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## LASER THERAPY — Treatment of choice for vascular malformations and complicated hemangiomas

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When a child presents in clinic with a vascular lesion, such as a hemangioma or port-wine stain, it is sometimes difficult to determine who may benefit from a laser surgery referral. Vascular lesions are among the most common types of birthmarks. Made up of a mass of dilated blood vessels, they are red or reddish-purple in color and may appear as a flat patch or spot on the skin, or may be elevated. Depending on the type of lesion the child has, it may or may not go away with time, and may or may not require treatment.

Since the advent of yellow-light lasers in the late 1980s, treatment of vascular lesions with laser therapy has greatly improved cosmetic outcomes and, in the case of troublesome hemangiomas, can prevent destructive complications such as damage to a child's vision, or obstruction of the airway.

Traditional yellow-light lasers, still used in many settings today, use short-pulse duration, necessary to prevent the skin from burning during treatment. The risk of burning and discomfort also means that treatment sessions cannot be extensive, and multiple sessions may be necessary to achieve satisfactory results. Nevertheless, for many patients, short-pulse laser therapy provides marked improvements and prevents complications that could arise if the lesions were to go untreated. Still, some pronounced vascular lesions have remained resistant to short-pulse laser therapy and the positive outcomes are minimal in these cases.

With recent advances in laser therapy, this is no longer true. Dye Lasers have been developed with longer pulse durations that penetrate the skin and larger-caliber blood vessels better than traditional short-pulse lasers, resulting in more complete removal of vascular lesions than ever

before possible. In addition, the development of the Dynamic Cooling Device (DCD), which sprays coolant on the skin milliseconds before each laser pulse, enables the skin to withstand greater exposure to the laser without burning. This is done with very little, if any, bruising or swelling and minimal discomfort.

## **Hemangiomas**

In most cases, these benign tumors are not apparent until shortly after the child is born. Often these birthmarks first appear as a dark or slightly discolored area on the skin that later becomes raised and darkens as it grows. They can occur anywhere on the body.

Some hemangiomas exist mainly on the surface of the skin. Others, known as cavernous hemangiomas, reach down into the deeper layers of the skin. They are red spongy masses that are filled with blood.

During the first few months of life, hemangiomas grow rapidly and can become quite large. They then go into a period of rest during which there is little change, and then start to involute. Depending on the size and depth of the mature hemangioma, it can take up to several years to completely disappear. If the hemangioma exists primarily on the skin's surface, there may be no evidence that it was there once it has totally regressed. However, deeper hemangiomas often leave a permanent change in the appearance of the skin in that area, requiring plastic surgery to correct residual deformations.

## **When is treatment of a hemangioma necessary?**

While most hemangiomas eventually disappear on their own and require no treatment, some – especially those that are large in size – can be troublesome or even destructive, requiring surgical intervention. For example, a hemangioma on the eyelid or near the eye can obstruct vision and may cause permanent eye damage. Hemangiomas on or near the lip or nose can block the airway or interfere with feeding. Laser therapy in these cases can arrest the development of the hemangioma, preventing serious complications that may compromise the child's well-being, as well as secondary cosmetic deformities.

Large, cavernous hemangiomas can become infected and develop painful ulcers that bleed. A single treatment with the laser frequently leads to total healing of the ulceration within three weeks of treatment and helps prevent further complications. Laser treatment can also stop the growth of the hemangioma in a young child.

## **Vascular malformations**

A vascular malformation may appear as a flat birthmark on the skin (although the skin in this area may be somewhat thickened). The blood flowing through the mass of vessels is what causes the red or purplish color. Unlike hemangiomas, most vascular malformations do not go away with age, but rather, grow as the child grows, and are permanent. The most common types of vascular malformations are port-wine stains and what are commonly called "stork bites" or "angel kisses."

Stork bites: As many as 30 to 50 percent of all newborns have these flat pink spots on the skin, also referred to as "angel kisses." They appear on the face and neck, in areas such as the eyelids, upper lip, back of the neck or forehead. When the baby cries or when the temperature gets warmer, the spots may become redder. In almost all cases, these types of vascular malformations will fade as the baby grows and surgery is not necessary.

Port-wine stains: These flat, reddish or purple “stains” on the skin most commonly appear on the face, although they can occur on other parts of the body. They are also called capillary malformations. The skin in the area of the capillary malformation often thickens and toughens with age, and vascular growths become more prominent. These growths bleed easily when injured. If a person has a capillary malformation on their arms or legs, it can be associated with accelerated growth of the soft tissues and enlargement of the arm or leg.



### **Treatment almost always necessary**

Because a port-wine stain is permanent and enlarges as a person grows, there are concerns about how this type of birthmark may affect a child socially and emotionally later in life, especially when the capillary malformation is on the face. Left untreated, there is also the risk that the skin of the birthmark will thicken, toughen and becomes granulated as the person ages.

*The Candela Vbeam long-pulse dye laser includes a Dynamic Cooling Device (DCD) that shoots a jet of cryogen spray onto the skin milliseconds before each laser pulse. The spray cools the skin making treatment markedly less painful, with little if any residual bruising. This allows for longer treatment sessions and deeper penetration of the skin and larger-caliber blood vessels, resulting in more complete removal of vascular lesions (such as the port-wine stains covering the body of the child pictured above) than ever before possible.*

When a port-wine stain is located in the area of the trigeminal nerve (around the forehead, cheekbone and eye on one side) it can be an indication of more serious blood vessel malformations in the eye and/or brain. This condition is known as Sturge Weber Syndrome. In addition to treating the child’s port-wine stain with laser therapy, further testing by a neurologist and ophthalmologist are important. In some cases the condition can be related to secondary glaucoma.

Traditionally, short-pulse laser surgery has allowed the surgeon to greatly lighten capillary malformations through several treatments, but it has often been impossible to remove the birthmark completely. However, advancements in laser technology have now made it possible to achieve remarkable results, further minimizing the appearance of port-wine stains.

### **Removal of spider veins and scars**

In addition to the treatment of vascular lesions, laser therapy is highly effective in removing “spider” veins, often found in the legs, and for improving the appearance of scar tissue. As with vascular malformations and hemangiomas, the procedure is done during same-day surgery and, in most cases, anesthesia is unnecessary with the use of the Dynamic Cooling Device. Often, multiple treatments are scheduled if large areas are to be treated.

For further information about the Minnesota Center for Craniofacial Services at Gillette Children’s, please call (651) 229-3905. To refer a patient or make an appointment, please call (651) 229-3944.