

PRODUCT APPLICATION

Long-Term Hair Removal with a Novel 0.65 ms Nd:YAG Laser

The LightPod Neo can perform hair removal in a similar fashion to Nd:YAG 1064 nm lasers that employ substantially longer pulse durations.

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In 2006-2007, a study was conducted to evaluate a pulsed Nd:YAG 1064 nm laser for long-term laser hair removal. Unlike conventional lasers and light-based devices in the field, the laser (LightPod Neo, Aerolase), in this evaluation uses a unique 0.65 ms pulse duration with no skin cooling, gels, or anesthetics. Ten female subjects and one male subject aged 30-42 years with Fitzpatrick Skin Types II through VI were treated.

All 1064 nm lasers target melanin in the hair follicles during hair removal treatments. The lasers with the longer pulse durations cause significant heating of the surrounding skin tissue, and consequently they require continuous skin cooling to protect the epidermis and reduce pain during treatment. In contrast, the LightPod Neo's 0.65 ms pulse duration is below the skin's TRT (thermal relaxation time) of approx. 0.8 ms, which means that it heats the follicle faster than the rate at which the surrounding skin tissue can conduct the heat away; thus the destruction of the follicle is more efficient. Meanwhile, these shorter laser pulses travel through the epidermis 30-50 times faster than a conventional 20-30 ms pulse, avoiding overheating of the epidermis. Thus, no skin cooling is required and treatment is pain-free, with minimal likelihood of side effects on darker skin such as hypopigmentation.



Fig. 1: David J. Friedman, M.D., administers LightPod Neo laser treatments, which require no skin cooling, gels or anesthetics



Fig. 2 Treatment of upper lip before (top) and 8.5 months after fifth treatment.

The LightPod Neo produces the necessary fluences for hair follicle destruction at this pulse duration by generating up to 15,000 watts of optical energy per pulse. But the main question addressed in the study had to do with clinical efficacy. Would this device — contrary to conventional expectations about the use of longer pulse durations for hair removal — have the capability of delivering long-term results?

Study subjects were treated for laser hair removal in various anatomic sites including upper lip, chin, anterior and posterior neck, and axillae. Patients underwent three to seven treatments each, with sessions spaced approximately one month apart. Subjects presented with visible stubs of the hairs in the treated areas, and individual follicles were treated with the laser pulses, as opposed to the method of covering the full treatment area, including follicle-free skin between targeted hairs. Spot sizes of 5 mm and 6 mm were used and fluences were increased gradually from as low as 21 J/cm² in initial sessions to as high as 51 J/cm² in later sessions to compensate



Fig. 3. Treatment of axilla before (top) and 11.5 months after third treatment.

for the reduction in melanin of the targeted hairs as treatments progressed (this increase in fluence was subject to skin tolerability, and somewhat lower fluences were used with very dark skin tones). No skin cooling, gels or anesthetics were used at any time. Long-term results were recorded at 4 to 11.5 months after the final treatment for each subject.

During the treatments, visible charring of hairs and perifollicular edema were observed; these are known to be the clinical endpoints of laser hair removal. Post-operative erythema was observed only a few times and when it occurred it was very mild and transient. All subjects described pain as very low or tolerable; none reported or presented with any pigmentary changes or other complications. Treatment times were quick due to the method of targeting individual follicles rather than treating full areas of skin

and because no application or cleanup of gels or anesthetics was required.

The long-term results showed significant clearance of hair, as reported by the subjects and confirmed photographically. After an average of 8.3 months following subjects' final treatment session, greater than 75 percent clearance was observed in most patients. Those treated five to seven times had 82 percent to 93 percent clearance on average.

Findings suggest that, from the standpoint of clinical efficacy, the Neo can perform hair removal in a similar fashion to Nd:YAG 1064-nm lasers that employ substantially longer pulse durations. This is true not only in terms of the percentage of hair clearance achievable in a given number of treatment sessions but, of particular importance, in terms of long-term results. When combined with the other advantages of the 0.65 ms pulse duration mentioned above— no skin cooling with virtually no treatment pain and the ability to safely treat any skin type—this makes the Neo a unique addition to the field of Nd:YAG lasers from a clinical performance standpoint. The treatment is also very hygienic as no skin applicator is used and the hand-piece does not contact the skin.

The physical characteristics of the LightPod Neo laser are also unique. Due to its air-cooled emitter design, it is a compact and portable 22 pound briefcase-sized device, in marked contrast to large conventional water-cooled laser systems. The Neo design has eliminated the water circulating subsystem as well as fiber optic cables and lightguides that are common in other systems, which results in a highly affordable device that is essentially maintenance-free.

Dr. Friedman is Director of the Lase Ohr Dermatology Cosmetic Laser Institute in Jerusalem, Israel. Laser hair removal is one of his special areas of research interest in addition to being a significant aspect of his private practice.