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Lasers and Lights for Treating Pigmented Lesions*

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Outline

Introduction

History

- Pigmented lesions were initially treated with destructive non-selective lasers.
- Now pigment selective Q-switched lasers used.

Epidemiology

- Pigmented skin lesions are exceedingly common.

Basic Science

- Selective destruction of pigmented lesions relies on the theory of selective photothermolysis.
- Melanin has a broad absorption spectrum with absorption steadily decreasing with increasing wavelength.
- Several Q-switched lasers fall within the melanin absorption spectrum. Their nanosecond pulse duration is effective since it is shorter than the thermal relaxation time of melanin.

Indications and Contraindications

Epidermal Pigmented Lesions

- Lentigines, Café au lait macules, and ephelides are common epidermal pigmented lesions that respond to laser treatment.
- Shorter laser wavelengths may suffice as deep tissue penetration is not necessary.
- Multiple treatments are often needed for complete removal.

Dermal Pigmented Lesions

- Melanocytic nevi, nevus of Ota, melasma, post-inflammatory hyperpigmentation, and drug induced pigmentation are dermal pigmented lesions that can be treated with lasers.
- Longer wavelengths may be needed to reach the pigment.

- Multiple treatments are necessary.
- Anesthesia is often needed.

Techniques

Pre-operative Management

- It is important to obtain a medical history prior to treatment and to educate patients about the potential outcomes.
- Anesthesia may be needed for larger or dermal pigmented lesions.
- Appropriate protective eyewear should be on all persons in the room.

Description of Technique

- Laser parameters depend on the particular laser, the patient's skin phototype, and the type of lesion.
- Adequate fluence should result in an immediate uniform ash white color.

Post-operative Management

- An occlusive ointment should be applied and patients should be educated on the healing process.

Adverse Events

Side Effects/Complications

- Post-inflammatory hyperpigmentation, an inadequate response and recurrence of the lesion are the most common side effects.

Prevention and Treatment of Side Effects/Complications

- Using the appropriate laser and fluence can reduce side effects.
- Educating patients so that there are realistic expectations can also help to reduce patient frustration and complications.

Future Directions

- Pico (10^{-12}) and femto second (10^{-15}) domain lasers are being developed.

Conclusions

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