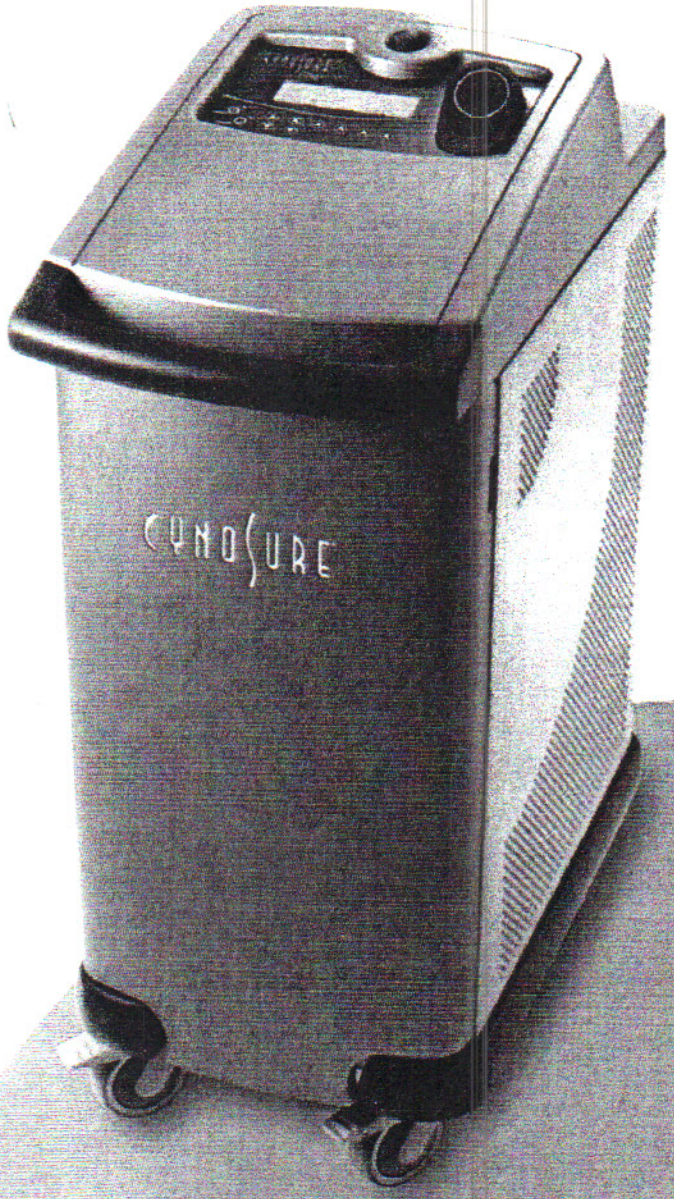
CYNOSURE



Elite™

Aesthetic Workstation

Acclaim® Apogee®

Clinical Reference Manual

Chapter 1 Introduction

About the Manual

The purpose of this manual is to review treatments and techniques and to provide general guidelines for the safe and effective use of the Apogee Elite, Apogee 5500 and Acclaim 7000 laser systems. The clinical protocols contained within this manual are based on current clinical use. However, they do not substitute for the clinical judgment of the physician and the individual patient's needs.

Like the operator manual, this clinical manual covers the Apogee Elite, Apogee 5500 and Acclaim 7000 laser systems. The information is presented primarily using the Apogee Elite laser, since that system houses both wavelengths. If you are using the Acclaim 7000 system, refer to the 1064-nm wavelength or YAG information only. If you are using the Apogee 5500 system, refer to the 755-nm wavelength or Alex information only.

Apogee Elite Laser System

The Apogee Elite laser is a multi-application system that delivers energy in the near infrared (755 nm) and infrared (1064 nm) region of the electromagnetic spectrum. See Figure 1.

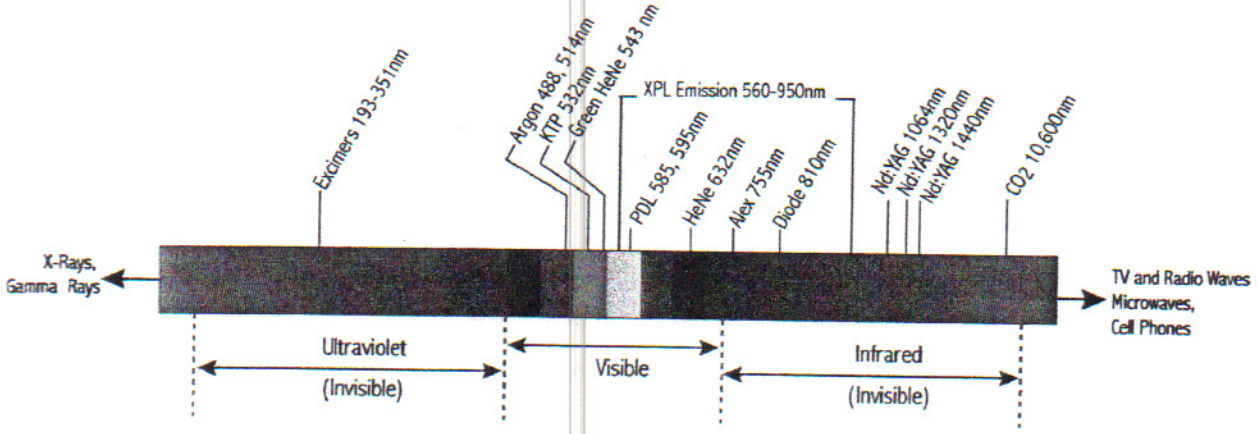


Figure 1—Electromagnetic Spectrum

Thermokinetic Selectivity Process

The Alexandrite wavelength (755 nm) and the Nd:YAG wavelength (1064 nm) safely and effectively target hair follicles, unwanted veins, pigmented lesions and treat sun-damaged skin with a minimum of pain, inconvenience and side effects. For example, in the case of hair removal, our long pulse infrared laser takes full advantage of the principle of Thermokinetic Selectivity™ (TKS™). TKS accounts for the heat diffused by a target after laser energy has been absorbed. It is related to the target's volume: absorbed energy (heat) dissipates through thermal transfer more slowly from a large target than from a smaller target of the same chromophore.

Selective Photothermolysis

TKS is an extension of Selective Photothermolysis, in which wavelength, energy, pulse width and thermal relaxation time all play a part in the selective destruction of a target and the preservation of the surrounding tissue. The energy that is required to damage the large target would spare a smaller structure, if the energy were applied for a period longer than required for the small structure to dissipate its absorbed heat. Because of the unfavorable "surface area-to-volume" ratio, a target structure of large volume is less able to conduct absorbed energy (heat) through its relatively small surface and transmit it outward to the surroundings than a small volume structure with the same chromophore, such as the epidermis.

Thermal Relaxation Time

When laser light is applied to a large target, such as a hair follicle, the pulse width of the laser must be shorter than the thermal relaxation time of the larger target, and yet much longer than the thermal relaxation time of the smaller target, such as the epidermis, See Figure 2. Thus, Thermokinetic Selectivity allows the epidermis to remain cool while the larger target, such as a hair follicle, heats up selectively. The thermal relaxation time of hair is 40–100 milliseconds (ms), and the thermal relaxation time of the epidermis is 3–10 ms.

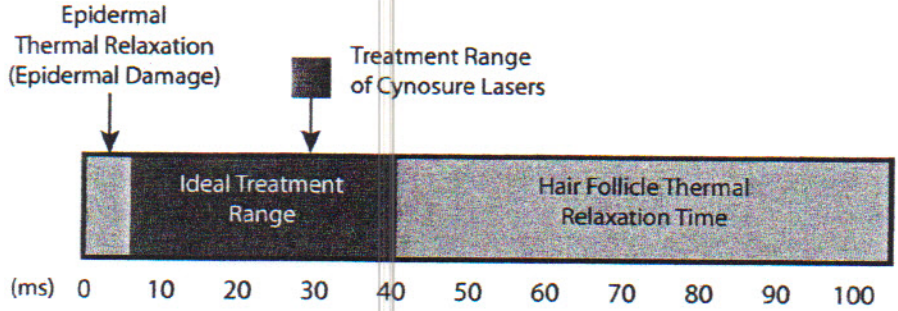


Figure 2—Ideal Range of Hair Removal

The Apogee Elite laser system delivers the correct combination of wavelengths (755 and 1064 nm), high fluences (up to 300 J/cm2) and long pulses (up to 300 ms) for its clinical applications.

Many advantages of the Apogee Elite laser system include the following:

- Ability to treat all skin types and tanned skin with minimal epidermal damage
- Rapid treatment of large areas
- Non-invasive
- Shorter course of treatment than electrolysis
- Consistent reproducible results

Classification of Skin Types

Before treating with the Apogee Elite laser, consider skin type and pigmentation of the patient. Pigment in the skin may compete with the intended target for absorption of laser energy. The Fitzpatrick Scale is a generally accepted means of determining skin type. Tanned skin also competes with the intended target and must be a consideration before treating.

The following table offers a broad guidance to identifying skin types based on hair, skin and eye color as well as sun reaction.

Table 1—Skin Types

Type	Hair Color	Skin Color	Eye Color	Sun Reaction
I	Red	White	Blue-green	Always burn, never tan
II	Blonde	White	Blue	Usually burn, tans with difficulty
III	Brown	White to Light Brown	Brown	Sometimes burns, average tanning
IV	Brown-black	Moderate Brown	Brown-black	Rarely burns, tans with ease
V	Black	Dark brown	Dark	Very rarely burns, tans very easily
VI	Black	Black	Dark	

Chapter 4 Treatment Indications

Indications

The Apogee Elite laser is indicated for permanent hair reduction and the treatment of leg and facial veins, vascular lesions, pigmented lesions, non-ablative skin treatment and wrinkle reduction.

Contraindications

Therapy using the Apogee Elite laser is contraindicated for those patients who:

- Are hypersensitive to light in the infrared, or near infrared wavelength region
- Take medication that is known to increase sensitivity to sunlight
- Are taking or have taken isotretinoin capsules within the last six months
- Take anticoagulants
- Have seizure disorders triggered by light
- Are pregnant
- Have suspicious pigmented lesions
- Are receiving or have received gold therapy
- Have Lupus
- Have unprotected sun exposure within 4 weeks of treatment if being treated with the Alexandrite laser (755-nm wavelength)
- Have unprotected sun exposure within 3–7 days of treatment if being treated with the YAG laser (1064-nm wavelength)

Adverse Effects

Complications, though rare, can occur with any laser procedure. All possibilities should be discussed with the patient and understood prior to treatment. Failure to comply with post-care instructions may increase the probability of complications.

Adverse Effects–All Indications

The following adverse effects can occur when treating with the Apogee Elite laser for all indications: hair removal, facial skin treatment, pigmented lesions or veins.

- Scarring, though rare, can occur following any laser procedure.
- Blistering during treatment may be an indication of sun exposure or an excessive fluence setting for the skin type. Blistering can occur during the first three days following the laser procedure. Blistered areas should be kept moist with an ointment until healed.
- Other acute changes may include scaling or scabbing. These changes are often associated with higher energies and their incidence decrease when treatment energies are reduced.
- Histamine/Hives: some patients develop raised papules similar to hives. This irritation usually subsides in a few hours.

Hair Removal

Additionally when using the Apogee Elite laser for hair removal, these adverse effects can occur:

- Pustules or pimples may develop in the first few days following treatment. The effected area should be kept clean and treated with care.
- Hyperpigmentation or hypopigmentation can occur following the laser treatment. Pigmentary changes have been reported to be transient although they may last for several months or longer.

Facial Skin Treatment

Additionally when using the Apogee Elite laser for facial skin treatment, this adverse effect can occur:

- Pustules or pimples may develop in the first few days following treatment. The effected area should be kept clean and treated with care.

Veins

Additionally when using the Apogee Elite laser for treatment of veins, these adverse effects can occur:

- Hyperpigmentation or hypopigmentation can occur following the laser treatment. Pigmentary changes have been reported to be transient although they may last for several months or longer.
- Patients will experience some temporary reddening of the skin around the treatment site.

Patient Selection

The following clinical protocol is based on methods in current clinical use. It does not substitute for the clinical judgment of individual patient needs.

Patient Selection–Hair

Apogee Elite laser therapy is for those patients who wish to reduce or eliminate unwanted hair. The 755-nm wavelength is ideal for treating unwanted hair in skin types I–III. The 1064-nm wavelength is ideal for treating skin types IV–VI or tanned skin.

When using the 755-nm wavelength, Apogee Elite laser therapy is not for those patients who have unprotected sun exposure or tanning within one month of the first treatment, and throughout the entire treatment course.

Patient Selection–Facial Skin Treatment

Apogee Elite laser therapy is for those patients with environmental skin damage, a red or ruddy complexion, discrete telangiectasia, uneven pigmentation and skin texture. Apogee Elite laser therapy is for patients with skin types I–IV.

Apogee Elite laser therapy using the 1064-nm wavelength is not for those patients who have suspicious pigmented lesions. Therapy is not for those patients who have with unprotected sun exposure or tanning within 3–7 days prior to treatment and throughout the course of their laser treatment. Apogee Elite laser therapy is not for patients with skin types V–VI.

Patient Selection–Pigmented Lesions

Apogee Elite laser therapy using the 755-mm wavelength is for patients who present with superficial pigmented lesions, as well as patient who desire facial treatment for pigmented lesions. Apogee Elite laser therapy is for patients with skin types I–III.

Apogee Elite laser therapy is not for patients who have unprotected sun exposure or tanning for four weeks prior to treatment, any time during treatment, or four weeks after the course of their laser treatment.

Apogee Elite laser therapy is not for those patients who have suspicious pigmented lesions. Therapy is not for those patients who have with unprotected sun exposure or tanning within 3–7 days prior to treatment and throughout the course of their laser treatment. Apogee Elite laser therapy is not for patients with skin types IV–VI.

Patient Selection–Vein

Apogee Elite laser therapy is for those patients who present with telangiectasia, as well as seek treatment of vessels up to 3 mm in diameter. Apogee Elite laser therapy is for patients with skin types I–IV.

Apogee Elite laser therapy using the 1064-nm wavelength is not for those patients who have suspicious pigmented lesions. Therapy is not for those patients who have with unprotected sun exposure or tanning within 3–7 days prior to treatment and throughout the course of their laser treatment. Apogee Elite laser therapy is not for patients with skin types V–VI.

Chapter 5 Treatment Consultation

Introduction

The consultation or initial visit allows an exchange between case provider and patient in an attempt to reach a decision regarding treatment. A complete patient history should be discussed. The patient must understand the procedure, proper expectations, risks and possible outcomes before treatment can begin.

Patient History

A thorough history of previous treatment methods, current medications, allergies and pigmentary problems should be discussed before treatment. Criteria for exclusion includes, but is not confined to:

- Photosensitivity
- Seizure disorders triggered by light
- Keloid formation
- Immunosuppression
- History of poor wound healing

In the case of vein treatment, criteria for exclusion is a history of vascular compromising disease

Patients with a history of hyperpigmentation and/or patients with skin type III or greater can be pretreated with topical bleaching agents 2–4 weeks prior to laser treatment and for 2 weeks following treatment to reduce the risk of pigmentary changes.

For patients with a history of cold sores, i.e., herpes simplex, a prophylactic antiviral medication should be considered prior to commencement of laser treatment.

Screening Evaluation

A thorough screening evaluation may include: medical history, physical examination, and invasive or non-invasive diagnostic examination. Once the screening evaluation is undertaken, a course of therapy is then implemented.

The following is a typical sequence of events that may be used to evaluate, classify and treat telangiectatic veins:

Facial Veins

- Physical examination
- If no abnormal findings, then proceed with laser treatment

Leg Veins

- Physical examination
- If no abnormal findings, then proceed with laser treatment
- If abnormal findings, then duplex scanning varicography
- Sclerotherapy of large diameter veins
- Sclerotherapy of communication or reticular veins that feed spider veins
- Sclerotherapy of spider telangiectasia greater than 1 mm in diameter
- Proceed with laser treatment

Photographs

Before and after photographs should be taken throughout the course of the treatment to monitor patient response to therapy. Photographs should be taken prior to treatment, immediate post operatively and during follow-up visits. Keep camera settings and photocomposition consistent to best discern treatment results.

Patient Documentation Forms

Patient documentation, such as consent forms, treatment records, pretreatment and posttreatment instructions, is important to document the success of treatment. Samples of these forms are provided in the in "Documentation" starting on page 45.

Consent Forms, the documented process of accepting and confirming treatment must be reviewed, understood and signed by the patient prior to treatment. These forms must review the topics discussed during consultation and acknowledge that the patient understands the procedure and that all questions have been answered.

Review Posttreatment Instructions and confirm that the patient will adhere to such instructions throughout the course of their laser treatment.

Test Spots

Treatment energies for each patient will vary according to patient skin type, location, density and color of hair. Test spots, using a variety of energies and pulse durations are recommended. These will ensure that the energy delivered to the patient is within safe parameters. Start at the low range, and then increase the fluence based on spot size and skin type.

Testing Evaluation

Evaluate the tested area(s) to identify appropriate treatment fluence between 10 to 20 minutes of administering treatment spots.

Verify that any hypopigmentation or hyperpigmentation has been transient to date. If the patient is concerned about pigmentary changes, further treatments may be delayed. Once the area returns to normal skin tone, treatments may be resumed.

If the treated area appears blanched, gray or white, this is an indication that the fluence is too high and should be decreased accordingly.

Further testing may be indicated depending on the results seen from the first area(s) tested.

Chapter 7 Hair Removal Treatment

Introduction

Laser hair removal is an established method of treating unwanted and/or excess hair. It may be helpful to define some of the common types of unwanted and/or excess hair.

Hirsutism is the presence of excessive bodily and facial hair, usually in a male pattern, especially in women presenting with facial hair in the beard and/or upper lip region. Hypertrichosis is growth of hair in excess of the normal, such as abnormal distribution or in abnormal locations, often with genetic or ethnic origins. Aesthetics can be defined as unwanted hair as it relates to improving physical appearance.

Hair-Growth Phases

It is important to understand the hair growth cycle and how this cycle varies in different parts of the body. There are three phases of hair growth defined below:

Anagen: This is the phase when synthesis of hair takes place. This is an active growth phase in which the hair bulb is intact. The hair grows both upward and downward. During early anagen phase the bulb is closest to the surface of the skin allowing for the most effective treatment. The time span for this phase is measured in months/years.

Catagen: This brief intermediate phase, measured in weeks, occurs between the anagen and telogen phases. During this phase the body absorbs the lower third of the follicle.

Telogen: This is the resting phase. The hair bulb is no longer present. It is now a club hair that will fall out or be pushed out of the follicle by a new anagen growing hair. The time span for this phase is measured in weeks/months.

It is only during the growth phase or anagen phase that hair reacts to laser light. The goal in hair removal is for laser light to penetrate to the depth of the hair follicle during the anagen phase to achieve long-term results.

Table 2—Hair Growth (Richards-Merhag Table) [1]

	% testing hairs Telogen	% growing hairs Anagen	% transition hair Catagen	% uncertain growth stage	duration growth time Telogen	duration growth time Anagen	number follicles/ square cm	the hair daily rate of growth	total number of follicles in the area	approx. depth terminal follicle
Head										
Scalp	13	85	1–2	1–2	3–4 months	2–6 years	350	0.35 mm		3–5 mm
Eyebrows	90	10			3 months	4–8 weeks		0.16 mm		2–2.5 mm
Ear	85	15			3 month	4–8 weeks				
Cheeks	30–50	50–70					880	0.32 mm		2–4 mm
Beard/ Chin	20	70			10 weeks	1 year	500	0.38 mm		2–4 mm
Upper Lip	35	65			6 weeks	16 weeks	500			1–2.5 mm
Body										
Axillae	70	30			3 months	4 months	65	0.3 mm		3.5–4.5 mm
Trunk	NA	NA					70	0.3	425,000	2–4.5 mm
Pubic Area	70	30			3 months	4 months	70			3.5–5 mm
Arms	80	20			18 weeks	13 weeks	80	0.3 mm	220,000	2–4.5 mm
Legs	80	20			24 weeks	16 weeks	60	0.21 mm	370,000	2.5–4 mm
Breasts	70	30					65	0.35 mm		3–4.5 mm

NOTE: The second column of data in the Richards-Merhag table shows the percentage of hair follicles in the anagen growth phase according to body location. Since only follicles in anagen phase are treatable, this table illustrates why it is difficult to predict the success of laser treatment by the number of irreversible damaged hair follicles. While 70% of the hairs in the beard and chin region are in anagen phase (therefore an ideal site for laser treatment), only 20% of the hairs in the legs and thigh region meet this condition.

1 M. Fuchs: Thermokinetic Selectivity—A New Highly Effective Method for Permanent Hair Removal: Experience with the LPIR Alexandrite Laser

Patient Expectations

The AcuPulse Elite laser is used to reduce or eliminate unwanted hair. Patients must understand that results will vary with each person.

Because the duration of hair growth cycle varies among body location being treated. The laser can only eliminate hair that is currently in the anagen growth phase, see Table 2. Multiple treatments are necessary over a span of 4-week intervals to remove hair from most areas. Hair from the legs may require 6–8 week treatment intervals due to hair growth cycles. Any results may not be apparent for several months posttreatment. Suggested treatments and treatment intervals are listed in the table below.

Table 3—Hair Removal Treatment Intervals

Body Part	Number of Treatments		Treatment Interval
	755 nm	1064 nm	
Lip	2–4	5–7	4 weeks
Face	4–6	5–7	4–6 weeks
Bikini Line	4–5	5–8	4–6 weeks
Arms	4–5	5–8	4–6 weeks
Underarms	4–5	5–8	4–6 weeks
Back	4–6	6–9	4–8 weeks
Legs	6–8	6–9	6–8 weeks

The laser pulse is often described as a wave of heat with the sensation of a pinprick. A topical anesthetic may be applied if necessary. The SmartCool® 6 cooling device by Cynosure is effective in reducing discomfort during laser treatment.

Erythema/follicular edema is a normal response to treatment and may be seen for 24–48 hours posttreatment. The treated hairs can take 7–4 days to exfoliate and may appear to be "growing" during this time.

SmartCool is a registered trademark of Cynosure, Inc.

Pretreatment Procedure

Patients with the slightest tan should not be treated with the Alexandrite laser (755 nm) but may be treated with the Nd:YAG laser (1064 nm). Patients are to avoid sun exposure, tanning beds, sunless tanning lotions and tanning creams before, during, and after the course of their laser treatment.

When using the 1064-nm wavelength, the patient should avoid sun exposure before treatment for 1–2 days, during treatment, and one week after treatment.

When using the 755-nm wavelength, the patient should avoid sun exposure for at least four weeks before treatment, during treatment and at least one week after treatment. A broad-spectrum sunscreen (UVA/UVB and SPF 30 or greater), should be applied to the treatment area(s) if sun exposure is possible.

Instruct the patient to shave the treatment areas within 24 hours before treatment. This is to remove the overlying hair from the treatment site. Thick overlying hair will absorb the laser energy reducing the amount of energy absorbed by the hair follicle. Superficial thermal injury can occur as well due to overlying hair.

Patients with a history of hyperpigmentation can be prescribed a preparation containing topical bleaching cream 2–4 weeks prior to treatment.

Skin should be void of make-up, creams and lotions prior to treatment.

Determination of Clinical Endpoint

A slight erythema should be noted in the skin around the hair follicles. Increased erythema during treatment can indicate the energy is too high or the patient has had recent sun exposure.

If the treatment area has even the slightest tan, the erythema response with the 755-nm wavelength is more intense and can lead to a purpuric response (blue-gray discoloration). If blistering occurs, treatment should be stopped immediately. Both purpura and blistering are signs of excessive energy. Treatment should be discontinued or fluence should be lowered immediately. Treatment may resume when the tan has faded, or the 1064-nm wavelength may be used.

Suggested Treatment Parameters

The highest fluence tolerable for the individual patient should be utilized during laser treatment. The fluence should be determined through test spots. Suggested treatment parameters are listed in the tables that follow.

Table 4—Hair Treatment with Alex (755 nm)

Skin Type I–II			
Area Treated	Spot Size (mm)	Fluence (J/cm²)	Pulse Width (ms)
Lip	10	20–35	20–5
Lip Coarse	10	18–30	20
Chin	10	20–35	20–5
Chin Coarse	10	18–30	20
Beard	10	20–35	20–5
Beard Coarse	10	18–28	20
Body	10	20–35	20–5
Body Coarse	10	18–30	20

Skin Type I–II			
Area Treated	Spot Size (mm)	Fluence (J/cm²)	Pulse Width (ms)
Lip	12	20–35	20–5
Lip (Coarse)	12	18–30	20
Chin	12	20–35	20–5
Chin (Coarse)	12	18–30	20
Beard	12	20–35	20–5
Beard (Coarse)	12	18–28	20
Body	12	20–35	20–5
Body (Coarse)	12	18–30	20

Skin Type I–II			
Area Treated	Spot Size (mm)	Fluence (J/cm²)	Pulse Width (ms)
Lip	15	20–25	20–5
Lip (Coarse)	15	18–25	20
Chin	15	20–25	20–5
Chin (Coarse)	15	18–25	20
Beard	15	20–25	20–5
Beard (Coarse)	15	18–25	20
Body	15	20–25	20–5
Body Coarse)	15	18–25	20

NOTES: Longer pulse widths (20 ms) should be used at initial treatment. Pulse width may be shortened based on skin type and follicle size. Fluence can be adjusted in conjunction with pulse width. When changing from a 20-ms pulse to a 5-ms pulse, decrease fluence by 2 J/cm².

[illegible] is the maximum fluence for the 15-mm spot size with the Apogee Elite. Due to depth of penetration of the 15-mm spot size, test spots are recommended and fluence should be reduced if changing from a 12-mm to a 15-mm spot size.

Table 4 (Continued)—Hair Treatment with Alex (755 nm)

Skin Type III			
Area Treated	**Spot Size (mm)**	**Fluence (J/cm²)**	**Pulse Width (ms)**
Lip	10	18–25	20–5
Lip (Coarse)	10	18–25	20
Chin	10	18–25	20–5
Chin (Coarse)	10	18–25	20
Beard	10	18–25	20–5
Beard (Coarse)	10	18–23	20
Body	10	18–25	20–5
Body (Coarse)	10	18–25	20

Skin Type III			
Area Treated	**Spot Size (mm)**	**Fluence (J/cm²)**	**Pulse Width (ms)**
Lip	12	18–25	20–5
Lip (Coarse)	12	18–25	20
Chin	12	18–25	20–5
Chin (Coarse)	12	18–25	20
Beard	12	18–25	20–5
Beard (Coarse)	12	18–23	20
Body	12	18–25	20–5
Body (Coarse)	12	18–25	20

Skin Type III			
Area Treated	**Spot Size (mm)**	**Fluence (J/cm²)**	**Pulse Width (ms)**
Lip	15	18–20	20–5
Lip (Coarse)	15	18–20	20
Chin	15	18–20	20–5
Chin (Coarse)	15	18–20	20
Beard	15	18–20	20–5
Beard (Coarse)	15	18–20	20
Body	15	18–20	20–5
Body (Coarse)	15	18–20	20

NOTES: Longer pulse widths (20 ms) should be used at initial treatment. Pulse width may be shortened based on skin type and follicle size. Fluence can be adjusted in conjunction with pulse width. When changing from a 20-ms pulse to a 5-ms pulse, decrease fluence by 2 J/cm².

25 J/cm² is the maximum fluence for the 15-mm spot size with the Apogee Elite. Due to depth of penetration of the 15-mm spot size, test spots are recommended and fluence should be reduced if changing from a 12-mm to a 15-mm spot size.

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Table 5—Hair Treatment with YAG (1064 nm)

Skin Type I–II			
Area Treated	**Spot Size (mm)**	**Fluence (J/cm²)**	**Pulse Width (ms)**
Lip	10	50–60	15–10
Lip (Coarse)	10	45–60	20
Chin	10	50–60	15–10
Chin (Coarse)	10	45–60	20
Beard	10	50–60	15–10
Beard (Coarse)	10	40–60	30–20
Body	10	45–65	15–10
Body (Coarse)	10	45–65	20

Skin Type III–IV or Tanned Skin			
Area Treated	**Spot Size (mm)**	**Fluence (J/cm²)**	**Pulse Width (ms)**
Lip	10	40–55	40–20
Lip (Coarse)	10	35–55	40–20
Chin	10	40–60	40–20
Chin (Coarse)	10	35–55	40–20
Beard	10	45–60	40–20
Beard (Coarse)	10	30–60	40–20
Body	10	50–60	40–20
Body (Coarse)	10	45–60	40–20

Skin Type V–VI			
Area Treated	**Spot Size (mm)**	**Fluence (J/cm²)**	**Pulse Width (ms)**
.ip	10	30–45	40–30
.ip (Coarse)	10	25–45	40–30
Chin	10	30–50	40–30
Chin (Coarse)	10	25–45	40–30
eard	10	30–40	40–30
eard (Coarse)	10	25–40	40–30
ody	10	30–50	40–30
ody (Coarse)	10	25–45	40–30

OTE: Longer pulse widths should be used at initial treatment. Pulse widths may be shortened based on in type and follicle size.

Table 5 (Continued)—Hair Treatment with YAG (1064 nm)

Skin Type III–IV			
Area Treated	**Spot Size (mm)**	**Fluence (J/cm²)**	**Pulse Width (ms)**
Lip	12	30–50	40–25
Lip (Coarse)	12	35–55	40–25
Chin	12	40–50	40–25
Chin (Coarse)	12	35–50	40–25
Beard	12	30–50	40–25
Beard (Coarse)	12	30–50	40–25
Body	12	45–50	40–25
Body (Coarse)	12	40–50	40–25
Skin Type V–VI			
Area Treated	**Spot Size (mm)**	**Fluence (J/cm²)**	**Pulse Width (ms)**
Lip	12	30–45	40–30
Lip (Coarse)	12	30–45	40–30
Chin	12	30–45	40–30
Chin (Coarse)	12	30–45	40–30
Beard	12	30–40	40–30
Beard (Coarse)	12	25–40	40–30
Body	12	30–45	40–30
Body (Coarse)	12	30–45	40–30
Skin Type IV			
Area Treated	**Spot Size (mm)**	**Fluence (J/cm²)**	**Pulse Width (ms)**
Face	15	25–35	40
Body	15	25–35	40
Skin Type V–VI			
Area Treated	**Spot Size (mm)**	**Fluence (J/cm²)**	**Pulse Width (ms)**
Face	15	20–35	40
Body	15	20–35	40

Longer pulse widths (40 ms) should be used at initial treatment. Pulse widths may be shortened based on skin type and follicle size.

If higher fluence is required, change to a 12-mm spot size.

Chapter 8 Facial Skin Treatment

Introduction

The following provides suggested guidelines for facial skin treatment using the Apogee Elite 1064-nm wavelength laser. The following clinical protocol is based on methods in current clinical use. It does not substitute for the clinical judgment of individual patient needs.

Patient Expectations

Treatment provides the most benefit to those with mild to moderate sun-damaged skin. To achieve optimal benefit, 4 to 6 treatments may be necessary at 3 to 4 week intervals. Non-ablative facial treatment with the Apogee Elite laser has minimal posttreatment-care requirements. Patients may return to normal activities after treatment.

Pretreatment Procedure

For better results, patients are to avoid sun exposure, tanning beds, tanning creams and sunless tanning lotions for one week prior to treatment and throughout the course of their laser treatment. A broad-spectrum (UVA/UVB) sunscreen SPF 30 or greater should be applied to the area(s) to be treated whenever exposed to the sun.

On the day of treatment, instruct the patient to thoroughly clean the area to be treated of any make-up, creams and lotions.

Treatment Procedure

Divide the facial treatment area into approximately 4 by 5 cm sections, or an equivalent area. Treat only one section at a time. **NOTE:** An area of 4 cm by 5 cm is typically treated with 400 to 500 pulses.

Hold the tip of the handpiece approximately 1 to 2 cm from the surface of the skin to be treated. The laser beam is defocused with a beam size of about 8 mm in diameter.

Move the handpiece back and forth rapidly (both from top-to-bottom and from left-to-right) making passes over the treatment sections. Treating with the laser in this manner should result in an even distribution of pulses. When distributing the pulses evenly, the heat build-up will be uniform and comfortable. If too much time is spent in a small area, or the handpiece is moved too slowly, the patient may become uncomfortable.

If desired, use the SmartCool 6 cooling system at a low setting for patient comfort.

After an area has been treated, treatment can begin on the next section with the same technique.

WARNING: To avoid eye injury from laser light, use extreme caution when treating near the eyes. Be sure that the patient has appropriate eye protection for the wavelength being used.

When treating near the eye, the laser beam should always be directed away from the eye and applied only to the skin outside of the orbital rim. Skin at the edge of the orbital rim can be pulled away from the eye, while the eye shield is being held in place, so that it can be treated outside of the orbital rim. Be aware that there is a distinct risk of acute auterion uveitis from improper eye protection in addition to possible retina damage.

As treatments in the ocular region (below the eyes, the bridge of the nose and the temples) require special care, it is often convenient to treat those areas first before moving on to the other areas. Other sensitive areas—just beneath the nose and over the beard area—may require the use of less pulses or lower fluences for some patients. When treatments are performed near the mouth, patients should be instructed to close their mouths to avoid accidental exposure of their teeth to the laser beam.

Treatments that have been performed on full faces typically require approximately 12,000 pulses with approximately 3000 pulses on each quadrant.

Immediately following treatment, the area may appear flushed and warm, but there should be no bruising. The redness should fade over the course of a few hours and should not be enough to interfere with daily activities.

Suggested Treatment Parameters

The highest fluence tolerable for the individual patient should be utilized during laser treatment. The fluence should be determined through test spots. Suggested treatment parameters are listed in the following table.

IMPORTANT: Treating in the **beard area of the face and neck may cause blistering and/or** irregular hair loss and **is not recommended.**

Table 6—Skin Treatment with YAG (1064 nm)

Skin Types I–IV (No Cooling Required)						
Area	Skin Type	Total Pulses (per Quadrant)	Spot Size (mm)	Fluence (J/cm2)	Pulse Duration (ms)	Rep. Rate (Hz)
Face	I–III	2000–3000	5	10–18	0.4	5
	IV	2000–3000	5	10–15	0.4	5
Neck	I–III	2000–3000	5	10–18	0.4	5
	IV	2000–3000	5	10–15	0.4	5
Chest/Hands	I–III	2000–3000	5	10–18	0.4	5
	IV	2000–3000	5	10–15	0.4	5

NOTE: When treating skin for fine lines and wrinkles work in quadrants. The skin should turn pink. If there is no visual reaction, continue with additional pulses. The pulses are not an absolute as each individual may respond differently.

Table 7—Sun-Damaged Skin Treatment with YAG (1064 nm)

Skin Types I–IV (Cooling Required)					
Skin Type	Treatments	Spot Size (mm)	Fluence (J/cm2)	Pulse Duration (ms)	Rep. Rate (Hz)
I–III	3–6 every two weeks	7	50	50	1–2.0
IV	3–6 every two weeks	7	30–40	50	1–2.0
I–III	3–6 every two weeks	10	50	50	1–1.5
IV	3–6 every two weeks	10	30–40	50	1–1.5

NOTE: Add topical anesthesia if desired.

Deliver pulses in a linear fashion with 10% overlap. Make 2–3 passes if tolerated. Type IV and neck areas may need lower fluence and/or a fewer passes.

Applying a cooling with the SmartCool 6 air-cooling system is recommended. When used with air-cooling systems, a coating of gel, such as Lubriderm or clear aloe vera, acts as a conduit for laser energy.

Posttreatment Skin Care

Following treatment, apply an aloe-based gel or equivalent to sooth and moisturize the skin. Following, and throughout the course of treatment, the treated skin is sensitized to sunlight. Patients should use daily a broad-spectrum (UVA/UVB) sunscreen SPF 30 or greater before, during, and after the course of treatment.

Patient Expectations

Pigmented skin treatment provides the most benefit to those with superficial benign pigmented lesions. To achieve optimal benefit, 1 to 2 treatments may be necessary about 3 weeks apart. Pigmented skin treatment with the Apogee Elite laser has minimal posttreatment care. Patients may return to normal activities after treatment. Suspicious pigmented lesions should not be treated.

Pretreatment Procedure

For better results, patients are to avoid sun exposure, tanning beds, tanning creams and sunless tanning lotions for four weeks prior to treatment and throughout the course of their laser treatment. A broad-spectrum (UVA/UVB) sunscreen SPF 30 or greater should be applied to the area(s) to be treated whenever exposed to the sun.

On the day of treatment, instruct the patient to thoroughly clean the area to be treated of any make-up, creams and lotions.

Suggested Treatment Parameters

The highest fluence tolerable for the individual patient should be utilized during laser treatment. The fluence should be determined through test spots. Suggested treatment parameters are listed in the following table. Darker lesions will respond faster to treatment and will need less energy than lighter lesions.

Table 8—Pigmented Lesions Treatment with Alex (755 nm)

Skin Types I, II and III (Cooling Required Posttreatment)			
Skin Type	Spot Size (mm)	Fluence (J/cm2)	Pulse Width (ms)
I–II	5	18–25	0.5
III	5	15–25	0.5
I–II	7, 10	20–24	5.0
III	7, 10	18–24	5.0

Posttreatment Skin Care

Following treatment, apply an aloe-based gel or equivalent to sooth and moisturize the skin. Following, and throughout the course of treatment, the treated skin is sensitized to sunlight. Patients should use daily a broad-spectrum (UVA/UVB) sunscreen SPF 30 or greater before, during, and after the course of treatment.

Treated lesions will likely crust, then slough over the course of several days/weeks. Patients should not scratch or pick at crusts.

Introduction

The following provides suggested guidelines for vein treatment using the Apogee Elite 1064-nm wavelength laser. The following clinical protocol is based on methods in current clinical use. It does not substitute for the clinical judgment of individual patient needs.

Pathophysiology of Veins—Telangiectasia

As noted by Hexsel and Alegre, the term telangiectasia was first introduced by Von Graf to describe a superficial vessel of the skin visible to human eye. Individually, these veins can measure from 0.1 to 3 mm in diameter and represent an expanded venule, capillary or arteriole. Telangiectasia can originate from arterioles or venules.

Telangiectasia can be classified into four types based on clinical appearance:

- Sinus or Simple (Linear): A red linear telangiectasia that occurs on the face, especially the nose or legs. In addition, a blue linear of anastomosing telangiectasia may be found often on the legs.
- Arborizing: A treelike appearance of capillary vessels in an inflamed condition.
- Spider or Star: A red, superficial telangiectasia arising from a central filling vessel of arteriolar origin. It is a focal network of dilated capillaries seen chiefly in pregnancy and hepatic cirrholis. These are characteristically 0.1–1.0 mm in diameter and red to cyanotic in color.
- Punctiform (Papular): Characterized by small circumscribed, superficial elevation of the skin, and are the results of dilated vessels. These are generally less than 2 mm in diameter, and frequently present in patients with collagen vascular disease.2

Telangiectasia is generally progressive; however, certain patients may experience spontaneous stabilization of the condition in early stages. Treatment of early stage disease may prevent the progression and cause regression of the underlying disease process.

Telangiectasia is one of the most common vascular lesions seen by physicians with a reported incidence of 30% in the general population.

More specifically, leg vein pathology affects up to 80 million adults in the United States alone. Similar occurrences have been reported in Western Europe. Women tend to develop leg vein pathology 3 to 4 times as often as men with reported estimates ranging from 29–41% and 6–15% respectively.

Dora Hexsel, MD, Porto Alegre, RS, "Ethnic and Topographic Aspects: FL169, Buttocks and Thighs," Abstracts, IACD Congress Rio, 2000, <http://www.dermato.med.br/iacd/congress/papers/papers-f.htm> (27 October 2005).

The Apogee Elite laser system delivers the combination of wavelength, high fluence and long pulses required to effectively treat veins up to 3 mm in diameter. Precise custom treatment of the vessel can be achieved while similar surrounding structures, such as the epidermis, remain largely unharmed.

Patient Expectations

Treatment with the Apogee Elite laser is used to fade, reduce, or eliminate veins. Patients must understand that results vary with each individual. Therapy using the Apogee Elite laser is not a cure for vein disease. Multiple treatments at 6 to 8 week intervals are often necessary. The laser feels like a snap of a rubber band and can be uncomfortable to many patients. The application of ice for a few seconds or the use of a cooling device may help alleviate discomfort. A topical anesthetic may be used prior to treatment.

Pretreatment Procedure

For better results and to reduce the risk pf epidermal injury, patients are to avoid sun exposure, tanning beds, tanning creams and sunless tanning lotions for 3–7 days prior to treatment and throughout the course of their laser treatment. Apply a broad-spectrum (UVA/UVB) sunscreen SPF 30 or greater to the area(s) to be treated whenever sun exposure is possible.

On the day of treatment, instruct the patient to thoroughly clean the area to be treated of any make-up, creams and lotions.

Determination of Clinical Endpoint

Treatment energies for each patient will vary according to size and color of the vessel. Test spots using a variety of fluences are recommended. This will ensure that the energy delivered to the patient is within a safe parameter range.

When treating veins, a shift in color or the appearance of the vessel is considered the clinical endpoint. Consider these examples.

- Red vessels may show a shift in color darkening to a reddish purple response with associated erythema (a slight redness). This color change will not dissipate following treatment.
- Blue vessels may appear to constrict or disappear following the laser pulse.
- Whitening, a blanching response, or blistering following the laser pulse is an indication that energy levels are too high, and therefore should be decreased accordingly.

WARNING: Treating with excessive energy levels can result in adverse effects, such as abnormal pigmentation and scarring. Test pulses are mandatory to determine proper tolerance to fluence.

Pulses are delivered in a linear fashion with less than 10 percent overlap between pulses. Pulses can be delivered through a coolant material, such as aqueous gel or a gel sheet. Energy adjustments to reach clinical endpoint should be made. Do not double pulse when using the Nd YAG laser: this can lead to scarring.

When treating telangiectasia, trace the vessel with laser pulses, beginning at the distal end of the vessel branch and working to the proximal end toward the larger feeding vessel. This will disrupt the blood flow and subsequently shut down the offending vessel. The best results are achieved when the entire vessel or group of vessels is treated.

Veins may require 2–3 treatments. When treating the large, deep leg veins, start with the 7-mm spot size. to treat deep feeding vessels, and then use the 5-mm spot on the more superficial leg veins. On the second treatment, start with the 5-mm spot size, and then use the 3-mm spot size.

Aggressive cooling with the SmartCool 6 air-cooling system is recommended. A coating of gel, ultrasound gel, surgical lubricant, or clear aloe, should be used in conjunction with the system as a conduit for the laser energy. If the patient finds air-cooling to be uncomfortable, turn it down. Use a cold pack, not ice, to provide additional cooling both pretreatment and posttreatment. It is recommended that cold packs are used pretreatment with larger veins.

Suggested starting treatment parameters are detailed in the following table.

Table 9—Vascular Treatment with YAG (1064 nm)

Vessel Type	Spot Size (mm)	Vessel Diameter (mm)	Pulse Width (ms)	Fluence (J/cm2)
Facial Telangiectasia (single pass only)	3	0.5 or greater	30–10	120–180
	1.5	0.1–1.0	20–5	300–450
Nose Telangiectasia (single pass only)	3	0.5 or greater	10–3	100–150
Fine Leg Telangiectasia/Spider Veins	7	1.0–3.0	100–30	120–160
	5	0.5–1.0	50–10	120–180
	3	0.5 or greater	40–10	120–180
	1.5	0.1–1.0	20–5	300–450

NOTES

Red vessels require a shorter pulse width. The darker and larger vessels will require a longer pulse. Use 10–15 ms on red vessels for fair to medium skin types II and III.

When treating the larger deeper leg vein, start with the 7-mm spot size, and then use the 5-mm spot on the more superficial leg veins. On the second treatment start with the 5mm spot size, and then use the 3-mm spot size.

Determine fluence based on skin type and by performing test spots. Smaller facial veins may require the use of higher fluence, while larger veins may require a longer pulse duration and a larger spot size to increase depth of penetration.

Immediately following treatment, the area may appear flushed and warm, but there should be no bruising. The redness should fade over the course of a few hours and should not be enough to interfere with daily activities.

To relieve any discomfort, use the SmartCool 6 air-cooling system and/or apply aloe vera gel to the treated areas immediately after treatment is recommended. Use packs posttreatment on all veins.

Posttreatment Skin Care

Apply ointment to the area to prevent drying and crusting. Ointment applied following the laser treatment can have a soothing effect. If a crust develops, allow it to fall off naturally. Do not scratch or pick.

- Avoid hot baths/whirlpools for one week following treatment
- Do not shave for 1 to 3 days if blistering and/or crusting occurs.
- Avoid exposure to the sun. Apply sunscreen with a SPF 30 or greater to the area whenever exposure to the sun is unavoidable.
- Avoid exercises that can cause vasodilatation for one week posttreatment. Walking is encouraged.
- If makeup is allowed, apply and remove it delicately. Excess rubbing can open the area and increase the chance of scarring.
- Discomfort, such as swelling or redness (lasting from a few hours to a couple of days), can be relieved with acetaminophen or ice packs.
- Please contact the office immediately if the treated area becomes tender and shows signs of infection (pus).

Follow-up Treatments

Follow-up treatments are scheduled at least at 3–4 week intervals.

Apogee 5500 Fluence Specifications

Pulse Characteristics (Operator Controlled)				
Handpiece Type	Rep. Rate	Min. Fluence	Max. Fluence	Pulse Width (ms)
5.0 mm	1.0 Hz	15 J/cm²	25 J/cm²	0.5
	1.5 Hz	15 J/cm²	25 J/cm²	0.5
	2.0 Hz	15 J/cm²	25 J/cm²	0.5
	3.0 Hz	15 J/cm²	25 J/cm²	0.5
	1.0 Hz	15 J/cm²	50 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	15 J/cm²	50 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	2.0 Hz	15 J/cm²	50 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
10.0 mm	1.0 Hz	7 J/cm²	50 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	7 J/cm²	40 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
12.0 mm	1.0 Hz	7 J/cm²	35 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	7 J/cm²	30 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
15.0 mm	1.0 Hz	7 J/cm²	25 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	7 J/cm²	20 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300

Apogee Elite (Alexandrite Laser) Fluence Specifications

Pulse Characteristics (Operator Controlled)				
Handpiece Type	**Rep. Rate**	**Min. Fluence**	**Max. Fluence**	**Pulse Width (ms)**
5.0 mm	1.0 Hz	15 J/cm²	25 J/cm²	0.5
	1.5 Hz	15 J/cm²	25 J/cm²	0.5
	2.0 Hz	15 J/cm²	25 J/cm²	0.5
	3.0 Hz	15 J/cm²	25 J/cm²	0.5
	1.0 Hz	15 J/cm²	50 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	15 J/cm²	50 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	2.0 Hz	15 J/cm²	50 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
7.0 mm	1.0 Hz	10 J/cm²	50 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	10 J/cm²	50 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	2.0 Hz	10 J/cm²	50 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
10.0 mm	1.0 Hz	7 J/cm²	50 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	7 J/cm²	40 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
12.0 mm	1.0 Hz	7 J/cm²	35 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	7 J/cm²	30 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
15.0 mm	1.0 Hz	7 J/cm²	25 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	7 J/cm²	20 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300

Apogee Elite (Nd: YAG Laser)/Acclaim 7000 Fluence Specifications

Pulse Characteristics (Operator Controlled)				
Handpiece Type	Rep. Rate	Min. Fluence	Max. Fluence	Pulse Width (ms)
1.5 mm	1.0 Hz	50 J/cm²	600 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	50 J/cm²	600 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	2.0 Hz	50 J/cm²	600 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
3.0 mm	1.0 Hz	50 J/cm²	300 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	50 J/cm²	300 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	2.0 Hz	50 J/cm²	300 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
5.0 mm	1.0 Hz	10 J/cm²	25 J/cm²	0.4
	1.5 Hz	10 J/cm²	25 J/cm²	0.4
	2.0 Hz	10 J/cm²	25 J/cm²	0.4
	5.0 Hz	10 J/cm²	25 J/cm²	0.4
	1.0 Hz	15 J/cm²	240 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	15 J/cm²	240 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	2.0 Hz	15 J/cm²	150 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
7.0 mm	1.0 Hz	10 J/cm²	17 J/cm²	0.4
	1.5 Hz	10 J/cm²	17 J/cm²	0.4
	2.0 Hz	10 J/cm²	17 J/cm²	0.4
	5.0 Hz	10 J/cm²	17 J/cm²	0.4
	1.0 Hz	15 J/cm²	160 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	15 J/cm²	120 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	2.0 Hz	15 J/cm²	75 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
10.0 mm	1.0 Hz	15 J/cm²	80 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	15 J/cm²	60 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
12.0 mm	1.0 Hz	15 J/cm²	50 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	15 J/cm²	40 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
15.0 mm	1.0 Hz	15 J/cm²	35 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	15 J/cm²	25 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300

Apogee Elite (Nd: YAG Laser)/Acclaim 7000 Fluence Specifications

Pulse Characteristics (Operator Controlled)				
Handpiece Type	**Rep. Rate**	**Min. Fluence**	**Max. Fluence**	**Pulse Width (ms)**
1.5 mm	1.0 Hz	50 J/cm²	600 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	50 J/cm²	600 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	2.0 Hz	50 J/cm²	600 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
3.0 mm	1.0 Hz	50 J/cm²	300 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	50 J/cm²	300 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	2.0 Hz	50 J/cm²	300 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
5.0 mm	1.0 Hz	10 J/cm²	25 J/cm²	0.4
	1.5 Hz	10 J/cm²	25 J/cm²	0.4
	2.0 Hz	10 J/cm²	25 J/cm²	0.4
	5.0 Hz	10 J/cm²	25 J/cm²	0.4
	1.0 Hz	15 J/cm²	240 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	15 J/cm²	240 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	2.0 Hz	15 J/cm²	150 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
7.0 mm	1.0 Hz	10 J/cm²	17 J/cm²	0.4
	1.5 Hz	10 J/cm²	17 J/cm²	0.4
	2.0 Hz	10 J/cm²	17 J/cm²	0.4
	5.0 Hz	10 J/cm²	17 J/cm²	0.4
	1.0 Hz	15 J/cm²	160 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	15 J/cm²	120 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	2.0 Hz	15 J/cm²	75 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
10.0 mm	1.0 Hz	15 J/cm²	80 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	15 J/cm²	60 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
12.0 mm	1.0 Hz	15 J/cm²	50 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	15 J/cm²	40 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
15.0 mm	1.0 Hz	15 J/cm²	35 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300
	1.5 Hz	15 J/cm²	25 J/cm²	5, 10, 15, 20, 25, 30, 40, 50, 100, 150, 200, 250, 300

Chapter 12 Documentation

Documentation of the laser procedure is required following each laser treatment. This is important for medical/legal implications when using medical lasers. Documentation of the treated area(s), energy used, number of pulses, patient reaction and any complications or comments should be recorded. Sample documentation forms are included.