755 nm diode laser super hair removal

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Evidence of laser hair removal compiled in one book
Evidence based data: 755nm still better than 810 diode?

1\textsuperscript{st} line 755 nm Alexandrite
2\textsuperscript{nd} line 800-810 nm Diode

- Face
- Axillae
- Trunk
- Bikini
- Legs
- Sinus pilonidalis
Light absorption characteristics

<table>
<thead>
<tr>
<th>Wavelength (nm)</th>
<th>Absorption (log scale)</th>
</tr>
</thead>
<tbody>
<tr>
<td>694nm</td>
<td>Water</td>
</tr>
<tr>
<td>758nm</td>
<td>Water</td>
</tr>
<tr>
<td>980nm</td>
<td>Water</td>
</tr>
<tr>
<td>1064nm</td>
<td>Water</td>
</tr>
</tbody>
</table>

-wasser
-Water
-Melanin
-Oxyhämoglobin
Technology of alexandrite lasers

Disadvantages of conventional 755nm systems
- Fragile transmission system
- Running cost flash lamps
- Bulky item
- Scanner to be mounted
Extended theory of selective photothermolysis

Bodendorf, M.O., Grunewald, S., Paasch, U. Dermatologische Lasertherapie III, Laserepilation, KVM, 2013
Low Dose Epilation by Alexandrite Laser: A Dose Response Study

Michael Drösner, Sabine Stranl, Barbara Hertenberger, Hannelore Klimk, and Claudia Pettke-Rank

Institute of Laser Research in Dermatology, cutaRIS Center, Munich, Germany

Submitted: August 2001 - Revised: August 2001

Summary

Theoretical considerations suggest fluences of 10 J/cm² to be sufficient for hair growth control by photo epilation with alexandrite laser. To prove this hypothesis for clinical applications a dosimetry study was performed with fluences of 5, 10, 15 and 20 J/cm² with an alexandrite laser (burst pulse, 7 ms pulse width, 9 mm spot size) in 14 volunteers. The regrowth rate of hair was calculated on the basis of digital hair counts on comparable test sides in different body locations (back, legs, abdomen, upper arms).

In all 4 fluence groups similar rates of hair loss were reached in short term epilation. After an average number of 4.9 treatments (range 2–8 treatments) alexandrite laser treatment with 5 J/cm² achieved 70.5% hair loss, with 10 J/cm² 74.2%, with 15 J/cm² 85.1% and 20 J/cm² resulted in 80.1%.

In preliminary results after a six months follow up the hair loss remained constantly at 56% within the 5 J/cm² field and showed still increase in hair loss in the 15 and 20 J/cm² fields, the latter reaching 81%. Only the 10 J/cm² field showed a slight regrowth (5%). The differences between the results of hair loss in these 4 fluence groups of 56% (5 J/cm² fields) or 62% (10 J/cm² field) versus 74% (15 or 20 J/cm² fields) were not statistically significant. These data suggest a sufficient hair reduction of more than 70% being achieved after at least 4 treatments with low fluences of 5 or 10 J/cm² of an alexandrite laser. The lower fluences (5 and 10 J/cm²) caused no pain during the photo epilation and had no side effects. The over all treatment was rather quick in performance with below mentioned fluences. Though the long term results of this study are still preliminary low fluences show comparable efficacy to treatments using higher fluences. A higher number of follow up cases could prove that low dose epilation is also effective in terms of long lasting results.
The new concepts of super hair removal

Super hair removal uses in motion technique

810 nm diode contact cooled laser to be moved

Generating a high average output power by utilizing low fluence and high repetition rate results in a virtually painless procedure ensuring a tremendous efficacy

Bodendorf, M.O., Grunewald, S., Paasch, U. Dermatologische Lasertherapie III, Laserepilation, KVM, 2013
SHR Non-Stack Pulse @ various wavelengths

- On-Time: 20 msec
- Off-Time: 80 msec
- 10J/cm²
- @ 10Hz

Wavelengths:
- 755 nm
- 810 nm
- 1064 nm
Concept of SHR

$10 \text{ J/cm}^2 \times 10 \text{ Hz} \times 80 \text{ sec} = 8.000 \text{ J (8kJ)}$

-shr

$1 \times 1 \text{ cm}^2$

$\sim 53 \text{ J/cm}^2$

$150 \text{ cm}^2$

$8 \text{ kJ}$

$10 \text{ cm}$

$15 \text{ cm}$
Traditional concept

HR

1x1 cm²

35 J/cm²

10 cm

15 cm
How to use
SHR treatment
Stamping in small areas
SHR Stack Pulse

.5 sec on-time

0.3 sec off-time
Ein neuer Ansatz in der Laser-Haarreduktion

Diodenlaser mit SHR („Super Hair Removal“) im Vergleich mit dem Alexandritlaser

### Tab. 1  Prozentuale Haarreduktion bei den Hauttypen I+II

<table>
<thead>
<tr>
<th>Schweregrad</th>
<th>Alexandritlaser</th>
<th>Diodenlaser (SHR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energiedichte</td>
<td>23 J/cm², 40 ms</td>
<td>10 J/cm², 20 ms</td>
</tr>
<tr>
<td>Dunkel, dick</td>
<td>46%</td>
<td>43%</td>
</tr>
<tr>
<td>Dunkel, dünn</td>
<td>22%</td>
<td>19%</td>
</tr>
<tr>
<td>Blond, dick</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>Blond, dünn</td>
<td>4%</td>
<td>3%</td>
</tr>
</tbody>
</table>

### Tab. 2  Prozentuale Haarreduktion bei den Hauttypen III+IV

<table>
<thead>
<tr>
<th>Schweregrad</th>
<th>Alexandritlaser</th>
<th>Diodenlaser (SHR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energiedichte</td>
<td>23 J/cm², 40 ms</td>
<td>10 J/cm², 20 ms</td>
</tr>
<tr>
<td>Dunkel, dick</td>
<td>28%</td>
<td>39%</td>
</tr>
<tr>
<td>Dunkel, dünn</td>
<td>10%</td>
<td>16%</td>
</tr>
<tr>
<td>Blond, dick</td>
<td>4%</td>
<td>6%</td>
</tr>
<tr>
<td>Blond, dünn</td>
<td>&lt;1%</td>
<td>2%</td>
</tr>
</tbody>
</table>
Clinical trial evaluating safety and efficacy of the new 755nm diode SHR principle
Pilot patient: Breast 6J/cm² 8KJ immediate response post 1ˢᵗ Tx

Proof of principle study to evaluate safety and efficacy of 755 nm diode SHR

Step 1: Treatment left side only

Clinical picture before Tx

1 min post

10 min post

20 min post

25 min post

30 min post
Step 1 Treatment left side only

- Dermatoscopy 12h post no Tx
- 12 h post
- Dermatoscopy 12h post 1st Tx

- 3D 12h post
- 3D Pigment 12h post
- 3D Erythema 12h post
Pat 1 Breast 6J/cm² 8KJ delayed response post 1\textsuperscript{st} Tx

Step 1: Treatment left side only

3D 12h post

3D Erythema 12h post
Pilot patient: Breast $7\text{J/cm}^2 \ 8\text{KJ}$ immediate response post $1^{\text{st}} \text{Tx}$

Step 2: Treatment right side only 24 h later
Pilot patient Breast 7J/cm² 8KJ delayed response post 1st Tx

Step 2: Treatment right side only

12h post

Dermatoscopy 12h post 1st Tx

3D 12h post

3D Pigment 12h post

3D Erythema 12h post
Pilot patient 1 weeks post 1\textsuperscript{st} Tx
Pilot patient 2 weeks post 1\textsuperscript{st} Tx
Pilot patient 4 weeks post 1\textsuperscript{st} Tx
Pilot patient 6 month follow-up
## Hair reduction rates @ 755 nm SHR

<table>
<thead>
<tr>
<th>Date</th>
<th>Breast right</th>
<th>Breast left</th>
<th>Mean</th>
<th>Reduction [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Tx</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>2 weeks post 1&lt;sup&gt;st&lt;/sup&gt; TX</td>
<td>10</td>
<td>14</td>
<td>12</td>
<td>33.3</td>
</tr>
<tr>
<td>4 weeks post 1&lt;sup&gt;st&lt;/sup&gt; TX</td>
<td>9</td>
<td>8</td>
<td>8.5</td>
<td>52.7</td>
</tr>
<tr>
<td>6 weeks post 1&lt;sup&gt;st&lt;/sup&gt; TX</td>
<td>7</td>
<td>5</td>
<td>6</td>
<td>66.6</td>
</tr>
<tr>
<td>4 weeks post 2&lt;sup&gt;nd&lt;/sup&gt; TX</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>55.5</td>
</tr>
<tr>
<td>4 weeks post 3&lt;sup&gt;rd&lt;/sup&gt; TX</td>
<td>4</td>
<td>3</td>
<td>3.5</td>
<td>80.5</td>
</tr>
<tr>
<td>4 weeks post 4&lt;sup&gt;th&lt;/sup&gt; TX</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>83.3</td>
</tr>
</tbody>
</table>

755nm diode SHR as effective as alexandrite
## Comparison 755 nm Alexandrite vs. 755 nm Diode

Pilot-Study to compare side by side 755nm conventional alexandrite laser vs. 755nm diode laser in high fluence mode for laser hair removal in axilla

<table>
<thead>
<tr>
<th></th>
<th>755 nm diode right axilla</th>
<th>755 nm Alexandrite left axilla</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tx1</td>
<td>20J/cm² 20ms 20% Overlap 12 Pulses 1 Pass</td>
<td>20J/cm², 20ms 34 Pulses 769 J</td>
</tr>
<tr>
<td>Tx2</td>
<td>20J/cm² 20ms 20% Overlap 12 Pulses 1 Pass</td>
<td>20J/cm², 20ms 34 Pulses 769 J</td>
</tr>
<tr>
<td>Tx3</td>
<td>20J/cm² 20ms 20% Overlap 12 Pulses 1 Pass</td>
<td>20J/cm², 20ms 24 Pulses 577J</td>
</tr>
<tr>
<td>TX4</td>
<td>20J/cm² 20ms 20% Overlap 12 Pulses 1 Pass</td>
<td>20J/cm², 20ms 33 Pulses 756 J</td>
</tr>
</tbody>
</table>
Pilot patient 2 weeks post 1\textsuperscript{st} Tx

755 nm diode HR

755 nm conventional alexandrite
Pilot patient 4 weeks post 1\textsuperscript{st} Tx

755 nm diode HR

755 nm conventional alexandrite
Pilot patient 6 month follow-up

755 nm diode HR

755 nm conventional alexandrite
Comparison 755 nm Alexandrite vs. 755 nm HR

Pilot-Study to compare side by side 755 nm conventional alexandrite laser (Arion) vs. 755 nm diode laser (Soprano) for laser hair removal in axillae

<table>
<thead>
<tr>
<th>Date</th>
<th>Axilla right diode</th>
<th>Axilla left alex</th>
<th>Reduction diode</th>
<th>Reduction alex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Tx</td>
<td>9</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 weeks post 1st TX</td>
<td>8</td>
<td>7</td>
<td>11.1</td>
<td>30.0</td>
</tr>
<tr>
<td>4 weeks post 1st TX</td>
<td>4</td>
<td>6</td>
<td>44.4</td>
<td>40.0</td>
</tr>
<tr>
<td>6 weeks post 1st TX</td>
<td>2</td>
<td>3</td>
<td>77.7</td>
<td>70.0</td>
</tr>
<tr>
<td>4 weeks post 2nd TX</td>
<td>3</td>
<td>7</td>
<td>66.6</td>
<td>30.0</td>
</tr>
<tr>
<td>4 weeks post 3rd TX</td>
<td>2</td>
<td>2</td>
<td>77.7</td>
<td>77.7</td>
</tr>
<tr>
<td>4 weeks post 4th TX</td>
<td>1</td>
<td>2</td>
<td>88.8</td>
<td>77.7</td>
</tr>
</tbody>
</table>

755nm diode HR as effective as alexandrite
Daly clinical practice

Before Tx

4 weeks post 2\textsuperscript{nd} Tx
Daily clinical practise: pitfalls

Axilla right  Axilla left  Leg left  Bikini

4 weeks post 1\textsuperscript{st} Tx

4 weeks post 2\textsuperscript{nd} Tx

Untreated area  Untreated area

6 weeks post 3\textsuperscript{rd} Tx

Waxed

Standard response
Conclusion

Published evidence

- 1\textsuperscript{st} line 755 nm Alexandrite
- 2\textsuperscript{nd} line 800-810 nm Diode
  - Face
  - Axillae
  - Trunk
  - Bikini
  - Legs
  - Sinus pilonidalis

755nm SHR resembles the missing link in laser hair removal

- To reduce pain
- While keeping efficacy of alexandrite wavelength
  - SHR as well HR mode