OBJECTIVE EVALUATION OF THE EFFECT OF Q-SWITCHED Nd:YAG (532nm) LASER; PASTELLE (WonTech Co.,Ltd.) ON SOLAR LENTIGO USING A COLORIMETER.

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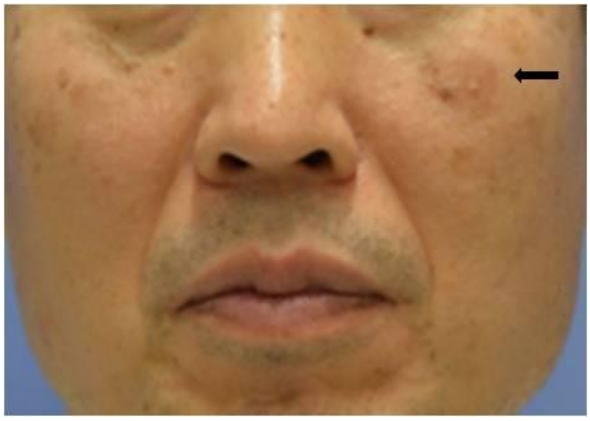

Fig. 1a. Multiple brown spots (solar lentigo) on the face before QSNL treatment

Fig. 1b. The treated solar lentigo (arrow) disappeared while the untreated solar lentigo remained.

Table 1. The results of QSNL treatment on the lentigo

Physician's global assessment(n=20)		Subjective Patient's assessment (n=20)		Colorimeter evaluation					
Improvement	Patients	Improvement	Patients	'L' value		'a' value*		'b' value*	
80-100%	11	80-100%	10	Pre	Post	Pre	Post	Pre	Post
60-80%	4	60-80%	8						
40-60%	4	40-60%	1	57.3	58.6	12.2	13.3	18.7	16.9
20-40%	0	20-40%	1						
0-20%	1	0-20%	0					* P<0.05	

Solar lentigines have been treated with various methods such as topical bleaching agents, cryotherapy and laser therapy[1]. Among the treatment modalities, laser therapy is known to be superior to the other classic methods and Q-switched Nd:YAG (QSNL) has a good result for the treatment of solar lentigines[2]. However, almost the previous studies have reported the efficacy of laser therapy based on the physician's global assessment and the patient's evaluation[1-4]. Although these evaluations are the standard and classic methods, there are some limits due to the subjectivity of physician's and patient's evaluation[5]. In this study, using a colorimeter, we tried to evaluate accurately and objectively the efficacy and side effects of QSNL (535nm) laser for the treatment of solar lentigo. Twenty Korean volunteers with solar lentigines on the face were enrolled. Informed consent was obtained and this clinical study was approved by the local institutional review board. We selected two prominent solar lentigines and each patient received two sessions of 535nm QSNL treatment with 4 weeks intervals. We had an additional 4-week follow-up period after the last treatment.

All lentigines were treated by a pulse of 20 nanoseconds pulse width and energy of 0.7-0.8 J/cm^2; spot size was 3-4 mm. Improvement was assessed based on the comparison of pre- and post-treatment (final visit) photographs. Patient photographs were reviewed by 3 independent dermatologists who were blinded to the study. Physicians independently rated the clinical improvement as follows: grade 0(disappearance of 0–20% of pigments), grade 1(20–40%), grade 2(40–60%),grade 3(60–80%), grade 4 (over 80%). For more objective measurement of improvement, we checked the same solar lentigo three times using a colorimeter (Minolta, CR-400) at both the baseline and final visit, and got the average value. The colorimeter checked the three parameters which consisted of the 'L*', 'a*' and 'b*' values. For subjective assessment, the patients checked the degree of improvement at every visit, and this was graded by a scale of 5. Adverse effects such as pain, hyperpigmentation, erythema and edema were graded as absent, mild, moderate, severe, and extremely severe. Of the 20 patients, the therapeutic effect for 11 patients (55.0%) was an excellent response after two treatment sessions, and 4 patients (20%) had a marked response on the investigator global assessment (Fig. 1, Table 1). The average improvement was 72.25%. With regards to the subjective self assessment, 18 of 20 patients (90%) reported marked or excellent improvement in the degree of pigmentation after treatment (Table 1). The 'L*' value on the colorimeter changed from 57.26 to 58.59, which means the luminescence of the solar lentigo improved after treatment.

The 'a*' value, reflecting skin erythema, ranged from 12.16 to 13.25. So the erythema was aggravated after the treatment. The 'b*' value decreased from 18.69 to 16.89, which showed

that the degree of brown pigmentation in the solar lentigo decreased (Table 1). 15 of 20 patiet ns (75%) reported mild to moderate pain during the treatment even though EMLA cream was applied prior to treatment. The pain was relieved within 1-2 hr after treatment. Post-inflamma tory hyperpigmentation (PIH) was noted in 4 of 20 patients (20%) within 4 weeks after the la st laser therapy, and went away within 3 months of the treatment. Mild to moderate erythema was found immediately after treatment in about 80%. A lot of lasers have been studied for tre ating solar lentigines, and some of them have excellent results. Of these, continuous or quasi-continuous lasers like ablative CO_2 laser, have increased risks of textural changes or scar for mation[1]. To overcome these problems, the Q-switched laser, which produces a greater temper ature with a short pulse duration, was developed based on the selective phtothermolysis of m elanosomes and melanin[1]. The Q-switched laser can remove pigmented lesions without injuri ng the surrounding tissue[2]. The previous study which compared the Q-switched Nd-YAG and long pulse Nd:YAG showed that the mean score (maximum, 10) for the degree of clearing, usi ng both the patient's and clinician's assessments, was 4.751[3]. Our study showed the mean sco re of improvement based on the physician's assessment was 72.25%. In a previous study, pati ents received just a single treatment and reported the improvement of their lentigines. So, it c an be speculated that multiple treatments will give better clearance of pigmentation[4].

In the evaluation by a colorimeter, which shows color changes more accurately and objectivel y[5], the degree of brown coloration of the lentigo improved by a factor of 1.8 (from 18.69 to 1 6.89) after treatment, and the luminescence of the lentigo (the 'L' value in the colorimeter) im proved. Although the human eye and photographic evaluation, as part of the physician's global assessment, remain important, these tools are subjective in nature, which might result in the p roblem of inter-observer variability. In using photography, standardization of images (color, b ackground, position, and lighting source) can be difficult, and results are very reliant on the p hotographer. Per contra, the colorimeter has been shown to provide reliable and reproducible data. This instrument has been effective in quantifying even small changes in skin color. It rep resents a convenient, easy and objective methodology for assessing color changes with treatment[5].

In darker skin types, the QS laser showed a post-inflammatory hyperpigmentation(PIH) risk of 10-25% [2], and in our study, 20% of patients reported mild or moderate PIH after treatmen t. Comparing QSNL and long pulsed Nd:YAG in the treatment of lentigines, the latter show ed less change of hypopigmentation because the long pulsed laser destroyed tissue with only the photothermal effect, but the QSNL destroyed tissue using both photothermal and

photomechanical reactions[2]. It might be thought that QSNL has a higher risk of PIH, and long pulsed lasers are more suitable for darker skin types. However, more purpura developed using this technique, and the increased risk of scar formation is a main concern with long pulsed laser treatment. In this study, we confirmed the effectiveness and side effects of QSNL on lentigines based on the assessment of the physician and the subjective patient's assessment, and by using more objective colorimeter evaluation.

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