

A Comparison between the Lyra Long-Pulsed Nd:YAG laser system and the Coherent LightSheer Diode laser system in the removal of hair

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Objectives

The objective of this study was to compare the efficacy and safety of the two wavelengths – 1064nm and 810nm – in the removal of hair in various skin types.

Material and Methods

A total of 46 identical sites were treated with two laser systems – 23 sites with the Lyra long-pulsed Nd:YAG laser and 23 sites with the LightSheer 810nm diode laser. Patients underwent 3 treatments at 6 to 8 weeks intervals.

The final evaluation took place at six months and ten months post last treatment. All patients were evaluated by a blinded investigator using high resolution photographs and by objective hair counts.

Results

Both lasers were found to deliver very similar clinical results, with the exception that the Nd:YAG laser was found safer on darker skin patients.

Introduction

Laser epilation is one of the most popular and commonly performed cosmetic procedures. Introduced five years ago with the normal mode Ruby (694nm) laser¹, the procedure has experienced radical changes. A variety of laser wavelengths, application times, and surface cooling methods have been since introduced⁴. The biggest challenge with this procedure was finding a single laser system that would treat all hair colors and skin types². The mechanism of laser hair removal is based on light absorption by follicular pigment, after having passed intact through the skin pigment. As laser technology developed, new wavelengths were introduced, moving from the short-pulsed visible to the long-pulsed infrared wavelengths. This resolved some of the problems with the darker skin types^{6,7}. However, the question arose as to commonly used wavelengths in the removal of hair, given its relatively poor absorption in melanin. Therefore, the objective of this study was to compare the reduction of hair removal in patients treated with both the Lyra Nd:YAG (1064nm) and LightSheer Diode (810nm) laser systems.

Materials and Methods:

From February 2000 to February 2001, a total of 21 patients – 19 female and two male patients – were

enrolled in the study and treated with the Lyra Nd:YAG (1064nm) and LightSheer Diode (810nm) laser systems. The patients were treated in a variety of locations comparing right and left sides of the axillae, shoulders, and bikini regions. The sides were chosen randomly for each laser system at first presentation for treatment. The patients represented a wide array of Fitzpatrick skin types – from II to VI – as depicted in Table 1. No other hair removal method was allowed during the duration of the study.

Table 1: Fitzpatrick Skin Type Distribution

Skin Type	II	III	IV	V	VI
Number of Patients	6	4	6	3	2

Of the 21 patients treated, three patients were treated in the axilla area only, three patients were treated in the bikini area only, 13 patients were treated in both the axilla and bikini areas, one patient was treated in the mid-back area and one patient was treated on the shoulders. The hair color varied from brown to black, with 11 patients having black hair and 10 patients having brown hair. Hair density also varied with each patient.

Anatomically similar areas were treated with both lasers using the following parameters: with the 810nm diode laser, 10x10mm spot size, 11 to 35ms pulse duration, at fluences between 12 and 35 J/cm²; and the 1064nm Nd:YAG laser,

5mm spot size, 35-65ms pulse duration, at fluences between 30 and 135 J/cm². The third treatment with the Nd:YAG laser was performed on all patients with a 10mm spot size, pulse duration 45-55msec, 35-50 J/cm². Both sets of parameters were suggested by the manufacturers, based on the clinical information collected from various previous studies^{3,6,7,8}. Patients completed the series of three laser treatments at 6 to 8 week intervals. The final evaluation was originally scheduled to be performed at six months after the last treatment. However, only eight patients were evaluated at that time. The remaining six patients were evaluated at 10 months after the last procedure. The investigators rationalized that because the results at the 10-month follow up could not be better than those at 6 months, and thus could not compromise the data, both objective and subjective results could reasonably be combined. Additionally, previous studies had demonstrated that the six months results post last treatment closely approximated the 2-year results⁵.

Results:

14 patients completed the study with a total of 23 sites treated. Four patients dropped out due to moderate or significant pain experienced during or immediately after the treatment. The remaining three patients withdrew from the study for logistical reasons. Pre and post operative (6 or 10 months) photographs of the treatment areas were assessed both subjectively and objectively (hair counts by high quality standardized photographs and by a blinded investigator). Tables 2a and 2b include final hair counts at six or ten months post final treatment.

Table 2a. Percent hair reduction in bikini area

Patient #	Skin Type	Lyra %	LightSheer %
12	II	23	40
14	II	28	23
1	III	63	60
2	III	53	50
4	III	40	47
5	IV	46	48
16	IV	45	48
18	IV	49	55
19	IV	36	20
11	V	40	62
17	V	75	68
13	VI	67	64
Average		47	49

Chart 1

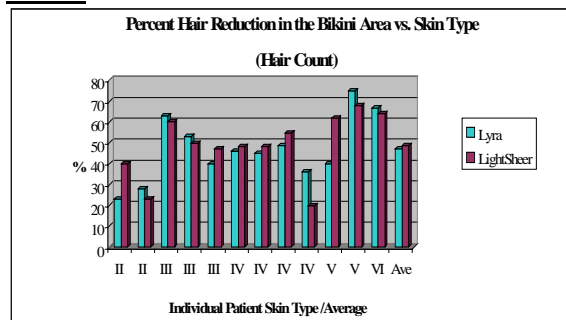


Table 2b. Percent hair reduction in axilla/shoulder area (Hair Count)

Patient #	Skin Type	Lyra %	LightSheer %
12	II	25	38
21	II	39	23
1	III	79	73
4	III	22	36
16	IV	14	23
18	IV	72	28
19	IV	24	74
10	V	31	8
11	V	84	69
17	V	52	62
13	VI	60	57
Average		46	45

Chart 2

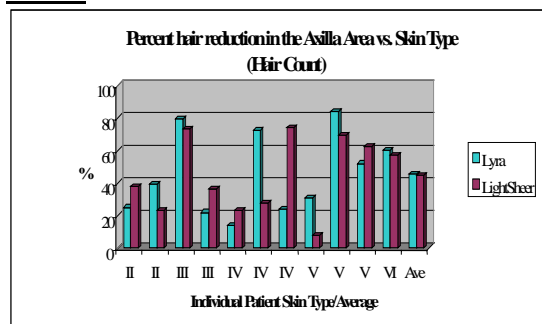


Table 3a. Percent hair reduction in bikini area (blinded investigator assessment)

Patient #	Skin Type	Lyra %	LightSheer %
12	II	30	60
14	II	60	70
1	III	90	90
2	III	80	90
16	IV	50	50
18	IV	70	70
19	IV	70	90
11	V	50	70
17	V	80	50
Average		64	71

Chart 3

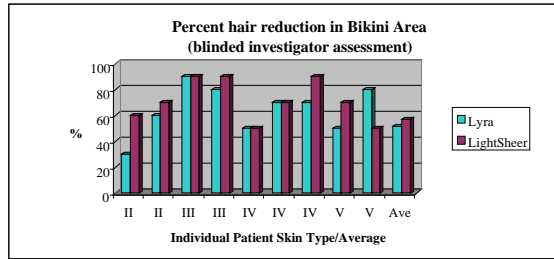
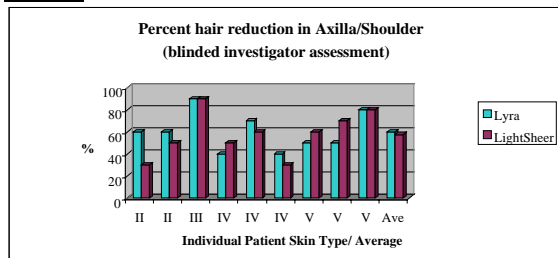


Table 3b. Percent hair reduction in axilla/shoulder area (blinded investigator assessment)

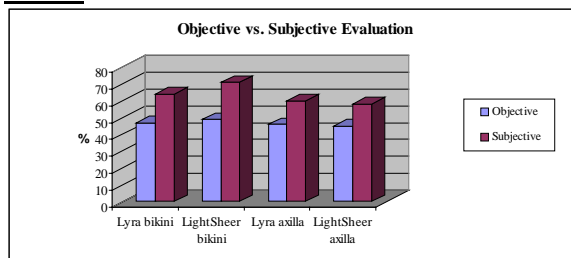
Patient #	Skin Type	Lyra %	LightSheer %
12	II	60	30
21	II	60	50
1	III	90	90
16	IV	40	50
18	IV	70	60
19	IV	40	30
10	V	50	60
11	V	50	70
17	V	80	80
Average		60	58

Chart 4



The average objective vs. subjective results were also analyzed. This comparison is depicted in Chart 5.

Chart 5



Conclusion:

This study was designed to evaluate the clinical differences between the long pulse 1064nm Lyra Nd:YAG and the long pulse 810nm LightSheer Diode lasers.

As seen from the above tables and charts, both lasers produced very similar results at six and ten months post three treatments, averaging about 60% ‘permanent’ hair loss. The results of this study indicate that the percentage of hair reduction as assessed subjectively by the investigator appeared higher than that presented by the objective hair count. We believe that this discrepancy is due to vellus hairs that are not as visible to the naked eye. The charts representing the overall results, however, seem to match very well.

Lighter skin type patients seemed to have more pain with the Lyra laser. This is presumably related to higher Nd:YAG fluences used on these patients. Darker skin type patients developed transient side effects with the LightSheer laser, including crusting and blistering.

Overall, both systems appear to work equally well (refer to photos below), given the use of appropriate parameters for each skin type and hair color. The long pulse 1064 nm Nd:YAG is safer for darker skin type patients.

Aside from the clinical effects, both systems were reliable and delivered consistent results. The scanner initially used with the Lyra laser was rather cumbersome. However, the new 10mm handpiece that replaced the scanner later in the study was found to be a superior delivery device due to its light-weight and better visibility of the treatment area. It compared favorably with the somewhat more cumbersome LightSheer handpiece. Both had efficient and effective cooling devices.

As with all these systems, clinical experience indicates that the greater the number of treatments, the better the results⁵.

Pic. 1a Patient skin type II with brown hair before treatment



Pic 1b. Patient 6 months after Lyra treatment



Pic. 2a. Same patient left side before treatment



Pic. 2b. 6 months after LightSheer treatment



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