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LASER REMOVAL OF TATTOOS REVIEWED

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The widespread use of Q-switched lasers with high peak power and nanosecond pulse durations for tattoo removal began in the early 1990s. Nowadays, the same techniques are still used but there are some interesting new developments.

Q-Switched lasers for tattoo removal include the ruby laser (694 nm), alexandrite laser (755 nm) and Nd:YAG laser (1064/532 nm). The latter can be equipped with dye filters to emit 585/650 nm wavelengths. Recently, picosecond lasers also became available.

Tattoos are exogenous pigment particles that are mainly found intracellularly within fibroblasts and macrophages. Their size ranges from 2 nm to 400 nm (most commonly 40 nm), with smaller particles grouped into larger membrane-bound granules measuring 0.5-4.0 µm. Selective destruction of tattoo particles largely depends on two parameters: laser wavelength, which should match the maximum absorption by the target, and pulse duration, which is based on the target size. Ideal pulse durations are in the nanosecond and picosecond range. The absorption of laser energy leads to the destruction of pigment-containing cells through a photomechanical effect. Transepidermal elimination and lymphatic transport, as well as alteration of the optical properties of the ink, make the tattoo less apparent.

An average of 2-6 treatments is needed for amateur tattoos and 6-12 treatments for professional tattoos, but higher treatment numbers are not unusual. Complete ink removal is not always possible.

In this section, specific indications for laser therapy will be discussed (such as cosmetic, traumatic and medical tattoo's), as well as contra-indications.

Current research focuses on optimizing therapeutic results with combined modalities (different laser systems, lasers combined with topical drugs), different algorithms (such as the R20 method that involves 4 treatment passes with a 20 minute interval) and the development of more performant laser systems. These will be discussed in the next presentations.