# Successful Treatment of a Residual, Thick, Infantile Hemangioma in a Darker Phototype Pediatric Patient Using the 755 nm Long-Pulsed Alexandrite Laser

Infantile hemangiomas are common, benign tumors of childhood that are estimated to affect approximately 5% to 10% of children.[1] When large and deep, infantile hemangiomas can pose therapeutic challenges for clinicians, especially when they do not completely involute. There is limited experience using the 755 nm long-pulsed alexandrite laser for hypertrophic port-wine stains and infantile hemangiomas.[2–5] The authors present a case of a thick, partially treated, residual infantile hemangioma effectively and safely treated with the 755 nm long-pulsed alexandrite laser using pulse stacking in a dark phototype patient.

A 2-year-old Hispanic girl of Fitzpatrick skin Type IV presented with a partially regressed infantile hemangioma. The patient had an uncomplicated term birth, and there was no use of fertility medications. There is no family history of infantile hemangiomas. The patient was previously treated with oral propranolol between the ages of 6 and 12 months. On physical examination, a $7 \times 10$ cm nodular, telangiectatic plaque was present on the right lower extremity involving the skin of the distal upper leg, knee, and the proximal lower leg (Figure 1). As an alternative to the proposed surgical excision with skin grafting, the affected area was treated with a 755 nm long-pulsed alexandrite laser with parameters of 15 millimeter spot size, fluence of 25 to 30 J/cm$^2$, 3 ms pulse duration, and cryogen spray cooling with spurt duration of 40 ms. Pulse stacking was performed with 3 to 5 pulses per area to an end point of transient vessel darkening at an approximate repetition rate of 1 pulse per 3 to 4 seconds to avoid epidermal damage. Topical anesthesia with 5% lidocaine cream and intermittent ice application was used. After 6 treatments over 14 months, the patient had significant reduction in the color and thickness of the hemangioma (Figure 2). To further induce hemangioma regression, 3 additional treatment sessions using 755 nm alexandrite laser were performed over the following year to debulk the lesion until it was no longer palpable. One fractional ablative $CO_2$ laser treatment was subsequently used to improve the skin texture (Figure 3). The patient tolerated the procedures well without complications

**Figure 1.** Partially regressed infantile hemangioma before treatment.


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**Figure 2.** Partially regressed infantile hemangioma after six 755 nm long-pulsed alexandrite laser treatments.

including pain, crusting, scaling, blistering, scarring, or dyspigmentation.

## Discussion

Various treatments for infantile hemangiomas have been described.[1] They include oral and topical beta blockers, oral and intralesional glucocorticoids, interferon-alpha, vincristine, surgical excision, embolization, and laser therapy. Although the pulse-dye laser successfully treats vascular lesions, it is generally ineffective for the treatment of deep infantile hemangiomas because of its limited penetration depth of 1.2 mm.[1] Lasers with longer wavelengths, such as the 755 nm long-pulsed alexandrite laser and 1,064 nm neodymium-doped yttrium aluminum garnet laser, have the advantage of deeper penetration for thicker lesions and reduced absorption by melanin, making them safer in darker phototype skin.

There is limited experience treating vascular lesions, especially deep and thick infantile hemangiomas, with the 755 nm long-pulsed alexandrite laser, and no study has used the pulse stacking technique.[2–5] The authors showed that the 755 nm long-pulsed alexandrite laser

**Figure 3.** Partially regressed infantile hemangioma after additional alexandrite and fractional ablative $CO_2$ laser treatments.

with stacked subpurpuric fluence pulses is effective in the treatment of a large, partially regressed, deep, nodular infantile hemangioma that was previously treated with oral propranolol. It suggests that the 755 nm long-pulsed alexandrite laser may be an effective therapeutic intervention for stable or involuting thick infantile hemangiomas or as an adjunctive treatment for those that do not completely involute in response to oral beta blockers. The patient had an excellent cosmetic outcome without adverse effects despite having darker skin color and was spared an extensive surgical excision with a skin grafting

procedure. This was accomplished by using cryogen cooling and intermittent ice application to limit epidermal damage, low fluence with pulse stacking to confine thermal damage to vascular targets, and a large spot size to enhance the depth of penetration. The authors used stacked pulses of lower fluence with the intent of achieving a similar effect on the vascular target as a single pulse at higher fluence while decreasing the risk of epidermal damage.

Limitations of this report include the fact that it documents a single case. Clinical results and side effects for patients may be dependent on operator experience. A large, prospective, randomized controlled trial with a rigorous control group examining the effects of the long-pulsed alexandrite laser on infantile hemangiomas with deep components is warranted to define the ideal laser settings and treatment frequencies. In addition, investigations comparing the concurrent or sequential use of oral propranolol and alexandrite laser would be of interest to delineate the best treatment algorithm and optimize management of complicated and deep infantile hemangiomas.

## References

1. Drolet BA, Esterly NB, Frieden IJ. Hemangiomas in children. N Engl J Med 1999;341:173–81.
2. Izikson L, Nelson JS, Anderson RR. Treatment of hypertrophic and resistant port wine stains with a 755 nm laser: a case series of 20 patients. Lasers Surg Med 2009;41:427–32.
3. Tierney EP, Hanke CW. Alexandrite laser for the treatment of port wine stains refractory to pulsed dye laser. Dermatol Surg 2005;37:1268–78.
4. Remlova E, Dostalova T, Michalusova I, Vranova J, et al. Hemangioma curative effect of PDL, alexandrite, Er:YAG and CO(2) lasers. Photomed Laser Surg 2011;29:815–25.
5. Su W, Ke Y, Xue J. Beneficial effects of early treatment of infantile hemangiomas with a long-pulse Alexandrite laser. Lasers Surg Med 2014;46:173–9.

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