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# Tattoo Removal by Q Switched Nd YAG: newer methods and future aspects

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## Introduction

There are a very large number of people with unwanted tattoos, but do not pursue laser treatment because of cost, time taken for treatment and uncertainty of treatment. Some patients discontinue in between because of multiple sessions required.

Quality Switched lasers (QSwL) emitting short high intensity pulses are the treatment of choice for amateur and professional tattoo removal. Laser treatment fragments the tattoo ink particles, by thermo-mechanical destruction via photo-acoustic waves, which are then cleared or re-phagocytised into smaller aggregation with gradual clearance. Laser sessions are traditionally spaced 4-6 weeks apart during which pigment fading and epidermal healing occurs. The traditional technique with single laser pass, may take months to years for fading of tattoo. The treatment course is often prolonged requiring multiple sessions and is costly and tedious.[1-4]

Newer method- R-20: Kossida et al[3] hypothesised that the 'immediate whitening reaction' seen after QSwL irradiation optically scatters subsequent laser passes, acting as temporary block. This whitening reaction resolves in approximately 20 minutes after each pass. They showed that multiple passes of QSwL given about 20 minutes apart (hence called R-20 method) are more effective than that the traditional technique with single laser pass. Despite more pronounced epidermal injury with R 20 method, scarring and pigmentary alterations remained low and rates were similar to those seen with conventional single pass treatment.

## Case

A 46 year old woman came for removal of a black-green amateur tattoo done on her left hand about 30 years ago. She wanted it to be removed before her daughter's marriage. She was treated with Q-Switched NdYAG laser with 1064 mode with parameters of 3mm spot size, 4 Hz frequency and fluence of 6 J/cm$^2$, using traditional single pass technique. After four sessions, monthly, there was only partial fading, so we decided to follow R-20 technique for tattoo removal with optimum results in a single session using same parameters but four passes 20 minutes apart. (Fig. 1a, 1b & 1c)

**Fig. 1a: Tattoo on left hand before treatment**

**Fig. 1b: One month after 4 sessions single pass method**

**Fig. 1c: One month after single session of R-20 method**

## Future Aspects

While the R-20 technique appears more effective, the total treatment time of 60-80 minutes presents difficulties for both patients and physicians. A new method has been devised by Reddy et al[4] called 'R-0' method in which topical perfluorodecalin (PFD) is used to resolve whitening after each pass, reducing the total treatment time to 5 minutes.

These impressive results raise few more questions:

- Can larger spot size and higher fluences be used and are more efficacious?
- Would combination of different lasers yield even better results?
- Can R-20 be done multiple times to get even faster results?
- Can the same method be used for treatment of pigmentary disorders including melasma?

This requires research in this field with larger multicentric trials to establish the efficacy and safety.

## References

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