

Consensus Recommendations From the American Acne & Rosacea Society on the Management of Rosacea, Part 4: A Status Report on Physical Modalities and Devices

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The fourth article in this 5-part series reviews common presentations of cutaneous rosacea. The physical modalities and devices used to treat cutaneous rosacea based on consensus recommendations from the American Acne & Rosacea Society (AARS) on the management of the major therapeutic uses of physical modalities and devices, especially laser and light-based systems, are for treatment of telangiectases and persistent facial erythema (background erythema).

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Phymas, especially rhinophyma, also are treated with physical modalities such as ablative lasers or surgical devices (eg, electrosurgical loop). Appropriately selected and properly used lasers and intense pulsed light (IPL) devices can successfully address specific clinical manifestations of rosacea that exhibit limited or no response to available medical therapies, such as telangiectases and background centrofacial erythema. Rosacea-associated symptoms also may improve. In most cases, treatment will need to be repeated intermittently to sustain improvement.

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Parts 1, 2, and 3 of this 5-part series from the American Acne & Rosacea Society (AARS) provided a status report on general measures, skin care, topical therapies, and systemic therapies.¹⁻³ In this article, physical modalities and devices are reviewed with discussion of the clinical manifestations that are usually responsive to specific physical modality options. Rational integration of physical modalities and devices into the overall management of rosacea also is discussed, with the goal being to achieve optimal therapeutic benefit from a comprehensive treatment program.

The Role of Physical Modalities and Devices in the Management of Rosacea

Telangiectasia and redness are among the most common visible signs of rosacea in patients presenting to dermatology practices.⁴ These features frequently become a psychological burden and can substantially impact patients' quality of life and self-esteem.⁵ Because these signs are the result of vascular abnormalities, they can be treated with lasers and light devices, which target oxyhemoglobin, deoxyhemoglobin, and methemoglobin, as well as clotted blood.⁶ The absorption of these chromophores by light occurs across a wide spectrum, with light devices developed to target a number of well-defined absorption peaks (Figure 1). Unfortunately, melanin also is notably active in these wavelength regions, which can impact treatment in patients with darker skin types or tanned skin. Blood vessels are destroyed through the absorption of light by the targeted chromophores, which generates heat that produces vascular destruction. If the energy is delivered more quickly than a vessel can release heat to the surrounding structures (ie, more rapidly than the thermal relaxation time), vascular destruction can occur.⁷ Smaller vessels that cause redness are more difficult to treat because higher energy delivered in a shorter period of time is required to destroy them, which often results in unwanted purpura lasting 1 to

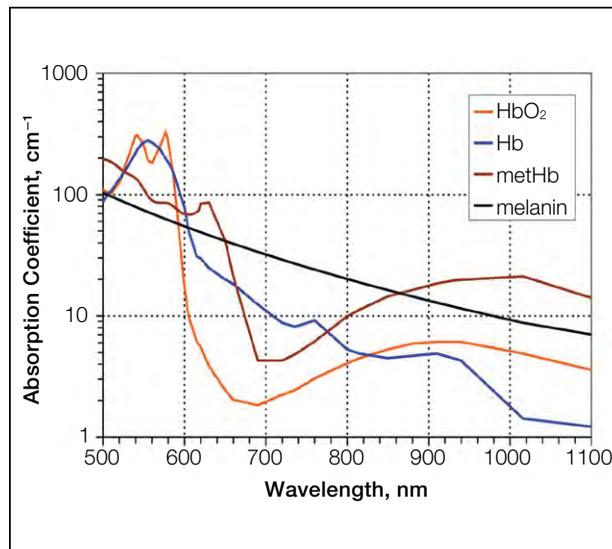


Figure 1. Absorption spectrum of blood. HbO₂ indicates oxyhemoglobin; Hb, deoxyhemoglobin; metHb, methemoglobin.

2 weeks. Larger telangiectatic vessels are ideally and effectively treated with longer millisecond pulse durations. They are routinely eradicated without purpura and with a good cosmetic outcome.⁸

Persistent facial redness in rosacea is due to small vessels that are fixed in a dilated state. Most of these vascular structures have an organized concentric layer of smooth muscle in their walls and are responsive to α -adrenergic control.⁹ They can be targeted with specific lasers and light devices.^{5,6,9,10} Substantial improvement has been noted using the pulsed dye laser (PDL) with a purpuric setting and intense pulsed light (IPL) devices; however, patients often are not satisfied with the degree of improvement, with only a 20% reduction in erythema reported.¹⁰ The use of α -adrenergic agents (eg, brimonidine) can effectively reduce diffuse facial redness of rosacea caused by fixed dilation of superficial vasculature, but improvement occurs only for a period of several hours after application and therefore requires regular dosing for control. One consequence associated with α -adrenergic agents is the enhanced visibility of telangiectases when background redness is reduced by vasoconstriction.^{11,12} Telangiectatic vessels are not significantly reduced by α -adrenergic agents.¹³ It would be reasonable to assume that the demand for treatment of telangiectatic vessels may be greater when α -adrenergic agents become more widely used, as the persistence and visibility of these vessels will be accentuated.

In rosacea patients, facial telangiectases predominantly are centrally distributed, unlike patients with

chronic photodamage who also can present with dilated vessels on the lateral cheeks and neck.¹⁴ Some males with chronic photodamage also exhibit fixed erythema of the ear helices. Many patients have both rosacea and photodamage, with telangiectatic vessels noted more diffusely in the head and neck region. The PDL using purpuric settings was the first device reported to be successful in the treatment of patients with rosacea¹⁵; however, prolonged bruising made the use of this device challenging for many physicians. The introduction of the longer-pulsed configuration for this device was a substantial improvement with minimal bruising and good efficacy; most patients experience 50% to 75% improvement in telangiectatic vessels in 1 to 3 treatment sessions.^{8,16} Intense pulsed light devices have a long history of success in the treatment of telangiectasia associated with rosacea (Figure 2).¹⁷ Although older devices were limited by lack of power and inadequate cooling, newer devices have been improved with robust cooling capabilities, much higher power in the shorter pulse durations, and a large spot size. All of these features have resulted in rapid, more effective, and safer treatments. Pulse stacking and multiple pass techniques also can be used to enhance efficacy.¹⁸ Data on the latest generations of both PDL and IPL devices suggest comparable improvement of 50% to 100% in telangiectasia in 1 to 2 treatment sessions⁸; however, most studies suggest that the inflammatory lesions of rosacea are not improved with these physical devices or other laser and IPL systems.¹⁹

Long-pulsed 532-nm lasers have a long history of use and efficacy in treating both the telangiectasia of rosacea and photodamage.²⁰ Low-powered devices can trace vessels, but their efficacy is limited to small and scattered vessels. High-powered, long-pulsed devices can target smaller vessels with short 10-millisecond pulse durations and larger vessels with 40-millisecond pulses. Contact cooling is an essential component of treatment that prevents damage from melanin absorption of light at this wavelength. Multiple passes with ancillary cooling from ice packs or a cold roller to prevent bulk heating can increase efficacy. Pulse stacking can lead to unwanted overheating and scarring. The efficacy of more powerful devices is similar to IPL and PDL, with most patients achieving 50% to 75% clearance in 1 to 2 treatment sessions.²¹

The long-pulsed Nd:YAG laser also has been used to treat facial telangiectasia. This device has been associated with unpredictable scarring, even when using well-established settings.²² A combined 2-wavelength laser—595-nm PDL and 1064-nm Nd:YAG—has been successfully used to treat facial telangiectases (Figure 3).²³ This combination of wavelengths appears to generate methemoglobin and clot

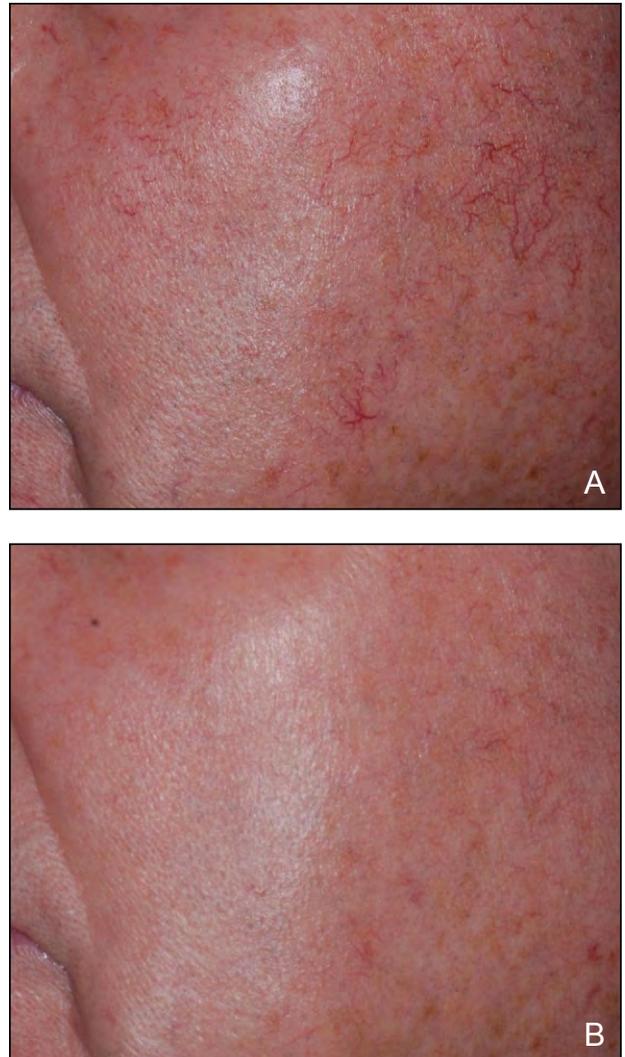


Figure 2. Telangiectasia on the left cheek before (A) and after (B) intense pulsed light treatment using the MaxG Optimized Light handpiece (Palomar Medical Technologies, Inc)(36 J; 10 milliseconds; 2 passes with intermittent cooling).

with the first PDL pulse, which are ideally treated with a relatively low-dose Nd:YAG pulse of energy. This device is particularly well suited for recalcitrant, previously treated facial vessels.

Patient Selection

When used under ideal and optimal conditions, most devices generally produce comparable and reproducible results. Patient selection is important. Individuals with tanned skin or darker skin types can be difficult to treat because melanin is absorbed by the same wavelengths used to treat the targeted blood vessels. It is best not to treat tanned skin. Visual examination and history are helpful when assessing skin

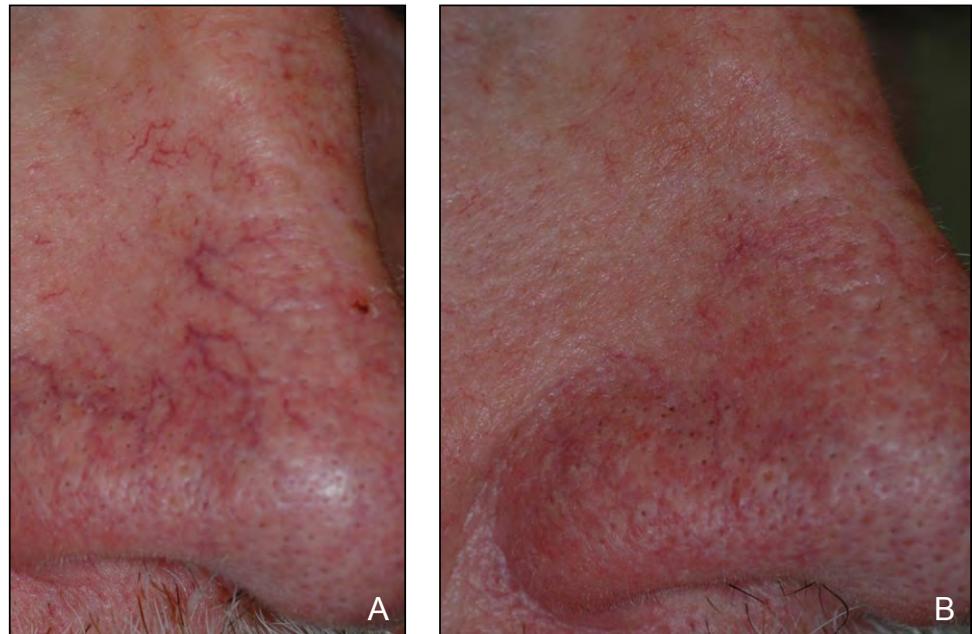


Figure 3. Telangiectasia on the nose before (A) and 1 month after treatment (B) with a combined 2-wavelength laser (595-nm pulsed dye laser and 1064-nm Nd:YAG).

pigmentation but can sometimes be misleading to the clinician. A recent innovation using a melanin index device known as the SkinTel Melanin Reader (Palomar Medical Technologies, Inc) can provide an objective assessment of pigmentation before treatment.²⁴ If there is any doubt regarding suitability for treatment, small test spots should be evaluated within 24 to 48 hours of treatment to provide a more definitive answer and prevent large areas from potentially being exposed to overtreatment.

Prior to treatment, it is important for physicians to be aware of their patients' expectations. Improvements of 50% to 75% in facial telangiectases can reliably be achieved in 1 to 2 treatments with aggressive settings. Providing 100% improvement is difficult, if not impossible, to achieve, which should be made clear to the patient during the informed consent and benefits versus risks discussion before initiating treatment. The duration of response generally is 3 to 5 years based on the experience of one of the authors (E.T.); however, there is interpatient variability with longevity of the therapeutic response. Unfortunately, insurance reimbursement for treatment of these visible signs of rosacea is virtually nonexistent, even though these devices have a long history of success and are approved by the US Food and Drug Administration.

Phymatous changes develop in a relatively small subset of rosacea patients, usually those with the papulopustular or erythematotelangiectatic subtypes,

and can lead to marked disfigurement.^{25,26} The lower nose (rhinophyma) is the most frequently affected site; however, other sites that can be affected are the chin (gnathophyma), forehead (metophyma), ears (otophyma), and eyelids (blepharophyma).²⁶ Because there are no known effective medical therapies for fully developed phymatous changes, physical modalities and/or surgical interventions are commonly used with several approaches reported. These approaches, which are sometimes used in combination, include tangential excision, electroscalpel, dermabrasion, laser ablation, scissor sculpting, radiofrequency electrosurgery, and wire loop electrosurgery.^{25,27-29}

Management Caveats

It is recommended to avoid treatment of tanned skin with lasers and light devices. If there is any doubt, small test spots should be evaluated within 24 to 48 hours of treatment to assist in determining suitability for full-face treatment. Use of a quality melanin index device can assist the clinician in providing an objective assessment of pigmentation before treatment.

Cooling also is an important aspect of treatment. Application of ice packs or cold rollers within minutes after treatment can minimize swelling and reduce discomfort. An optical coupling gel (eg, ultrasound gel) also can enhance cooling when used with a device, which uses contact or air cooling. Pulse stacking (PDL only) and multiple passes (all devices) also can increase efficacy.

Conclusion

Despite the availability of multiple medical therapies for rosacea, physical modalities and devices are helpful in managing specific clinical manifestations of rosacea that are commonly encountered in dermatology practice. Laser systems, such as PDL and Nd:YAG, as well as IPL devices can be used to effectively treat persistently dilated superficial cutaneous vessels that are not responsive to medical therapies used for treatment of papulopustular rosacea, including linear telangiectases and more confluent telangiectatic networks. Diffuse (background) erythema that persists between flares also may improve. It is important for the clinician to be familiar with the specific features of the laser systems and IPL devices they are intending to use to optimize outcomes and reduce the risk for complications. Specific techniques such as using multiple passes, stacking of pulses when using the PDL, and cooling with ice packs or cold rollers within minutes after treatment are all beneficial and assist in obtaining better outcomes. Physical modalities and/or surgical interventions are commonly used alone or in combination to treat phymatous changes, especially rhinophyma. Approaches for the treatment of rhinophyma include tangential excision, electroscalpel, dermabrasion, laser ablation, scissor sculpting, radio-frequency electrosurgery, and wire loop electrosurgery.

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