MultiPlex 1064/585 nm Laser Treatment of Vascular Lesions

Mark B. Taylor, Nancy J. Samolitis
Gateway Aesthetic Institute and Laser Center
Salt Lake City, Utah

Background

The pulsed dye laser (PDL) and the Nd:YAG have been used for years to treat a variety of vascular lesions ranging from simple telangiectasia and spider veins to complex hemangiomas and vascular malformations. The PDL is considered the “gold standard” for treating smaller, more superficial vessels. The PDL has limitations because of the shallow depth of penetration of visible yellow light and the adverse effect of purpura when using short high energy pulses. The 1064 nm Nd:YAG laser provides greater depth of penetration but lower specificity. 1064 nm lasers have greater affinity for deeper large vessels and in high fluences may also be capable of treating fine surface vessels. Vascular lesions are diverse with vessels of varying size, density, color, flow and depth and may not be responsive to either visible light or infrared lasers alone. The use of dual sequential wavelengths has been studied as a method of minimizing the side effects of these lasers, while increasing the efficacy for treating vascular lesions.

Treatment and Methods

Patients with varying recalcitrant lesions were treated using the Cynergy MultiPlex (Cynosure, Inc.) which allows the sequential emission of PDL and Nd:YAG wavelengths, two optimal vascular wavelengths into one unit, permitting independent usage as well as their combined usage within its MultiPlex™ feature. MultiPlex is a new concept that sequentially emits these two wavelengths from the same delivery fiber with a pre-selected delay between the two pulses. The PDL energy fires first converting hemoglobin to methemoglobin and micro-clots, changing blood’s absorption characteristics. The Nd:YAG, which is highly absorbed by these newly created blood constituents, fires milliseconds later, allowing the reduction of treatment fluence and reducing adverse effects while improving outcomes. The inter-pulse delay is chosen based on the flow rate of the vessel and allows the converted methemoglobin to flow within the target while remaining in the treatment area. Each treatment was customized using multiple different settings per patient and treatment based on vessel depth, density color, size, flow, and considerations for safety and efficacy. A layered treatment approach was used in treating the lesions.

Results

Superficial vascular lesions with large vessels are easiest to treat. Deep vascular lesions with small dense high flow vessels are most difficult to treat. All vascular lesions can be improved with Cynergy MultiPlex treatment. Cynergy laser appears to have an advantage over multiple laser treatments separated by a long delay.
Figure 2. Keloid Scar on Chest - Cynergy MultiPlex: 7 treatments over 9 months. PDL 0.5-6.0 ms pulse, 6.5-8.5 J/cm², Nd:YAG 10-20 msec 35-45 J/cm², 7 mm spot, Smart Cool 6, laser treatments followed by Traimcinolone Acetonide injections, 40 mg/cc 0.2-1.0 cc per treatment.

Figure 3. Superficial & Deep Hemangioma - Upper Eyelid - 4 treatments over 9 months. 2 treatments 532 KTP 0.8 mm spot, 90 msec pulse, 5 Hz, 35.8 J/cm² - Partial improvement. One Cynergy MultiPlex Treatment: PDL 8.5-15 J, 6-10 msec pulse, 7 mm spot; Nd:YAG 15 msec, 40 J/cm², 7 mm spot, Smart Cool 4. One PDL only treatment: 15 J/cm², 10 msec pulse, 7 mm spot and No Nd:YAG. Note: Skin was pulled up over supraorbital bone during MultiPlex treatment using YAG – Metal eye shields.

Figure 4. Port Wine Stain - 6 Treatments One treatment with Vasculight IPL: Triple pulse mode 550 filter p1=1.0, D1=10 msec, P2=1.8 msec, D2= 15 msec, P3 = 2.5 msec, 35.5 J/cm² – partial improvement Cynergy MultiPlex Treatments: 6 treatments over 8 months PDL: 7.5-8.5 J/cm², 2-6 msec pulse, Nd:YAG 10-15 msec pulse 30-40 J/cm², medium delay, Smart Cool 6.

Figure 5. Keloidal Port Wine Stain - 4 treatments.

Figure 6. Treatment Resistant Hemangioma - Superficial and Deep on Upper Back Cynergy MultiPlex 8 treatments over 10 months: Cynergy MultiPlex: PDL 0.5-10.0 msec pulse, 8.5-12J/cm², Nd:YAG 10-40 msec pulse, 45-60 J/cm², medium delay, Nd:YAG alone 20 msec pulse, 295-300 J/cm², 3 mm spot. Smart cool 6.

Figure 7. Hemangioma - Superficial & Deep Cynergy MultiPlex: 4 treatments over 4 months. PDL 6 msec, 7.5-8.5 J/cm², Nd:YAG 10-15 msec, 30-40 J/cm², Smart cool 6.
Conclusion

The Cynergy with Multiplex laser appears to have an advantage in the treatment of complex vascular lesions over any other laser alone.

References

16. Cynergy Laser Case Studies Mark B. Taylor, MD, Nancy J. Samolitis, MD Gateway Aesthetic Institute and Laser Center – Salt Lake City, Utah