

Picosecond Technology for Skin Applications: Past, Present, and Future

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Background/Objective:

I will discuss my 10 year journey investigating, innovating, treating patients with these devices in my practice with a team of scientist. First, I will focus on the construction of these devices and how they differ from q-switched lasers. This talk will stress the importance of thermal confinement of in the 500-750 picosecond pulse durations. While the photothermal nature of heating with fragmentation of inert materials is important in tattoo treatments, this is not the primary mechanism of the treatment of pigmentary disorders with the targeting of melanin. Here, selective, and localized heating of melanosomes with picosecond lasers at low energies is of great value in confining thermal damage which is very important when treating skin of color. Nevus of Ota and low dose treatments of melasma are two conditions in Asian patients that these devices are particularly useful.

The use of the fractional optic with picosecond laser has proven to be an important tool in rejuvenation and the treatment of sun damaged skin and acne scars in patients skin types III-V. We will review the histology and the pathophysiology of laser induced optical breakdown (LIOB) and how this injury results in the improvements seen with these devices. The spectrum of histological changes will be described in detail. Clinical examples of patients treated with these devices will be presented.

A new generation of a picosecond Alexandrite laser with 50% more power and other improvements will be highlighted. Finally, thoughts on future improvements and aspirational goals for short pulsed lasers will be discussed.