business.

Continuous wave argon (488 and 514 nm), continuous wave CO2 (10,600 nm) and Nd:YAG (1,064 nm) lasers all can eliminate spider veins but can cause burns, scars and hypopigmentation. The pulse dye laser's ability to apply precise ablation of unwanted vascular tissue with minimal injury to normal tissue made them the first generation of clinically useful lasers for telangiectasias. However, a two-week healing period with dark purple purpura on patients' face was often a result. The advent of ultra-long pulse 585 nm laser technology cured the problem of purpura, but some of those systems could be large and expensive. In addition, unless the clinician had a large number of patients in need of treatment of port wine stains, hemangiomas, venous lakes and other big vascular clinical conditions, the expense outweighed the practicality.

The KTP (Potassium-titanyl-phosphate) or frequency doubled lasers became an intermediary option for the casual vascular practitioner who needed a lightweight, portable laser that offered the versatility of treating the most common vascular conditions such as telangiectasias, cherry angiomas and small hemangiomas or venous conglomerations.<sup>1-3</sup> In addition, due to the 532 nm wavelength, numerous pigmented lesions such as DPN's, pigmented nevi, and lentigos can be treated and further boost the



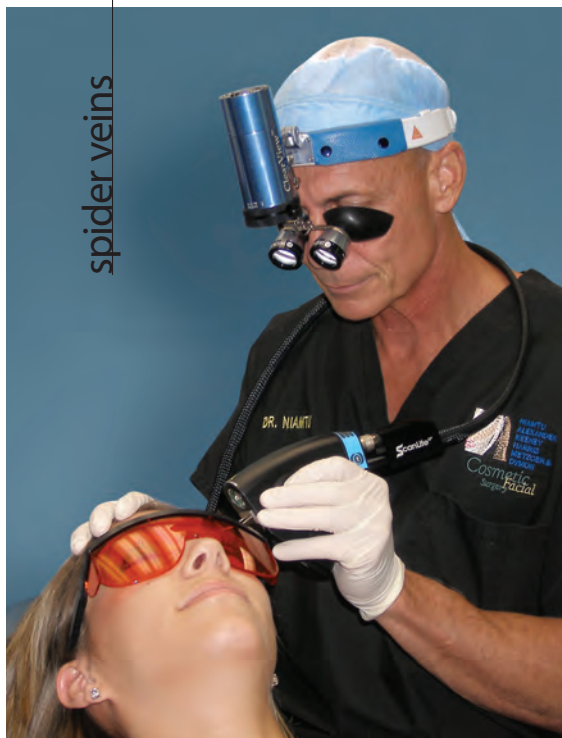
» **TELANGIECTASIAS** on the the nose and cheek before and after treatment with a 532 nm laser using a 0.7 mm handpiece at 18 J/cm<sup>2</sup>.



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spider veins



Dr. Niamtu demonstrates laser treatment of telangiectasia while wearing protective magnification loupes with a polarizing headlight.

effectiveness of this type of laser for virtually any cosmetic practice. In my practice, I've found the dual wavelength, frequency doubling laser (Iridex VariLite 532 nm and 940 nm) effectively covers a wide range of facial vascular lesions.

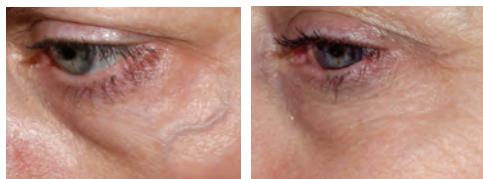
### Green Light for Red Lesions

The 532 nm wavelength is a green light obtained by a process known as frequency doubling. A high-powered 808 nm laser is used to optically pump an Nd:YAG crystal that produces 1064 nm light. This light is then focused onto a potassium titanyl phosphate crystal to double its frequency, which halves the wavelength, producing a 532 nm wavelength. A red diode aiming beam is added to target the 532 nm beam to "point" the laser.

The 532 nm wavelength is effective for smaller red telangiectasia and other small vascular and pigmented lesions, but less effective for large vessels, deep vessels or blue vessels. The high absorption 532 nm treatments are preferred for smaller (up to

1 mm) and more superficial vessels. These vessels are more selectively treated using wavelengths that are strongly absorbed by oxyhemoglobin, because the vessels can be heated to a clinical response temperature with minimal incidental energy. The high oxyhemoglobin absorption can, however, limit the depth to which laser light penetrates the skin, making it difficult to treat large or deep vessels with these wavelengths. A good rule of thumb is that when treating small, superficial vessels that primarily contain oxygenated hemoglobin, it is beneficial to use a wavelength near one of the primary absorption peaks. A drawback of the 532 nm wavelength is its high affinity for melanin. The peak absorption for the melanin and hemoglobin are close at the 532 nm wavelength. This means that the 532 nm wavelength may target both red and brown lesions simultaneously, making treatment difficult on tan or pigmented skin.

I generally use the 532 nm wavelength at 18-20 J/cm<sup>2</sup> for the average telangiectasia (up to 1 mm) or pigmented lesion. Ectatic



» A LARGE PERIORBITAL VEIN treated with 940 nm laser over two sessions with the 0.7 mm handpiece at a setting of 200 J/cm<sup>2</sup>.



» A VENOUS LAKE treated with the 940 nm laser using the 0.7 mm handpiece at a setting of 180 J/cm<sup>2</sup> in a single treatment session.

## » DEVICES FOR VASCULAR LESIONS

**Candela's** GentleMAX is a multi-wavelength laser workstation applicable for a variety of treatments, including facial vein and pigmented lesion removal, leg vein removal, hair reduction and skin tightening. It combines the capabilities of both the GentleLASE and GentleYAG systems. [www.candelalasers.com](http://www.candelalasers.com)

**Palomar** Starlux 500 is a platform for both laser and IPL. Application-specific handpieces allow the clinician to expand the system based on need. The Lux1064+ can clear a variety of leg vessels from small red to large blue veins. [www.palomarmedical.com](http://www.palomarmedical.com)

**Sciton's** ClearScan is a 1064 nm Nd:YAG laser designed for strong absorption in oxyhemoglobin and melanin for selectively heating veins and hair follicles. The large pattern generator provides fast, non-sequential scanning, cooling and a flat-top beam profile. The system minimizes subsurface heat buildup for additional comfort. [www.sciton.com](http://www.sciton.com)

The RevLite EO Q-Switched laser from **Hoya ConBio** is a multi-wavelength device utilizing a high-speed shutter to produce nanosecond

pulse widths. The PhotoAcoustic Technology Pulse technology limits healthy tissue's exposure to thermal buildup and produces a photo acoustic action to target molecules. MultiLite Dye Laser handpieces can convert the RevLite from 532 nm to 585 nm or 650 nm wavelengths. [www.conbio.com](http://www.conbio.com)

The Trios from **Viora** is a modular IPL system with long lamp life and the ability to customize settings for treatment accuracy. An easily portable unit, the Trios offers a low cost-per-pulse and multiple popular applications. [www.vioramed.com](http://www.vioramed.com)

**Focus Medical** offers the NaturaLaseQS, a Q-switched Nd:YAG laser with four wavelengths (1064 nm, 532 nm, 585 nm and 650 nm). Key benefits include a large spot size and flat top beam to deliver energy deeper into the skin. [www.focusmedical.com](http://www.focusmedical.com)

The Apollo Mini, by **Sandstone Medical Technologies**, is a compact, portable IPL with multiple light guides and an exclusive "extended non-ablation technology" for treating sensitive skin areas with minimal discomfort. [www.sandstonetechnologies.com](http://www.sandstonetechnologies.com)

vessels disappear when treated because the laser creates a steam bubble along the axis of the vessel, clearing the lumen and pushing a column of hot blood along the vessel. As the vessel cools during the thermal relaxation time (TRT), the vapor bubble cools and collapses the vessel wall. Thermal coagulation of the blood beyond the vessel forms an intravascular plug that occludes the vessel wall beyond the site of laser energy exposure.<sup>4</sup> Since the vessel walls do not rupture, there is no purpura produced. I generally deliver double laser shots every several millimeters along the vessel during treatment. The key is to find the lowest power setting that ablates the vessel without burning the skin. A more selective photothermolysis can be achieved by using a pulse duration that is close or equal to the TRT of the targeted vessel,<sup>2,3</sup> which for telangiectasias is in the range of 10 milliseconds to 60 milliseconds. A pulse dye laser, on the other hand, produces a pulse duration of 450 microseconds to 50 milliseconds. The 532 nm laser has a much longer pulse duration of 60 milliseconds to 100 milliseconds, which more closely matches the TRT of facial telangiectasias. Deeper and larger caliber vessels require a longer pulse duration which makes the 532 wavelength less effective.

### Infrared Option for Blue Vessels

Although the 532 nm wavelength was the mainstay for my facial vascular patients, the option of using the 940 nm wavelength available from the dual wavelength laser has allowed

me to cover a broader range of lesions without switching to an additional device.

The 940 nm is a near-infrared wavelength that was originally intended to treat larger (over 1 mm), deeper, more resistant and bluer vessels.<sup>3</sup> The 940 nm wavelength is emitted directly from a customized indium gallium arsenide diode laser and is chosen for larger and deeper vessels primarily because it is exactly at the peak of the secondary absorption band of oxyhemoglobin in the near IR region of the spectrum. Larger and deeper vessels contain both oxygenated and reduced hemoglobin, and the 940 nm wavelength targets the secondary absorption peak of oxygenated and reduced hemoglobin. For deeper blue veins, the target can be venous blood, and it is important to consider the reduced hemoglobin spectrum. Less strongly absorbed wavelengths penetrate deeper and can more uniformly heat through larger diameter vessels. Since there is less absorption, a much higher fluence (10 to 15 times) must be used with the 940 nm platform. Reduced hemoglobin absorption falls rapidly above 950 nm wavelengths, and 940 nm is the longest wavelength for which reduced hemoglobin has adequate absorption. For this reason, the 940 nm is a workhorse.

My experience with the 532 nm and 940 nm system has been that both wavelengths are effective for small telangiectasias, but the 940 is superior for larger, bluer and deeper vessels due to it deeper penetration. Tierney and Hanke recently concluded that "both the 532 and 940 nm wavelength were equally efficacious for smaller caliber vessels facial telangiectasias, but we lack evidence to support whether one wavelength is superior. On photographic evaluation, the 940 nm was significantly more efficacious for larger caliber vessels than 532 nm."<sup>3</sup>

I employ the 940 wavelength almost exclusively due to its effectiveness with small and large vessels. I turn to the 532 nm only when using the optional ScanLite scanner to treat large areas (which is not compatible with the 940 nm). Although multiple spot size handpieces are available, I exclusively use the 0.7 mm with the 940 nm for telangiectasias. A polarizing headlight loupe system also accompanies the VariLite, which allows the operator to use clear loupes instead of dark goggles that may obscure the finer vessels. The polarizing headlight also reduces skin reflection, which allows superior visualization when compared to the naked eye.

Clinicians with extensive vascular practices often rely on pulsed dye lasers and IPLs. However, for practices such as my own, those devices would not receive enough use to justify the expense and maintenance. Cosmetic patients are impulsive, and it is very common for patients to ask for spider vein removal when in for another treatment. Having access to a small, easily portable, dual laser device with no filters to change makes treatments fast and easy. ■

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