

# Rapid Resolution of a Segmental Infantile Hemangioma Using Non-thermal Low-frequency Ultrasound: A Novel Therapeutic Intervention

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## ABSTRACT

### BACKGROUND

Facial segmental hemangiomas are common benign vascular neoplasms typically developing during the first year of life. They generally involute spontaneously by age 5 months. However, they can be associated with serious complications, including ulceration, infection, pain, hemorrhage, structural abnormalities, and interference with respiration and vision. Standard care includes oral corticosteroids and laser therapy.

### OBJECTIVE

This case report describes the effectiveness of non-thermal, low-frequency, therapeutic ultrasound (LFTU) treatment in a 5-month-old infant with an ulcerated, segmental facial hemangioma that impeded vision and had become necrotic, hemorrhagic, and painful despite conventional treatments. Clinical data suggests that non-thermal LFTU delivered via sterile saline mist promotes healing in recalcitrant and painful wounds.<sup>1-3</sup>

### METHODS

The original treatment plan was to use LFTU to debride the wound of necrotic tissue, allow it to heal, insert a series of tissue expanders and resect the hemangioma. Debriding necrotic tissue surgically or enzymatically was deemed impossible due to pain, the potential for bleeding, and the necessity for the repeated use of general anesthesia. LFTU was used in conjunction with moist wound healing.

### RESULTS

Daily, painless, 3-7-minute LFTU treatments were administered. Within 1 week, granulation tissue replaced necrotic tissue. The wound began to epithelialize and decrease in size. By week 2, the hemangioma unexpectedly began to involute. The combination of ulcer healing and involution allowed the steroids to be weaned and the laser treatments to be discontinued. Within 7 weeks, complete healing had been achieved. Involution continued after LFTU was discontinued.

### DISCUSSION

The rapid, painless healing of this ulcerated facial hemangioma suggests that LFTU may benefit other complicated hemangiomas.

### REFERENCES

- Ennis WJ, Formann P, Mozen N, et al. Ultrasound therapy for recalcitrant diabetic foot ulcers: results of a randomized, double-blind, controlled, multicenter study. *Ostomy Wound Manage* 2005;51(8):24-39.
- Kavros SJ, Miller JL, Hanna SW. Treatment of ischemic wounds with noncontact, low-frequency ultrasound: the Mayo clinic experience, 2004-2006. *Adv Skin Wound Care*. 2007;20(4):221-6.
- Gehling ML, Samies JH. The effect of noncontact, low-intensity, low-frequency therapeutic ultrasound on lower-extremity chronic wound pain: a retrospective chart review. *Ostomy Wound Manage*. 2007;53(3):44-50.

\*MIST® Therapy, Celleration, Inc., Eden Prairie, Minnesota.



Low-frequency therapeutic ultrasound waves are delivered via sterile saline mist. The device does not contact the wound.

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## CASE HISTORY

The patient was born on December 11, 2006 after an uneventful pregnancy. Shortly after birth her mother noted a faint pink hue on the left side of her face, which grew rapidly into a large segmental hemangioma. By 1 month of age, the hemangioma was causing significant discomfort and affecting her vision. She was started on oral corticosteroids; however, the lesion continued to enlarge and ulcerate.

In February 2007, laser therapy was initiated on an every-fourth-week schedule, resulting in some involution of the lesion. The plan was to place tissue expanders and eventually resect the hemangioma. However, the tissue expanders could not be placed with the open wounds present. Topical treatments for the ulcerated lesion included a hydrogel, becaplermin, and Betadine.

In May 2007, she presented to our clinic with a segmental hemangioma that involved the left side of her face and obstructed her vision. There was a necrotic wound in the central portion of the lesion measuring 6.0 x 7.0 cm. The wound was painful and bled easily. The patient was irritable, and reportedly fed poorly.

Our initial plan was to remove the necrotic tissue to prepare the wound for grafting with bioengineered skin or other advanced wound care techniques. Sharp debridement was not an option due to risk of bleeding. Moreover, a general anesthetic would have been required for even minor debridement. Likewise, we feared that topical enzymatic debriding agents would add to her discomfort. Although we had achieved prior success in using LFTU for painless debridement in adult patients with arterial and venous leg ulcerations, we had not yet used this treatment on children.

On May 17, 2007, daily treatments with LFTU were initiated. Duration of each treatment was based on wound area per the treatment algorithm provided by the manufacturer and ranged from 7 minutes per day for the initial wound area of 42 cm<sup>2</sup> (6.0 x 7.0 cm) to 3 minutes per day when the wound area reached less than 10 cm<sup>2</sup>. The treatments did not appear to cause discomfort. After each treatment, bacitracin and Adaptic® (Johnson & Johnson, Somerville, New Jersey) were applied. There was an immediate improvement in the wound with a reduction in the nonviable tissue and an increase in granulation.

By May 24, 2007, the wound had begun to epithelialize and measured only 3.0 x 5.0 cm. On May 31, 2007, it was noted that the hemangioma had begun to involute. On June 7, 2007, the open area measured 2.0 x 4.5 cm. Laser treatments were discontinued and we began to wean the patient from her steroids. One month into therapy the wound had divided into two areas of 1.0 cm<sup>2</sup> and 1.4 cm<sup>2</sup>. We decreased the MIST treatments to 3 times weekly.

On July 2, 2007, the wound was completely closed, eliminating the need for a skin graft. Her vision was no longer affected, her appetite had improved, and she appeared to be in less pain. Steroid treatment was discontinued and no further laser treatments were required. The hemangioma has continued to involute and we are observing this process on an ongoing basis.

