The Advance of Non-ablative Laser Approach in Skin Renewal and New Horizons in Laser Aesthetic Surgery

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The Advance of Non-ablative Laser Approach in Skin Renewal

Speaker: Dr. Q. Ren

Laser resurfacing involves ablation of the upper layers of the skin, thermal injury to the dermis and subsequently a healing process that results in an inflammatory response, activation of fibroblasts as well as new collagen and elastic fibres formation. These result in a fresh new looking skin and a healthier dermis. There are, however, some limitation: it is invasive and involves open wound; the recovery process is long; and anaesthesia is required. Hyperpigmentation, in Asian patients in particular, is an important complication. Can we stimulate new collagen deposition in the upper dermis without damaging the epidermis so that lengthy recovery process is not reqiured? These can be achieved by the use of laser with suitable wavelength to achieve localized heating of collagen in the upper dermis. A device to offer optimal protection to the epidermis during the process is also important.

Wavelength selection

The wavelength of 1450 nm, using water as the major absorbent, produces thermal heating that is limited to the upper papillary dermis, which is the most significant area for skin rejuvenation. Undesirable side effects are reduced, as the heating does not go very deep in the dermis and the collateral deep damage is minimized. Moreover, lower fluence can also be used.

Optimal epidermal protection

Dynamic Cooling Device (DCD) protects the epidermis from thermal injuries by the spray of cryogen to reduce the temperature of the skin surface. Spatially defined photothermolysis employs concepts of pre-cooling, heating, intermittent cooling and thermal quenching in order to enhance its effectiveness. This involves chains of heating and cooling. DCD is said to improve patient's comfort and safety.

Other non-ablative skin rejuvenation apparatus

The speaker elaborated the relation between different target chromophobes and the use of other non-ablative skin rejuvenation apparatus, such as pulsed dye lasers, Q-switched Nd:YAG lasers, long pulsed Near-Infrared lasers and intensive pulse light. For most of them, proper protection of the epidermis and the avoidance of energy absorption by melanin in normal skin are the key issues to successful treatment.

Learning points:

Proper wavelength selection, optimal protection of the epidermis and localized heating of collagen in the upper dermis are important in non-ablative laser treatment.

New Horizons in Laser Aesthetic Surgery

Speaker: Dr. S. Rosenbaum

The focus of new development in the field of aesthetic surgery includes body contouring using, for example, fat transfer, liposuction, dermal fillers, botulinum toxin and facial rejuvenation using various methods like electron, chemicals and photon. Nowadays, patients expect treatment with quick healing, no pain and no scar.

Body contouring can be achieved using fat transfer or dermal fillers like tissue engineered human collagen. These products when injected into, for example, stretch marks, induce fibrotic reactions and improve the aesthetic appearance of the skin.

Facial rejuvenation with electrons

There are a number of machines in the market with this mode of action. They are used, for example, in face lifting and skin enhancement. Electronic impulses are delivered to the target skin to achieve desired effects.

Facial rejuvenation with chemical

Modified phenol peeling is commonly used for acne scar and abnormal skin pigmentations. Tretinoin and Beta Hydroxyl Acids are also suitable choices.

Facial rejuvenation with photons

It is divided into ablative and non-ablative. The latter has the advantage of minimal discomfort, progressive results and the possible combination with other modalities of treatment. It is the fastest growing area in cutaneous cosmetic laser surgery. It works by a primary stimulation of new collagen production through injury and repair.

Hair removal

Hair removal with laser is achieved by selective photothermolysis of hair follicles and hair shaft using melanin as the chromophores. 694 nm Ruby, 755 nm Alexandrite, 800 nm diode and 1064 nm Nd:YAG can be used. Since epidermal melanin competes for laser absorption, skin cooling using, for example, cooled gel or chilled contact probe, is critical. Light hair can be dyed first in order to enhance the effectiveness. Photodynamic therapy using 5 aminolevulinic acid (ALA) is a new technology in this area.

Finally, the speaker commented on the use of hormonal anti-aging agents like pregnenolone and melatoni.

Learning points:

Non-ablative laser aesthetic therapy does not have some of the side effects accompanying the traditional ablative counterparts. Skin cooling is critical in non-ablative laser surgery.