Laser&Health
ACADEMY

LA&HA Doctor's Notes

AvalancheLase® Hair Removal

1. Introduction

Fotona AvalancheLase® is an advanced laser system designed for hair removal, incorporating two laser wavelengths considered to be the gold standard in laser hair removal: **755 nm (alexandrite)** and **1064 nm (Nd:YAG)**. By combining these complementary wavelengths, AvalancheLase® enables **effective, fast, safe, and comfortable** hair removal across all Fitzpatrick skin types (I-VI). While the system offers various other treatments, this document focuses primarily on laser hair removal.

2. Introduction to photo-epilation

Photo-epilation is a process for achieving long-term hair removal by **thermally destroying the hair follicle and its reproductive system** preserving the surrounding tissue. The target chromophore in laser hair removal is **melanin**. Longer wavelengths are required to destroy the hair follicle effectively, as the hair papilla is located deep in the skin. Therefore, the 755 nm and 1064 nm wavelengths are ideal for hair removal.

3. Wavelengths of 755 nm and 1064 nm

First, based on the patient's Fitzpatrick skin type, the practitioner must determine which wavelength will be used for laser hair removal.

- 755 nm wavelength: primarily used on lighter Fitzpatrick skin types (I-III) due to its high absorption in melanin.
- 1064 nm wavelength: exhibits lower epidermal interference, penetrates deeper into the skin, and has lower melanin absorption, making it safer for use on darker Fitzpatrick skin types (IV-VI).

4. Spot Size

Once the wavelength has been selected based on the patient's skin tone, the optimal spot size is chosen to perform the procedure.

Fotona AvalancheLase® allows for quick and effective treatment with **larger spot sizes** (up to 30 mm). Since **hair follicles lie deep** within the skin, larger spot sizes (at least 8 mm or 12 mm) are selected to reduce scattering and enhance penetration. Procedures on smaller areas are performed with a 12 mm spot size, while procedures on larger areas are done with a 20 mm spot size or larger. It is important to note that larger spot sizes may cause slightly more discomfort, so initial treatments on densely hairy areas can be done with a 12 mm spot size (e.g., underarms and bikini area) and later with a 20 mm spot size.

5. Pulse duration

Pulse duration is the elapsed time during which a laser pulse's energy is delivered to the tissue. It is set based on the **Thermal Relaxation Time (TRT)** of the hair follicle, which is the time required for the target (hair follicle) to cool down by at least 50%. The pulse duration should be **equal to or shorter than the TRT of the hair follicle**. The finer the hair, the shorter the pulse duration should be.

Typically, pulse durations for hair removal range **from 1 ms** (light skin, fine hair) **to 10 ms** (darker skin, coarse hair).

6. Fluence (J/cm^2)

Fluence depends on the wavelength used, the patient's Fitzpatrick skin type & hair density, and the specific technique used for the procedure. The **»avalanche« brushing technique** can be used with **lower fluence**, while the **»stamping« technique** requires **higher fluence**. Fotona AvalancheLase® features pre-set parameters based on wavelength, Fitzpatrick skin type, and hair color and thickness. Experienced operators can also use the **"Expert" mode** to set parameters manually.

The **»stamping« technique** is generally performed with higher fluence, as the area is **treated only once**. The **»avalanche« technique**, on the other hand, is performed with lower fluence to **achieve cumulative energy increase**.

Recommended fluences:

STAMPING MODE

FITZPATRICK SKIN TYPE	755 nm	1064 nm
1	12 – 20 J/cm^2	30 – 50 J/cm^2
2	12 – 18 J/cm^2	30 – 50 J/cm^2
3	12 – 16 J/cm^2	30 – 40 J/cm^2
4	/	/
5	/	/
6	/	/

AVALANCHE MODE

FITZPATRICK SKIN TYPE	755 nm	1064 nm
1	6 – 12 J/cm^2	15 – 25 J/cm^2
2	6 – 12 J/cm^2	15 – 25 J/cm^2
3	6 – 12 J/cm^2	15 – 25 J/cm^2
4	/	10 – 20 J/cm^2
5	/	10 – 20 J/cm^2
6	/	10 – 20 J/cm^2

7. Avalanche and stamping techniques

• AVALANCHE technique

Fotona AvalancheLase® supports the "avalanche" technique, delivering pulses at **higher frequencies** (user-dependent) with **lower energy** densities until the **cumulative desired energy** for the treatment **area is reached**. This technique is effective and **more comfortable**, especially for darker skin types and patients with low pain tolerance or higher hair density. For guidance, cumulative energy targets are:

AREA	Cumulative energy - 755 nm »avalanche« technique	Cumulative energy - 1064 nm »avalanche« technique
Axilla	4 kJ	8 kJ
Each lower leg	40 kJ	80 kJ
Each thigh	50 kJ	100 kJ
Back	100 kJ	200 kJ
Arms	25 kJ	50 kJ

Due to variations in patient body size, the total surface of the treatment area may differ, leading to variations in cumulative energy values. As a general guideline, we recommend using 4–5 kJ/755 nm or 8–10 kJ/1064 nm per 100 cm^2.

• STAMPING technique

The stamping technique involves **lower frequency** and **higher fluence**. The treated area is covered **once** with **5-10% overlap**. This method is preferred for finer and lighter hair and during the final treatment sessions. Frequency is user-dependent, typically starting at 1.5 Hz for beginners and 2 – 2.2 Hz for advanced users.

• Combining techniques

Initial treatment sessions, for example from the 1st to the 3rd session, for patients with dense hair can start with the "avalanche" technique for comfort, shifting to the stamping technique from the 4th session onward as hair density decreases.

8. Cooling

Skin cooling is often used during laser treatments in aesthetics and dermatology to **avoid** or **minimize** patient **discomfort, protect** the epidermis, **reduce** erythema and **improve** the **efficacy** of the laser.

Since cooling during laser hair removal is essential, AvalancheLase® has an **integrated DMC™ (Dry Spray Molecular Cooling)** system in the device, handpiece, and scanner. This enhances **comfort** and ensures **effective cooling**.

Proper cooling helps avoid unwanted side effects of laser treatments (burns, hyperpigmentation, etc.), and at the same time allows the operator to use the appropriate energy density for the laser procedure.

The AvalancheLase® has **9 levels** of DMC™ cooling. For most body treatments, level 5 is used, while for the face, level 3 cooling is often more appropriate. If the patient still feels discomfort despite appropriate parameters and cooling, the cooling level can be increased.

If the procedure is performed with a scanner, it is advisable to use a higher cooling level (level 7-9).

9. Skin reactions

Desired Effects:

After laser hair removal, **erythema** and **perifollicular edema** are often observed. Perifollicular edema is a clear sign of **thermal damage** to the hair follicle and an indicator of a **successful treatment**. Not all patients develop erythema and perifollicular edema, however, so this is not an indicator of an unsuccessful treatment.

Undesired Effects:

- Widespread edema (early indicator of dermal necrosis)
- Gray or white discoloration of the skin (lasts a few seconds and is an indicator of dermal damage)
- Blisters
- Epidermal detachment
- Hypopigmentation
- Hyperpigmentation
- Scarring
- Herpes simplex at the treatment area

10. Common indications

- Aesthetic hair removal
- Pseudo-folliculitis
- Hypertrichosis
- Hirsutism (evaluation recommended using the Ferriman-Gallwey scale)

11. Contraindications

In addition to the absolute and relative contraindications for laser procedures (in the Operator Manual), two additional relative contraindications for laser hair removal are:

- Recent excessive sun exposure
- Any tissue in the proximity of or on top of any kind of implant

12.Patient selection and preparation

During the consultation, inform the patient about:

- Expected results
- Possible side effects
- The possibility of suboptimal results (in cases of darker skin, lighter hair, or hirsutism).

The treated area should be:

- Shaven
- Untanned
- Clean (free of cosmetic products)
- With protected dermal nevi and tattoos
- Free of herpetic outbreaks (for frequent herpes outbreaks, prescribe an antiviral before the treatment)

To ensure the patient understands the need for multiple sessions (at least 6) to achieve effective hair removal, they must **understand the hair growth cycle**.

Begin the procedure by treating a small **test area** using the parameters intended for the entire procedure. Wait 10 minutes and observe the area. If gray discoloration of the skin, blisters, vesicles, bullae, epidermal peeling, hypopigmentation, hyperpigmentation, tissue scarring, or other suspicious changes occur, do not proceed with the treatment.

It is recommended to take a **photograph** before the first procedure to document the hair density in the area. The patient should shave the area 7 days before the expected procedure, so the hair will be clearly visible in the photograph.

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13. Hair growth cycle

The hair follicle is a vital component of mammalian skin and represents a unique, highly regenerative system that undergoes phases of rapid growth, regression, and resting periods.

- **Anagen Phase:**

  This phase has significantly higher metabolic activity among matrix keratinocytes that produce the hair fiber and inner root sheath. During the anagen phase, **hair follicles are most receptive to laser light** because they are **rich in melanin** and **close to the root we want to destroy**. Laser hair removal is effective on hairs in the anagen phase of growth.

- **Catagen Phase:**

  This is a short transitional phase between anagen and telogen, lasting between two to four weeks. **Hair stops growing**, and the hair follicle shrinks in size.

- **Telogen Phase:**

  This is the resting stage. Because hair is no longer firmly anchored in the tissue, laser hair removal at this point is **ineffective**.

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14. Treatment schedule

The time interval between sessions depends on the treated area. Sessions are performed **4 to 10 weeks apart**. If hair growth is not present, **postpone the laser session** for one week. The first 2-3 treatment sessions should be in a shorter timeframe, while after the 3rd session, the intervals can be extended.

Treatment schedule by area:

TREATED AREA	TREATMENT SCHEDULE
face	4 – 6 weeks
axilla	4 – 6 weeks
arms	6 – 8 weeks
abdomen	8 – 10 weeks
bikini	6 weeks
thighs	8 weeks
back	8 - 10 weeks

Together with the client, **aim to complete 6-8 consecutive sessions**. Assess the effectiveness of the laser treatments 6 months after the final session. After 6-8 sessions, noticeable hair thinning and hair removal will be evident.

15. Post-treatment care

- **Sun protection with UVA/B sunscreen**
- **Moisturize the skin with neutral creams**
- **Avoid hot baths/showers, saunas, pools, and massages for at least one day after the procedure**
- **Cool the skin if necessary**

16. Procedure execution (from A-Z)

Consultation with the patient:

- Review the skin, hair, health status, and patient's expectations
- Advise on post-treatment and between-session skin care
- Explain the expected results
- Clarify the need for multiple treatment sessions (explain the hair growth cycle)

1. **Determine the wavelength** (based on the patient's Fitzpatrick skin type)
2. **Select the spot size** (based on the treated area)
3. **Select the pulse duration** (based on hair and skin color)
4. **Select the fluence** (based on Fitzpatrick skin type, hair density, and color)
5. **Photograph the area**
6. **Shave the hair**
7. **Cover nevi and tattoos**
8. **Test on a small area** (at least for the first treatment) – wait 5-10 minutes for results
9. **Divide the area** into smaller sections (use a white pencil, never black); dividing the area into smaller sections for the stamping technique is highly recommended for more precise treatment
10. **Perform the procedure**
11. **Discuss post-treatment home care**
12. **Schedule the next appointment within the appropriate timeframe**

For the second and subsequent treatment sessions, ask the patient if they experienced any issues after the procedure and whether their hair shed approximately 2-3 weeks post-treatment. If the hair has shed, the chosen parameters are likely appropriate.