

PHACE Syndrome Family Conference

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Laser Treatment Basics

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DISCLOSURE OF RELATIONSHIPS WITH INDUSTRY , CONFLICTS OF INTEREST

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DISCLOSURES

I do not have any relevant relationships with industry.

Laser Basics

- How are lasers used to treat skin conditions
- How are lasers used to to treat infantile hemangioma
- What to expect
 - What does it feel like
 - What can be done to reduce discomfort
 - Treatment without sedation or general anesthesia
 - Anesthesia/sedation recent controversy and research
 - How many treatments
 - What will the skin look like following treatment
 - Aftercare
- Special considerations

What is a LASER

- LASER
 - *L*ight
 - *A*mplification by
 - *S*timulated
 - *E*mission of
 - *R*adiation
 - Visible light **NOT** X-ray radiation for Dermatology lasers

LASER

- Selective photothermolysis
 - Anderson and Parrish 1983
 - Laser energy can be directed at a specific target
 - Leads to a targeted destruction with reduced “collateral damage”
- This principle has been essential for creating different kinds of lasers that target a variety of skin conditions
 - Vascular lesions
 - Pigmented lesions
 - Tattoo pigments

A Laser Designed for the Target

- Pulsed Dye Lasers (PDL)
 - Lasers with wavelengths between 585nm-600nm and lead to destruction of the vessels within a vascular birthmark
 - Originally designed to treat flat “port wine stain” birthmarks
 - Considered a “non-ablative” laser (less destructive)
- What is the target in a hemangioma?
 - Blood vessels that contain blood/blood cells
 - Blood cells contain the protein **oxyhemoglobin**
 - **Laser energy is absorbed by the blood cells in the IH leads to destruction**
 - **“Mopping up”**
 - PDLs used for hemangiomas can penetrate ~1.5-2mm
 - Doesn't reach the deeper portion
 - Multiple treatments are required

Pulsed Dye Laser

- Wavelength 595nm is common
- Pulse duration
 - Laser is fired in a pulsed fashion
- Energy emitted with each pulse
 - Type of lesion
 - Skin type
- Spot size
 - Size of the beam of light
 - Corresponds to the surface area treated with each pulse
 - 7mm-10mm
- Epidermal cooling system
 - Protects the skin cells and pigment
 - Reduces the discomfort

Pulsed Dye Laser Treatment Hemangioma

- Multiple laser treatments required
- The number of treatments depends upon the stage
- Laser is uncomfortable
 - Anesthetic creams
 - Cooling device built into the laser helps
 - General anesthesia/sedation may be required to treat larger lesions in young children
- Eye protection is a must to protect the vision
 - Pads and external laser goggles (look like opaque metal “swim goggles”)
 - Insertion of metal eyeshield (“contact lens”) treating lids

Pulsed Dye Laser Treatment

- Proliferative stage
 - Hemangioma is growing so competing with growth
 - More frequent treatments required
- Involuting/residual stage
 - Not growing
 - Leftover “spidery vessels” may not clear completely
- To manage ulceration
 - Described in literature to heal ulceration in a focal area
 - May make ulceration worse in some patients

Hemangiomas are Heterogeneous

- No single formula
 - Few well designed studies to answer the questions
 - Interpreting the medical literature is challenging
- Comparing “apples to oranges”
 - Different thickness
 - Different sizes of blood vessels within the hemangioma
 - Different stages of growth and resolution

Laser Reactions

- Feels like a “rubber band snapping against skin”
 - Lasts for a short time
- *Swelling*
- *Bruised appearance (purpura)*
 - Lasts several days
- Ulceration
- Pigment changes
- Atrophy
- Thickened (Hypertrophic Scars)

- **Normal activity after treatment**

Pulsed Dye Laser Treatment Hemangioma Summary

- Timing is individualized
 - Early treatment is competing with growth
 - Multiple treatments more frequently than for PWS
 - Later treatment during involution
 - Can be challenging to treat a toddler
 - Residual fibrofatty tissue or larger spidery vessels
 - Laser for ulceration
- Limited depth of penetration
- Better response described in smaller thinner hemangiomas
- Pulsed Dye Lasers are rarely used alone to treat life or function threatening hemangiomas located on the surface of the skin

Fractional Resurfacing

OBSERVATION

ONLINE FIRST

Ablative Fractional Resurfacing for Involved Hemangioma Residuum

Lori A. Brightman, MD; Jeremy A. Brauer, MD; Vitaly Terushkin, MD; Christopher Hunzeker, MD; Kavitha K. Reddy, MD; Elliot T. Weiss, MD; Julie K. Karen, MD; Elizabeth K. Hale, MD; Robert Anolik, MD; Leonard Bernstein, MD; Roy G. Geronemus, MD

Background: Given the natural tendency for 15% to 40% of infantile hemangiomas to spontaneously involute over time, much debate surrounds the issue of treatment. Until recently, effective therapies to improve the appearance of residual textural skin changes in these patients were lacking. We suggest the use of ablative fractional resurfacing for the treatment of textural skin changes resulting from involuted hemangiomas.

Observations: All patients treated with an ablative fractional carbon dioxide laser experienced considerable

flattening of the fibrofatty residual tissue, with at least 50% to 75% improvement in color, texture, and overall appearance.

Conclusion: While additional future studies are needed, we believe that ablative fractional resurfacing should be considered for the treatment of textural skin changes associated with involuted infantile hemangiomas.

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Fractional Resurfacing

- Different type of laser “skin –resurfacing”
- Managing the texture changes/scars
- Goal is to restructure the deeper layers of skin tissue
- “Ablative laser” more destructive than ”non-ablative” PDL
 - Creates injury confined to tunnels in the skin and then cells from healthy un-injured skin can migrate in and re-populate the area
 - Stimulates collagen and fibrous cells that support the skin
- Operator dependent- **REQUIRES EXPERTISE**
 - Special considerations in children, limited use reported in the literature
- Easier to cause damage with this type of laser than PDL
- Multiple treatments
- Painful
- Patients treated using general anesthesia

Brightman LA et al. Arch Dermatol 2012;148:1294-8

Lasers for Hemangiomas

- Each case has to be considered independently
 - What is the goal of treatment?
- Special considerations relate to the size and pattern “segmental hemangioma” in PHACE
 - Deeper component
 - Ulceration risk?
- Defining whether there is a role for combination therapy
 - Medications and laser?
 - Optimal timing?
 - Are their increased risks?
- Role/risks of repeated anesthesia

phace syndrome™ community



www.phaceregistry.com

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