A SidebySide Comparative Study of 1064 nm Nd: YAG, 810 nm Diode and 755 nm Alexandrite Lasers for Treatment of 033 mm Leg Veins

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Abstract

BACKGROUND: Laser and intense pulsed light device treatments of leg veins have generally yielded disappointing results. Use of longer wavelengths, longer pulse widths, and better cooling devices have recently sparked renewed interests in these methods.

OBJECTIVE: To prospectively compare, side by side, a 3-msec cryogen spray-equipped 755 nm alexandrite, a sapphire window cooled super-long-pulse 810 nm diode, and a variable pulse width, cryogen spray-equipped 1064 nm Nd:YAG laser for the treatment of 0.3–3mm leg veins.

METHODS: Thirty female volunteers, skin types I–V, age 32–67 years with comparable sets of leg veins were treated with the Nd:YAG laser and either the diode laser, alexandrite laser, or both. In most patients two to three sets of comparable sites were treated. Treatment parameters varied with each laser and according to the size of veins being treated. Patients were examined 1 week after each treatment and at 1, 2, and 3 months after the last treatment. Pre- and posttreatment 35mm photographs were taken. Improvement was judged by two experienced physicians both visually on patients and by comparison of pre- and posttreatment photographs. Results were graded as percent resolution, in five groups, 0%, 0–25%, 25–50%, 50–75%, and 75–100%.

RESULTS: In the 22 patients completing the study, 36 leg vein sites were treated with the Nd:YAG laser, 18 leg vein sites were treated with the diode laser, and 12 leg vein sites were treated with the alexandrite laser. Greater than 75% improvement was observed at 88% of the Nd:YAG laser-treated sites, 29% of the diode laser-treated sites, and 33% of the alexandrite laser-treated sites. Greater than 50% improvement was observed at 94% of the Nd:YAG laser-treated sites, 33% of the diode laser-treated sites, and 58% of the alexandrite laser-treated sites. Less than 25% improvement was observed at 6% of the Nd:YAG laser-treated sites, 39% of the diode laser-treated sites, and 33% of the alexandrite laser-treated sites. Pain during treatment was variably perceived by patients, but occasionally sufficient for patients to decline further treatment. Posttreatment purpura and telangiectatic matting were a significant drawback for the alexandrite laser. Transient hemosiderin pigmentation, as seen with sclerotherapy, was common with larger vessels.

CONCLUSION: The cryogen spray-equipped 1064 nm Nd:YAG laser was remarkably effective and safe for the treatment of 0.3–3 mm leg veins. The use of topical anesthesia may be needed for some patients. The super-long-pulse 810 nm diode laser gave unpredictable results. Additional refinements of fluence and pulse width could improve its performance. The 3-msec, 755 nm alexandrite laser at fluences of 60–70 J/cm^2 and an 8 mm spot can be effective, but inflammatory response, purpura, and matting limit its usefulness. Longer pulse widths might decrease these problems.

For leg vein treatment, the 1064 nm wavelength is very safe for type V skin, the 810 nm wavelength at super-long pulse widths of 400–1000 msec is very safe for type IV and marginal for type V skin, and the 755 nm wavelength is limited to nontanned type I–III skin.

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