

## SHORT REPORT

# Laser-assisted depigmentation for resistant vitiligo: a retrospective case series with long-term follow-up

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## Abstract

**Background** Blanching creams are used to depigment and to achieve uniform skin tone in widespread vitiligo. Length of the treatment and side-effects strongly limit their use in common practice.

**Objectives** To assess the long-term efficacy and tolerance of Q-Switched (QS) lasers for depigmenting the remaining unaffected skin in vitiligo.

**Methods** Retrospective study of vitiligo patients treated with QS lasers in the Department of Dermatology of the University Hospital of Nice, France, from 2002 to 2011. Localizations and the percentage of body surface area of treated lesions, the total number of sessions and the possible relapses and side-effects, were analysed. Global satisfaction of the patients was evaluated on a visual analogical scale.

**Results** Sixteen areas of normally pigmented skin were treated in six patients. The median number of sessions to achieve a complete depigmentation was 2 (1–6). The mean duration of follow-up was 36 months (19–120). One third of the patients had no relapse. A complete repigmentation was observed after 21 months in one patient; a 50% repigmentation was noted in one patient, 7 months after the end of the treatment. Two patients showed a minimal repigmentation (<25%), 18 months and 9 years after the first laser treatments. The repigmentations were effectively treated with a maintenance session. The mean total number of sessions performed during this period was 3 (1–20). Side-effects were limited to transient purpura and crusts. The satisfaction of the patients was excellent (mean 9/10).

**Conclusions** QS lasers appear as an efficient and safe modality for depigmenting normal skin in vitiligo.

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## Conflict of interest

None declared.

## Funding sources

None.

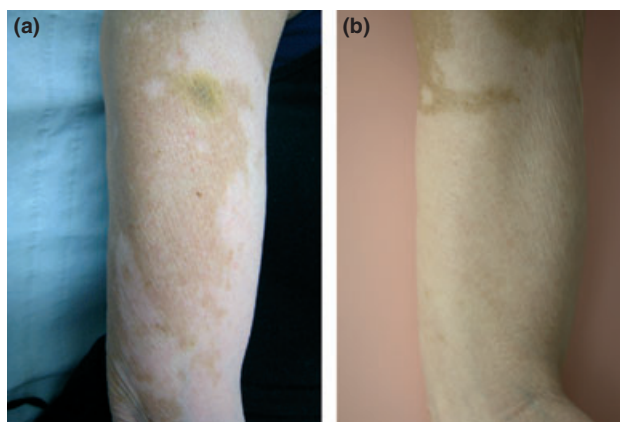
## Introduction

In patients with widespread vitiligo resisting to repigmenting therapies, depigmentation is an attractive alternative for achieving uniform skin tone. Blanching creams applied daily for months can produce a depigmentation of the skin but side-effects, including irritant and allergic contact dermatitis, post-inflammatory hypermelanosis, leukoderma en confetti, strongly limit their use.<sup>1–3</sup> Cryotherapy has been also used because melanocytes are very sensitive to cold damage.<sup>4</sup> Only small areas can be treated and several sessions are required to achieve depigmentation. Pain, erythema, bullous lesions and crusts are common side-effects. Careful monitoring of the amount of cold delivered is needed as too much cold could induce scars, while insufficient cold damages would not allow achieving depigmentation. Q-Switched (QS) lasers have been

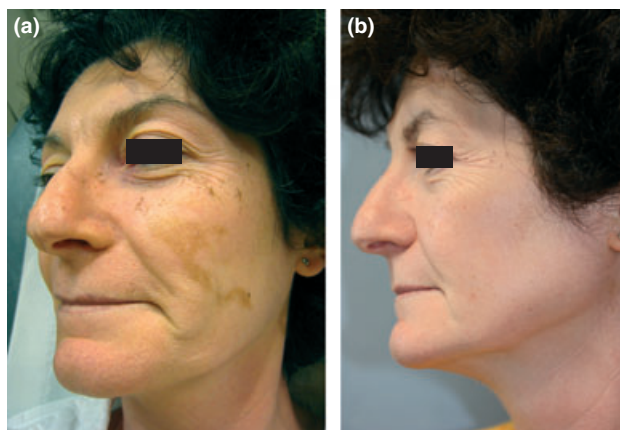
reported for depigmenting normal skin in vitiligo, but the data are limited and long-term results are still missing. The objective of this study was to assess the long-term efficacy and tolerance of QS lasers for depigmenting the remaining unaffected skin in vitiligo.

## Methods

We conducted a retrospective analysis of vitiligo patients treated with QS lasers in the Department of Dermatology of the University Hospital of Nice, France, from 2002 to 2011 (IRB waived). All case-noted of vitiligo patients were retrieved and patients who undergone laser therapy for depigmentation purpose were subsequently selected. All the treated patients were asked to come back to the centre for evaluation. Data regarding demography, history of the vitiligo, use of photoprotection were collected by an independent physician. The localizations and the percentage of body



**Figure 1** (a) Remaining pigmented skin of the arm in a woman with widespread vitiligo. (b) Clinical aspect 30 months after one session of 755 nm QS laser. Note the clear demarcation line between treated and untreated skin (the patient wanted to depigment the lower part of the arm so that she could wear T-shirts again).



**Figure 2** (a) Widespread vitiligo on the face. (b) Thirty-six months after three sessions of 755 nm QS laser. Minimal repigmentation (less than 25%) is observed.

surface area (BSA) of treated lesions according to Wallace's index, the type of QS lasers, parameters used, the total number of sessions and the possible relapses and side-effects were analysed. Comparative photographs were taken and compared with pictures taken before the treatment to assess the depigmentation achieved. Satisfaction was evaluated on a visual analogical scale (VAS) ranging from 0 (not satisfied at all) to 10 (extremely satisfied).

## Results

All six patients selected for the study had vitiligo spreading to at least 50% of a body area and non-responsive to medical and/or surgical approaches as it should be the rule for such intervention. They were contacted and all of them accepted to come back for a follow-up visit. The results are summarized in Table 1.

Three type of QS lasers were used: 694 nm ruby laser (Paragon Elite, Lynton®, Cheshire, United Kingdom), 755 nm Alexandrite and 532 nm Nd:Yag laser (Trivantage, Candela®, Wayland, MA). Respective settings for each patient are reported in Table 1. Sixteen areas of normally pigmented skin were treated. Five to 15% BSA were treated (average 8.8). A complete depigmentation was achieved in all patients. The median number of sessions to achieve a complete depigmentation was 2.<sup>1-6</sup> The median duration of follow-up was 36 months (19–120). Five of the six patients used a SPF50+ sunscreen, at least twice a day during the entire year on treated areas. One patient did not use any photoprotection. One third of the patients had no relapse. A complete repigmentation was observed after 21 months in one patient; a 50% repigmentation was noted in one patient, 7 months after the end of the treatment. Two patients showed a minimal repigmentation (<25%), 18 months and 9 years after the first laser treatments. No correlation was found between relapses, and the use of sunscreens, the patients' skin type, and duration of vitiligo. The number of sessions to achieve a complete depigmentation was similar between all the treated localizations; however, the upper arms and trunk were the only areas that did not show any relapses. The mean total number of sessions performed during this period was 3 (1–20). Side-effects were limited to transient purpura and crusts. Pain during session was tolerable without any anaesthesia (mean 3.75/10). The median satisfaction was 9.

## Discussion

Few studies are available on the use of QS lasers for depigmenting normal skin in vitiligo. A series of nine patients that failed to respond to blanching creams were treated with ruby QS laser.<sup>5</sup> The treatment was effective after only one session with a follow-up period of 9 months. The ruby QS laser was used after failure of topical 4-methoxyphenol.<sup>6</sup> Only 69% of patients achieved a complete depigmentation with the cream, and four of the five patients who did not respond to the 4-MP cream had successful depigmentation with the QS laser. The relapse rate with QS laser was 44% with a follow-up from 2 to 18 months. Two additional cases, one with ruby QS laser<sup>7</sup> and the other with Alexandrite QS laser<sup>8</sup> were reported to be effective with no relapse at 1 year follow-up. We report the first series of vitiligo patients treated in first hand with QS laser with a long-term follow-up. The results show that QS laser treatment is effective after a few sessions with limited side-effects and a high satisfaction of the patients. The three QS lasers used appear to be effective. However, the small number of patients and the fact that several types of lasers have been used during the successive sessions do not allow drawing conclusion about their respective effectiveness. Two third of the patients had relapses. In most cases, the repigmentation was limited and was effectively treated with a maintenance session. The average total number of sessions including treatment and maintenance sessions was less than 6 for an average follow-up of more than 48 months. One patient had a total number of 20 sessions,

**Table 1** Population characteristics and results

Patient	Age	Sex	Skin type	Duration of vitiligo (years)	Treated areas	% BSA treated	Laser used settings	Number of sessions to achieve complete depigmentation	Total number of sessions	Sides-effects	Follow-up in months	Satisfaction	Pain	Repigmentation	Photo-protection
1	56	F	2	10	Face, hands, neck	9	532 nm	2	2	Transient crusts, purpura	19	2,3	5,5	Yes	Yes
2	51	F	3	25	Face, hands	5	4 J/cm <sup>2</sup> , 755 nm, 18 J/cm <sup>2</sup>	6	6	Transient crusts	48	10	1,5	No	Yes
3	53	F	2	30	Face, elbows, hands	8	694 nm, 6 J/cm <sup>2</sup> , 532 nm, 3.6 J/cm <sup>2</sup>	2	20	Transient crusts, purpura	120	10	4	Yes	Yes
4	79	F	3	31	Neck, trunk, arms, hands, face	15	532 nm, 4 J/cm <sup>2</sup>	1	1	Transient crusts, purpura	36	8	0	Yes	No
5 (See Fig. 2)	67	F	3	12	Face	4	755 nm, 16 J/cm <sup>2</sup>	3	4	Transient crusts	36	6	6,5	Yes	Yes
6 (See Fig. 1)	58	F	4	8	Neck, arms	12	755 nm, 12 J/cm <sup>2</sup>	1	1	Transient crusts	30	10	5	No	Yes
Average	60.67			19.33		8.83		2.50	5.67		48.17	7.72	3.75		
Median	57.00			18.50		8.50		2.00	3.00		36.00	9.00	4.50		
Range	51-79			8-31		5-15		1-6	1-20		19-120	2.3-10	0-6.5		

but she was treated for 10 years, and thus received only one or two maintenance treatment every year on the limited area that repigmented. All the repigmentations were observed after the summer period despite the fact that five of the six patients reported using photoprotection. The face, neck and hands were more prone to repigment than other body areas that were covered by clothes, emphasizing the potential role of the sun exposure in relapses. This emphasizes that the sun protection behaviour of the patients (mostly the use of sunscreens) was not sufficient to prevent the relapses. Importantly, the treatment was well tolerated with limited and transient side-effects. Data concerning depigmentation therapies for vitiligo are very limited and long-term follow-up is lacking. However, according to the literature, the relapse rate seems to be quite equivalent between laser and blanching creams. Both approaches have advantages and caveats. Depigmenting preparations can be applied on large surfaces, while the cost of laser procedures limits its use for depigmenting less than 10%–15% BSA. However, the creams have to be applied for 6 to 12 months to achieve a depigmentation with numerous side-effects.<sup>9–12</sup> At the opposite, a limited numbers of laser sessions are needed to achieve a complete depigmentation and it offers a good tolerance and satisfaction.

In conclusion, QS lasers appear as an efficient and safe modality for depigmenting the remaining unaffected skin in vitiligo. It can be proposed for areas that failed to depigment after the use of a blanching preparation. According to their efficacy and good tolerance QS lasers should also be proposed as the first line treatment when the surface that needs to be depigmented is limited in size. In all cases, patients should be informed that delayed repigmenta-

tion can be observed with both cream and laser, especially in sun-exposed areas.

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