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## Clinical Pearls

*Clinical Pearls help prepare residents for the future by providing them with top tips from experts about what they should know about specific, key subject areas by the time they complete their residency.*

# Endpoints in laser surgery

Victor Ross, MD

Endpoints in laser surgery are more important than any settings on a device. It is worthwhile to recognize endpoints for efficacy and safety.

**1. In treating blood vessels with longer pulses (> 5 ms), regardless of wavelength, desirable endpoints include (a) thrombosis of the vessel or (b) stenosis of the vessel.**

Either of these endpoints, particularly if they are still present several minutes after the procedure, are reliable indicators of success and a durable response. An exception is paranasal vessels, which, regardless of immediate endpoint, sometimes persist or recur. Overtreatment is typically associated with immediate tissue graying.

**2. For picosecond and nanosecond pulses for pigmented lesions, the desired endpoint is the lowest fluence that causes mild whitening at the surface.**

One should avoid using a fluence so high that the epidermis is dislodged completely. Retained epidermal debris forms a biological dressing which accelerates healing and decreases the likelihood of postinflammatory hyperpigmentation.

**3. For longer pulsed technologies, such as intense pulsed light, pulsed dye laser, and long pulsed KTP laser, the desired pigment lesion endpoint is progressive darkening of the lesions and mild perilesional erythema.**

Normally these changes require 5 to 20 minutes to evolve. Because these endpoints do not occur immediately, one needs a certain amount of experience to proceed confidently over a large area. One option, particularly when treating large areas, is to (a) perform small test pulses with a range of reasonable fluences, (b) use numbing cream over the entire treatment area for 30-45 minutes, and (c) reevaluate the test spots. By this time, the endpoint should have evolved so that the operator can confidently treat

the remainder of the area without risk of significant side effects. Immediate greying or blistering indicates too high a fluence. In general, for pigmented and vascular lesions, use of a polarizing illuminator head set will enhance visualization of the endpoints.<sup>1</sup>

**4. For treating red scars, one can use either purpuric or non-purpuric settings.**

When applying purpuric settings, which I find works better for most red scars (versus non-purpuric settings), the optimal fluence is one that establishes the smallest amount of purpura, typically for pulsed dye laser, about 4 to 6 J/cm<sup>2</sup> and 0.45 ms. Occasionally, a blanching phenomenon, which can mimic epidermal damage, occurs after pulsed dye laser. The operator should rest assured, however, that with adequate cooling and these lower settings, whether it is for a port wine stain or an erythematous scar, the epidermis will be preserved.

**5. For adnexal tumors (i.e., syringomas or trichoepithelioma) and nevi treated with either Er YAG or CO2 laser, the endpoint should be elimination of the exophytic portion of the lesion, using a series of stacked pulses.**

You may often observe a whitish fibrous stroma at the base of the flattened lesion. Normally the laser surgeon can apply a few more pulses until an approximately 0.25-0.5 mm depression is observed. This type of fine work requires magnification.<sup>2 3</sup>

### References:

1. Ross, E.V., et al., Objective Melanin Measurements: Review of Novel Dosimetry Guidance Device for Intense Pulsed Light in Aesthetic Treatments. *J Drugs Dermatol*, 2016. 15 (4): p. 421-32.
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3. Wanner, M., et al., Immediate skin responses to laser and light treatments: Warning endpoints: How to avoid side effects. *J Am Acad Dermatol*, 2016. 74 (5): p. 807-19. **DR**



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