

Editorial

Light-assisted hair removal: facts, expectations and obligations

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Although the socially acceptable levels of facial and body hair vary amongst different societies, the electronic and print media has much sensitized the masses about this issue. Unwanted facial and body hair pose a nagging concern among both females and males. Different physical methods, pharmacologic agents, hormonal treatments, camouflage, electrolysis have been in use since centuries but all of these have limitations of their own and the search for a safe, efficient method continues. Light-assisted hair removal (LAHR), using lasers of different wavelengths and broad-band intense pulse light (IPL) sources because of long-term results, safety and ability to rapidly treat a larger area, has emerged as a promising method (**Table 1**). However, quest for permanent photoepilation to meet patients' expectations is the major goals of this ever-evolving field. Research regarding the hair follicle science and clinical photoepilatory correlation reveals following facts. A laser operator is expected to know, plan and discuss the treatment in the light of following facts.¹

- Melanin is the target chromophore

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Table 1 Different lasers and light sources used for hair removal [1].

Short wavelength
Ruby laser (694 nm)
Alexandrite laser (755 nm)
Intermediate wavelength
Diode laser (800-900 nm)
Intense pulse light (600-1200 nm)
Long wavelength
Nd:YAG laser (1064 nm)

in light-assisted hair removal; hence light hair respond poorly because of lack of target chromophore.

- Hair follicles are best targeted during anagen stage when there is the greatest degree of melanization.
- The type of laser or IPL and their specific parameters must be adapted to the patient's skin type, hair thickness and pigment concentration.
- A short wavelength technology i.e. 500-800 nm is appropriate for light brown/blond hair of thin diameters (Fitzpatrick skin types I-III), whereas larger wavelength i.e. 800-1200 nm is chosen for the darker skin phenotypic individuals with coarse dark brown/black hair (Fitzpatrick skin types IV-VI).
- The pulse duration of impulse should be above the thermal relaxation time (TRT) of the

- epidermis (3-8 ms) and below the TRT of the target cell (80-100 ms).
- The larger spot size (≥ 10 mm) is preferable as it allows the deeper penetration of light.
 - The endpoint of therapy is perifollicular erythema. If not achieved with initial settings, fluence or pulse width may be readjusted. Similarly, fluences should be reduced by 10% to 20% if side effects occur.
 - Topical anesthetics e.g. EMLA, ELMAX, or betacaine might reduce discomfort during treatment. To prevent side effects, skin cooling is mandatory. Contact cooling, cryogen spray, forced air cooling, or application of refrigerated aqueous gel or ice cubes may be used.
 - For permanent photoepilation, damage to the entire germinative area of the hair follicle i.e. bulge and matrix region must occur. Partial germinative zone injury will lead to the development of dystrophic hair which have potential for regrowing during the subsequent hair cycle. Similarly, if only the hair shaft is destroyed, only exogen shedding will occur and hair will regrow subsequently.
 - Multiple repeat treatments are more effective than single treatment.
 - Laser hair removal does not guarantee permanent hair removal, it does extend the 'hair-free' period which can vary from several months to several years with multiple treatments.
 - Variable results have been reported varying from 40% to 80%. Given

the tremendous variation in laser technique, the efficacy of procedure is difficult to study. Marayiannis *et al.*² reported no difference between the efficacy of long-pulsed alexandrite laser and IPL. Similarly, Kamal³ found similar results with long-pulsed Nd:YAG laser and IPL.

- Overall incidence of adverse effects after LAHR appears to be low. Mild, transient erythema and superficial blistering may occur. Hyper- and hypopigmentation are reported in 10-20% of treated individuals.⁴ Hyperpigmentation lasts 8 to 12 weeks, while hypopigmentation can last several months. Paradoxical hypertrichosis adjacent to the treated area has been reported.⁵

Although laser-like devices have been used for photoepilation without much success since 1969, FDA approved the first laser (Q-switched Nd:YAG) for this purpose in 1995. Over the ensuing years, as the biology of hair follicle and laser-tissue interactions were better understood, many new generations of lasers and light sources were marketed. Aggressive marketing by the manufacturers contributed to the popularity of lasers among physicians as well as patients. Nowadays, LAHR has become the standard method of treatment for unwanted hair. Nonetheless, despite all the publicity this modality is still in its infancy and many new facts are being unraveled.

Orringer *et al.* using immunohistochemical staining, before and after laser treatment, did not find destruction of stem cells in the germinative region suggesting that frank destruction of the stem cells does not occur

and some other mechanisms or functional alterations may underlie the clinical results of this method.⁶ The intact stem cells may be responsible for hair regrowth. Photoepilation of grey or salt and pepper hair remains another problematic area. Combined radiofrequency and optical energy technology may produce effective photoepilation of blond and white hair phenotypes.⁷ LAHR may be combined with some other treatment e.g. eflornithine.⁸ Similarly new techniques for skin cooling e.g. pneumatic skin flattening are being developed.⁹

What about patients' expectations? The goals and expectations of treatment vary from patient to patient. Pressurized by heavy investment on these expensive gadgets and patients' demand, laser practitioners often make big, unrealistic claims of hundred percent and permanent hair removal, unfortunately, based on manufacturers' promotional data. Such claims create high hopes and expectations in patients and when these are not met bring a bad reputation to professionals i.e. dermatologists. Isn't fooling the public for short-term monetary benefits a breach in the so called Hippocrates oath 'first do no harm...' which every physician makes before plunging into clinical practice?

Legal issues are also another front.¹⁰ Who should do LAHR? The procedure is being practiced by dermatologists, plastic surgeons, general physicians and even nonphysicians who do not understand the basic principles of photoepilation. All are using this mode of therapy for self-promotion and self-projection. Is this not medical malpractice? Isn't our moral obligation to protect our patients from their

suffering at the hands of these qualified and unqualified quacks? And if yes, how to circumvent this? A hundred million dollar question.

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