

Research Article

White/Grey Hair Reduction Using Q-Switched Nd: Yag laser Fr or Microsecond Pulse, DIODE 810 and Carbon Atom Dye in 100 Patients in Skin of Color in Indian Patients.

White Hair Reduction in the Indian Skin

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Citation: Sidharth Sonthalia, Amarendra Pandey C, Biplav Agarwal (2023) White/Grey Hair Reduction Using Q-Switched Nd:Yag laser Fr or Microsecond Pulse ,DIODE 810 and Carbon Atom Dye in 100 Patients in Skin of Colour in Indian Patients. *J Dermatol & Ther* 3: 116.

Received: April 6, 2023; **Accepted:** April 15, 2023; **Published:** April 19, 2023.

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Abstract

Hair removal is an ambiguous term, as the patients believe 100 % hair will be gone, but even in the best candidate with fair skin tone and dark hair this is not usually possible. US-FDA defines it as stable decrease in the number of terminal hairs for a period longer than the complete hair cycle at a given site following a treatment regime, which may include multiple sessions.

Graying/lightening of hair either physiological or pathological poses a challenge in absence of the target chromophore.

We have in this study and original research work attempted to understand the possibilities for using a laser like diode 810 nm and QSNY lasers for the same.

Grey hair caused by depletion of melanocyte stem cell and gradual reduction in the number of pigment producing melanocytes and senile white hair has absence of tyrosinase activity which makes it difficult to target and thereby hampers in the treatment by hair reduction Lasers, here we impart an artificial chromophore using the carbon atom dye

Keywords: DIODE 810, Q-Switched Nd: YAG, 1024 Nm, White Hair Education, White Hair Reduction, Hair Reduction. Lhr, Laser Hair Reduction.

Introduction

I would like to classify LHR as a borderline therapeutic procedure instead of a purely cosmetic one owing to the social stigma associated with facial hair in India. Facial hair means masculinity means being less attractive by many and furthermore in some strata of the society considered as a sign of virility, all this means great mental trauma. All the above leads to severe mental illnesses as well including depression, low self-esteem, and anxiety disorders.

So, while working with various lasers and patients we came up with this novel approach to treat unwanted facial white hair which were a cause of great concern for many, we simultaneously went on to remove white and normal black hair in same sessions however after the black hair reduced significantly, the white hair required between 4-6 more sessions. The intricate procedure of hair removal in Indian skin types III to V requires multiple sessions with low energies Vs less sittings & more energies as the risk for PIH is a constant threat.

LHR should be closely supervised if not dealt with directly by the dermatologist/specialist,

The introduction of carbon dye provides a learning curve to obtain the desirable results,

The limitations of my study were absence of histopathological co-relation of the methodology used and the efficacy of the carbon atom dye for terminal white hair Vs vellus black hair,

Materials and Methods

Subjects: Eligible participants were primarily females and one male participant who were between the age group of 45-65 years of age who had white /grey facial hair using methods such as waxing, threading, and trimmer to remove the same while some from the rural population were using no methods of hair removal.

Procedure

-The carbon dye is applied for 25 mins directly over the white hair using a pointed ear bud/toothpick then subsequently removed using a facial cleanser, its completely removed off the skin as it has penetrated the root of the hair.

-The excess dye is carefully wiped off lest there are chances of severe diode burns & charring.

-First, we use the FR PULSE of the QSNY to individually target the white hair and if they are plenty then we for the first 4-5 sessions move straight to the next step and to the diode.

-Now after this the hair are shaved off using an electronic trimmer making sure the hair is removed in the same direction as the hair growth.

-Initially the appropriate pulse duration in stamping mode coupled with several passes mode of the diode is used

-When after 5 to 7 sessions the hair become scanty and widely spaced and primarily white hair are only left the long pulse can be used primarily in this case again the hair is not shaved initially and later after shaving now, we use lower energy densities of the diode is used for maintenance sessions.

-Sessions were given at intervals ranging from 25-30 days and energy densities ranging from 22 j/cm² to 32 j/cm² with pulse widths of 30 ms and 100 ms for the diode.

-With the qsnv we used the zoom hand piece with spot size 3 energy between 1400-1600 j

The patients were not put on any medications, only post procedure sunscreen was prescribed to be used regularly.

The study was cleared by the ethics committee of our institution and was conducted in accordance with the ethical principles of the 1975 declaration of Helsinki and in compliance with the good clinical practice guidelines.

Rationale of Using the Carbon Atom Dye: In absence of histopathological studies, one might assume the carbon atom dye traverses up to the level of the hair root. we can deduct from the results that the artificial chromophore travels down to the level of the hair root there by providing a suitable target to our diode very much like the natural melanin of the hair and thereby causing the grey hair lhr to occur, in the absence of any other modality presently available this remains to be the most practical and easy to follow though it's a work in progress.

Diode Energy Densities and Frequencies used: In our experience we have found that following the general dictum of increasing the energy densities by 10 to 20 % with each sitting can have devastating side effects like diode burns and PIH. Hence in phototypes 3 to 5 we are safer using energy densities not beyond 34 j/cm² in 100 ms pulse and not beyond 30 j/cm² in 30 ms pulse.

The increase instead should be in frequency from 1-3 Hz and simultaneous use of the SP mode (in motion mode).

The rationale remains clear that after achieving thermolysis at a threshold energy density we have to target the residual follicles without causing burns and pih.

Outcomes: We saw a 60-70 percent reduction in the total number of hair follicles in 80 percent of the cases, in 10 percent of the cases the number of hair follicles reduced by 50 % however in all 90 % cases we saw a reduction in the caliber of the white hair follicle and minimum reduction of 50 % in the white hair count ,10 % cases were noncompliant and were lost to follow up.

Tolerability/Safety Results

Only 2 % of the initial cases suffered from mild diode burns and pih which were subsequently treated, and they subsided other patients showed minimal side effects or diode burns since we adhered to the guidelines of the carbon dye application diligently and had learnt from a first few. There were no serious adverse effects or long-term side effects reported in this study.

Limitations and Pitfalls

About the Technology: Helios III [Figure 1] is the latest innovative fractional" QSNV laser from Korea. The Helios III laser system is based on the Nd: YAG (1064 nm) and frequency doubled KTP Nd: YAG (532 nm) laser technology. The three basic elements of its operations include – (a) Nd: YAG crystal used as a gain medium, which produces a laser beam, (b) a resonator then amplifies the beam, and (c) a lamp that contains Xenon gas that is used as a pumping light source [4]. The regulation of laser output and repetition rate can be set by the user via GUI (Graphic User Interface) and controlled by microprocessor, which interfaces with the power supply. Helios III has

five modes and four hand-pieces. Its fractional handpiece was developed with diffractive optical element (DOE), a new patented technology that releases micro beams (instead of the erstwhile bulk beams of energy) that stimulate keratinocytes minimally thereby minimizing the possibility of PIH. We also used the gold standard diode 810 miles man premium in this study.

Statutory licensing of the Device: In view of the plethora of devices with similar indications being manufactured by unreliable companies, the importance of the statutory approval of a device by the United States Food & Drug Administration (US-FDA) need not be overemphasized. Laseroptek Co. Ltd., the manufacturers of Helios III, was accorded US-FDA approval from the Department of Health & Human Services in June 2016 [4]; the indications for which Helios III was given approval are listed in Box 1. Results with Helios III and milesman premium in Indian patients. The device has been approved by the US-FDA and has been extensively used with high efficacy and safety in lighter skin types. The purpose of this paper is to apprise Indian Dermatologists, and dermatologists using laser devices in the skin of color (SOC) with the first-hand experience of the authors of using the device in Indian patients for various indications.

Conclusions

The intricate procedure of hair removal in Indian skin types iii to v requires multiple sessions with low energies Vs less sittings & more energies as the risk for PIH is a constant threat. LHR should be closely supervised if not dealt with directly by the dermatologist/specialist. The introduction of carbon dye provides a learning curve to obtain the desirable results. The limitations of my study were absence of histopathological co-relation of the methodology used and the efficacy of the carbon atom dye for terminal white hair Vs vellus black hair. LHR expectation alignment and explaining the realistic definition to the patient is a must. LHR can never achieve 100 % hair removal permanently. This message must be clear to all including our staff. Maintenance sittings schedules must be strictly followed and monitored. Strict sun protection is advised with appropriate sunscreens, moisturizers and face care products are an absolute must. In absence of any other protocol existing for white hair reduction and with minimal side effects and low cost of treatment this study provides a viable and for now the only option for white hair reduction in the Indian skin of color.

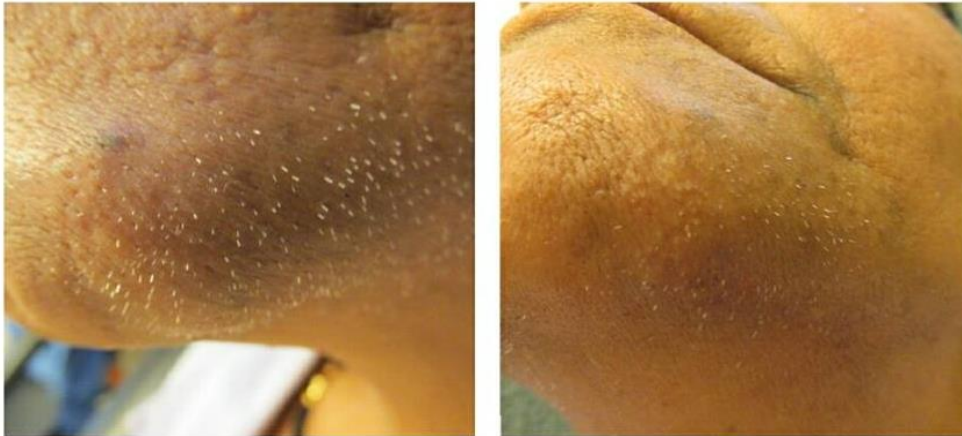
Limitations

No other comparable published studies for Caucasian or African skin types were found to the best of my knowledge, hence making my findings to be the first. A more systematized study comprising of similar cohort groups needs to be undertaken in the future for the development of safer yet effective parameters and protocols. Histopathology during the study could not be done due to patients unwilling for biopsy from the facial area and financial restraints.

Figure 1: A 58-year-old Indian female patient baseline pic Before Lhr (Grey/White Hair)



Figure 2&3: After Upto 80% Reduction in White/Grey Hair Post Lhr.



Energy Densities : 10 Sittings: 24-34 J/Cm² At 30 Ms/Freq 2-3: Sp 10 Max.

Figure 4: Before and after of a 60-year-old female patient 9 Sittings: 28-34 J/Cm² At 30 Ms/Freq 2-3: Sp 10 Max.
Base line black and white hair mixed, salt and pepper 45-year-old female.



Figure 5: After 9 sessions with diode and qsn using the carbon dye 85 percent reduction in the total number of follicles.



Figure 6: Baseline after normal black hair lhr 58-year-old male patient.



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