IADVL

IADVL SIG-LASER (IADVL Academy) Newsletter

Vol 1 (Issue 1) December 2021

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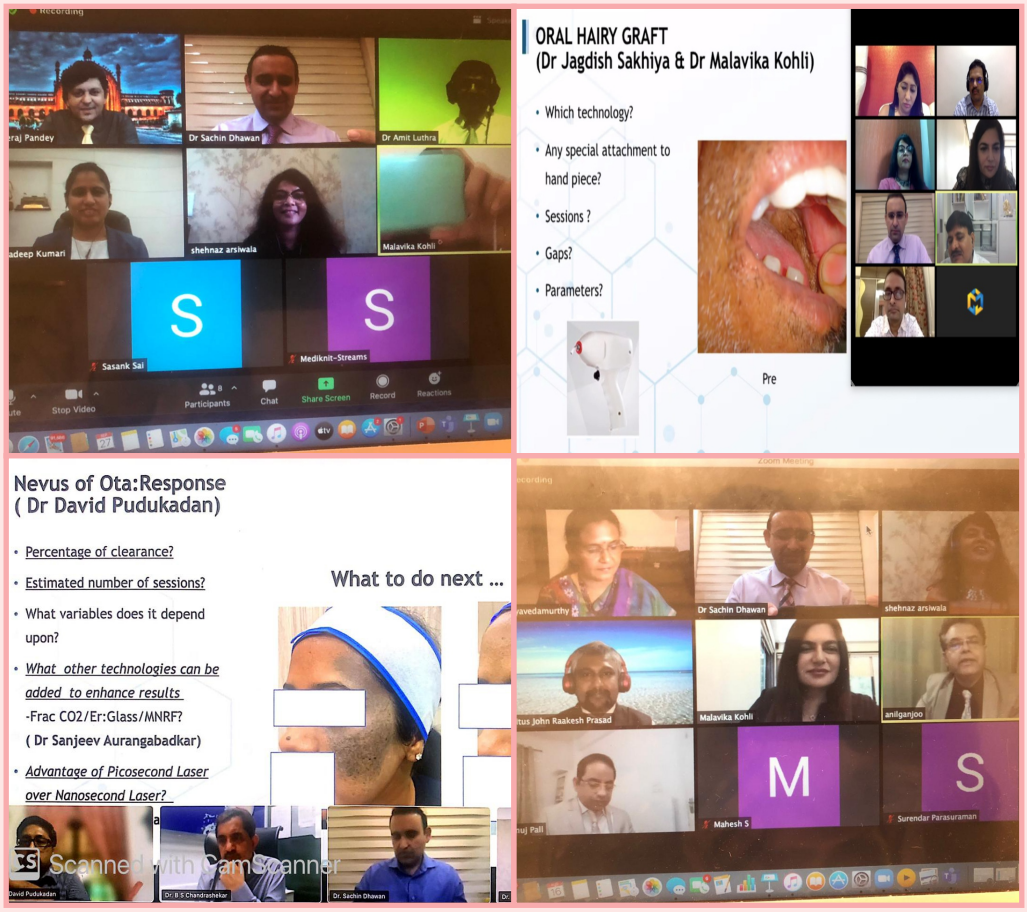

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WELCOME NOTE

Dr Sachin Dhawan
Coordinator - SIG Dermatosurgery

Dear colleagues, welcome to the SIG Lasers newsletter;

SIG Lasers is a newly christened SIG formed by sub dividing SIG Lasers and Aesthetics in the year 2020 . Its formation emphasises the growing importance of Lasers and Energy Based Devices in modern dermatology practice. There is a lot of ambiguity about the science behind lasers and EBDs , as barring a few teaching hospitals , lasers are not a part of the dermatology teaching beyond the basic level . This has allowed a lot of confusion and mis information to creep in and its difficult to choose between technologies and devices that best suit the need of an individual dermatologist. The aim of our SIG is to spread awareness so that this choice becomes easy. We look forward to bringing out relevant Information to colleagues via this newsletter and similar measures in the future.

Dr Sachin Dhawan
Coordinator - SIG Dermatosurgery

MESSAGE FROM COORDINATOR/ EDITOR

Dr. Pradeep Kumari
Coordinator / Editor

Dear IADVLites,

We are living in the times of an online knowledge explosion via remote meetings and conferences. Lasers as an advancing and exponentially growing field has benefitted from this surge of more interaction amongst laser surgeons during the unprecedented and challenging Covid epidemic times of year 2020.

The scenario in lasers has moved from luxury to daily essentials in practice of dermatology. The concept of using Lasers in hair reduction and scar reduction has moved to newer and newer indications of using them in many clinical scenarios leading to results which couldn't be achieved earlier helping many regain self esteem and confidence in today's society and age. However at the same time, this has also brought in threats of more complications and medicolegal issues. It is essential for all of us dermatologist to be first fully aware of our rights as a consumer when buying new lasers (Dr. Sahil Mrigpuri article on laser buyer's checklist), then a careful adherence to ethical

And legal issues and at the same time constantly updating (Journal scan- Dr. Swapnil Shah, Picosecond laser- Dr. BS Chandrasekhar, Non convential use of Pulse dye laser- Dr. Jyothy, Quiz- Dr. Jyothy) ourselves with what's new at at the edge of innovation in our field is desirable.

As Members of IADVL's Special Interest Group on LASERS we have also endeavoured to take science of Lasers to each and every dermatologist in last year as part of extensive online workshops spread through year in 2020. We remain committed to strengthening this knowledge base further by conducting further hybrid workshops in the coming year.

We are thankful to IADVL and IADVL Academy for giving us this opportunity to work and freedom to express ideas to add a little shine to this already brilliant field.

Hoping to learn from each other through continued interaction! Please share your views, opinions or contributions which we can share in the future issues.

Happy LASER- ING happy learning!

Dr. Pradeep Kumari
Chief Dermatologist, Asia Institute of Hair Transplant; Pune
Skin & Surgery International; Pune
drgahlotpradeep@gmail.com

Report of IADVL Online Workshop Series

SIG Lasers Activity Report -

Due to Covid 19 Pandemic, physical meetings which form a very important part of the any SIGs activities, were not possible , so under the guidance of IADVL Academy , we conducted 5 hybrid online workshops with in depth presentations and videos covering the following topics-

Resurfacing Devices

Pigmentary Lasers

Laser Hair Reduction

Energy Based Devices

Device based Medifacials

These lecture series were well received and managed to get more than 7000 views among them . They are available on the IADVL Academy website .

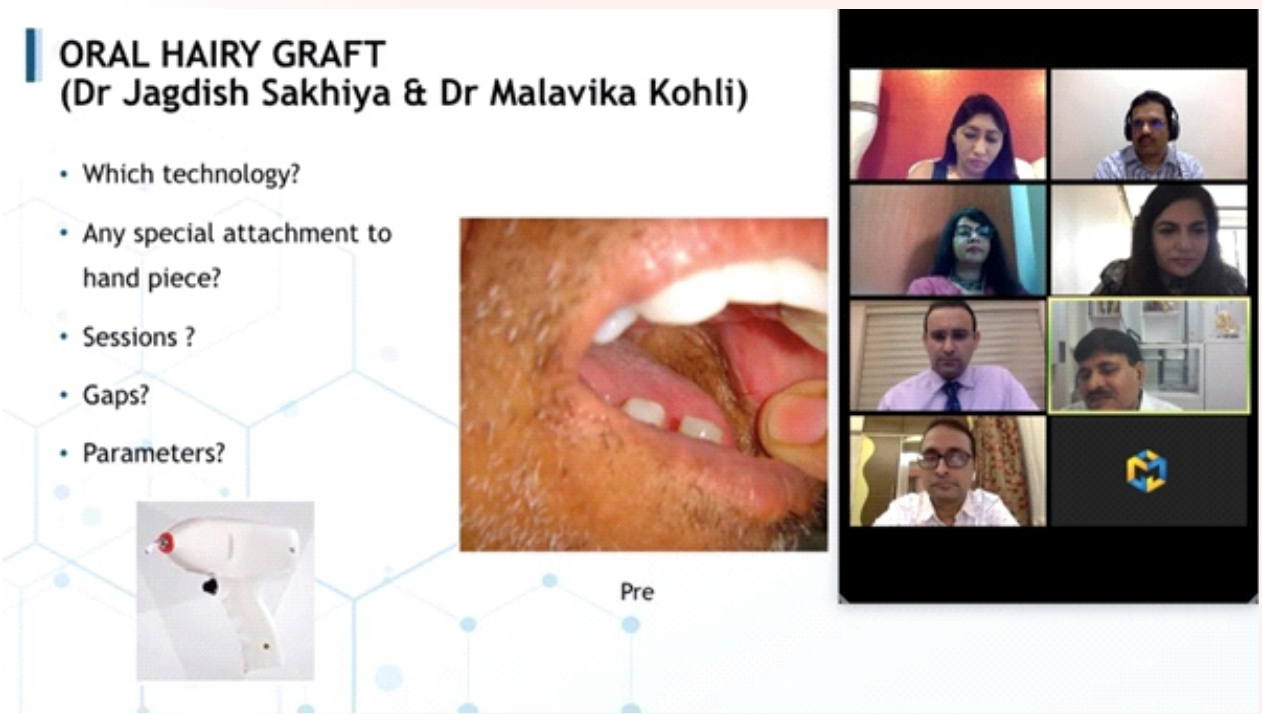
Each lecture series was followed by a live panel discussion with renowned laser experts from SIG Lasers and other prominent dermatologists from the country.

We also did a live workshop about Lasers and Covid 19 Pandemic in the initial phase of the pandemic when there was a lot of ambiguity about the use of devices in aesthetics and laser dermatology .

This was followed by a paper published in IDOJ on the topic - Lasers use in dermatology practice in the evolving Covid 10 scenario: Recommendations by SIG Lasers(IADVL Academy) .

In the first of its kind e-Dermacon 2021 , SIG Lasers conducted a session with renowned Indian and International experts on topics such as Endovacular Lasers , Picosecond Lasers and Subdermal Lipolysis .

In the upcoming year, we plan to carry our work forward by doing and International Speaker Program and more physical/hybrid workshops as situation allows

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Zoom Meeting
Recording
Speaker View
Dr.Neeraj Pandey
Dr Sachin Dhawan
Dr Amit Luthra
Dr. Pradeep Kumari
shehnaz arsiwala
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LASER E-WORSHOP
BY SIG LASERS

SUN PHARMA

PIGMENTARY LASER

SIG Lasers E-Workshop Stage 2: Live Webinar - Interaction with the faculty on Saturday, 20th June 2020 from 07:00 - 08:30 PM

panelists

Dr Selvam

Dr Swapnil Shah

Dr Sanjeev Aurangabadkar

Dr David Pudukadan

Dr Chandrashekar B

Moderator

Dr Sachin Dhawan

Instructions:

- The Live interaction is exclusive for IADVL Members who have pre-registered for Laser E-Workshop after viewing the recorded video lectures. (To watch visit https://iadvl.mediknit.org/)
- **Please login with your username and password registered with www.iadvl.org**
- To avail e-Certificate, enter the "Completion Code" displayed on the completion of the live webinar in the form mentioned under description & submit.

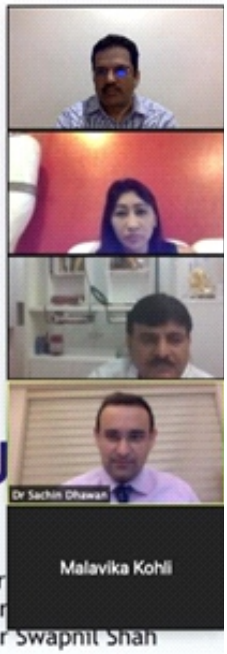
To participate in Laser E-Workshop visit
https://iadvl.mediknit.org/

For queries/feedback/technical assistance please email to
digitalacademy@iadvl.org

IADVL 1973

IADVL ACADEMY

IADVL ACADEMY SIG-Lasers
LASER HAIR REDUCTION PANEL DISCU



Moderator: Dr Sachin Dhawan
Coordinator SIG Lasers

Panelists: Dr Abhishek De
Dr Shehnaz Arsiwala
Dr Rajetha Damisetty
Dr
Dr Swapnil Shah

PICO SECOND LASER

Dr. B. S. Chandrasekhar

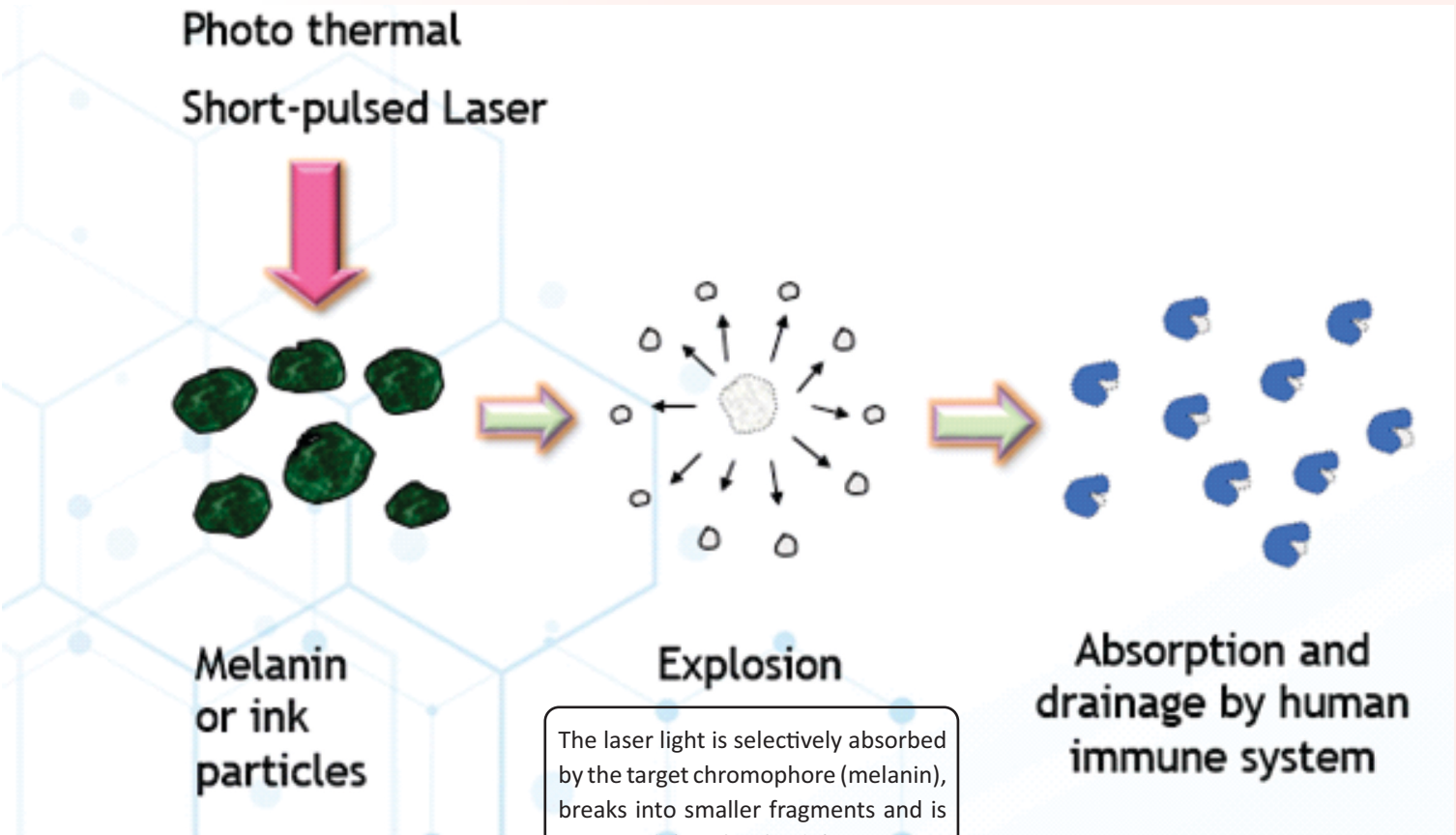
Dr. Monisha shetty

INTRODUCTION:

PICO second (PS) laser, a novel laser technology with less irritation and more efficacy (LIME). In general, PS laser adopts lower fluence and causes less heat irritation to surrounding tissue by applying concentrated energy in an extremely short pulse duration. It predominantly yields photomechanical effects (PMEs) and stress destruction effects to target. In 2016, the PICO second laser was approved for removal of pigments .It is an improved technology from traditional q switched lasers. PICO second lasers are approximately 10 times faster than nano second q switched lasers.

MECHANISM OF ACTION OF NANO SECOND LASER V/S PICOSECOND LASER:

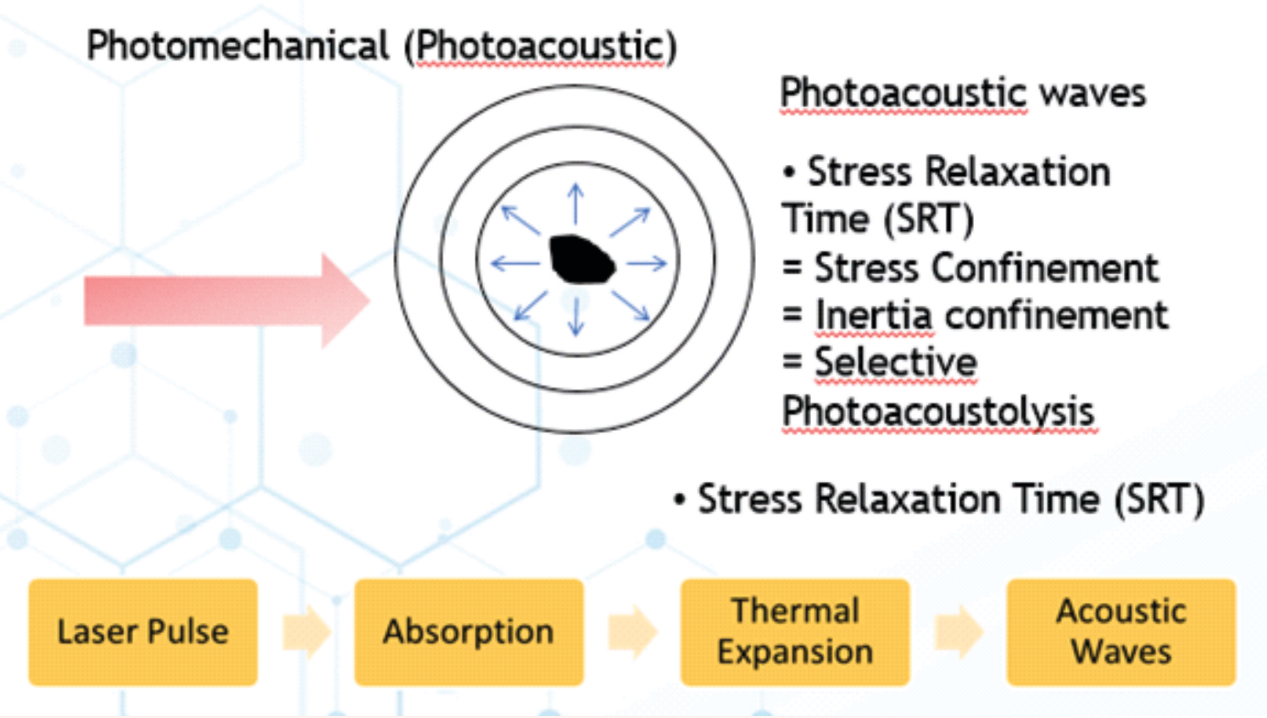
1) Selective photothermolysis:

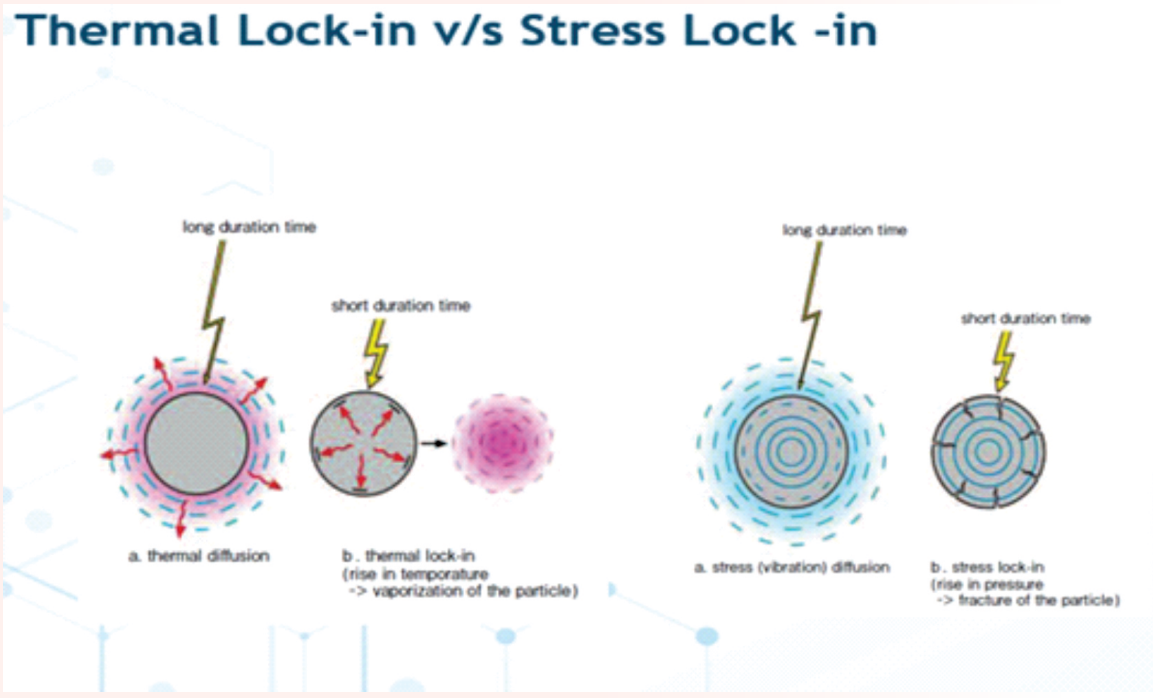


The laser light is selectively absorbed by the target chromophore (melanin), breaks into smaller fragments and is removed by the body's immune system.

2) Selective Photoacoustolysis:

When a particle is heated within an extremely short period of time, the stress generated within the particle does not have enough time to diffuse and stress lock in (stress relaxation time theory) is achieved and if the generated stress is high enough to cause the fracture of particle. This is analogous to thermal lock in where in the structure is heated in a very short exposure time, the temperature rises quickly and there is no time for the heat to diffuse.





Mechanism of action of thermal lock in:
Thermal infusion with a long period of time results in thermal diffusion whereas thermal infusion with a short time results in thermal lock in causing rise in temperature and vaporization of the particle.

Mechanism of action of stress lock in:
Mechanical stress generated with a long period of time results in stress diffusion, whereas mechanical stress generated within a very short period of time results in stress lock in causing rise in pressure and fracture of the particle

3) Subcellelular Selective Photothermolysis:

A low fluence Q-switched Nd:YAG laser modifies the 3D structure of melanocyte and ultrastructure of melanosome by subcellular-selective photothermolysis.

OPTIMAL TREATMENT END POINT OF PICO LASER:

Immediate frosting seen post laser.

REASON FOR FROSTING:

Heat induced steam cavities in melanosomes

↓

Causes scattering of visible light leading to white colour

↓

These are well demarcated circular structures within the melanosomes (1-30 micrometre)

↓

Gas bubbles (water vapour, nitrogen or other gas) and gradually disappear in 20 minutes

Pico laser a new generation of pigment removing laser: Prototypes in the market

- Pico Plus, Pico Way and Pico Sure are three different brands of picosecond lasers. They have their differences in terms of their pulse duration, wavelength, peak power and manufacturer

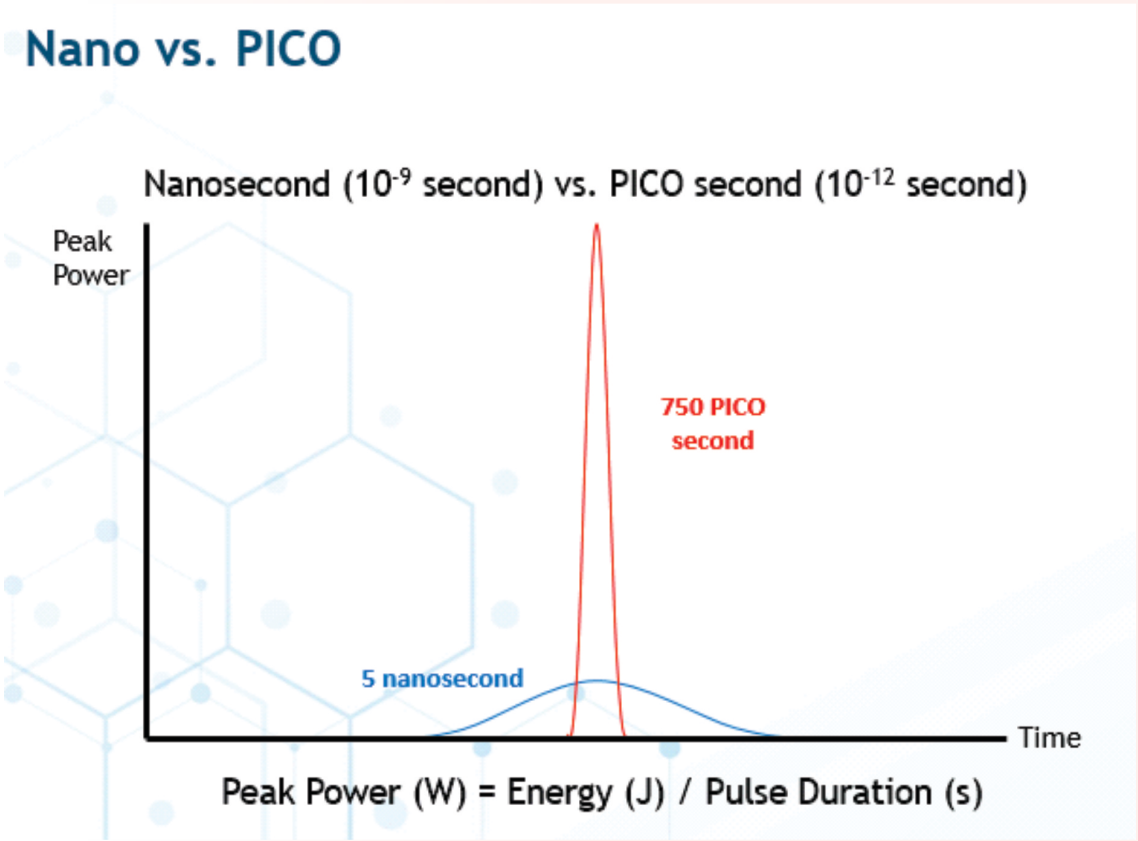
PICOPLUS	PICOSURE	PICOWAY
-Second generation -Uses 4 wavelengths -Higest peak power-1.8W -Uses Nd:YAG to create laser beams -Produces a shorter pulse width, which allows the device to precisely target pigments	-First pico laser cleared by FDA -Uses alexandrite to create laser beams -Helps to remove even difficult tattoo ink colors-green and blue	-Uses Nd:YAG to create laser beams -Shortest pulse duration among all the picosecond laser . -Uses photo-acoustic energy to treat dark pigments

INDICATIONS:

EPIDERMAL LESIONS	DERMAL LESIONS	MIXED LESIONS
CAFÉ AU LAIT MACULES	NEVUS OF OTA	LENTIGENES
EPHELIDES	BLUE NEVUS	BECKERS NEVUS
LENTIGENES	HORIS NEVUS	MELASMA
NAEVUS SPILUS	MELASMA	TATTOO
MELASMA	TATTOO	PERI ORBITAL HYPERPIGMENTATION
EPIDERMAL NEVUS		POST INFLAMMATORY HYPERPIGMENTATION
		LPP
		DRUG INDUCED: MINOCYCLINE

CONTRAINDICATIONS:

- 1)Healing disorders
- 2)Psychoneurosis
- 3) Patients with unrealistic expectations regarding the outcome of treatment
- 4) Patients unable/unwilling to follow treatment guidelines
- 5)Pre-malignant or malignant lesions
- 6)Psoriasis and eczema
- 7)Pigmentary abnormality like vitiligo

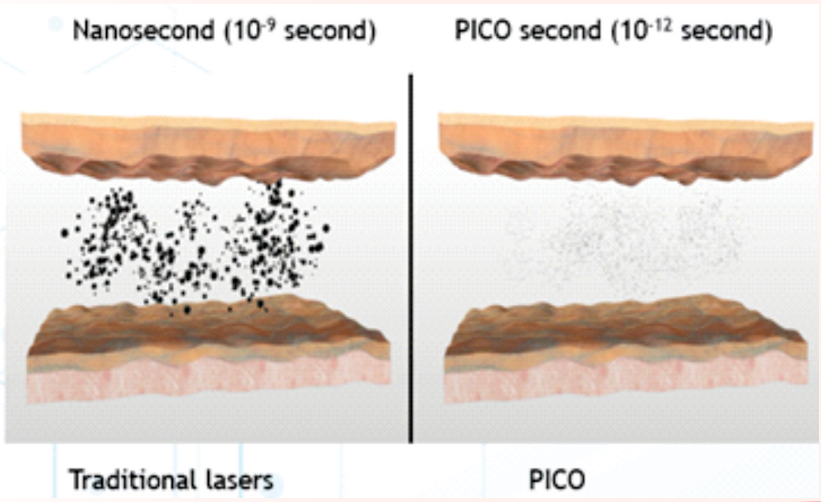


NANO VS PICO; WHAT IS THE DIFFERENCE?

Pico lasers are 1000 times faster has 1/10000 the wavelength than a nano second Q switch laser.The spike in peak power is distinctly higher than what a nano second laser can produce. Pico laser peoduces a more photoacoustic effect than photothermal effect compared to a Q switched nano-second laser.

As the laser energy in pico laser is delivered so rapidly, it causes swift vibrations of the pigments it targets but the heat dissipates so rapidly that there is little heating effect.

Q switch (nano second) laser have both photothermal (heat) and photo mechanical (acoustic) effect, whereas the Pico second laser have more photomechanical effect than photothermal effect.



The traditional Nano second lasers leave behind larger fragments and hence more treatment sessions are needed and sometimes complete clearance cannot be achieved, whereas the picosecond laser breaks up the pigment effectively into smaller fragments which are easily removed by body's immune system , hence leading to faster clearance and fewer treatment sessions.

Features of a PICO laser:

A

The different hand pieces available are the:

B

1) Zoom hand piece: Zoom Handpiece
Spot size:1, 2, 3, 4, 5, 6 mm @ 1064 nm
Spot size:0.9, 1.5, 2.3, 3.3, 4.3, 5.3 mm @ 532 nm
Auto-detection: detects both hand piece and spot sizes
Clinical Uses
Used for below indications at 1064 nm

- Black and dark tattoos
- Dermal pigmented lesions (Nevus of Ota, ABNOM, etc.)

Used for below indications at 532 nm

- Red tattoos
- Epidermal pigmented lesions (freckles, SK, etc.)

2)PICO Toning Collimated Handpiece

- Spot size:6, 7, 8, 9, 10 mm @ 1064 nm
- Spot size:4.3, 5.3, 6.5, 8.0, 9.0 mm @ 532 nm
- Auto-detection: detects both hand piece and spot sizes

Clinical Uses: Used for below indications at 1064 nm

- Black and dark tattoos
- Dermal pigmented lesions (melasma, Nevus of Ota, ABNOM, etc.)

Clinical Uses: Used for below indications at 532 nm

- Red tattoos
- Epidermal pigmented lesions (freckles, SK, etc.)

Mechanism of action: Concept-Low fluence, multiple pass technique, multiple sessions at weekly intervals

- Theory- Subcellular selective photothermolysis. Subcellular selective photothermolysis- uses high-peak power, ultrashort pulse duration (ns) and flat top beam resulting in destruction of only melanin in the target cell . Ultra structural changes were noticed within the melanosomes on electron microscopy. Following laser treatment- there is reduction in the dendrites of epidermal melanocytes. Stage 4 melanosomes undergo selective photothermolysis (where in the melanocytes remained intact and melanosomes were destroyed).

3) Gold Toning^{+} Handpiece:

2, 5 mm @ 595 nm, Separate tips for each spot size, Auto-detection: detects handpiece only (spot sizes are manually selected).

Clinical uses: Used for below indications at 595 nm

- Colored tattoos (sky blue)
- Post-acne erythema, inflammatory acne, facial flushing, rosacea

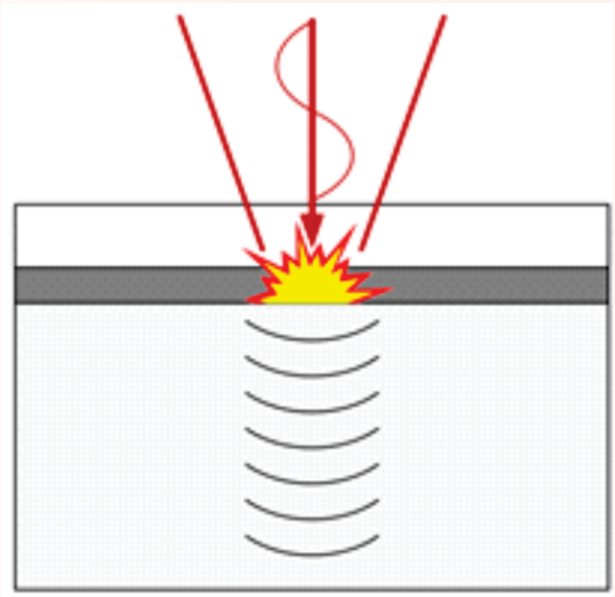
4) 660nm handpiece:

660nm is a new treatment technique that can treat epidermal pigmented lesions such as freckles using 660nm wavelength. Compared to 532nm wavelength which was the previous wavelength of choice, the 660nm laser offers lower oxy and deoxy haemoglobin absorption and therefore causes less damage to superficial blood vessels with reduced side effects and reduced possibility of post inflammatory hyperpigmentation.
66Onm probe can deliver intense energy onto the same spot size compared to 532nm and can precisely treat only the lesion.

2, 3 mm @ 660 nm
Auto-detection: detects handpiece only (spot sizes are manually selected)
Clinical uses: Used for below indications at 660 nm
Colored tattoos (green)
Epidermal pigmented lesions
(Freckles, SK, etc.)

5) Focused Dots Handpiece

Highly-focused photoacoustic waves creates focused layers creating LIOBs (Laser Induced Optical Breakdowns) in tissue phantom.



Handpiece:

- 7.4 mm X 7.4 mm @1064 nm
- 81 micro-focused spots (diameter of 100 um each)
- Auto-detection: detects handpiece (spot size is fixed)

Clinical Uses: Used for below indications at 1064 nm

Final Resurfacing
Skin rejuvenation (Cold Rejuvenation)
Fine wrinkles
Scars

Acne Scars (by Focus Toning)

Normal View

CRITERIA FOR PATIENTS SELECTION:

-PS laser may be considered as first line of treatment option for Nevus of Ota and Hori's macules (level of evidence:Level 1b)

-Ps laser is a good therapeutic option for photorejuvenation, mainly in skin of color where the other laser options are limited (level of evidence: Level 2a)

-Solar lentigens and freckles also tend to response with a high degree of safety and efficacy (level of evidence: Level 2b)

-As an add on therapy for patients with moderate to severe melisma, who also benefit from the concurrent reduction of photodamage and benign pigmentation (level of evidence: Level 2b)

-For patients who desire minimal downtime and has failed other well- established treatments for patients with mild to moderate acne scarring (level of evidence: Level 2b) fractionated PS laser can be done

-Acne scar patients who are skin of colour and/or who present with concurrent pigmentary issues may be an ideal candidate for fractionated picosecond laser (level of evidence: Level 2b)

- PS laser currently represents the gold standard treatment option for removal of unwanted tattoos of almost any colour (level of evidence: Level 1a)

PRE PROCEDDURE INSTRUCTIONS BEFORE ENROLLING THE PATIENTS FOR LASER:

1. Patient should be counselled regarding the procedure, number of sessions and the possible effects and side effects
2. Assess the patients' expectations

3. Inform the patient regarding the number of sessions required (2-3 sessions more than actual requirement and results/outcome to be expected, complete clearance in nevoid conditions is doubtful) Assess the skin and do test patch always before starting the treatment
4. Inform the patient about complications, which is very important such as initial end point, pin point bleeding, Post inflammatory hyperpigmentation, temporary hair loss and time required for recovery
5. Adequate sun protection to be taken.
6. Patient with h/o recurrent herpes simplex/herpes labialis to be enquired
7. Stop evening and night creams 2 days before procedure

POST PROCEDURE CARE:

- Stop evening and night creams 3-4 days after procedure
- Avoid sun exposure
- Doctor Gives oral/topical steroids and analgesics as and when indicated

COMPICATIONS:

1) Immediate: Erythema, Edema, blistering, pin point bleeding in case of tattoo removal- give **ice packs and cooling.**

2) Delayed: In case of tattoo removal: Blistering, crusting, post inflammatory hyper/hypopigmentation, depigmentation, scarring, paradoxical tattoo darkening-**give oral and topical steroids for 3-5 days in case of impending edema and blistering, and in case of post inflammatory hyperpigmentation treat with topical steroids.**

In case of laser toning: confetti like depigmentation, post inflammatory hyperpigmentation.

VASCULAR INDICATION

Indication	Probe	Parameters	End point	Interval
Post acne erythema	Gold toning probe, 595nm	0.1-0.3J/5mm	Erythema	1 week
Rosacea	Gold toning probe, 595nm	0.1-0.3J/5mm	Erythema	1 week
Melasma	Gold toning probe, 595nm	0.1-0.3J/5mm	Erythema	1 week
TSDF	Gold toning probe, 595nm	0.1-0.3J/5mm	Erythema	1 week
Telangiectasia	Gold toning probe, 595nm	0.1-0.3J/2mm	Erythema	1 week

PIGMENTARY INDICATION

Indication	Probe	Parameters	End point	Interval
1. Melasma/LPP	Pico toning	0.2-0.3J/8mm/3-5 passes	Erythema	2 weeks
2. Post inflammatory hyperpigmentation	Pico toning-1064 P-PTP	0.7J/8mm/ 3-4 passes	Erythema	2 weeks
3.Tattoo removal **Colour of tattoo:** a)Black/Blue/Brown b)Red/orange/yellow C)Sky blue d)Green	1064nm Pico zoom probe 532nm Pico zoom 595nm, gold toning probe 660nm Ruvy touch probe	Start at 0.8j/3-4mm/1 pass Start at 0.2J/3mm/1 pass Start at 0.5 J, 2mm spot Start at 0.4J,3mm spot	Frosting Frosting Erythema Frosting	4-6 weeks 4-6 weeks 4-6 weeks 4-6 weeks

PIGMENTARY INDICATION

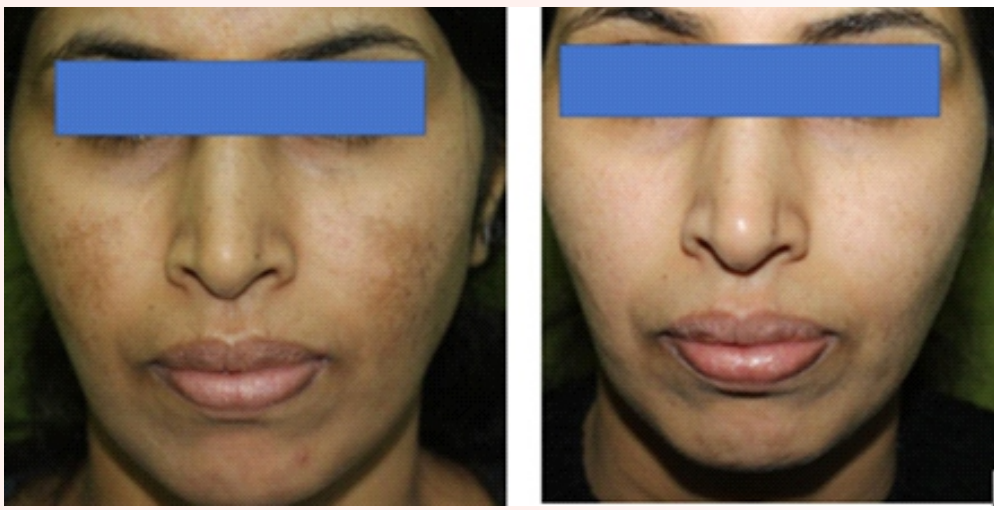
Indication	Probe	Parameters	End point	Interval
1.Ephelides/SK/lentigines/ Cafe-au-lait	Pico 532nm	0.4J/2.33.3mm(calm: 3.3mm-4.3mm)	Frosting	3 weeks
2. Freckles	Ruvy 660nm	0.5J/2-3mm spot size	Frosting	3 weeks
3.Nevus spilus	Pico 532nm	0.4J/4.3-5.3mm	Frosting	4-6 weeks
4.ABNOM	Zoom 1064nm	2J/ 4-5mm spot size	Frosting	4-6 weeks
5.Nevus of ota	Zoom 1064nm	2J/5-6mm spot size	Frosting	4-6 weeks
6.Beckers nevus	Zoom 1064nm	0.6J/6mm spot size	Frosting	4-6 weeks
7.Skin rejuvenation, pores and scars	Focused dot hand piece,1064nm PICO	0.5J,7.4X7.4mm	Erythema and edema	3 weeks

INDICATIONS AND EXPERT OPINION:

1) Open pores- focused dots 0.5 j/cm, 7.4mm, and 3 passes

- Expert opinion: PICO second lasers for treatment of sagging skin, open pores and general facial rejuvenation are in nascent stage. Before promoting any rejuvenation treatment, basic studies should be performed.

2)Melasma:

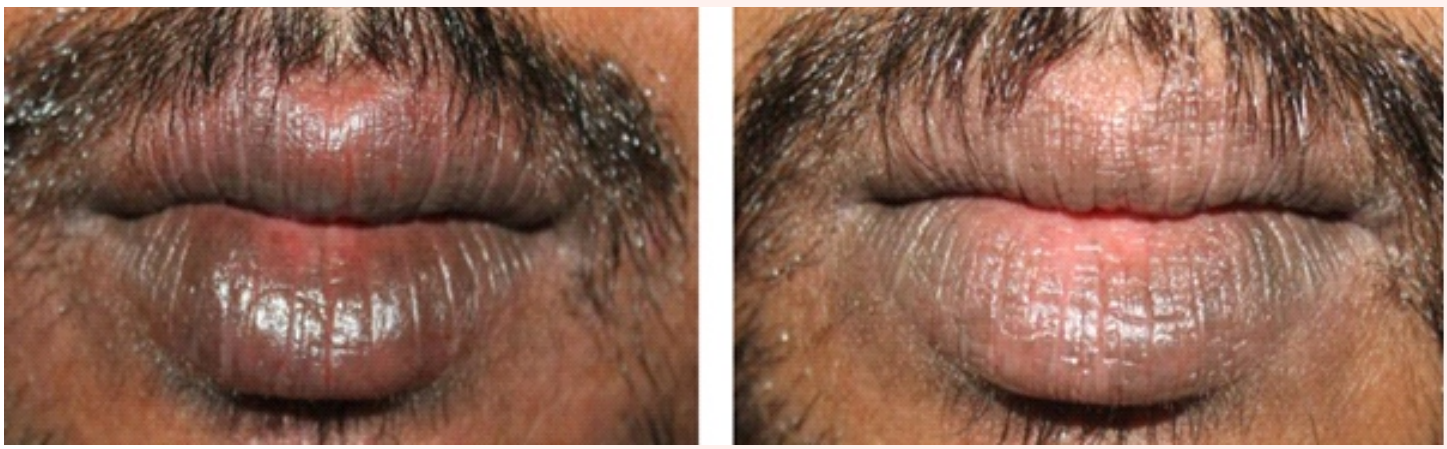


After 4 sessions of PICO toning, 0.3J-0.45J, 8mm, pass

Expert opinion: Laser toning for melasma

- While LT sessions are being given, the melanin decreases and at first LT may seem to be effective but in many cases soon after the treatment is terminated melasma recurs, and in some cases there is a rebound effect resulting in patches of pigment which are darker than before the treatment. LT is also known to cause intractable punctuate leukoderma.

LIP TONING:

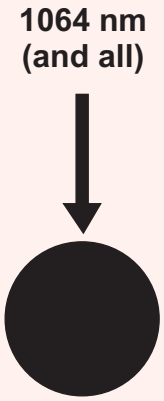


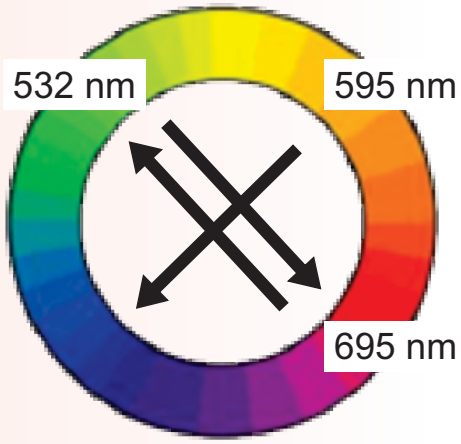
After 5 sessions of PICO toning.E: 0.3j-0.6j, 3 passes

3)TATOO REMOVAL**:**

BASED ON "COMPLEMENTARY MATCHING" OF TATTOO PIGMENT FOLLOWING LASERS ARE USED:

Four-wavelengths (1064, 532, 595, 660 nm)





Tatoo-1064nm:1.2j/cm,3mm

Expert opinion:

- LASER EXPERTS have achieved much lower rates of transient hair loss in eyebrow tattoo removal owing to the LIME property of PS lasers.
- PS lasers also make the removal of large tattoos less painful during treatment, with fewer complications postoperatively. They also reduce the number of treatments required to remove the pigment

Bindi tattoo: 1064nm 1.8j/cm,2mm

After 8 sessions of PICO laser

Red: 0.5J-0.7J, 3mm, 532 nm
Black and Blue: 1.2J -1.6J, 4mm
Green: 0.3J-0.5J,3mm

EXPERT OPINION:

- The question of color dependency. It was originally thought that since PS-lasers rely heavily on the photoacoustic reaction for their therapeutic effect, the removal of tattoo pigments would be color independent where all colors would be removed at the same rate. However in actual practice, although color dependence is smaller than NS-lasers, color dependence still exists
- There is the question of color changes and shifts in tattoos. It is known that in certain tattoos color changes and shifts occur after NS-laser irradiation which can make the tattoo more conspicuous than before the treatment. Is this applicable to PS is a question to answer
- True' PS-laser is not yet developed. The current shortest pulse width is 350 ps, and that is still 0.35 ns. When we get down to single digit PICO pulse widths, then we may well see true color independence.

In the future, Femtosecond lasers (fs-lasers) with shorter pulse width than the PS-laser may be developed for clinical application. The question remains the same. What pulse width is best suited for which types of tattoos? Studies on this subject are strongly warranted

4) GOLD TONING:

Acne vulgaris grade 3

After 2 sessions of spectra gold toning, 0.36J/5mm-0.5J/5mm

After 2 sessions of spectra gold toning, 0.36J/5mm-0.5J/5mm

660nm FOR a) FRECKLES:

Before

After 1 session (with 660 nm)

B) Pigmented Xerodermoid:

After 5 sessions of PICo ruvy touch 1st session: 0.8J, 3mm. Last session: 0.3J, 3mmm

C) Albinism with Freckles:

After 5 sessions of PICo ruvy touch 1st session: 0.3J. Last session: 0.5J

D) Reticulate Pigmentation:

8 sessions of PICO 660nm

PICO FOCUSSED DOT FOR

A) Post Traumatic Scar:

After 6 sessions of PICO focussed dot ,0.5j-0.8j,3 passes

B)For pores and acne scars:
After 5 sessions of PICO focused dot.E: 0.3j-0.6j, 2 passe

6) Pico 1064nm Zoom probe

(a) DERMAL MELANOCYTOSIS:
Nevus of ota: 1064nm, 2.2J/cm, 4mm, 1pass

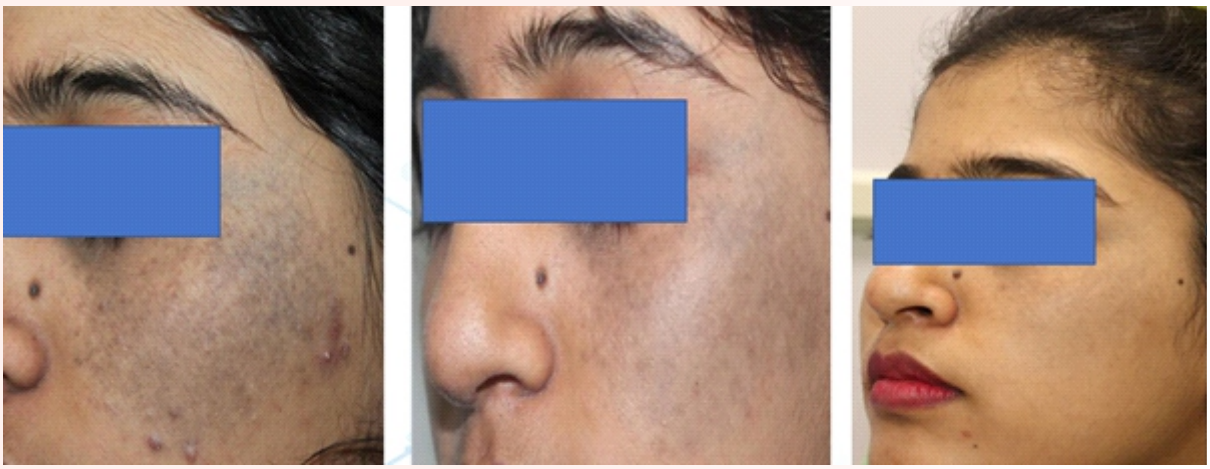
Before

After 4sessions

NANO VS PICO:

After 7 sessions of spectra Nd:YAG.
6.4j(3mm)-3.2j(6mm)

After 3 sessions of PICO zoom probe.
E: 2J,6mm



(b) MIXED:

Beckers Nevus:
Erb:YAG ablation was done
2 sessions of spectra Nd:YAG
#10 sessions of PICO zoom probe

2) **ILVEN:**

Before

After

9 sessions of PICO zoom probe,1 J, 3 passes

ADVANTAGES OF PS LASERS:

- Better and fast results (lesser number of sessions are required)
- Better skin reaction end point
- Less pain and scarring
- Less downtime
- Less side effects
- Able to treat recalcitrant cases
- Are colour independent, all colours are removed equally in a tattoo
- Able to treat large and multicoloured tattoos

CONCLUSION:

- The PS-laser is a revolutionary advance for laser tattoo removal but may be a less effective device in other indications such as those currently being treated with no-down time. Many more trials are needed to prove or disprove their effectiveness in non-tattoo pigmented lesions, our short experience with Pico laser appears promising in non-tattoo pigmented lesions too.

NONCONVENTIONAL USES OF PULSED DYE LASER IN DERMATOLOGY

Dr. Jyothy k

Flash lamp pulsed-dye laser (FPDL) is considered as the most specific laser currently available for the treatment of superficial cutaneous vascular lesions. It uses a rhodamine dye,dissolved in a solvent and pumped by a flash lamp and it emits a laser of wavelength between 585-595nm. The chromophore targeted with this wavelength is oxyHaemoglobin (present in the RBCS) which has an optimal absorption within 577-600 nm range. The new generation PDL machines provide longer pulse duration (1.5 -40ms) and better epidermal cooling to allow safe use of higher fluences without the development of purpura. The vascular conditions approved for treatment with PDL are

a.**Congenital vascular lesions**- PWS,Haemangioma

b.Acquired vascular lesions Telangiectasia (face,legs),rosacea (with telangiectasia & erythema),spider angioma,Poikiloderma of Civatte, venous lakes,Cherry angioma, Angiofibroma etc.

FPDL has been tried in the management of nonvascular lesions but with vascular structural involvement. So we can further classify the indications of PDL as

1.Typical vascular lesions (already mentioned above)

2.Vascular dependent lesions

- Viral infections - Verruca vulgaris, Genital viral warts
- Inflammatory skin diseases - Localized psoriasis ,Lupus erythematoses Acne
- Diseases of connective tissue(collagen) - Keloid, hypertropic scars, Striae distensae, Atrophic scars
- Neoplastic disorders BCC,Kaposis sarcoma,Angiolymphoid hyperplasia

3.Non vascular lesions – Molluscum contagiosum, Xanthelasma palpebrarum, Epidermal pigmentation, Darier's disease, Sebaceous hyperplasia.

FPDL does not always represent the first line of treatment for all these lesions .They can be managed with other modalities ,however FDPL has a role when these conditions become resistant or show poor response to conventional treatments. Pulsed dye laser which is a non-ablative laser with great safety profile can be utilized to treat paediatric population who may refuse painful treatments.It can also be tried in those patients who are unable to receive anaesthesia and when surgery is contraindicated. PDL also comes to help to treat lesions in certain areas like Nose, Anogenital areas, Face etc where risk of disfiguring scars/keloids are high with surgical procedures. Some of these conditions are managed with combination therapies where PDL is used along with other light based devices or surgery.

How does PDL work ?

The lesions of the above mentioned conditions contain large number of blood vessels which can be destroyed by FPDL either by specific destruction of abnormal vessels, components of lesions themselves or by selective thrombosis of vessels which lead to obliteration of the nutrient supply to the lesions. Another mechanism postulated is the effect on fibroblast proliferation and type III collagen deposition by FPDL. There occurs apoptosis and upregulation of extracellular signal regulated kinase and p38 Mitogen activated protein kinase activity. These mechanisms may be involved in the improvement of scars, keloids and skin rejuvenation.

Let us discuss some of these off label indications in detail:

KELOIDS &HYPERTROPHIC SCARS

Keloids and hypertrophic scars are fibroproliferative disorders (FPDs) of the skin and they can be called pathological or inflammatory scars.The pathogenesis of these scars clearly involves local conditions such as delayed wound healing, wound depth, and the tension of the skin around the scars which results in prolonged and/or repeated bouts of inflammation in the reticular layer of the dermis and this inflammation generates abnormal numbers of blood vessels (as well as collagen and nerve fibers) in the dermal reticular layer and also induce endothelial dysfunction (i.e., vascular hyperpermeability) during the inflammatory stage of wound healing .FPDL can inhibit abnormal angiogenesis and vascular hyperpermeability and thus improves the scar appearance, pliability and thickness. FPDL works better when the scars are erythematous and fresh ie soon after the wound healing. The laser sessions are usually at 4-6 weeks and requires several sessions depending on the nature of the scar. Non purpuric parameters like lower energy and longer pulse width are preferred.PDL treatments improves the colour and texture of the scars as well as reduce the thickness to a great extent.PDL can be combined with ILS, fractional lasers or MNRF treatments for better outcome.

VERRUCA AND GENITAL WARTS

FPDL has been tried in the management of recalcitrant viral warts including plantar warts. The exact mechanism of action is not known however it is postulated that it blocks blood supply by causing selective photothermolysis.Light microscopic evaluation of treated areas immediately after treatment and at 1, 6, and 13 days after treatment show agglutinated erythrocytes in the papillary vessels with subsequent thrombosis and endothelial and keratinocyte necrosis. This destruction may obliterate the nutrient supply to the wart or destroy the rapidly dividing epidermal cells that contain human papilloma virus. In addition, thermal injury of the heat sensitive HPV may also contribute to the mode of action.It appears that an intact immune system is also essential as immunocompromised patients with viral warts respond poorly to PDL. It is possible that the local dermal vascular destruction of the wart stimulates cell mediated immune responses known to be important for eradication of viral warts clearance. The laser sessions can be done at 2-4 weeks intervals and requires 6-8 sessions on an average. The parameters used for this are

Spot size- 7-10 mm, Pulse width 1.5ms, Energy

This modality can be combined with light curettage to improve the penetration of the laser energy.

LOCALISED PSORIASIS

Psoriatic lesions demonstrate abnormal vasculature ,dermal angiogenesis ,epidermal hyperplasia and lymphocytotropism .Selective removal of abnormal vasculature by PDL based on selective photothermolysis helps to clear

localized psoriatic lesions on the skin as well as nail psoriasis. In addition PDL reduces the number of lymphocytes and helps to control inflammation. Hence PDL has been tried in refractory cases and when systemic therapies are contraindicated .The parameters preferred for nail psoriasis are shorter pulse duration and medium energy because longer pulse duration causes more pain.

MELASMA

The pathogenesis of melasma is not fully understood and several factors play role in its development. Recent studies have shown that interaction between the altered cutaneous vasculature and melanocytes have an influence on hyperpigmentation .The melanocytes express VEGF receptors 1 & 2 and neuropilin and may respond to angiogenic factors .The area affected by melasma shows pronounced change in the form of increased number and size of dermal blood vessels .From this point of view, laser targeting blood vessels might decrease the stimulation of melanocytes and prevent melanogenesis. Moreover PDL is used in the treatment of epidermal pigmentation. PDL has been tried alone or in combination with hydroquinonetriple combination cream,, Q Switched Nd-YAG Laser (QSYL) and Intense Pulsed Light in melasma patients .The results are better when PDL session is combined with QSYL in patients showing vascularity in dermascopy.

The recommended parameters for some of the PDL amenable off label indications are given in Table 1

To summarize,correct selection of patients for treatment using FPDL is the most useful strategy, as this technique is beneficial in selected patients, such as those with persistent and/or recalcitrant dermatological disorders with vessel involvement. FPDL in all these indications is safe,well-tolerated, and effective treatment method and may be considered an alternative or a complementary treatment for resistant and/or recalcitrant lesions or when contraindications do not suggest the use of other therapies .Also,off-label procedures must always be carried out carefully, with a strict follow-up in order to ensure safety. The high cost of the procedure may represent a limit in its use, despite the excellent aesthetic outcome of results.

Table -1

INDICATION	PARAMETERS
Striae rubrae/ distensae Angiolymphoid hyperplasia Jessner Kanof disease Kaposi's sarcoma Verruca	Wavelength :595nm Spot size: 7-10mm Energy : 7-8j/cm2 Pulse width: 0.5-1..5ms

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8. W. Manuskiatti, R. Wanitphakdeedecha, and R. E. Fitzpatrick, “Effect of pulse width of a 595-nm flashlamp-pumped pulsed dye laser on the treatment response of keloidal and hypertrophic sternotomy scars,” Dermatologic Surgery, vol. 33, no. 2, pp. 152–161, 2007.
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JOURNAL SCAN

Dr. Swapnil Shah MD

1. Lasers for Becker's nevus. Zhong Y, Yang B, Huang L, Elias PM, Man MQ. Lasers for Becker's nevus. Lasers Med Sci. 2019 Aug;34(6):1071-1079. doi: 10.1007/s10103-019-02734-3. Epub 2019 Feb 14. PMID: 30762191; PMCID: PMC6626575.

Abstract:
Becker's nevus is a common pigmented dermatosis, usually featured by ipsilateral pigmented patch with hypertrichosis. Becker's nevus is often treated with various types of lasers although other regimens are available. However, clinical outcomes appear inconsistent among studies. To summarize the clinical outcomes of Becker's nevus treated with lasers via literature review. A variety of lasers had been used alone or in combination to treat Becker's nevus. Laser wavelengths used for Becker's nevus ranged from 504 to 10,600 nm, while the number of treatment varied from 1 to 12 sessions. The clinical outcomes were mixed although combination of lasers with different wavelengths appeared to achieve a better efficacy. Adverse effects were usually mild to moderate erythema. While lasers are relatively safe, their efficacy for Becker's nevus is moderate. It seems that combination therapy could improve the outcome. However, trials in larger group of patients are required to validate the efficacy of each type of lasers for Becker's nevus.
Comment: Becker's nevus is one of the most difficult pigmentary disorders to treat. This paper highlighted the various lasers from pulsed dye to full ablative lasers with partial to complete clearance of pigment. The hairs do responds well to hair removal. It is clear from this paper although various lasers have tried the treatment response is unsatisfactory and often incomplete.

2. Forbat E, Al-Niaimi F. Nonvascular uses of pulsed dye laser in clinical dermatology. J Cosmet Dermatol. 2019 Apr 19. doi: 10.1111/jocd.12924. Epub ahead of print. PMID: 31002479.

Abstract
Lasers are fast becoming the vogue of dermatology ranging from ablative, nonablative, fractional photothermolysis to vascular lasers. There are a range of vascular lasers including potassium titanyl phosphate (KTP 532 nm), pulsed dye laser (PDL -595 nm), diode (810 nm), and Nd:YAG (1064 nm). PDL is a laser that emits yellow light using Rhodamine dye as it is lasing medium. Typical vascular lesions which are treated by PDL include port wine stain, haemangioma, telangiectasia, spider angioma, and rosacea. This article focuses on the use of PDL beyond primary vascular conditions. We review the evidence, or lack thereof, of the use of PDL in acne vulgaris, scars, striae, warts, molluscum, psoriasis, rejuvenation, basal cell carcinoma (BCC), and miscellaneous dermatological sequelae.

Comment: Pulsed Dye or vascular lasers are underused lasers in India because of maintenance cost. These wavelengths are now can be produced without using the dye and dramatically decreasing the maintenance cost. Apart from standard vascular indications such as port wine stains and telangiectasias, a vascular laser can be used in various other day to day indications sucha as acne, early scars, keloids, ecchymoses, striae rubra, warts, molluscum contagiosum, psoriasis, basa cell carcinoma, sarcoid and cutaneous lupus, angiolymphoid hyperplasia with eosinophilia, pearly penil papules,

morphea and lentigens in combination with q switched lasers etc. This papers revies these indications.

3. Systematic Review of Light-Based Treatments for Hidradenitis Suppurativa. GraciaCazaña T, Berdel Díaz LV, Martín Sánchez JI, Querol Nasarre I, Gilaberte Y. ActasDermosifiliogr. 2020 Mar;111(2):89-106. English, Spanish. doi: 10.1016/j.ad.2019.04.008. Epub 2019 Dec 20. PMID: 31870491.

Abstract
Treatment options for hidradenitis suppurativa include light-based therapy. This systematic review aimed to update our understanding of the efficacy, effectiveness and safety of these treatments for hidradenitis suppurativa by evaluating the literature published since the 2015 Cochrane review on this topic. We conducted an electronic search of the following databases: MEDLINE, EMBASE, University of York Centre for Reviews and Dissemination database, Cochrane Database of Systematic Reviews, Cochrane Skin Group Specialised Skin Register, University of Nottingham's Centre of Evidence Based Dermatology database, and TESEO. The systematic review included 6 case series, 3 systematic reviews, and 2 clinical trials on the use of conventional and intralesional photodynamic therapy, intense pulsed light therapy, and Nd:YAG, carbon dioxide, and diode laser therapy for hidradenitis suppurative in 248 patients.

Comment: HS is a chronic debilitating inflammatory condition of pilosebaceous unit. The current treatment option includes prolonged courses with antibiotics, retinoids, hormonal treatment, and Biologics. All of these have their own limitations. Addition of light based treatments is a big plus in management of this refractory dermatosis. This article reviews various published option including: 1] use of topical PDT using 5-ALA or methylene blue as a photosensitisers and exposing the lesional skin to light at wavelength of 630nm. 2] Intense pulsed light which can target the occluded hair follicular unit, and also has antimicrobial effect 3] Long pulsed Nd-YAG laser, which again act on pilosebaceous units. And said to be more effective for groin lesions. 4. Other lasers including Fractional co2 in combination with long pulsed Nd-YAG, ablative CO2 and intralesional diode.

Although an interesting option, larger studies are required with lasers and lights

4. Lasers for reduction of unwanted hair in skin of colour: a systematic review and meta-analysis. Dorgham NA, Dorgham DA. J Eur Acad Dermatol Venereol. 2020 May;34(5):948-955. doi: 10.1111/jdv.15995. Epub 2019 Nov 6. PMID: 31587390.

Abstract
Light-based therapies are one of the most effective and widely used strategies for removal of undesired hair, with a broadly favourable safety profile. However, subjects with pigmented skin are found to be more prone to laser-related adverse events. While prolonged pulse-width and longer treatment duration were proposed to minimize adverse events, the optimal treatment option among available phototherapy modalities - long-pulsed (Nd:YAG), pulsed diode and alexandrite lasers as well as intense pulsed light (IPL) - remains unclear, particularly for skin of colour. To determine superiority in terms of effectiveness and tolerability, we conducted a systematic review of literature on different types of in-office laser and IPL for hair removal in subjects with Fitzpatrick skin types III-VI. The meta-analysis was performed using Review Manager (RevMan) version 5.3 and included 12 eligible comparative trials (nine randomized controlled trials and

three quasi-randomized). In terms of hair count reduction, pooled effect estimates for long-pulsed ND:YAG laser [OR: 0.26, 95% CI (0.1, 0.78)] and diode laser [standardized mean difference (SMD): -0.11, 95% CI (-0.62, 0.39)] were not statistically significant from those of IPL; in contrast, alexandrite laser was found to be superior to IPL in reducing hair count [SMD: -1.7, 95% CI (-2.6, -0.78)]. In terms of adverse events, the pooled effect estimates favoured long-pulsed Nd:YAG laser to IPL with respect to postinflammatory hyperpigmentation [OR: 0.26, 95% CI: (0.1, 0.78)]. However, both pulsed diode and alexandrite lasers exhibited a comparable safety profile to IPL, despite higher pain scores with lasers. In conclusion, this systematic review suggests that treatment outcomes for different in-office laser devices and IPL in subjects with skin type III-VI are broadly similar; nevertheless, we observed a trend towards greater hair reduction following laser therapy compared with IPL.

Comment: This paper reviews efficacy of various wavelength in type 3 to type 6 skin. Compared to IPL these solid states lasers were found safe and effective against IPL. Alexandrite being the most effective wavelength and long pulsed Nd-YAG 1064nm is the safest one.

5. Laser treatment for onychomycosis: Ma W, Si C, KasyanjuCarrero LM, Liu HF, Yin XF, Liu J, Xu Y, Zhou B. A systematic review and meta-analysis. Medicine (Baltimore). 2019 Nov;98(48):e17948. doi: 10.1097/MD.0000000000017948. PMID: 31770202; PMCID: PMC6890331.

Abstract

Background: Laser systems are a common treatment choice for onychomycosis. They exert their effects on inhibiting the growth of the fungus by selective photothermolysis but efficacy is dependent on the specific type of apparatus used. To systematically review the available published literature on the curative effects and safety of laser treatment for onychomycosis.

Methods: Databases including PubMed, web of science, China National Knowledge Internet (CNKI), WanFang Database and VIP were searched systematically to identify relevant articles published up to July 2018. Potentially relevant articles were sourced, assessed against eligibility criteria by 2 researchers independently and data were extracted from included studies. A meta-analysis was performed using R software.

Results: Thirty-five articles involving 1723 patients and 4278 infected nails were included. Meta-analysis of data extracted from these studies revealed that: the overall mycological cure rate was 63.0% (95%CI 0.53-0.73); the mycological cure rate associated with the 1064-nm Nd: YAG laser was 63.0% (95%CI 0.51-0.74); and that of CO2 lasers was 74.0% (95%CI 0.37-0.98). The published data indicate that laser treatment is relatively safe, but can cause tolerable pain and occasionally lead to bleeding after treatment.

Conclusion: Laser treatment of onychomycosis is effective and safe. The cumulative cure rate of laser treatment was significantly higher for CO2 lasers than other types of laser. Laser practitioners should be made aware of potential adverse effects such as pain and bleeding.

Comment: Onychomycosis is a common problem in India. Systemic and topical antifungal are treatment of choice but most of the time the results are suboptimal. Lasers have given a new treatment modality which can be used as a monotherapy or in combination with systemic or topical antifungals for enhanced efficacy. Various lasers suchas long pulsed or q switched Nd-YAG , fractional Co2, 810nm Diode can be used for the treatment, expanding the indications for these lasers.

6. Alharbi R, Clanner-Engelshofen B, Hildebrand JA, Schinabeck-Kühne N, Niculescu L, French LE, Kaudewitz P, Reinholz M. Diode lasers for the treatment of genital warts. Eur J Dermatol. 2019 Aug 1;29(4):409-416. doi: 10.1684/ejd.2019.3600. PMID: 31625921.

Abstract
Human papillomavirus (HPV) infections are the most common sexually transmitted diseases leading to genital warts. Developing lesions start off as small papules, which then grow larger and protrude, eventually coalescing into plaque-like formations. The aim of this study was to evaluate the efficacy of diode laser coagulation as a treatment for genital warts relative to their number, size, localisation, and recurrence rate. Altogether, 45 patients were evaluated in this study. Patients were initially assigned to one of two groups, depending on the size and number of their genital warts, and received a maximum of two laser treatments. Patients were assessed up to three months after intervention. A cure was defined as the complete removal of condylomata. In Group I, 84% of the patients (21/25) were free of recurrence after three months (last follow-up visit). In Group II, 60% of the patients were free of recurrence after three months (12/20 patients); 25% after the first and 35% after the second treatment. Overall, a cure rate of 73% was achieved (33/45 patients). By splitting the laser treatment for multiple, extensive, and/or coalescing genital warts into two sessions, thereby being less destructive to the surrounding tissue, it was possible to achieve comparable cure rates between the two groups. This study indicates that laser treatment is an effective therapy option. Further studies including larger patient cohorts are necessary to ultimately confirm the advantages of laser treatment.

Comments: Interesting study using multi-functional diode laser . To treat condylomata, the contact-free coagulating setting is used. It is applied in a continuous wave mode at 20 W with a wavelength of 940 nm and a spot diameter of 1 mm. They used acetic acids to marked the area and treatment was done under infiltration anaesthesia. They found lowest recurrence with this modality.

7. Lasers for the prevention and treatment of hypertrophic scars: a review of the literature. Rosenthal A, Kolli H, Israilevich R, Moy R. J Cosmet Laser Ther. 2020 Apr 2;22(3):115-125. doi: 10.1080/14764172.2020.1783451. Epub 2020 Jun 24. PMID: 32576064.

Despite the increasing knowledge about wound healing mechanisms and the advancements made in laser technology, hypertrophic scars remain difficult to manage. This review intends to discuss the laser devices studied in the prevention and treatment of HS, arising from trauma, surgery, and burns, detail their mechanisms of action, and emphasize those devices with the most promising effects. Most of the suggested mechanisms and explanations for the use of lasers in

treating hypertrophic scars are based on selective photothermolysis, in which the light energy emitted from a laser is absorbed by its intended target, thereby disrupting existing collagen and altering the cycle of neocollagenesis. Through our literature review, we have determined that combination therapies, utilizing more than one laser target demonstrate enhanced clinical efficacy. Further, early use of laser devices has been shown to enhance the cosmetic result of sutured wounds and may play a role in preventing the development of hypertrophic scars.

Comment:
Various lasers targeting different chromophores are used in treatment and prevention of hypertrophic scars. These includes, pulsed dye lasers, 1064nm Nd-YAG lasers, Fractional Co2 and Erbium lasers, non-ablative fractional lasers as well as low level diode lasers. These lasers works on principle of selective photothermolysis, in which the light energy emitted from a laser is absorbed by its intended target, thereby disrupting existing collagen and altering the cycle of neocollagenesis. Combinations of different lasers targeting different wavelength are found to be superior for example combination of PDL with CO2 or combining 1064nm with 595 nm PDL .

Fractional lasers are found be very useful if used early in inflammatory phase of wound healing in prevention of hypertrophic scarring and for the best cosmetic outcome.

8.Kounidas G, Kastora S, Rajpara S. Decoding infraorbital dark circles with lasers and fillers. J Dermatolog Treat. 2020 Dec 3:1-8. doi: 10.1080/09546634.2020.1855297. Epub ahead of print. PMID: 33272039.

Abstract
Background: The degree and severity of dark circles varies according to the skin type, age, and lifestyle.
Objectives: To evaluate different non-surgical treatment options for dark circles.

Methods: In a private practice setting in the UK and India, 34 patients with dark circles with different Fitzpatrick skin types were treated with fillers (Group 1), lasers (Group 2), and fillers and lasers combined (Group 3). Pre and post treatment photos were taken and subjective and objective outcomes in appearance were reported.

Results: All treatment options were effective in all three groups with minimal side effects reported. No statistically significant difference was found between the three treatment groups. Patients who had tear troughs and/or hollow eyes responded well to fillers, patients with loose and wrinkled skin to CO_2 laser, patients with tear troughs and hyperpigmentation to fillers, Q switched Nd:YAG and topical agents and patients with tear troughs and veins to fillers and long pulsed Nd:YAG lasers. Most patients (82%) rated the improvement in their appearance as excellent.

Conclusions: All 3 treatment modalities were effective in the reduction of periorbital dark circles depending on underlying cause. Non-surgical treatments are capable of correcting and improving dark circles with minimum complications and downtime.

Comment: Article describes the modalities of treatment for periorbital dark circle. Depending on the aetiology a correct combination of lasers, topical and fillers produces satisfactory response.

9.Wipf A, Boysen N, Hordinsky MK, Dando EE, Sadick N, Farah RS. The rise of transcutaneous drug delivery for the management of alopecia: a review of existing literature and an eye towards the future. J Cosmet Laser Ther. 2019 Aug;21(5):247-254. doi: 10.1080/14764172.2018.1525743. Epub 2018 Oct 9. PMID: 30300013.

Abstract
Introduction: Fractional lasers and microneedling devices are increasingly used with topical drugs to treat various conditions, including alopecia, as they grant access to dermal structures such as hair follicles and cutaneous vasculature. Objective: To perform a comprehensive review on transcutaneous drug delivery for the management of alopecia. Methods: PubMed, Embase, and Ovid Medline databases were searched using terms including: alopecia, microneedling, lasers, androgenetic alopecia (AGA), alopecia areata (AA), drug delivery. Articles were examined for inclusion criteria: diagnosis of alopecia regardless of type, use of fractional laser or microneedling devices, and subsequent administration of topical medication. Results: 8 studies, 6 prospective clinical trials and 2 case series, examining either AA or AGA were identified. For AA, five studies examined microneedling together with topical triamcinolone in three of these, while two studies used photodynamic therapy. Regarding AGA, two studies used topical minoxidil plus microneedling, and one examined topical finasteride with fractional erbium glass laser. Improvement was seen in 6 of the 8 studies. Discussion: Transcutaneous drug delivery via fractional laser and microneedling is a promising modality with preliminary evidence for increased hair regrowth over topical therapy alone. Further studies are needed to elucidate treatment parameters and appropriate device selection for drug delivery.

Coomment: A futuristic article for transcutaneous drug delivery. With this many drugs can be delivered to treat variety of skin conditions such as scars, keloids, Vitiligo, Alopecia , Psoriasis, Prurigo nodularis, granuloma annulare and so on.

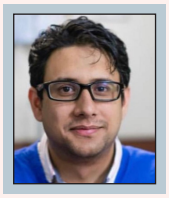
10."Comparative study between the efficacy of fractional CO2 laser, Q-switched Nd:YAG laser (1064 nm), and both types in treatment of keratosis pilaris". Sobhi RM, Adawy NAH, Zaky IS. Lasers Med Sci. 2020 Aug;35(6):1367-1376. doi: 10.1007/s10103-020-02956-w. Epub 2020 Jan 11. PMID: 31927647.

Abstract
The aim of this study was to assess and compare the efficacy of fractional CO2 laser, Q-switched Nd:YAG laser (1064 nm), and their combined use in treatment of keratosis pilaris. The study included twenty female patients. For each patient, three areas were randomly assigned to treatment by either fractional CO2 laser (area A) or Q-switched laser (1064 nm) (area C), or both types of laser (area B). All patients were assessed by digital photography at baseline and 1 month after the last session. Assessment was done by two non-blinded and two blinded investigators (blinded investigators do not know which area is treated with which machine and non-blinded knows). Patients reported the degree of satisfaction or any adverse effects also after 1 month from the last session. The three treatment modalities led to overall improvement in the KP lesions. According to patients' score and investigator two, area B showed statistically significant improvement

compared to areas A and C (p=0.001 and p=0.039, respectively). The first blinded investigators' assessment revealed that there was statistically significant improvement in area C compared to A and B (p = 0.023). The assessment of both investigator one and the second blinded investigator revealed that there was improvement in the three areas with no statistically significant difference between them. Both fractional CO2 and Q-switched Nd:YAG laser (1064 nm) proved to be safe and effective in the treatment of keratosis pilaris regarding not only pigmentation but also follicular prominence; their combination may have an additive effect.

Comment: Keratosis pilaris is a common skin condition where there is no satisfactory treatment. The cosmetic effect of this condition is disturbing. This article opens up a new and easy treatment avenue for the treatment of KP. Fractional co2 , Q switched Nd yag laser either alon or in combination were found effective.

CHECKLIST TO WEIGH BEFORE INVESTING IN A LASER TECHNOLOGY



Dr. Sahil Mrigpuri

Investing in the right technology at the right time is a key to success for many young aspiring dermatologists. The availability of a variety of laser devices of various specifications and pricing estimations has prompted dilemma. The purchase of a laser involves large investments and hence careful considerations are a must. With the expanding number of machines, it has become a befuddling task for the physician to settle on which framework to purchase.

Finalizing a laser device, maintaining the machine and after-sales service are essential angles to having a fruitful laser practice. While the overalldecision relies upon individual requirements, some broad suggestions can be sketched out.

The doctor should be clearly aware of the area that can be designated for laser equipment in the OPD/ clinic , paying modality of the patients, prevalence of different dermatological and aesthetic indications, patient's demography to see what types of treatments would be most appealing and then decide which laser would be most suitable for practice in that area.

First and foremost, the buyer should learn basic laser physics, indications for lasers, know the results expected and complications possible. This learning can further be enhanced by attending laser workshops and conferences and established laser centres.

Laser specifications such as spot size, pulse duration, peak power, customisation options are of utmost importance. A large spot size is preferable for laser hair removal.[1] A large spot size allows deeper penetration and allows faster treatments during the laser procedure. High peak power, ultra short pulse and Gaussian vs. top-hat beam profile are important parameters in Q switch device to choose. Top-hat beam profile is preferable for Q switched lasers that can prevent hotspots[2]. The Fractional laser should preferably have variable scan density, adjustable and variable scan patters, changeable spot size of each micro-beam and high power.[3] Correct wavelength of filters, variable on time and off time, and inbuilt cooling system in handpiece are important parameters while selecting an IPL.

Planning of the type of machine, warranty, availability of spare parts, and reliability of after sales service are important prerequisites before taking the final decision. It is essential to sign a contract or agreement before acquisition of a laser which covers key aspects of warranty, installation, after sales administration and breakdown and repair timeline.

Buying a non FDA approved device to offset high initial investments may not be a good option to guarantee legitimate working. Even more care is required to ensure proper functioning and maintenance. Bad results may also lead to bad publicity whereas good word of mouth will not only fetch the patient's satisfaction but will be far more rewarding adding

value to the physician's reputation which is a vital ingredient for success.

The reliability of the dealer and company is to be inquired in order to be assured of after-sales service. Approaching dermatologists referred by the companies should always be avoided because of possible biased opinions. Guidance although can be taken from senior mentors who have no conflicts of interest.

Another vital aspect thar needs to be kept in mind are the published articles in peer reviewed journals to access safety and side effect profile of the technology.

A pre-purchase demonstration of the equipment is highly recommended. As the cosmetic laser is a major investment, it is extremely important to make sure the equipment is the right fit for your needs.

Always bargain with laser companies to strike a deal to include complimentary consumables and free AMC for a specific period of time. Offer post- dated cheques which will help to stagger your investment. Keeping all above factors in mind, the conclusion is to assure that you recover your investment cost in maximum 3-4 years before the technology is old and and upgraded devices are available.

So the final checklist can be summarized as:

1. Disease demographics and kind of practice{aesthetic or clinical}one intends to build in long run.
2. Understanding patients paying capability and costs of LASER procedures in nearby clinics
3. Studying LASER physics and mechanism of action for optimum outcomes.
4. To know the correct indications and possible results.
5. Choose the right machine based on LASER parameters, brand value, and after sale support.
6. Strike the best deal to build LASER practice as an asset to your clinic.

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TEST YOUR KNOWLEDGE

Dr. Jyothy k

1.Which lasers are used as aiming beam for invisible lasers like co 2 laser?

a)Diode laser b)He Ne laser C)Both a&b D) None of the above

2. Who invented Intense Pulsed Light ? When?

a) Shimon Eckhouse , 1992 b) Rox Anderson (1993) c) Gordon Gould (1970) d) None of the above

3. What is the absorption peak of dry collagen ?

a) 2µm b) 5µm c)6-7µm d) 10µm

4. Identify him, What was his contribution to the field of Lasers?

5. LEDs are used for

a)PDT b) UV free phototherapy c) wound healing d) all of the above

6. Kirby Desai scale is based on the following factors except

a) Location of tattoo b) Scarring and damage c) Fitzpatrick skin type d) Age of the tattoo

7.The indications for fractional lasers include all except

a) Colloid milium b) Transepidermal drug delivery c) Lichen amyloidosis d) Psoriasis

8. Match the following

1. Blue/black tattoo - Q switched laser 755nm
2. Purple/teal tattoo - Q switched laser 1064nm
3. Green tattoo - Q switched laser 532 nm
4. Red tattoo - Q switched laser 655nm

9.The ideal dimensions of a laser procedure room should be

a) 8x8 feet b) 10x10 feet c) 12x12 feet d) 15x15 feet

10. Which of the following is not a laser used for hair reduction

a) 1064 nm Nd YAG b) 655nm Alexandrite c) 1540 nm Erbium d) 810 nm diode

11. The three absorption peaks of Haemoglobin (Hb) are all except ?

a. 418nm b.600nm c.542nm d.577nm

12. Which of the following statement is not true for pulsed dye laser?

a. Rhodamine 6g dye is used as the lasing medium

b. PDL can be safely used in infants

c. Post treatment purpura is not dependent on pulse duration

d. PDL has been tried in localized psoriasis

13. Which is useful in the treatment of facial telangiectasias?

a. Alexandrite laser b.Fractional Erb c. IPL d. none of the above

14.Which of the following statements are true?

a. Imiquimod application helps to improve the results of laser tattoo removal

b.Pigment darkening can occur while treating white coloured tattoos

c. R0 method involves applications of perfulorobenzene

d. Pico second laser have pulse duration of 10^{-15} seconds

15. Which laser is considered as the workhorse among cutaneous lasers ?

a.PDL b.KTP laser c.Carbondioxide laser d.Erb -YAG laser

16. Which statement is true in the context of laser hair reduction?

a)TRT (Thermal relaxation time)of terminal hair is between 3ms to 30ms

b). Smaller the spot size ,deeper is the penetration

c). Pulse duration of laser beam should be shorter than TRT of epidermis

d) .The optimal duration needs to be shorter or equal to TDT (thermal damage time)

17. First Q switched laser developed was

a.Nd-YAG b. Ruby c. Alexandrite d.KTP

18.Which procedure is based on the principle of selective subcellular photo thermolysis?

a. Tattoo removal b.Laser toning c. carbon peel d .All of the above

19.Which of the following statement is false?

a. RF energy is colour blind and chromophore is not required for electrothermal effect

b.Skin RF energy does not scatter

c. RF energy penetrates deeper in to the dermis

d.The depth of penetration of RF is directly proportional to the frequency of RF

19.Lasers used for lipolysis include

a. Diode 980nm b. 1064 Nd-YAG 1064nm c. Diode 1320 nm d. All of the above

20. The beneficial effect of low level laser therapy (LLLT) on wound healing is due to

a.It increases protein &mRNAlevels of Ialpha-Iapha&Ialpha8 in keratinocytes

b.It upregulates BFGF ,HGF & SCF responsible for fibroblast proliferation

c.It increases TGF beta & VEGF responsible for collagen synthesis &neovascularization

d.All of the above

Answers

1.C 2. A 3.C 4. C.K.N Patel, 1964 5.D 6.D 7.D

8. 1 - 1064

2 – 755

3 – 694

4- 532

9. C

10.C

11.B

12.C

13. B

14. B

15. C

16. D

17. D

18. B

19.D

20. D

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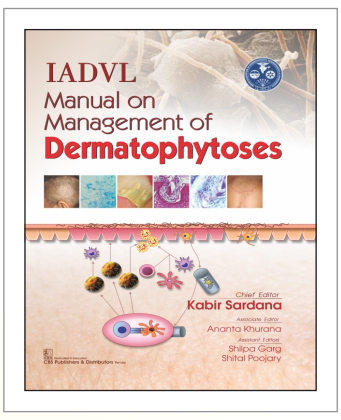

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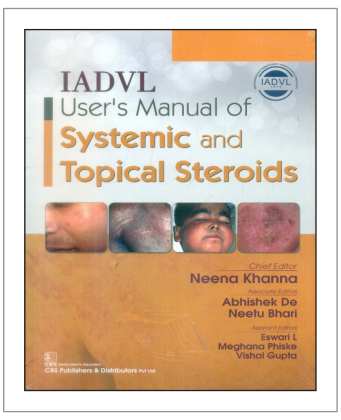

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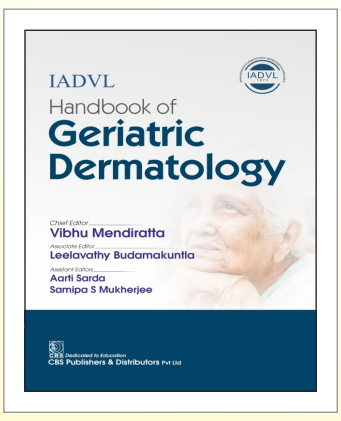

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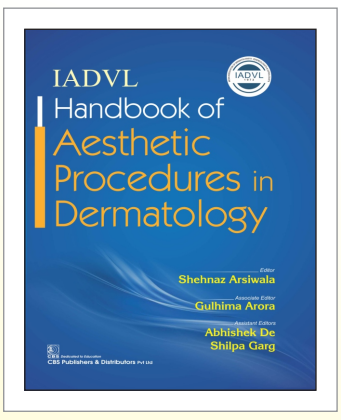

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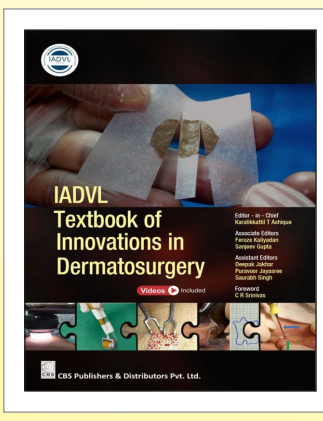

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