

# Comparison of High-fluence, Single-pass Diode Laser to Low-fluence, Multiple-pass Diode Laser for Laser Hair Reduction With 18 Months of Follow Up

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## ABSTRACT

Laser hair removal is the most popular laser procedure in the United States (U.S.), yet there has not been a prospective study demonstrating long-term efficacy of diode laser hair removal beyond six months. A prospective, single-center, bilaterally paired, blinded, randomized comparison split leg study was carried out with 22 patients comparing high-fluence, single-pass diode laser to low-fluence, multiple-pass diode laser. Hair counts were done six and 18 months following five treatment sessions and were found to be comparable to 90–94 percent hair reduction. Hair counts at six months following the fifth treatment were comparable to hair counts at 18 months, indicating that sixth-month hair counts can be considered indicative of long-term results. The low-fluence, multiple-pass in-motion technique was associated with significantly less pain compared to the high-fluence, single-pass technique. Multiple passes of a diode laser at low fluences but with high average power results in permanent hair removal with less discomfort and fewer adverse effects, especially in darker skin.

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## INTRODUCTION

High-fluence diode lasers with contact cooling have emerged as the gold standard to remove unwanted hair.<sup>1</sup> There have been multiple studies demonstrating efficacy of laser hair removal at one to six months following the final treatment, including a meta-analysis<sup>1</sup> and a Cochrane review.<sup>2</sup> However, there has been only one prospective study demonstrating hair removal efficacy beyond six months following the final treatment, which in that case compared the alexandrite to the Nd-Yag laser.<sup>3</sup> In addition, laser hair removal is associated with pain and side effects, especially when treating dark or tanned skin. A novel diode laser with low-level fluence (5–10 J/cm<sup>2</sup>) with a high repetition rate at 10 Hz (Soprano SHR by Alma Lasers, Chicago, IL) and using multiple passes in constant motion was compared to a traditional one-pass high fluence (25–40 J/cm<sup>2</sup>) diode laser (LightSheer ET, Lumenis, Santa Clara, CA).

The first study was designed to evaluate the hypothesis that low-level diode laser fluences done repetitively on a hair follicle will produce permanent hair removal with less discomfort and fewer side effects than will a single high-fluence pulse was published in this journal.<sup>4</sup> Hair counts were done six months following the fifth treatment comparing the two lasers, and were found to be comparable. This paper reports further data from the original study with an 18-month follow-up following the final treatment. Hair counts done at six months following the final treatment correlate very well with hair counts done one year later.

## PATIENTS, MATERIALS AND METHODS

This prospective single-center, bilaterally paired, blinded, randomized comparison study was conducted in accordance with recognized Good Clinical Practice (GCP/ICH) guidelines and applicable regulatory requirements. Thirty-three female subjects (skin types I–V) with hair on the legs who in the opinion of the investigator were viable candidates for laser hair removal were enrolled in the study. These patients were offered five complimentary laser hair removal treatments on their legs as an inducement to enroll in the study. Alma lasers partially funded the cost of doing the initial study.

Subjects were to be between 25 and 65 years of age, in good general health with no known photosensitivity or use of medication with photosensitivity as a side effect, no obvious skin disease or history of chronic skin disease other than moderate facial acne vulgaris, no history of keloid or hypertrophic scar formation, and no tattooing in the treatment area. Subjects were excluded if: they were pregnant, nursing or unwilling to use birth control during the study period if of childbearing age; they had waxed the lower legs or undergone therapy with any radiofrequency or light source; they used prescription or over-the-counter therapy to the skin of the lower leg within 30 days prior to enrollment; they had history of any confounding cancerous or pre-cancerous skin lesions; or they had been treated with an investigational drug or device within 30 days prior to and during the study period. Tanning for at least 30 days prior to and during the study period was discouraged. Shaving the legs was permitted; waxing was prohibited.