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New Hair Removal Methods

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New Hair Removal Methods

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Introduction

Systems for hair removal using lasers and pulsed light sources seek to achieve a stable result without damaging epidermal structures, thus reducing the number and length of sessions over the medium term. In order to meet the requirements of selective photothermolysis, many different laser sources with specific wavelengths and pulse durations have been used.

It should be remembered that effective long-term hair removal requires inducing a selective destruction of both the "bulge" and its vascular papilla. Since these structures are located deep within the skin surface, the laser must be able to effectively penetrate into the tissue. For this reason, sources that emit in the near infrared have rightly been used. Hair removal lasers target the eumelanin which is concentrated in the stem and hair follicle at the level of the dermal papilla and bulge. Such laser systems as the Nd:YAG 1064 nm, the 755 nm Alexandrite, laser diodes and high intensity pulsed light are effective and widespread.

For correct laser hair removal, it is critical to accurately and continuously assess the skin and the anatomical/biological characteristics of the hair: first of all, skin phototype, colour and hair size affect the choice of the optimum wavelength for each patient.

Hair diameter varies, as do its depth and speed of growth. Likewise, hair depth also varies according both to the anatomical site and to the biological cycle of the hair, being shallower in the telogen than in the anagen phase. In any case, the anagen phase is the ideal time to perform the treatment, as it is during this period of growth that concentrations of the target melanin are highest.

It should also be taken into account that as the sessions progress, there may be some lightening and thinning of the hair, structural changes requiring a new operating strategy and treatment protocol. Following the principle of selective photothermolysis, the pulse duration, for example, will have to be changed in order to keep it effective, with shorter durations for finer or lighter hair, increasing the peak power of the pulses.

Major Laser Hair Removal Systems

In addition to the considerations outlined above, the best choice of laser hair removal system will depend to a great extent on the type and variety of treatments a medical practice wishes to perform.

- In general, the Nd:YAG 1064 nm laser is the system with the greatest penetration into the tissue, and provides a safe and versatile approach for patients of dark phototype. This wavelength is also good for treatments for vascular lesions such as telangiectasias of the lower limbs and face, venous lakes of the lips as well as recent well-documented successful treatments of onychomycosis.
- The 755 nm Alexandrite laser system displays adequate tissue penetration and greater affinity with melanin than the Nd:YAG, leading to a more incisive and effective treatment. However, subjects with darker skin types generally need more careful attention, although recent technological innovations have enabled practitioners to use this source with an "in-motion" technique, opening up the opportunity to treat even darker phototypes more safely. This wavelength has thus become the gold standard for hair removal, while it still retains a role as second choice in the treatment of superficial benign pigmented lesions.
- There are also some diode laser systems that enable hair removal treatments to be performed with extreme speed and ease. Such systems are normally used with an in-motion method, generating small pulses with high repetition frequencies.
- Finally, intense pulsed light, while not strictly speaking a laser, is widely used as, in addition to the hair removal process, it can also be used

for organic, vascular and pigmentary rejuvenation treatments. Intense pulsed light can be used to treat large areas of tissue, but as it has a broad emission spectrum, it should be used with extreme caution on darker skin types.

As shown above, although each system has its own objective therapeutic potential, each practitioner's needs will vary according to the type of patients they treat and the variety of treatments they intend to perform.

However, if we narrow the discussion down to depilation alone, where the aim is to carry out highly effective treatment that is respectful of the patient's phototype, then solid state systems (Alex 755 nm and Nd:YAG 1064 nm) are the first choice, as these are the only lasers to offer great flexibility and versatility in terms of operating parameters (pulse duration and peak power).

Although intense pulsed light systems and diode lasers do have documented potential, what usually happens is that as treatment sessions progress, with the lightening and thinning of the residual hairs, a stronger emission mode (with fractionated pulse or shorter pulse duration) is required. In such cases, the ideal solution would be to change the type of laser source in order to optimally complete the treatment cycle. If this is not possible, the results will be more dependent on the practitioner's skill and sensitivity.

By contrast, solid state systems (Alex 755 nm and Nd:YAG 1064 nm) deliver pulses with higher peak powers, or even with very short pulse durations (under a millisecond). This makes it possible to optimise coverage of the operating areas, taking into account how the hair evolves across the various stages of treatment. Although the practitioner's assessment is always decisive for successful treatment, these systems enable the specialist to work under optimal conditions, ensuring flexibility and scientifically recognized operating safety.

Multipass Method with Moveo Handpiece

Recent years have seen a huge increase in demand for hair removal treatments combined with reduced invasiveness. Indeed, patients are demanding increasingly effective procedures, associated with minimal pain and reduced risk of side effects and complications.

It should be remembered that the most frequent complications include post-inflammatory hyperpigmentation, which is usually transient, sometimes permanent hypopigmentation usually due to interference of the wavelength used with epidermal melanin (tanned skin or dark phototypes) or vesicular lesions caused by using excessive fluences which are generally more frequent in dark skin types.

In order to overcome these problems, expand safety margins and deal more easily with darker phototypes, the latest generation of Alexandrite and Nd:YAG laser systems, manufactured by DEKA feature a special handpiece with integrated cooling, known as Moveo (Figure 1). This handpiece makes it possible to use fluid continuous movements over the treatment area (measuring about 10x10 cm) by performing multiple steps (multipass technique) so as to give this area an adequate therapeutic dose without overheating the skin.

Figure 1. Moveo handpiece. The energy emitted by a laser system with wavelength visible and near infrared radiation is largely reflected by the skin. The Moveo handpiece was designed to solve this problem. DEKA has developed a technology that optimise the laser-skin coupling by doubling the transmission of energy. The sapphire tip that comes in contact with the skin decreases the variation in the reflection index by reducing the reflected energy loss.

The handpiece is held in a vertical position, in contact with the skin, applying slight pressure to ensure constant contact between the two work surfaces (i.e. handpiece and skin).

The multipass method with the Moveo handpiece uses specific pulses developed specifically for this handpiece. The treatment is considerably less painful

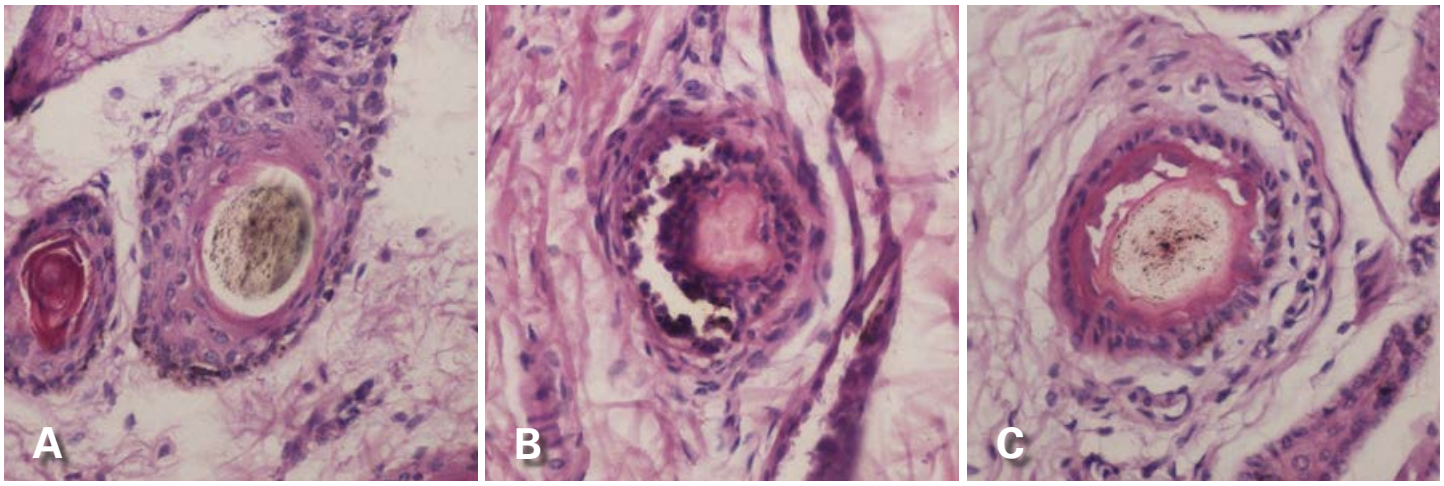

Figure 2. Histological skin preparations stained with haematoxylin and eosin (H&E). (**A**): positive control. The hair has a lamellar structure, the melanocytes and basal cells of the hair bulb are normal, as are their appended sebaceous glands. (**B**): histological image following traditional hair-removal treatment (single-pass) with a DEKA 755 nm laser. Coagulative necrosis of the hair can be observed, with partial detachment of the cuticle and part of the hair cortex. (**C**): histological image following a treatment with the Moveo handpiece (multipass technique) with a DEKA 755 nm laser. Once again, coagulative necrosis, this time of the whole hair (medulla, cortex and cuticle) can be seen.

than the traditional single-pulse method, enabling patients to be treated in greater safety. At the same time its operational effectiveness is comparable to that of the standard method, as shown by a series of major clinical and histological findings (Figure 2).

The procedure using Moveo is both simple and safe to perform, enabling the practitioner to manage the treatment areas in a more uniform way and to minimize the risk of minor burns, especially among darker phototypes. The in-motion method also significantly reduces treatment duration for large areas (such as the trunk and lower limbs).

Patients have also observed improved skin brightness, texture and tone in treated areas, which is closely related to the rejuvenating effects of the 755 nm and/or 1064 nm wavelengths.

Lastly, the benefits of this new treatment mode are confirmed by the high levels of satisfaction reported by patients, as reflected in the growing demand for treatment and maintenance cycles using this technique.

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