

BBL™ & ClearSilk™: An effective combination treatment for visible symptoms of rosacea and diffuse redness.

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The efficacy and mechanisms of light and laser therapy are well established and elucidated. However recent trends in patient demand for minimal downtime have pushed the envelope on investigating new ways to achieve lasting cosmesis through one or a series of low downtime, comfortable treatments. It is commonly held that downtime correlates directly to impact of results, but by combining two treatments at the same time with complementary mechanisms, it may be possible to achieve added benefits by optimizing the modalities to work in concert. This is particularly beneficial in the treatment of chronic and progressive disorders like rosacea, wherein easing the symptoms of erythema and flushing may ideally also help slow progression.

INTRODUCTION

Light-based aesthetic medicine has become the premier method to provide customizable, minimally invasive treatments across numerous cosmetic dermatological indications. However, a recent paradigm shift away from single corrective treatments towards tolerable, lower downtime treatment courses poses many interesting questions regarding long term efficacy. Furthermore, innovations which provide the ability to customize precise and gentle treatments allow for feasible ongoing maintenance regimens to ensure the persistence of aesthetic improvement. A growing body of evidence is beginning to show that properly matched complementary technologies allow for exceptional treatments in spite of low downtime; however, questions remain:

- Do these combination treatments last?
- Is there any additional benefit to combination of multiple modalities?
- Can appropriate maintenance regimens help to prolong cosmesis?

This paper will briefly discuss existing evidence for the added value of combining two unique treatments towards lasting cosmesis, offer theory behind what makes a good combined treatment, and present recent evidence on the combination of BBL (BroadBand Light) treatment J/cm2 J/cm2 and ClearSilk Nd:YAG laser modalities for improving the signs associated with Rosacea, including facial flushing.

Combination treatments have shown promise in the improvement of cosmetic and dermatological conditions with complex presentation prior to this report. In fact, the Sciton JOULE platform is often used for combination studies, due to the ability

to place multiple modalities on a single platform. Recent studies by Kim et al showed the combination of BBL and a superficial ablative treatment (MicroLaserPeel® or MLP, Sciton Er:YAG 2940 nm) showed significant improvement in mean global aesthetic score (>2.5) for both pigmented lesions as well as tone, texture, and wrinkles in 35 patients [1]. A similar combo treatment design by Berlin et al showed persistence of a BBL/ MLP combo treatment over 3 months follow-up, citing histological results from both light and electron microscopy that suggest changes in collagen and elastin consistent with a wound healing response and an increase in type III collagen. Several studies have also been conducted to combine BBL with pneumatic treatments [2], microneedling [3], and botox [4]. However, when discussing the potential benefits of said combination treatments there are so many degrees of freedom that it is important to ensure appropriate comparisons and it is key to ensure similar parameters, delivered energy and defined endpoints.

Combination treatments with exceptional value offer complementary mechanisms, each treating a different aspect of a complex multifactorial presentation. Rosacea often offers an excellent example of such a multifactorial presentation. Rosacea is a complex progressive skin disorder that presents with a variety of symptoms, the pathogenesis of which are relatively unknown despite links to a broad array of factors including hypertension, mites [5], sun exposure, topical steroids, and hormone replacement therapy, migraines and menopause [6]. Patients report significant interference with social and professional aspects of their lives due to the impact of rosacea. To date there is no conclusive evidence that a single, lasting corrective treatment for rosacea exists. Our

current knowledge of rosacea implies that it is progressive, and that the most frustrating symptoms are vascular in nature, treating the vascular malformations may help not only with immediate quality of life, but ideally also with slowing the disease progression.

The broad presentation of rosacea often includes erythema, telangiectasia, flushing, and raised papulo-pustular lesions. Given the theory of selective photothermolysis [7], the optimal treatment parameters for superficial lesions like telangiectasias and papulo-pustular lesions are the polar opposite of the optimal treatment parameters for deep penetration to target subsurface vasculature. Lasers offer a range of solutions for treating a variety of vascular conditions, such that treatment parameters including, spot size, power, and pulse width provide the ability to selectively target the hemoglobin chromophore in different vessel sizes. [8, 9]

Wavelengths best known for the treatment of vascular conditions are typically between 532-595 nm, and 1064 nm, each with its own strengths and weaknesses. While utilizing an Nd:YAG laser alone may be possible for superficial and deep vessels, the lower absorption rate of Nd:YAG (Figure 1) for hemoglobin establishes that it is less useful to treat small vessels (with a very low amount of chromophore such as with superficial vessels) and more efficient in treating big vessels with high amounts of chromophore (more usual in deep vessels), whereas a shorter wavelength such as 515 nm is more efficient in treating the superficial vascular component because it covers both peaks of absorption of hemoglobin. In fact, it is the preferred filter used in the treatment protocol for the treatment of rosacea, and ideal for skin types I or II (which is the most common skin type associated with the rosacea patients treated by Dr. Antonio Campo). As a result, neither 1064 nm or 515 nm alone will easily and completely treat the variety of vascular symptoms associated with facial rosacea, yet when combined, they can achieve improved efficacy.

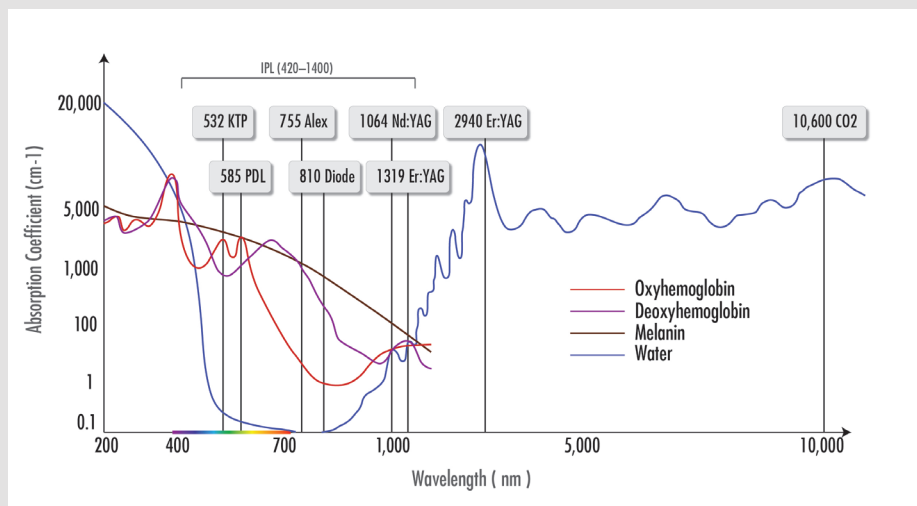
In the case of BBL and ClearSilk (1064 Nd:YAG), each device provides its own strengths towards a superior overall cosmesis. Although BBL (BroadBand Light) is an IPL (Intensed Pulsed Light) device that can target a broad spectrum of 400-1400 nm it offers specific 515 nm and 560 nm filters which target the superficial vasculature, while the depth penetration of the Nd:YAG (1064 nm) allows targeting of deeper vasculature, and both BBL [10] as well as Nd:YAG laser have previously shown success in resolving certain aspects of the presentation of rosacea [11]. The goal of this paper is to demonstrate treatment parameters for the optimal combination between BBL and ClearSilk treatments for facial rejuvenation when the vascular symptoms of rosacea are present.

MATERIALS AND METHODS

All the treatments described in this paper were performed under the diagnosis and supervision of the author utilizing the Sciton JOULE platform equipped with BBL (BroadBand Light; using long-pass filters targeting 515 nm or 560 nm) and ClearSilk (Nd:YAG laser 1064 nm). From the different absorption profiles seen in Figure 1, you can see that these two treatments meet the criteria of complementary therapeutics based on absorption profile and therefore subsequent penetration depth. The BBL 515 nm and 560 nm filters cover melanin and hemoglobin, and are selected initially based on skin type targeted: 515 nm for vascular and pigmentary disorders in skin types I and II and 560 nm for the same indications in skin types III-IV, whereas, the ClearSilk at 1064 nm provides deeper penetration due to the longer wavelength which has less scattering and a higher absorption by hemoglobin than for water which are key to the penetration depth and in the efficacy in heating vascular lesions.

The reason BBL is often used as the basis for many combination treatments is that the simple exchange of filters allows for a high range of versatility provided the treatment targets largely

Figure 1: Absorption Chart shows strong hemoglobin and melanin absorption by BBL filter wavelengths for superficial treatment, and hemoglobin absorption with low water absorption to allow deeper penetration with ClearSilk Nd:YAG



superficial structures. BBL filter combinations exist for the treatment of superficial vascular lesions, benign pigmented lesions, hair removal, acne treatment, and even skin tightening. Reviewing the hemoglobin absorption spectrum and choosing the target wavelengths for filter, either 515 nm or 560 nm depending on skin type, BBL allows for penetration of about 2 mm with pulse durations of 5-20 ms, inherently allowing for the treatment of small vessels, as seen in, rosacea, superficial telangiectasias, poikiloderma of Civatte, cherry hemangiomas, superficial hemangiomas, and venular and capillary malformations.

PREPARATION, PARAMETERS, AND POSTCARE

In order to minimize adverse events when treating vascular lesions, proper skin preparation is optimal. For patients with history of melasma and/or post inflammatory hyperpigmentation, or any patients with Fitzpatrick skin type IV, a pretreatment course of Klingsman’s formulation for a duration of 3 weeks to 2 months is recommended. Immediately prior to treatment, the area must be clean (makeup removed). While the treatment has some discomfort the application of numbing cream is not recommended because it is known to cause vasoconstriction which would limit the presence of the target chromophore as well as limit the patient’s ability to provide feedback during the ClearSilk treatment.

For the combination treatment, BBL is conducted first followed by ClearSilk. The BBL treatment takes around 7 minutes, while the prolonged gradual heating of the Clear Silk treatment takes 8 to 10 minutes to reach the optimal temperature which means the entire combination treatment lasts around 15-11 minutes.

First, appropriate treatment parameters for BBL (wavelength filter, pulse duration, fluence, and sapphire tip temperature, see Table 1) are selected on the touchscreen, and then ultrasound gel is applied to the treatment area. Facial rejuvenation treatment

parameters used for the combination vascular treatments demonstrated herein are dependent on Fitzpatrick skin type and recommendations are listed in Table 1. The basic configuration is to select the parameters and perform a first pass utilizing the 515 nm or 560 nm filter depending on skin type to treat overall redness and homogenize background color. For the second pass, the 515 nm is used with the square finesse adapter, and the fluence is raised by 2 joules from the first pass, focusing treatment on the areas with increased redness and/or darkened pigment. Please see the corresponding webinar for treatment videos (sciton.com/webinar-archive/) that fully demonstrate this technique. Note that external cooling (in these cases performed using a Zimmer Chiller), is required for before, during, and after treatment with these aggressive settings to minimize risk of any adverse reaction.

The ClearSilk follows immediately after the BBL treatment. Recall that ClearSilk is 1064 nm Nd:Yag is designed to give short pulses in a fashion that gradually and gently heats deeper tissue structures to a sustained target temperature, with built-in temperature feedback in the handpiece to monitor the course of the treatment. For this treatment, the endpoint of treatment is when the handpiece demonstrates a reading of 42°C (noted by the lighting of the second orange bar in the temperature gauge). The design of the treatment is to target deeper vessels that may be responsible for the flushing response associated with rosacea that is not resolved by BBL alone. The key to the proper execution of this treatment is to achieve the target temperature gradually for an entire area; therefore, technique is key for optimal outcomes. For these treatments, the face is divided into three regions: forehead, left face, and right face, each of which is treated separately (See Figure 2). Each region is then subdivided into columns (about 5 x 10 cm in area) as indicated in Figure 2. Treatment is accomplished by slow vertical zig-zag passes within a column. After three passes in a column, move to the next column and so on. After traversing the area (i.e. forehead) in one direction, return in the

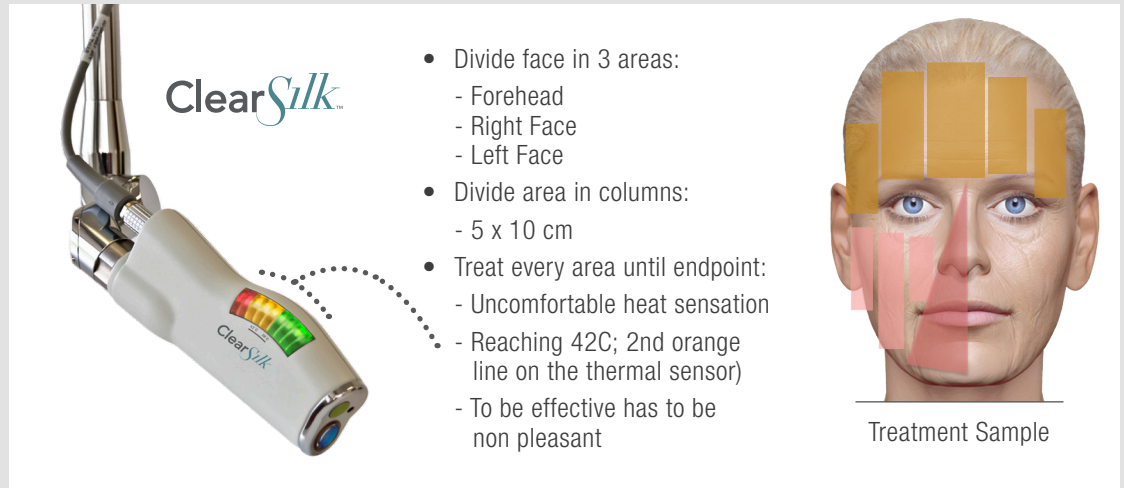
Table 1: Parameters for BBL meant for combination treatment of superficial vasculature, divided by skin type

Filter Wavelength by Skin Type	First Pass Wavelength	Second Pass Wavelength with Finesse Adapter
I & II	515 nm	515 nm
III & IV	560 nm	515 nm
Pulse Duration by Vessel Size	(pulse duration remains the same)	
Redness (vessel size < visibility)	10 ms	10 ms
Very Thin Telangiectasia	10 ms	10 ms
Mid size Telangiectasia	10-15 ms	10-15 ms
Thick Vessels	20-30 ms	20-30 ms
Fluence by Lesion Color and Structure	(Increase Fluence by ~2 J/cm²)	
Dark Red Lesions	12-14 J/cm ²	14-16 J/cm ²
Purple Lesions	12-14 J/cm ²	14-16 J/cm ²
Light Red Lesions	15-18 J/cm ²	17-20 J/cm ²

Example:

BBL ClearSilk Combo Treatments indicated for facial rejuvenation with rosacea usually combat redness with light red color therefore a Fitzpatrick Skin Type III treatment would entail: 560 nm filter, 10 ms pulse duration with 15 J/cm² for first pass followed by 515 nm, 10 ms pulse duration at 17 J/cm² on second pass with finesse adapter attached.

Figure 2: Detailed description of technique for Clear Silk treatment on the face to ensure best application.



other direction for two more passes per column. This is usually sufficient to achieve the treatment temperature endpoint (42°C, second orange light). Then the area is completely treated, and the next area treatment begins. It is critical to note that patient discomfort is a known surrogate endpoint of this treatment that can be trusted and is expected. In fact, mild discomfort is ideal for optimal results as it is an indicator that the treatment has achieved the target temperature. A video of the exact treatment method can be viewed during the accompanying Sciton webinar on this technique.

After treatment cooling is essential to proper post-treatment care. The use of a Zimmer Cryo 6 air chiller for several minutes is recommended as well as longer term application of cooling pads. Patients are recommended to adhere to a regimen of fluticasone cream every 12 hours for 2-3 days as well as strict application of 50+ FPS sunscreen (preference to physical sunscreen) and avoidance of prolonged sun exposure. Some patients, especially those with severe inflammatory rosacea types, may benefit from oral pre and post treatment with doxycycline for 1 to 2 weeks. If severe swelling happens oral treatment with prednisolone (30 mg/day x 3 days) may reduce the intensity or duration of the swelling. As in any treatment, setting proper patient expectation of the healing time course plays a big role in success and patient compliance. Redness due to treatment is expected to resolve within 2-5 days, while swelling develops gradually and should resolve in 3-4 days. Darkening and peeling of any pigmented lesions also targeted for removal during initial BBL treatment usually resolves in 7-10 days.

RESULTS

Although improvement can be seen after one combination treatment, several treatments and then maintenance are usually

recommended to achieve lasting cosmesis in the case of rosacea symptoms like flushing and erythema. Herein 4 cases are presented with specific treatment parameters and outcomes.

Figure 3 shows a 72 year old female who presented with desire to remove uneven background coloration as well as the elimination of signs of rosacea, including erythema, small telangiectasia, and a notable deep blue reticular vein. The vein was treated at the outset with Nd:YAG, but with parameters designed for deep vein coagulation (6 mm spot size, 20 ms pulse width, and fluence of 110 J/cm²). Then BBL was accomplished according to the protocol for Fitzpatrick Skin Type II (Table 1), namely a first pass with the 515 nm filter, 10 ms pulse at 15 J/cm² fluence, followed by a second pass with the finesse adapter attached and the 515 nm filter, 10 ms pulse at 17 J/cm². ClearSilk treatment was done with the following settings: 7 mm spot size, 0.3 ms pulse width, 7 J/cm² fluence, 10 Hz repetition rate, for a total of around 4,500-6,000 shots. A total of two treatments (30 minutes each) were accomplished with a month in between. The before and after photos demonstrated show a 6 week period with the follow-up picture taken 2 weeks after the final treatment.

Figure 4 shows a similar case in which an 36 year old female presented with desire to remove uneven background coloration as well as the elimination of erythema. BBL and ClearSilk treatments was accomplished with the same exact settings as in Figure 1 above. A total of two treatments were accomplished with a month in between. The before and after photos demonstrated show a 3 month period the follow-up picture taken 1 month after the final treatment. The patient is expected to return for several additional BBL treatments.

Following the same protocols described above, Figure 5 shows before and after treatments after 3 sessions to demonstrate reduction of visible symptoms. The patient received 3 treatments and the final picture was taken 1 month after the last treatment. The settings used for the first pass was with the 515 nm filter, 10 ms, 15J/cm², followed by a second pass that utilized the same filter combined with the square finesse adapter and increasing to 17J/cm²; Lastly, the ClearSilk treatment was done with the following settings: 7 mm spot size, 0.3 ms pulse width, 7 J/cm² fluence, 10 Hz repetition rate, for a total of around 4,000-6,000 shots.

The final case presented, Figure 6, shows before and after 2 sessions of treatments with the resulting reduction of visible symptoms. Each treatment featured two passes, with the first pass with the 560 nm filter, 10 ms, 15 J/cm², followed by a second pass which utilized the 515 nm filter combined with the square finesse adapter and increasing to 16J/cm²; Lastly, the ClearSilk treatment was done with the following settings: 7 mm spot size, 0.3 ms pulse width, 7 J/cm² fluence, 11 Hz repetition rate, for a total of around 3,500-4,200 shots.

Figure 3:
A) Before B) After

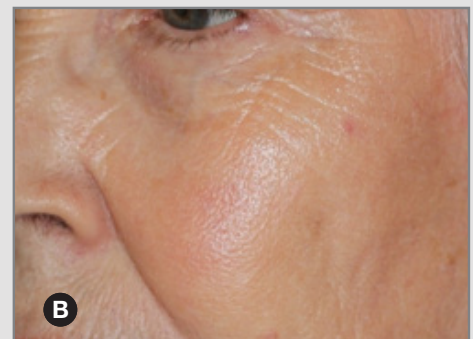


Figure 4:
A) Before B) After



Figure 5:
A) Before B) After



Figure 6:
A) Before B) After



In all cases listed, treatments were well received and patients were satisfied with the outcomes of the treatments. Although complications sometimes arise, the most common is swelling and it is usually resolved within 2-4 days. To avoid potential negative impact of any swelling, the first visit is often scheduled on a Thursday.

DISCUSSION

With the variety of light- and energy-based options, advent of new tools, and nuanced capabilities for low downtime treatments, using the “right tool for the job” is easier said than done, especially given that the best answer is often to pair different modalities to different aspects of patient presentation and desired outcomes.

When considering low downtime treatment regimens that offer excellent and long lasting cosmesis for photo-rejuvenation and the reduction in vascular conditions such as rosacea, the combination of BBL and ClearSilk allows for optimization to treat both superficial and deep elements, a more complete overall solution. It is evident from the case studies shown that visible results are observed after a single treatment, but further improvement is possible over time with proper patient education on compliance and regular maintenance treatments. In the cases discussed, initial presentation was generally treated monthly until resolution of symptoms present at initial presentation, ideally followed by annual or bi-annual maintenance treatments. Continued follow ups show cumulative benefits beyond reversal of initial concerns.

CONCLUSIONS

The combination of BBL and ClearSilk treatments not only allow for the improvement of the visible signs associated with facial vascular conditions such as rosacea, but also display lasting results despite minimal downtime, provided proper patient education, pretreatment, post care, and compliance with ongoing sun protection. Treatment parameters were discussed for optimization of the combination treatment of BBL and ClearSilk for symptoms of rosacea are implicated. Patients underwent monthly treatment until resolution of redness, erythema, and facial flushing, followed by regular maintenance optimally at an annual or bi-annual interval. The additional benefits observed of ongoing maintenance treatment merit further analysis.

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Printed in USA

2600-003-24 Rev. A