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MeDioStar
Laser Hair Removal Study
Comparison 810 nm – 940 nm

Below please find my preliminary data comparing 810 nm and 940 nm wavelengths for laser hair removal.

Total patients enrolled: 25

3 Male (12%)
22 Female (88%)

Avg. Age: 38.9 years

Patients receiving at least 2 treatments: **6 (24%)**
Patients receiving 3 or more treatments: **19 (76%)**

One patient was diagnosed with Polycystic Ovarian Syndrome;
Two patients were diagnosed with Pseudofolliculitis Barbae.

Patient Skin Types:

60% were skin types II - III;
40% were skin types IV - VI

Type I	**0**
Type II	**10 (40%)**
Type III	**5 (20%)**
Type IV	**8 (32%)**
Type V	**1 (4%)**
Type VI	**1 (4%)**

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To minimize discomfort, the first treatment was carried out with a frequency of 0.5 Hz for all patients. Beginning with the second treatment session, all treatments were performed with a frequency of 1 Hz. A pulse frequency of 1 Hz would be expected to emphasize any putative comfort advantages of one laser over the other.
In this **single-blinded study,** patients were asked if they experienced any difference in discomfort between sides treated. The 810 nm laser was always situated on the Right side of the room (Patient's Right side) and the 940 nm laser was always situated on the Left side of the room (Patient's Left Side) with the patient lying on their back. When patients were lying on their stomachs, the back of the legs thus also received treatment with the other laser since the placement of the laser in the room never changed. For laser treatment of backs, the Left side thus received treatment with the 810 nm wavelength, the Right side with 940 nm wavelength.
All treatments were carried out in standard meticulous fashion using clear water-soluble Aquasonic ultrasound gel as an interface between chilled laser hand piece and site to be treated.

Prospective Blinded Study: All Treatment Parameters Identical

½ of Treatment Region Rx'd with one Wavelength; other ½ w/ the other Wavelength

810 nm

940 nm

Fluences Used:

These were based on many years experience and are reflected in the patients skin type, hair characteristics, hair density of the site to be treated, recommendations from Asclepion, pulse frequency, patients pain perception upon treatment, and erythematous, perifollicular response.
The fluence and pulse durations used were identical for both sides. The fluences used at the beginning of treatment ranged from 11 J/cm^2 (Skin Type VI) – 32 J/cm^2 (Skin Type II). As a rule, fluences were increased by 1 J/cm^2 per treatment session and patient.
Patients underwent **88 total treatment sessions** for a **plethora of body locations** with the most frequent being the lip, chin, bikini, and axillary regions.

Differences in Treatment Comfort

- **between Wavelengths for all 88 treatment sessions** are as follows:

  For **58** sessions **(65.9%)** treatment with the **940 nm** wavelength was perceived as **more comfortable** (less painful).
  For **18** sessions **(20.5%)** there was **no comfort difference** between wavelengths.
  For **9** sessions **(10.2%)** treatment with the **810 nm** wavelength was perceived as **more comfortable** (less painful).
  For 3 sessions (3.4%) a divided opinion (split) was recorded.

  Since comfort perception may be related to the **number of sites** treated **during a single session**, the data were further stratified examining patients who had a single site treated during a treatment session and those who had multiple sites treated (two or more).

  35 (39.8%) total treatment sessions were for single sites
  53 (60.2%) total treatment sessions were for multiple sites

- between Wavelengths for all 35 **single site** treatment sessions are as follows:

  For **26** sessions **(74%)** treatment with the **940 nm** wavelength was perceived as **more comfortable** (less painful).
  For **6** sessions **(17%)** there was **no comfort difference** between wavelengths.
  For **3** sessions **(9%)** treatment with the **810 nm** wavelength was perceived as **more comfortable** (less painful).

- between Wavelengths for all 53 **multiple site** treatment sessions are as follows:

  For **32** sessions **(60.4%)** treatment with the **940 nm** wavelength was perceived as **more comfortable** (less painful).
  For **13** sessions **(24.5%)** there was **no comfort difference** between wavelengths.
  For **5** sessions **(9.4%)** treatment with the **810 nm** wavelength was perceived as **more comfortable** (less painful).
  For 3 sessions (5.7%) a divided opinion (split) was recorded.

Differences in Treatment Comfort

- Importantly, **comfort differences** among all treatment sessions based on the **Skin Type** of the patient was also examined:

  ➢ For **Skin Types II and III** upon which a total of 55 treatment sessions were performed:

  For **29** sessions **(52.7%)** treatment with the **940 nm** wavelength was perceived as **more comfortable** (less painful).
  For **16** sessions **(29%)** there was **no comfort difference** between wavelengths.
  For **8** sessions **(15%)** treatment with the **810 nm** wavelength was perceived as **more comfortable** (less painful).
  For 2 sessions (3.6%) a divided opinion (split) was recorded.

  ➢ For **Skin Types IV through VI** upon which a total of 33 treatment sessions were performed:

  For **29** sessions **(88%)** treatment with the **940 nm** wavelength was perceived as **more comfortable** (less painful).
  For **2** sessions **(6%)** there was **no comfort difference** between wavelengths.
  For **1** session **(3%)** treatment with the **810 nm** wavelength was perceived as **more comfortable** (less painful).
  For 1 session (3%) a divided opinion (split) was recorded.

Conclusion:
Treatment with the 940 nm wavelength was perceived by the majority of patients as being more comfortable through all sites treated as well as sessions in which single and multiple sites were treated. <u>The comfort advantage of the 940 nm wavelength was particularly evident for patients of color</u> with skin types IV through VI.

Differences in Clearing

Importantly, we examined meticulously for **differences in % Clearing** between the two wavelengths between sides on all sites treated and skin types. *At the time of the final evaluation*, these were as follows:

- **For All Patients:**

  For 13 patients ***(52%)*** there was ***not even a 5% difference between sides*** in the ***% Clearing*** (% of hairs gone).
  For 7 patients (28%) there was at least 5% more clearing on the 810 nm treated side. **For the majority of these patients, the difference was no greater than 5% more hair removed on the 810nm side than the 940 nm side.**
  For 5 patients (20%) there was at least 5% more clearing on the 940 nm treated side. **For the majority of these patients, the difference was no greater than 10% more hair removed on the 940nm side than the 810 nm side.**

Since patients of color exhibited particularly clear comfort differences between wavelengths, the data for the % clearing was further stratified to examine for differences among skin types:

- **Clearing for Skin Types IV – VI (%):**

  For 7/10 patients **(70%)** there was ***not even a 5% difference between sides*** in the ***% Clearing*** (% of hairs gone).
  For 2/10 patients (20%) there was at least 5% more clearing on the 810 nm treated side.
  For 1/10 patients (10%) there was at least 5% more clearing on the 940 nm treated side.

- **Clearing for Skin Types II – III (%):**

  For 6/15 patients **(40%)** there was ***not even a 5% difference between sides*** in the ***% Clearing*** (% of hairs gone).
  For 5/15 patients (33%) there was at least 5% more clearing on the 810 nm treated side. **For the majority of these patients, the difference was no greater than 5% more hair removed on the 810nm side than the 940 nm side.**
  For 4/15 patients (27%) there was at least 5% more clearing on the 940 nm treated side. **For the majority of these patients, the difference was no greater than 10% more hair removed on the 940nm side than the 810 nm side.**

  The % of Hair Removed (% Clearing) per Treatment Session and Wavelength is summarized in the following table:

		940 nm Side	810 nm Side
After 1 Treatment	54 Treatment Sites	31.11%	32.13%
After 2 Treatments	47 Treatment Sites	46.91%	45.53%
After 3 Treatments	43 Treatment Sites	60.35%	58.11%

Conclusion:

<u>For all patients and sites:</u>
There was only 1% more hair removed on the 810 nm side over the 940 nm side after the first treatment;
After patients received 2 treatments there was 1.5% more hair removed on the 940nm side over the 810 nm side.
After 3 treatments there was 2% more hair removed on the 940 nm side over the 810nm side.

These differences are negligible and do not appear to be statistically significant.

Since past experience with the 810nm wavelength was far greater than with 940 nm, fluences selected for treatment were based on 810 nm experience with the 940 nm fluence then matched for treatment. It remains to be determined if treatment with the 940 nm wavelength was thus suboptimal i.e. if there would have been far greater clearing on the 940 nm side if higher fluences had been used with 940 nm than for 810 nm. This possibility remains particularly intriguing because of the practical greater safety evident with the 940 nm wavelength.

Transient Sequelae:

One patient with Skin Type IV (Greek heritage) developed significant crusting and spot bruising on the 810 nm treated side whereas the corresponding 940 nm exhibited not even the slightest evidence of any negative sequelae. This necessitated a switch in treatment with the 940nm for both sides.
One patient with Skin Type III (Italian heritage) exhibited prolonged erythema and Post-Inflammatory Hyperpigmentation on the 810 nm treated side not evident on the 940 treated side. This did not necessitate a wavelength switch.
Thus 2/25 (8%) patients exhibited transient Sequelae on the 810 nm treated side whereas 0/25 (0%) patients exhibited such Sequelae on the 940 nm side even though the fluences selected for treatment were tailored for 810nm and not 940 nm.

These data also suggest that the failure of 810 nm to show significantly more hair removal than the 940 nm treated side was not related to fluences chosen that were too low since the common incidence of transient Sequelae demonstrable in the routine use of 810 nm in my practice is below 0.5%.

Additional observations:

Both wavelengths very effectively relieved Pseudofolliculitis Barbae in both patients exhibiting this condition.
For the one patient with Polycystic Ovarian Syndrome, our data mirror that of other investigators in that the response to treatment was slower. This was true for both wavelengths.
One patient with Skin Type II was the only patient in the study who exhibited a 20% difference in hair removed between sides. The side exhibiting this difference was 810 nm. Despite experiencing considerably more discomfort on the 810 nm side necessitating both a decrease in fluence and the use of a topical numbing agent, this was the only patient who requested a switch to 810nm treatment for both sides. This switch occurred for the 4th treatment session.

In summary, the 940 nm hair removal laser with a large spot size and chilled handpiece represents an exciting development in highly efficacious removal of unwanted hair for a plethora of body locations with a previously unseen total lack of even transient undesirable sequelae with a considerable margin of comfort during treatment. Although these advantages may be even more profound for patients of color, they were readily appreciated by most patients in a geographic area of intense year round Ultraviolet exposure.

MeDioStar Treatments

Baseline 810nm 940nm

After Two Treatments

Baseline 810nm 940nm

After Three Treatments