

Efficacy and safety of a linear scanning 808 nm diode laser system for hair removal

David Slouka | Charles University, Medical School Plzen, Czech Republic

Jiri Voltr | VS LASERA Laser Centre Plzen, Czech Republic

Aim

The aim of the study was to compare the efficacy of the novel linear scanning 808 nm diode laser¹ and “gold standard” 800 nm square spot laser² for the hair removal.

The basic differences between these two systems are shown in the Table 1.

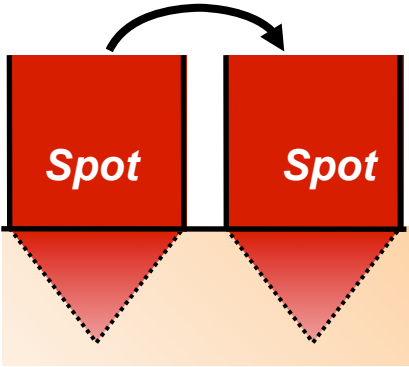
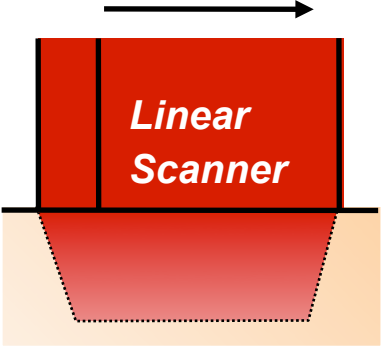
	
Single shots, different spots	Scanning along the skin surface
Duty cycle (laser on) < 10 %	Duty cycle (laser on) 30 - 40 %
Difficult to achieve optimal overlap	Optimal positioning in large spot due to scanner
Penetration depth depends on spot size	Deep homogeneous heating in the hair root layer
Longer treatment time because of many positionings of handpiece	Short because of fewer positionings of handpiece

Table 1: Comparison Spot-by-spot vs. Linear Scanning systems

¹ LEDA 808 | 12 x 2 mm slit scanning over 50 x 12 mm area | Quantel Derma

² LightSheer ET | individual square spot 9 x 9 mm | Lumenis

Study design

There were 18 patients enrolled in this study at its beginning. At the end of the study 16 patients were evaluated, 2 patients were excluded due to pregnancy. All patients were treated in an axilla region. Each patient underwent totally 6 treatment sessions with 6 to 8 weeks interval between individual treatment sessions.

Each treatment session consists of treating the left axilla with the linear scanning laser and the right axilla with the spot-by-spot laser.

Evaluated parameters included:

- Hair count before the 1st treatment session.
- Hair count after the 3rd treatment session.
- Hair count after the 6th treatment session.
- Hair count 6 months after the final session.
- Additional subjective evaluation by patients included two parameters (1) subjective pain and (2) efficacy assessment.

Treatment parameters

No pharmacological topical anesthesia was used with neither system. The contact cooling of the treated area was used in case of the spot-by-spot laser and the cold air cooling was used with the linear scanning laser.

Treatment parameters used for each patient were set depending on the skin type and individual skin reactions.

Range of used treatment parameters is shown in the Table 2:

	Fluence	Pulse duration
Linear scanning	24 - 30 J/cm ²	12 - 15 ms
Spot-by-spot	20 - 30 J/cm ²	11 - 30 ms

Table 2: Range of used treatment parameters

Results

The results based on the hair count per square centimeter are show in the Table 3. It is obvious that the average hair count reduction is comparable with both systems.

	Before 1st treatment session	After 3rd treatment session	After 6th treatment session	6 months after 6th treatment session
Linear scanning	82	38	24	29
Spot-by-spot	78	39	24	29

Table 3: Objective results - average hair count per cm²

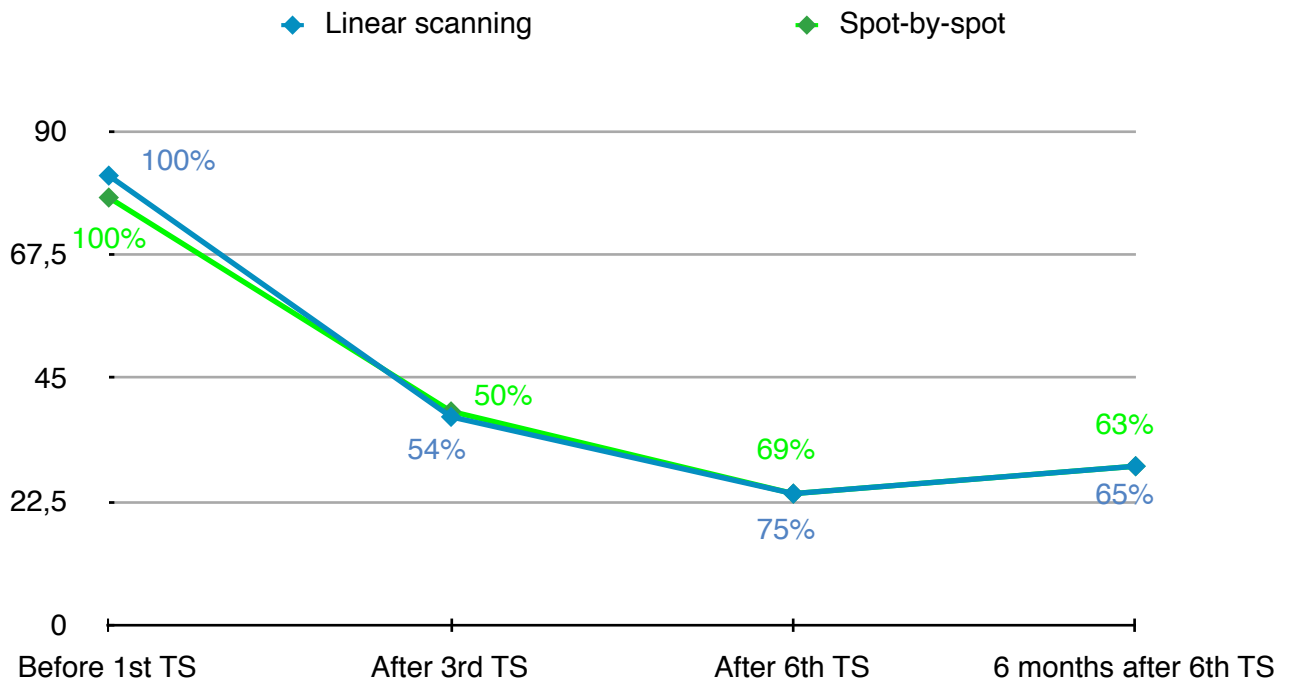


Chart 1: Hair count reduction (TS = treatment session)

We also let the patients assess their subjective experience with both systems as for the pain perception and efficacy. The school scale was used for the assessment going from 1 for the best rating to 5 for the worst. The results are shown in the Table 4.

		1st TS	2nd TS	3rd TS	4th TS	5th TS	6th TS
PAIN	Linear scanning	2	3	2	2	2	2
	Spot-by-spot	4	3	3	3	3	3
EFFICACY	Linear scanning	2	2	3	2	2	2
	Spot-by-spot	2	2	2	2	2	2

Table 4: Subjective pain and efficacy assessment by patients (TS = treatment session)

Conclusion

This study showed that the linear scanning laser system proved the same hair reduction capabilities as widespread spot-by-spot laser.

No adverse side effects were observed with either system.

In our practical experience there is far more spots overlapping while using the spot-by-spot laser in vivo due to the smaller spot size. This is practically impossible to avoid at treating a patient. This fact might increase an efficacy of this system in some measure. On the contrary the linear scanning system allows for more homogenous application of photonic energy across the treated area.

Duration of the treatment is in general significantly shorter with the linear scanning system. We surmise that this fact may contribute to the better subjective pain assessment by patients. Airflow cooling of the treated area by the linear scanning system may be another contribution as well.

Subjective assessment of efficacy as evaluated by patients was similar by both systems.

Spot-by-spot laser system is better in handling while treating small areas due to its small spot size and more compact form of the handpiece.

Data in this publication are based on the lecture held at the 18th Congress of the European Academy of Dermatology and Venerology in Berlin, October 2009.

