PICOCARE
A NEW PARADIGM FOR TREATMENT OF VARIOUS SKIN LESIONS

Klaus Fritz discusses his experience using the PICOCARE picosecond laser for tattoo removal, pigmentary lesions, and nail treatments

KLAUS FRITZ, MD, is Director of Dermatology and laser center Landau and Kandel. Assoc.Professor Univ Carol Davila (Ro). Lecturer at University Osnabrück. President German Academy of Dermatology. Past President European Soc. Laser Dermatology (ESLD)

Picosecond lasers have opened a new era for tattoo removal and pigment treatment with ultra-short pulse duration and higher peak power. The performance of picosecond lasers has proven to be superior to traditional Q-switched (QS) lasers with noticeable results and few side-effects. I have been using PICOCARE from WonTech (Daejeon, Korea) because of its great specifications; shorter pulse duration (450ps at 1064nm and 375ps at 532nm), higher peak power (1.33GW at 1064nm) and various handpieces (zoom, collimation, 595nm, 660nm, and MLA (Microlens Array). This article will be based on my clinical experience with PICOCARE.

Shortening the laser pulse to a picosecond domain produces a largely photomechanical effect on tattoo ink and melanin while the photothermal effect becomes less prevalent the shorter pulse durations get. This has permitted better and more efficacious tattoo treatments with fewer sessions, necessary for better clearance in comparison to QS technology.

PICOCARE has a dual wavelength; 1064nm and 532nm. 1064nm is to eliminate dermal pigmentations (eg. Ota Nevus, Ito Ota Nevus, Acquired Bilateral Nevus Ota-like Macules) and dark tattoo inks (black, brown, dark blue). 532nm is to treat epidermal pigmentations (eg. Solar Lentigines, Freckles, Age Spots) and light coloured tattoos (red, orange, and yellow).

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As the pulse duration becomes shorter, the photomechanical effect acts more than the effect of selective chromophore absorption, so that the pigment particles are fragmented into smaller sizes in a colour blind manner. For this reason, I am clinically using 532nm for green tattoo removal as well and the results are outstanding.

The zoom optic is a standard adjustable handpiece, energy fluence varies according to the spot diameter. For dermal melanin or tattoos, the spot diameter of 4-8 mm can be helpful, for more superficial use I preferably select 2-4 mm spot size.

Pico-toning

Pico-toning is a widely required procedure for patients who do not want downtime and improve their dull skin tone and unwanted pigmentations progressively. Toning is mainly with 1064nm and performed at low fluence, high frequency, and multiple passes. Toning done with a QS laser requires more than 8 sessions to achieve effective outcomes and hypopigmentation is an issue with QS-toning in dark skin types. On the other hand, pico-toning brings optimal outcomes with 5 sessions and has little issue with depigmentation.

The great advantage with PICOCARE is the dye handpieces; 595nm and 660nm. These handpieces allow physicians to treat difficult colours faster and more effectively and to extend a range of treatment. 595nm, the wavelength of pulsed dye lasers used to treat medium deep vasculatures, is used for blue tattoo, active acne and rosacea while 660 nm is indicated for green tattoo and epidermal pigments.

Fractional handpiece

In recent years, picosecond lasers have gone beyond the limited range of indications (clearance of tattoos and pigments) due to the use of a fractional handpiece. High-intensity fractionated laser light irradiated in ultra-short pulses create LIOB (Laser Induced Optical Breakdown), which produces plasma induced cavitations (epidermis or/and dermis at 1064nm and epidermis at 532nm).

A number of histologic studies revealed localized areas of intraepidermal injuries where the basal layer of the skin, surrounding epidermal cells and the stratum corneum remain intact. The localized injuries stimulate production of collagen, elastin, and mucin.

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This mechanism has an excellent impact on pigmentation treatment as well as scar treatment and skin rejuvenation that used to be treated with fractional ablative lasers that have longer down time and severe thermal damage. Unlike fractional lasers, this method is safe and effective for Asians or daker skin with a high risk of PIH (Post-Inflammatory Hyperpigmentation) by minimizing heat transfer and delivering stronger energy to the target.

HEXA MLA

PICOCARE's fractional handpiece, HEXA MLA, is the only handpiece with a wide range of spot sizes among picosecond lasers available in the global market (3-10mm). In high fluence, 3-4mm is used for various types of scars including ice-pick and rolling scars. The downtime from scar treatment is about 5-7days and volume of the scar is noticeably improved. At low fluence, 6-10mm is used for skin rejuvenation of the entire face. Downtime is only a few hours to 2 days and the results are superior to skin resurfacing done by fractional ablative lasers. Only one to three sessions provide outstanding results with improvements of enlarged pores, fine lines, wrinkles, uneven skin texture, and dull skin tone. Such technique is well known as an upgraded version of pico-toning (toning effects plus skin rejuvenation).

HEXA MLA is currently being used to extend a range of indications to nails in addition to improved treatment of classic tattoo and pigment removal. The focused destruction with less thermal diffusion also allows to treat nail fungus, resulting in less active fungus in the nail and clearing the darkening of the infected nail. Onychomelanosis and melanonychia are also treatable with PICOCARE.

PICOCARE is a new paradigm for tattoo removal, pigment treatment as wells scar treatment, skin rejuvenation and nail treatment in a better and safe manner. Such versatile, effective and safe laser will help physicians improve their performance outcomes and patient satisfaction.

Figure 1 Tattoo removal: (A) before and (B) after 1 session of PICOCARE treatment. Photos courtesy of Dr. Klaus Fritz

Figure 2 Nail fungus: (A) before and (B) after 1 session of PICOCARE treatment. Photos courtesy of Dr. Klaus Fritz