High-Power 532/1064 nm Nd:YAG Laser for Skin Revitalization and the Treatment of Discrete Pigmented and Vascular Lesions: A Prospective, Single-Center, Open-Label Study of New Treatment Parameters

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ABSTRACT

Background and Objective: Uneven pigmentation or redness and the presence of discrete pigmented or vascular lesions are common concerns among patients seeking a laser skin revitalization treatment. We evaluated the safety, efficacy, and patient acceptance of area treatments with new parameter settings for improvement in pigmentation and redness uniformity when delivered sequentially in a single session following smaller spot size treatments of discrete and/or linear lesions.

Materials and Methods: Fourteen subjects, each with pigment and/or vascular uniformity concerns and the presence of discrete and/or linear pigmented and vascular lesions on the face, neck, and/or chest, were enrolled in this IRB-approved prospective study. Subjects received 4 treatments at 4-week intervals to discrete and/or linear lesions and to areas with uniformity concerns, sequentially in the same session, using at least two of four handpieces of different designs. Adverse events and patient discomfort were assessed by handpiece type. Standardized photographs were taken at baseline, prior to each session and during 4- and 12-week follow-up visits. Global Improvement Scale grades (GIS: 0-4) were assigned by the investigator reviewing baseline and final follow-up visit photographs, by a blinded evaluator reviewing randomized before and after photographs for temporal order and the degree of change between the randomized images, and by the subjects' perception of improvement from baseline. Discrete and linear lesion response was evaluated by the investigator by lesion type. Satisfaction levels with treatment outcomes, willingness to enroll again if able to restart the study, and perceptions of changes in skin quality metric were assessed by questionnaires completed by all subjects during the final follow-up visit.

Results: Eleven subjects completed the study attending both follow-up visits. Ten of these subjects attended all 4 treatment sessions and one subject attended only 3 treatment sessions. Two subjects were lost from the study after attending 1 and 2 treatment sessions, respectively, and one subject who attended all 4 treatment sessions and the 4-week follow-up visit was lost prior to the 12-week follow-up visit, all for reasons not related to study treatments.

A total of 102 spot or tracing treatments of discrete and/or linear lesions of various types, and 87 area treatments were delivered with handpieces of different designs to face, neck, and/or chest skin. All treatment related adverse effects resolved without intervention, other than application of ice packs (48%) and/or topical hydrocortisone (16%). The temporal orders of all randomized before and after images were correctly identified by the blinded evaluator. The investigator, blinded evaluator, and subjects' average GIS grades were 2.5 ± 0.8, 2.6 ± 1.0, and 2.8 ± 0.9, respectively, corresponding to moderate to significant average global improvement. Patient acceptance of treatment with the new parameter settings was high with 45.5% and 45.5% of subjects very satisfied and satisfied with their outcomes, respectively; and 73% and 18% of subjects indicating they would be very willing or willing, respectively, to enroll again if able to restart the study. During the 12-week follow-up visit, the majority of subjects believed their skin looked and felt healthier (91%), was more uniform in tone (91%), looked more radiant (55%), and noticed their skin had fewer or less-visible wrinkles (55%).

Conclusion: Spot and tracing treatment of discrete and/or linear lesions and global treatment of areas with pigmentation and/or vascular uniformity concerns, delivered sequentially in the same session, can safely and effectively be performed with high patient acceptance using the newly accessible parameter settings of a high-power 532/1064 nm laser system.

INTRODUCTION

Sun damage induced facial dyschromia and the appearance of visible discrete or linear pigmented and vascular lesions are common early signs of skin aging. In affluent countries, where an unblemished facial complexion is associated with youthful skin, the demand for skin revitalization and skin toning procedures is very high. To satisfy the demand, many laser and intense pulsed light (IPL) therapies have been explored extensively. The 532 nm output wavelength of frequency-doubled Nd:YAG laser using pulse durations of 2-20 ms has been shown to be safe and effective for skin revitalization and the treatment of a wide variety of superficial discrete and linear

pigmented and vascular lesions.[1-6] Similarly, the 1064 nm output wavelength of the Nd:YAG laser, using pulse durations of 15-50 ms with contact skin cooling, has been shown to be safe and effective for treating larger and deeper vessels, including leg and periocular veins and venous lakes.[7-9] Additionally, the high repetition rate, low-fluence laser genesis treatment with the 1064 nm wavelength using a pulse duration of 300 µs has been shown to safely and effectively stimulate neocollagenesis and improve skin texture and radiance, as well as reduce pore size and skin redness.[10-11] Offsetting these positive clinical findings, the low power of many 532/1064 nm systems has limited the maximum treatment spot size into which clinically meaningful energies could be delivered, before exceeding the thermal relaxation time of target tissues. With the commercial release of the excel V in 2011, a versatile dual-wavelength 532/1064 nm device became available that offered 900 Watts at 532 nm allowing clinically meaningful fluence and pulse duration combinations to be delivered into treatment spot sizes up to 12 mm. With the recent release of the yet higher power excel V+ (>1500 Watts @ 532 nm), the use of spot sizes as large as 16 mm has been enabled. To improve patient comfort while safely delivering these higher-energy laser pulses, the heat-extraction capacity of handpiece-integrated contact cooling sapphire window was tripled. The higher power of the excel V+ has also enabled, for the first time, the use of 500 µs pulses at 532 nm delivered into 8 mm diameter treatment spots at 10 Hz.

The objective of this study was to evaluate the safety, efficacy, and patient acceptance of area treatments with new parameter settings (13 16 mm, 0-4 Hz, 8-20 ms pulse duration; and 8 mm, 10 Hz, 0.5-1.0 ms pulse duration) for improvement in pigmentation and redness uniformity, when delivered sequentially in a single session following smaller spot size treatment of discrete and/or linear lesions.

MATERIALS AND METHODS

This was a prospective single-center, open-label study conducted in accordance with the World Medical Association Declaration of Helsinki to evaluate the safety, efficacy, and patient acceptance of treatments with the excel V+ (Cutera Inc., Brisbane, CA) using small and large spot size handpieces, sequentially in the same session, for improvement in discrete and linear lesions and in pigmentation and vascular uniformity. To be eligible for enrollment in this IRB-approved study, subjects were required to have pigmentation and/or vascular uniformity concerns and the presence of discrete or linear pigmented and vascular lesions on the face, neck, and/or chest. Exclusion criteria included any type of cosmetic treatment to the target area in the prior 6 months, including laser or light-based procedures or surgery; Fitzpatrick Skin Type V or VI; participation in a clinical trial of another device or drug in the prior 6 months; and being unwilling or unable to limit sun exposure for the duration of the study period. Fifteen potential subjects were screened, one subject failed to meet the study eligibility criteria, and the remaining 14 subjects were consented and enrolled (Table 1).

Table 1. Subject Demographics

Subjects (n)		14
Age ± SD (Median, Range)		56.6 ± 9.4 (55.5, 44-79)
Females, n (%)		8 (57%)
Males, n (%)		6 (43%)
Fitzpatrick Skin Type, n (%)	I	2 (14%)
	II	7 (50%)
	III	3 (21%)
	IV	2 (14%)

Subjects received 4 treatments at 4-week intervals for discrete and/or linear lesions and to areas with pigmentation or vascular uniformity concerns using at least two of four excel V+ handpieces of different designs in sequence within the same treatment session. Standardized photographs were taken at baseline, prior to each treatment session and during 4- and 12-week follow-up visits. Subjects were asked to rate the discomfort during treatment, on a 0-10 scale, by body region for all handpieces used in each treatment session. Adverse effects were assessed by location and handpiece type. Global Improvement Scale grades (GIS) were assigned by the investigator reviewing baseline and final follow-up visit photographs, by a blinded evaluator reviewing randomized before and after photographs for temporal order and the degree of change between the randomized images (incorrect temporal order would result in negative improvement grades), and by the subjects' perception of improvement from baseline, all using the scale shown in Table 2. Discrete and linear lesion response was evaluated by the investigator by lesion type. Satisfaction levels with treatment outcomes, willingness to enroll again if able to restart the study, and perceptions of changes in skin quality metric were assessed by questionnaires completed by all subjects during the final follow-up visit.

Table 2. Global Improvement Scale (GIS)

4 = Very Significant Improvement (> 75%)
3 = Significant Improvement (51 – 75%)
2 = Moderate Improvement (26 – 50%)
1 = Mild Improvement (6 – 25%)
0 = No Change (0 – 5%)

Investigational Device

excel V+ is the highest-power, dual-wavelength, frequency-doubled Nd:YAG laser system commercially available. The system includes handpieces of different designs optimized for global treatment of large areas and spot and/or tracing treatment of discrete lesions and linear vessels. The treatment parameter setting options and compatible treatment techniques (area, tracing, or spot treatment) for the various handpieces are shown in Table 3.

Table 3. excel V+ Parameter Settings by Handpiece

Handpiece (Compatible Treatments)	CoolView (Area, Tracing or Spot)		Genesis V (Area)		Dermastat (Tracing or Spot)
Wavelength (nm)	532	1064	532	1064	532
Fluence (J/cm²)	1.5 – 42	5 – 300	0.5 – 2	4 – 7	5 – 40
Pulse Duration (ms)	0.5 – 40	5 – 100	0.5, 1	0.3	0.5 – 20
Spot Size (mm)	2 – 16	2 – 16	8	8	1, 2
Repetition Rate (Hz)	0 – 4	0 – 2	0-4, 10	0 – 10	0 – 4
Cooling (°C)	Yes: 5, 10, 15 or 20		No		No

Within this study, spot treatment and tracing of all discrete and/or linear lesions were performed first in each session using the Dermastat handpieces (1 mm, 2 mm, or both) and/or the CoolView handpiece set to the appropriate wavelength(s) and spot size for the vessels or lesions to be treated. Treatments were typically delivered using a low repetition rate, with minimal spot overlap (~10%), in a single pass. Areas with pigmentation and/or vascular uniformity concerns were then treated confluently with 20-30% spot overlap using the CoolView handpiece set to 532 nm in a single pass, and/or with the Genesis V handpiece using a 10 Hz, multi-pass, low-fluence genesis painting technique until an endpoint of mild to moderate erythema was reached. When using the Genesis V handpiece, the wavelength was preferentially set to 532 nm as the green genesis treatment with this wavelength has not been previously studied.

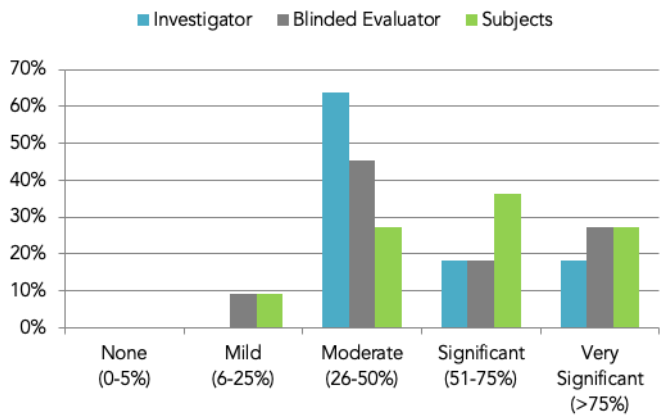
RESULTS

Eleven subjects completed the study attending both follow-up visits. Ten of these subjects attended all 4 treatment sessions and one subject attended only 3 treatment sessions. Two subjects were lost from the study after attending 1 and 2 treatment sessions, respectively, and one subject who attended all 4 treatment sessions and the 4-week follow-up visit was lost prior to the 12-week follow-up visit, all for reasons not related to study treatments. During the 50 treatment sessions, 102 spot treatments of discrete or linear lesions of various types and 87 area treatments were delivered with different handpieces to face, neck, and/or chest skin.

Discrete and linear lesions treated included solar and senile lentigines, ephelides, seborrheic keratoses, skin tags, cherry and spider angiomas, facial and nasal telangiectasia, periocular veins, and venous lakes. Area treatments were performed for dyschromia, hyperpigmentation, matted telangiectasia, facial erythema or redness from mild to moderate rosacea, and Poikiloderma of Civatte.

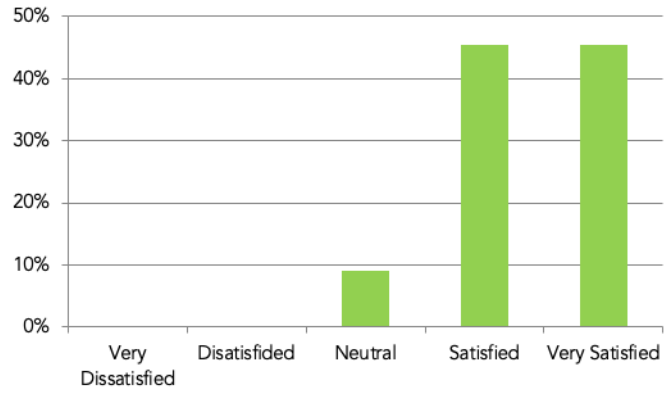
The temporal orders of all randomized before and after images (100%) were correctly identified by the blinded evaluator. GIS grading results for the investigator, blinded evaluator, and subjects are shown in Chart 1. Average GIS grades were 2.5 ± 0.8, 2.6 ± 1.0, and 2.8 ± 0.9 for the investigator, blinded evaluator, and subjects, corresponding to moderate to significant average improvement.

Chart 1: Investigator, Blinded Evaluator & Subject GIS Grades



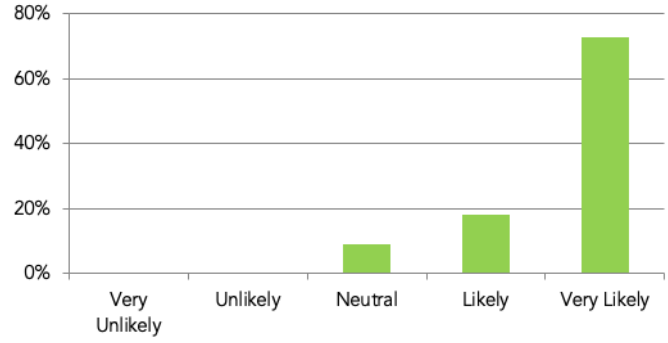
Satisfaction levels were high with 45.5% and 45.5% of subjects very satisfied and satisfied with their treatment outcomes, respectively (Chart 2); and 73% and 18% of subjects indicating they would be very likely and likely, respectively, to enroll again if able to restart the study (Chart 3).

Chart 2: Subject Satisfaction with Treatment Outcome



During the 12-week follow-up visit, the majority of subjects believed their skin looked and felt healthier (91%), was more uniform in tone (91%), looked more radiant (55%), and noticed their skin had fewer or less-visible wrinkles (55%).

Chart 3: Subject Willingness to Enroll Again



Lentigines and cherry angiomas were the most responsive discrete lesions typically clearing in 1 or 2 treatment sessions. Facial telangiectasia responded well to treatment with vessel clearing during each treatment and most remaining clear. For telangiectasia in or near the alar grove, and those with a visible branch structure, some recurrence did occur. The recurrence rate diminished with the number of treatments, and significant improvement or clearing was typically achieved in 2 to 4 sessions (Figures 1-2). Area treatments resulted in clinically significant improvement in pigmentation uniformity and/or reduction in diffuse redness in all subjects (Figure 3-6).

Treatment Discomfort and Adverse Effects

All treatments were well tolerated. Table 5 shows treatment discomfort scores by handpiece type and wavelength. Subjects reported minimal to mild posttreatment discomfort lasting 1-12 hours, or for 2 7 days for some sessions (18%) where subjects also reported mild or moderate edema.

There were no serious or unexpected adverse effects. All expected adverse effects (Table 4) were of mild to moderate severity and all resolved without intervention, other than application of ice packs (48%) or topical hydrocortisone (16%).

Table 4. Adverse Effects

	n (%)	Severity (0-3)	Duration (days)
Erythema	50 (100%)	1.2 ± 0.4	1.5 ± 1.4
Edema	32 (64%)	1.1 ± 0.3	2.6 ± 5.0
Purpura	7 (14%)	1.0 ± 0.0	4.3 ± 2.2
Scabbing	7 (14%)	1.0 ± 0.0	11 ± 12

Mild to moderate erythema developed within minutes of treating all areas and lesions with all handpieces. Edema developed following most 532 nm CoolView handpiece area treatments of facial regions with baseline mild to significant redness. Edema was more common during earlier treatment sessions than in later sessions. Mild purpura was seen immediately following some 532 nm CoolView handpieces spot or tracing treatments for pulse durations ≤ 5 ms. All patients were told to expect pigmented lesions to darken during and following treatment prior to naturally sloughing. This was not considered to be an adverse effect unless the darkened lesion developed into a scab or crust (n=7, 14%).

Treatment parameters (median [range], average ± SD), number of pulses delivered, subject discomfort scores, handpiece usage data (Sessions Used In, %), and areas treated (total Areas [Face, Neck, Chest]) for each treatment type, handpiece, and wavelength are shown in Table 5.

Table 5. Treatment Data by Handpiece Type and Wavelength

Handpiece	Wavelength	Sessions Used n (%)	Skin Cooling Median [range] Avg. ± SD	Spot Size Median [range] Avg. ± SD	Fluence Median [range] Avg. ± SD	Pulse Width Median [range] Avg. ± SD	Pulses Median [range] Avg. ± SD	Discomfort Median [range] Avg. ± SD
Spot and Tracing Treatments of Discrete and Linear Lesions								
CoolView	532 nm	31 (62%)	5°C [5 - 15] 6.4°C ± 2.6°C	7 mm [3 - 16] 8.0 ± 3.4 mm	8.6 J/cm² [5.6 - 13] 8.6 ± 1.4 J/cm²	8 ms [3 - 20] 9.2 ± 2.8 ms	12 [1 - 67] 18 ± 17	3 [1 - 7] 3.3 ± 1.6
CoolView	1064 nm	18 (36%)	5°C [5 - 5] 5°C ± 0°C	5 mm [5 - 7] 5.2 ± 0.6 mm	130 J/cm² [90 - 145] 129 ± 11 J/cm²	20 ms [10 - 35] 22 ± 6 ms	11 [3 - 157] 24 ± 35	4 [1 - 7] 4.2 ± 1.5
Dermastat, 2 mm	532 nm	38 (76%)	n/a	2 mm	11.5 J/cm² [6 - 25] 11.0 ± 4.8 J/cm²	9 ms [1 - 10] 6.1 ± 3.8 ms	12 [1 - 330] 52 ± 73	2 [1 - 4] 1.9 ± 0.8
Dermastat, 1 mm	532 nm	15 (30%)	n/a	1 mm	13 J/cm² [13 - 18.8] 15.1 ± 2.5 J/cm²	10 ms [10 - 20] 12.7 ± 4.4 ms	15 [3 - 32] 17 ± 10	3 [2 - 5] 3.0 ± 0.6
	Total	**102**						
Area Treatments for Pigmentation and Vascular Uniformity								
Handpiece	**Wavelength**	**Areas [F,N,C]**	**Skin Cooling**	**Spot Size**	**Fluence**	**Pulse Width**	**Pulses**	**Discomfort**
CoolView	532 nm	60 [44, 14, 2]	10°C [5 - 15] 7.8°C ± 2.8°C	15 mm [10 - 16] 14.4 ± 2 mm	7.2 J/cm² [5 - 8.7] 7 ± 0.9 J/cm²	10 ms [8 - 20] 11 ± 2 ms	115 [8 - 364] 121 ± 80	3.5 [1 - 8] 3.7 ± 1.7
Genesis V	532 nm	22 [19,1, 2]	n/a	8 mm	1.3 J/cm² [1 - 1.4] 1.2 ± 0.1 J/cm²	0.5 ms [0.5 - 1] 0.55 ± 0.14 ms	3810 [960 - 8057] 4086 ± 1933	2.5 [1 - 6] 2.9 ± 1.3
Genesis V	1064 nm	5 [4, 1, 0]	n/a	8 mm	6 J/cm² [6 - 6] 6 ± 0 J/cm²	0.3 ms	4166 [2113 - 4899] 3754 ± 998	2 [1 - 6] 2.6 ± 1.7
	Total	**87 [67, 16, 4]**						

Figure 1. Male subject (44 years of age, FST III) graded as having significant (51-75%) and very significant (>75%) improvement in pigmentation and vascular uniformity by the investigator and blinded evaluator, respectively. Arrows **A** indicate discrete pigmented lesions and arrows **B** indicate cherry angiomas, both cleared in 2 treatment sessions; and arrows **C** indicate telangiectasia cleared or significantly improved in 1 to 4 treatment sessions.

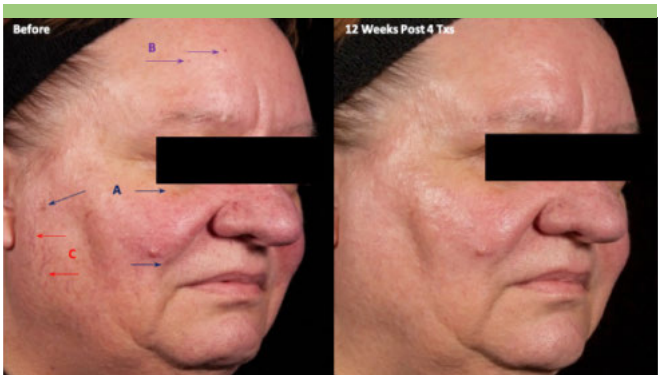


Figure 2. Female subject (61 years of age, FST II) graded as having very significant (>75%) improvement in pigmentation and vascular uniformity by the investigator and blinded evaluator. Arrows **A** indicate discrete pigmented lesions and arrows **B** indicate cherry angiomas, both cleared in 1 treatment session. Arrows **C** indicate branch structure telangiectasia cleared in 3 treatment sessions.

Figure 3. Female subject (50 years of age, FST I) graded as having moderate (26-50%) and significant (51-75%) improvement in pigmentation and vascular uniformity by the investigator and blinded evaluator, respectively. The subject graded her improvement as very significant (>75%).

Figure 4. Male subject (79 years of age, FST II) graded as having significant (51-75%) and very significant (>75%) improvement in pigmentation and vascular uniformity by the investigator and blinded evaluator, respectively. The subject graded his improvement as significant (51-75%).

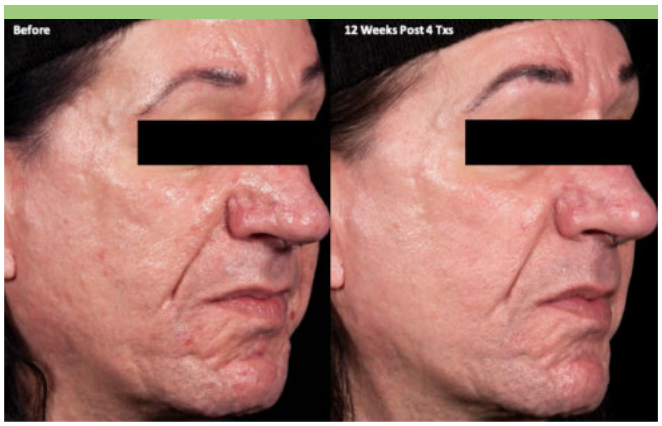


Figure 5. Male subject (48 years of age, FST II) graded as having very significant (>75%) and significant (51-75%) improvement in pigmentation and vascular uniformity by the investigator and blinded evaluator, respectively. The subject graded his improvement as significant (51-75%).

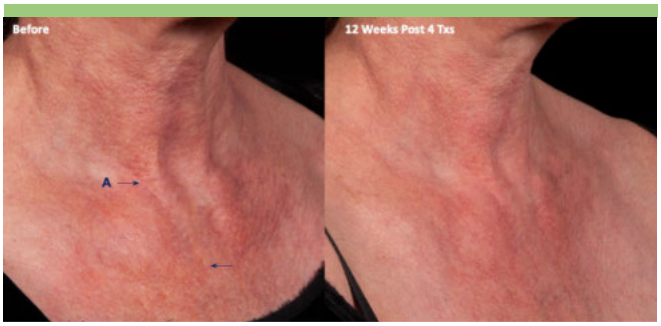


Figure 6. Female subject (58 years of age, FST II) graded as having moderate improvement (26 50%) in pigmentation and vascular uniformity by the investigator and blinded evaluator. The subject graded her improvement as very significant (>75%). Arrows A indicate a surgical scar that significantly softened and became less visible following two Genesis V 532 nm area treatments (sessions 1 & 2), two CoolView 532 nm area treatments (sessions 3 and 4), and one CoolView 1064 nm, 5 mm spot size tracing treatment of the scar (delivered in session 4 prior to the CoolView 532 nm area treatment).

HANDPIECE USAGE DETAILS

CoolView Handpiece Treatments

The CoolView handpiece was used during all 50 treatment sessions. The high usage is attributed to the handpiece allowing either 532 nm or 1064 nm wavelengths to be delivered though a skin-contact sapphire window into spot sizes adjustable in diameter from 2 mm to 16 mm; and integrated thermoelectric cooling (within the handpiece body) cooling and holding the window at 5°C, 10°C, 15°C or 20°C providing epidermal protection during vascular and pigmented lesion spot/tracing or area treatments. The window temperature was set to 5°C for all vascular-only area and spot/tracing treatments; to 10°C where vascular and/or pigment response was desired; and to 15°C for some discrete pigmented lesion spot treatments, mostly for lighter lesions on lighter FST subjects.

The 532 nm output was used during 88% (44/50) of sessions on 93% (13/14) of subjects for area treatments to 44 partial- or full-faces, 14 bilateral necks (performed in the same sessions as partial- or full-face treatments), and 2 upper-chest areas (same subject in successive sessions); and during 62% (31/50) of sessions on 79% (11/14) of subjects to spot-treat discrete lesions (pigmented and/or vascular), trace small prominent telangiectatic vessels (< 1 mm), or both (median spot size: 7 mm). The pulse duration and fluence settings were selected and adjusted to achieve the desired clinical endpoint for the lesion type and/or area-treatment response.

The 1064 nm output was used during 36% (18/50) of sessions on 71% (10/14) of subjects to spot-treat discrete vascular lesions, trace prominent vessels (≥ 1 mm), or both (median spot size: 5 mm). Due to the low absorption coefficient of oxyhemoglobin at 1064 nm, significantly higher fluence settings were required for vascular lesion or vessel response than were required at 532 nm (median: 130 J/cm^2 vs. 8.6 J/cm^2), and pulses of longer duration were required to better match the longer thermal relaxation time of the larger vessels (median: 20 ms @ 1064 nm vs. 8 ms @ 532 nm).

Genesis V Area Treatments

The Genesis V was used with the 532 nm output during 42% (21/50) of sessions on 57% (8/14) of subjects for area treatments to 19 partial- or full-faces, 1 bilateral neck (performed in the same session as a full-face treatment), and 2 upper-chest areas. The number of pulses delivered varied significantly (average: 4,086 ± 1,933; median: 3,810 [960 - 8,057]) based on the size of the area to be treated and the number of passes required to reach the clinical endpoint.

The Genesis V was used with the 1064 nm output during 8% (4/50) of sessions on 14% (2/14) of subjects for area treatment of 4 full-faces and 1 bilateral neck. Pulses were also delivered at 10 Hz. The variance in the number of pulse delivered was lower due to higher consistency in the sizes of the areas treated (average: 3,754 ± 998; median: 4,166 [2,113 – 4,899]).

In the 6 sessions where the CoolView handpiece was not used for area treatments, the Genesis V handpiece was used and the area treatments were delivered immediately following the spot/tracing treatments. In the remaining 15 sessions where both handpiece were used, the Genesis V area treatments were delivered after the CoolView area treatments.

Dermastat Spot and Tracing Treatment

The 2 mm Dermastat was used during 76% (38/50) of sessions on 93% (13/14) of subjects to spot-treat discrete lesions (pigmented and vascular), trace small telangiectatic vessels (< 0.5 mm), or both. The number of pulses delivered with the handpiece varied significantly ranging from 1-22 pulses for spot treatment of only a few discrete lesions (n=24), to 54-330 for many discrete lesions and/or tracing of vessels (n=14). The pulse duration and fluence settings selected also varied significantly by lesion type. For spot treatment of discrete pigmented lesions pulse durations of 1-6 ms were typically used with fluence settings ranging from 6 to 25 J/cm^2, based on lesion darkness (lighter lesions: higher fluence; and darker lesions: lower settings). For spot or tracing treatment of discrete vascular lesions or linear vessels, longer pulse durations (8-10 ms) were typically used with a narrower range of fluence settings (11-15 J/cm^2).

The 1 mm Dermastat was used during 30% (15/50) of sessions on 29% (4/14) of subjects to spot-treat small discrete vascular lesions and to trace small lengths of less-prominent telangiectatic vessels (typically < 0.2 mm). Higher average fluence settings were typically required for vessel closure when treating with the 1 mm Dermastat than with the 2 mm Dermastat (15.1 ± 2.5 J/cm^2 vs. 11.0 ± 4.8 J/cm^2) most likely due to higher scattering losses associated with the smaller spot size; however, vessel closure was achieved with less total pulse energy. The median number of pulses delivered per session was higher with the 1 mm Dermastat than with the 2 mm Dermastat (15 vs. 12), however, the average, standard deviation and range of number of pulses were lower for the 1 mm Dermastat than for the 2 mm Dermastat (17 ± 10 [3 - 32] vs. 52 ± 73 [1 - 330]) indicating more consistency in the lesion types treated with the 1 mm Dermastat than with the 2 mm Dermastat.

DISCUSSION

To the best of our knowledge, this is the first report of the 532 nm wavelength being used with short-millisecond pulses (11 ± 2 ms) in spot sizes as large as 16 mm diameter from a handpiece with integrated contact cooling. This is also the first report of the 532 nm wavelength being used with 500 µs pulses in a spot size of 8 mm diameter delivered at 10 Hz for multi-pass Genesis-style treatment.

The 532 nm wavelength is highly absorbed by melanin and oxyhemoglobin, allowing simultaneous treatment of brown dyschromia and red vascularity, while stimulating epidermal turnover and collagen production in the papillary dermis. Clinically significant

improvements in both pigmentation and redness were achieved. Additional efficacy of stimulating dermal remodeling by 532 nm is thought to be via both direct thermal effects and through a vascular component, which releases chemical mediators to stimulate collagen synthesis of fibroblasts.[13, 14] These effects likely contributed to the study finding that the majority of subjects believed their skin looked and felt healthier (91%), was more uniform in tone (91%), looked more radiant (55%), and noticed their skin had fewer or less-visible wrinkles (55%).

CONCLUSION

Spot and tracing treatment of discrete and/or linear lesions and global treatment of areas with pigmentation and/or vascular uniformity concerns, delivered sequentially in the same session, can safely and effectively be performed with high patient acceptance using the newly accessible parameter settings of a high-power 532/1064 nm laser system. The conservative parameters utilized in this study could be optimized to reduce the number of sessions needed, increase improvement, or achieve complete resolution of discrete and linear lesions, pigmentation, and vascular uniformity.

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