RESIDENT DREAM

Dermatology Residents Education And Motivation Bulletin

Jun 2015, Vol.2, No.2. *A newsletter for IADVL Residents*

From the Editor's desk:

It is extremely heart-warming to find that our very own dream, Resident DREAM (Dermatology Residents Education and Motivation Bulletin), has entered into its 5th issue with all your love, support and affection.

The wonderful idea, which was mooted in 2014 by our very own mentor, Dr. Rashmi Sarkar Ma'am, Hony. Gen. Sec., IADVL, has indeed become a reality, being appreciated by residents and faculty alike, across the length and breadth of this diverse country. Today, this name has become familiar to dermatologists across the country, and the untiring efforts of all the residents along with the unconditional support of all the faculty members and IADVL have helped in the realisation of this novel dream.

We find ourselves honoured and privileged to get a chance to become Editors of this issue of Resident DREAM. It has been a huge learning experience for us, and we waddled through because of all your hard work, love and support. Over the years, this flagship Resident mouthpiece of IADVL has gained momentum and unrivalled popularity, attracting new residents to come forward and contribute for this bulletin with each passing day.

In this issue, we have focussed on Dermatosurgery, one of the most fascinating and upcoming avenues of Dermatology. We have also brought forward several new Residents from the nooks and corners of this diverse country to contribute to this issue. We invite more residents to contribute to this bulletin, your own bulletin, and make themselves heard all across the nation.

This issue starts off with a rendezvous with one of the Doyens of Dermatology, Dr. Torello Lotti, who needs no further introduction. We are also honored to share with you the experience and insight of one of the finest and most revered Dermatologists of our country, Dr. Venkataram Mysore, who also happens to be the President of IADVL. We have a wonderful article by our colleague Dr. Seujee Das and

mentored by Dr. Shyamanta Barua, which explains how to deal with a perplexing mole. With Vitiligo Day around the corner on 25th June, we have tried to usher a new ray of hope to these patients by means of varied surgical interventions, Dr. Aayushi Mehta will guide us through the intricate procedure of hair transplant, while Dr. Sukesh MS will be enlightening us on the scope for trichology, beyond our residency. Dr. Ishad Aggarwal will be enlightening us on the widespread use of Lasers for tattoo removal in our setup. Dr Suvina, Dr. Ashish Amrani and Dr. Avtar have summed up brilliantly some of the newer and upcoming Dermatological procedures; Dermoscopy, Platelet Rich Plasma and Confocal microscopy respectively.

With such a plethora of interesting topics, we hope this issue will make a wonderful read for all of us. We indeed feel greatly honoured and blessed to be able to edit this wonderful issue and work with our beloved colleagues. Last but not the least, this issue would not have been possible without the constant prodding and encouragement of our beloved and respected mentor, Dr. Rashmi Sarkar ma'am, as well as the entire family of IADVL. We sincerely hope all of you enjoy reading issue as much as we have enjoyed preparing it.

Signing off,
On behalf of Team Resident-DREAM,
Dr. Indrashis Podder, Kolkata
Dr. Sahil Mrigpuri, Chandigarh

An Interview with
PROF. TORELLO LOTTI
DOYEN OF DERMATOLOGY

**Professor and Chair of Dermatology and Venereology,
University of Rome "G.Marconi" Rome, Italy
President, World Health Academy
Chair, Executive Scientific Committee, Vitiligo Research foundation.**

Sir, what made you take up dermatology as a subject of choice in medicine?

The wonderful bright green color of Direct Immunofluorescence.

Sir, how did you start your work on Vitiligo and Pigmentary Disorders?

I started with the design of the first device for microfocused therapy for Vitiligo:http://www.curavitiligine.it/bioskin.php

Could you share with us some optional programmes abroad during residency?

As Vitiligo Research Foundation Chair of the Scientific Advisory Board, I have started a one-of a – kind Masterclasses program for residents in Dermatology with special interest in Vitiligo, since 2011, with the first VRF Masterclass in Barcelona, Spain. Our Master-Classes offers a program of international events with access to a series of educational workshops. They are open to anyone and are attended by dermatologists, researchers, international opinion leaders, and executives from the VR Foundation. See more at: http://vrfoundation.org/doctors-page--4/master-classes

Sir what message would you like to give to residents to build up their interest in research and pathogenesis of diseases?

Don't be hungry, don't be foolish- Be passionate.

Being an author of over 1500 scientific papers , what thoughts would you like to share for beginners on how to write a clinical paper ?

First, ask yourself if you have something to say. If yes, search in the literature if it has already been said. If your data/hypotheses are new work on them, try to formulate in the best and innovative and unbiased manner.

Sir what is your view on surgical management of vitiligo?

We are still in doubt if and when to start surgical management. Techniques are not always standardized and sometimes very personal.

What advise would you give on time management skills to residents?

It will depend on the different schools. Each Scientific Committee creates its own management style, residents should be be enthusiatic to work for hours together and keep time for recreation whenever possible.

What is the scope of cosmetic dermatology and dermatosurgery in India?

India is a great country with beautiful minds. Cosmetic Dermatology is now an integral part of Dermatological Sciences: India is in the cutting edge position. Dermatosurgery is an essential part of Dermatology; I salute with pleasure the Medical Societies of Dermatological Surgery Sciences.

Interviewed by -
Dr. Sahil Mrigpuri
PGY-2, PGIMER Chandigarh

An Interview with
Dr. Venkataram Mysore
MD, DNB, DipRCPath[Lond], FRCP[glasgow], President IADVL
Pioneer of Dermatosurgery in India

Q. What do you think about the current scenario of dermatology in our country?

A. The scenario has never been brighter- procedural dermatology has brought in many gains to dermatologists. What was once a sit and treat dermatology practice has now become more interventional. Although rapid advances in treatments including drugs, lasers and surgery have meant new avenues for learning and patient care, challenges such as consumer activism, medicolegal issues, loss of interest in traditional dermatology, an over-reliance on aesthetic treatments, unethical practices, exaggerated advertisements, and entry of non-dermatologists into the field still exist in our profession.

Q. How did you manage to gain your vast experience and knowledge in both dermatopathology and dermatosurgery?

A. This is a long story- I was fascinated by pathology and in fact MD Pathology was my third choice after Medicine and Dermatology. I got Dermatology- from there Pathology was an automatic entry due to close interaction between the two. Both were visual specialties and at the same time, surgery too was an interest- the fact is dermatology was a small subject in those days- and I needed avenues for learning. I was impressed by Dr PN Behl who in those days (1986) had an institute in Delhi where he taught vitiligo surgery. I spent four months with him. When abroad, I met excellent pathologists and I was exposed to technology like DIF, electron microscopy etc- this rekindled my interest in Dermatopathology.

In 1994, Royal College announced introduction of a Diplomate exam in Dermatopathology, and I took it. It was tough and saw me make two trips to Cardiff, and Hammersmith Hospital to learn the subject deeply- but in the end I passed it in 1995, being the first one from India to do it (to the best of my knowledge).

Then in 2000, a relative of mine asked my opinion about hair transplantation. I realised I knew nothing about it, I had no answers! So I read- and was fascinated by the advances in the field – the

FUT technique. That took me to Taegu in South Korea to learn the surgery from Dr Jung Chul Kim. And the rest as they say is history.

Q. How should residents manage their time between clinical dermatology, surgical procedures and cosmetic procedures?

A. Residents during PG should learn dermatology – in depth. And they should get an exposure to the sub-specialties. Then they should decide which one they would like to follow; each has its requirements.

You can combine lasers with other specialities, but surgery is more exclusive (especially hair transplantation and liposuction); one needs considerable training and dedication.

I do not recommend that residents enter these fields without learning core dermatology. If a plastic surgeon has to spend 3 years to learn general surgery, why can't our dermatologists spend three years to learn dermatology? One should never leave one's mother speciality - despite being busy in surgery I still practice clinical dermatology and dermatopathology. My message is: Do not be in a hurry, take your time, and learn in depth.

Q. What fellowships are available to pursue dermatosurgery in India? Can the IADVL help to obtain overseas fellowships?

A. IADVL has several fellowships in different subjects within India. We have a large number of experts in India –they are willing to teach- so our youngsters are indeed lucky. This year, the number of fellowships has increased four-fold. The selection process is transparent and unbiased. Overseas fellowships are being introduced in dermatopathology. But these short term fellowships are only a beginning. You can't learn any subject in one month! Thereafter you need to work, attend workshops or work with seniors. We are also communicating with the National Board of Examinations to start fellowships.

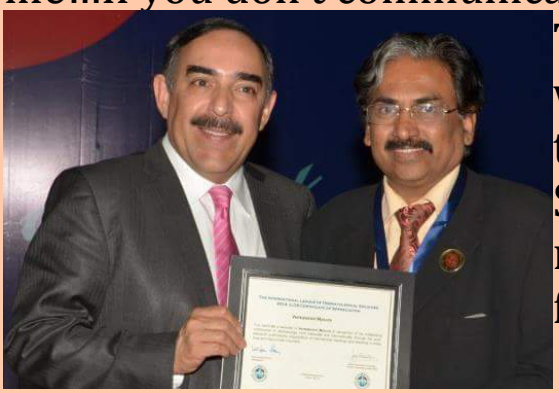
Q. How is your experience of leading IADVL, one of the largest dermatological associations in the world?

A. It is exciting; there are multiple challenges, diverse opinions and opportunities- and meeting them is a great experience. Ours is a voluntary organization- we don't run an office with employees, but with volunteers. It is so heartening to see that we have over 300 members working and doing their bit for IADVL. It is their dedication, commitment and focus that makes this organization so progressive. It is important for members and residents to feel good and be proud of the association- the association is like our mother. If we take care of it by working hard, it will take care of us too. Residents have a special responsibility- they need to become full members after their post-graduation and be active- contribute to the association. Give back what you get, in full measure.

Q. What is your message to young residents who are interested in dermatosurgery and aspire to become like you some day?

A. Become like me? Learn dermatology, dermatopathology along with dermatosurgery too! I would say always put science first, art next and commerce last of all. Remember; in medicine end product is patient satisfaction; money is a byproduct. Money should never be the end product.

Second message: Learn, read, communicate and write- publish! These days, communication is everything- be it in practice or in personal life or in community life…If you don't communicate well, you perish!



Third message: Joy is in effort- in trying; Joy is in working- in doing; NOT IN THE RESULT. So keep trying; keep working!

So my friends, my best wishes to each and every resident- you, our residents, our children are the future. Our job is in the present.

I want to end this by the following verse by Khalil Gibran:

(this is another message- read literature other than dermatology- there is so much joy to be found there)

Children (read residents),
They do not belong to you; they pass through you
They belong to tomorrow; you belong to yesterday.
Your children are not your children-
They are expressions of life's longing
for longevity

They are the arrows- you are the bow!
The more you bend, the farther they go, farther they go!

And we want you to go farther and higher; higher than we did!

Interviewed by - Dr. Indrashis Podder, PGY-2, Medical College and Hospital, Kolkata.

Surgical approach to vitiligo management
It's evolution down the ages...

Dr. Indrashis Podder,
PG2, Medical College and Hospital, Kolkata

Dr. Sahil Mrigpuri,
PG2, PGIMER, Chandigarh

Introduction:

Vitiligo is the most common depigmenting skin disorder, affecting about 0.5-2% of the general population which has tremendous cosmetic and psychological impact on the affected individual; apart from being a social stigma.

Initial therapy for vitiligo is medical management; however surgical management is emerging as the treatment of choice in stable disease. There are several modalities of surgical therapy which have evolved down the ages; and newer methods are being put forwarded for a holistic management of disease.

Principle of Surgical treatment[1]:

The basic principle of surgical modalities in vitiligo is to introduce melanocytes into the lesional skin, which would then establish and function as epidermal-melanin units; thus producing cosmetically acceptable re-pigmentation of the affected parts.

Techniques of vitiligo surgery:

The currently available surgical methods for vitiligo can be broadly classified as grafting and non-grafting techniques; the former being used more commonly. The different methods of vitiligo surgery are tabulated in **Table 1**[1].

Evolution of different surgical techniques[1]:

The different surgical modalities for correction of vitiligo, which came into vogue in the later part of 20th century, have evolved down the ages to become more effective and safe. The fascinating history of evolution of vitiligo surgery has been summarized in **Table 2.**

General principles of Vitiligo surgery:

Unilateral segmental vitiligo gives the best response to grafting and transplant methods; however appropriate patient selection is important to achieve maximal results.[4] None of the surgical modalities developed so far is uniformly effective in all patients and body sites and there is need for constant research and innovations for better surgical therapeutic options for vitiligo.

Aims of various surgical procedures[5]:

A) CamouflageTattooing: Introduction

Table 1 - Methods of Vitiligo Surgery

Grafting techniques		Non-grafting techniques
Tissue grafts	**Cellular grafts**	
Minipunch grafts (MPG)	Non-cultured cell suspensions- Epidermal cell (NCECS), autologous non cultured extracted hair follicle outer root sheath suspension also called follicular cell suspension (FCS)	Micropigmentation
Suction blister epidermal grafts (SBEG)	Cultured cell suspensions- Melanocyte (CM) ['pure' melanocytes], epithelial graft (CEG).	Excision/closure
Thin/ultra-thin split thickness skin graft (STSG)	Extracted hair follicle outer root sheath cell suspension [EHF-ORS-CS]	Dermabrasion/ Chemabrasion
Hair follicle graft (HFG)		Lasers and light therapy-excimer laser, targeted phototherapy etc.

Table 2 - Evolution of Vitiligo Surgery[2,3]

Year	Technique	Proponent
1964	Thiersch's skin grafting	Behl
1971	Suction blister graft	Falabella
1972	Punch grafting	Orentreich
1978-83	Mini-punch grafting	Falabella
1987-88	Cultured melanocyte graft	Lerner
1992	Cultured epidermis graft	Falabella
1992	First non-cultured melanocyte transplant	Gauthier et al
1993	Transplantation of autologous cultured melanocytes	Olsson
1999	Single hair transplantation	**Malakar, Dhar**
2002	Ultrathin epidermal sheets and basal cell layer suspension	Olssor
2005	Minipunch grafting + NBUVB	**Lahiri, Malakar**
2009[2]	Plucked hair follicle	Vaenscheidt et al.
2011[3]	Extracted hair follicle outer root sheath cell suspension (EHF-ORS-CS)	**Mohanty et al.**

of artificial pigments into the lesions for permanent camouflage.

B) Excision: Removal of the depigmented areas, e.g. excision with primary closure, and covering with thin Thiersch's graft.

C) Melanocyte transplantation[6, 7]: Commonly used methods of autologous transplant of melanocytes are tissue grafts and cellular grafts.

D) Therapeutic wounding: Injuring the lesion to stimulate the melanocytes from the periphery and the black hair follicles to proliferate, migrate and re-pigment the lesion, e.g. therapeutic dermabrasion, laser ablation, cryosurgery (liquid nitrogen spraying), needling and local application of phenol or trichloroacetic acid.[5]

Selection of patient for surgery:

As already stated, selection of the right patient is of paramount importance before embarking on vitiligo surgery. Some special points which need to be addressed are given below:

• Stability of the disease [8]

The most important factors indicating stability of lesion are:

(1) No progression of lesions for at least 1 year

(2) Spontaneous re-pigmentation of skin lesions.

(3) A positive minigrafting test disclosing repigmentation around four to five minigrafts (1.0 or 1.2 mm), implanted 3 to 4 mm apart within an achromic lesion, is an indication of future recovery by surgery. So far, this test is the most accurate evidence of vitiligo stability[9].

(4) Absence of new koebnerization, including the donor site for the minigraftingtest[4].

(5) Unilateral vitiligo is almost a synonym of stable disease with an excellent re-pigmentation response.

• Methods and Size of Lesions

Depending on the size of the treated area, the method may vary. Simple methods such as minigrafting and suction epidermal grafting are useful for small- or medium-sized lesions. On the contrary, for extensive depigmented defects, cellular transplants may be required.

• Age

Because of the invasive nature of surgical procedures, they are not recommended in children; however, highly motivated preadolescents can be treated under sedation or general anaesthesia. Results are better in young aged darker individuals.

• Psychological Aspects/ Patient expectations:

A thorough psychological evaluation is usually required in all patients to avoid unrealistic expectation of the patients.

• Photographic Records

Proper pre and post-op photographs are recommended to help in determining the percentage of improvement, quality of repigmentation, and possible side effects.

• Method and Donor Site

Appropriate training with a specific method is an important prerequisite for surgical therapy. Donor sites should be as hidden as possible, the gluteal region and medial thigh may be suitable for this purpose in most patients.

Difficult Areas for Surgical Treatment

With surgical procedures, much improvement is achieved, particularly in unilateral vitiligo, but certain areas are difficult to re-pigment, such as joints, lips, eyelids, genitalia, cutaneous folds, the dorsum of hands and feet, and especially fingers and toes.

Success rates of Different surgical options

Among all procedures, SBEG and thin and ultra-thin STSG seem to be the most effective procedures, with overall success rates of 80.3% (CI 76.4–84.2%) and 77.9% (CI 72.2–83.6%), respectively[10]. Among cellular grafts, all techniques seem to be equally effective with success rates of 61.1% (CI 56.1–66.1%), 63.6% (CI 57.2–70%), and 63.6% (CI 55.8–70.6%) for NCES, CM, and CE, respectively. Preliminary results of FCS showed a mean repigmentation of 65.7% [11]

Cases with more extensive vitiligo vulgaris, involving greater than 30% body surface area, are generally considered unsuitable for transplantation procedures as chances of retention of the pigment are less. Extensive areas may be best treated with cellular grafts – theoretically, culture methods would provide an unlimited number of cells/tissue for transplantation.

In all procedures, post-operative adjuvant PUVA/PUVASOL enhances repigmentation rate. Comparatively acral lesions and lesions over bony prominences are less responsive to surgery.

Response after grafting

The treated area appears bright pink immediately after removal of the dressing. The earliest pigmentation is usually noticed by 3 weeks post-surgery. Many patients show hyperpigmentation, which gradually blends with the surrounding skin over 6–8 months.The donor area usually heals rapidly and soon became indistinguishable from the surrounding skin. Occasionally, the donor area may heal with hyperpigmentation.

Adverse events[10]

No serious adverse events have been reported with any of the transplantation methods. Cellular grafts appear to have the least frequency of adverse events. Tissue grafts are reported to be associated with more adverse effects and the maximum number of adverse events on the recipient site is seen with MPG (0.7) and STSG (0.5).

Some commonly used techniques of vitiligo surgery are given below:

•Autologous mini-punch grafting

(MPG):

oEasiest, cheapest and fastest of all surgical options.[12]

oOptimal punch sizes preferably less than 1.5 cm; same sized punches are to be used for donor and recipient areas.

oSites->Acral areas, palms, soles are most suitable.

oAdvantages-> Simple, easy, inexpensive office procedure.

oDisadvantages-> Cobble-stoning and polka-dotting of recipient area, results take time.

• Suction blister epidermal grafting (SBEG):

oAverage negative pressure to raise the blister->250-400 mm Hg [1].

oSites-> Small areas; lips, eye lids.

oAdvantages-> Safe, inexpensive; probably best cosmetic result among tissue grafts esp. on lips.

oDisadvantages-> Time-consuming, only suitable for small areas.

•Thin/Ultra-thin split thickness skin grafting (STSG):

oSites-> suitable for larger areas.

oAdvantages->covers large areas, difficult to treat areas (eyelids, inner canthus of eye, genitalia etc.)

oDisadvantages->Hyperpigmentation and hypertrophy may occur of treated area, surgical skill needed.

• Cultured epidermal/melanocyte grafts (CE/CM):

oOne of the newer techniques.

oAdvantages-> Treatment of the affected area many fold larger than the donor area.

oDisadvantages->Expensive, requirement of trained man-power, suspected xenobiotic properties of some constituents [13].

• Non cultured epidermal cell suspension (NCES)

oEmerging as treatment of choice with excellent results and diffuse pigmentation

oAdvantages-> Uniform and diffuse pigmentation, better resuts

oDisadvantages-> Requirement of trypsin, centrifuge and lab facilities.

• Follicular cell suspension [extracted hair follicle outer root sheath cell suspension (EHF-ORS-CS)]

oRelatively newer technique

oResults not equivalent to NCES; pigmentation diffuse with minimal side effects.

oAdvantages-> Minimally invasive, no risk of complications at donor site

oDisadvantages-> Results not equivalent to NCES, requirement of lab facilities.

ACKNOWLEDGEMENT:

Dr. Koushik Lahiri

MBBS, DVD(CAL), FIAD, FFAADV, MRCPS(Glasgow), FRCP(Edin)

Director, International Society of Dermatology

Editor, Indian Journal of Dermatology

President,Association of Cutaneous Surgeons(I)

References:

1. Venkataram M, Lahiri K. Overview of vitiligo surgery. In ACSI textbook on Cutaneous and Aesthetic surgery. Eds. Mysore Venkataram. New Delhi. Jaypee Brothers Medical publishers. 2013; 1st edition: pp 328-334.

2. Vanscheidt W, Hunziker T. Repigmentation by outer-root-sheath-derived melanocytes: Proof of concept in vitiligo and leucoderma. Dermatology. 2009;218:342–3.

3. Mohanty S, Kumar A, Dhawan J, Sreenivas V, Gupta S. Non-cultured extracted hair follicle outer root sheath cell suspension for transplantation in vitiligo. Br J Dermatol. 2011;164:1241–6

4. Falabella R. Surgical approaches for stable vitiligo. Dermatol Surg. 2005;31:1277-84.

5. Savant SS. Surgical therapy of vitiligo: current status. Indian J DermatolVenereolLeprol. 2005;71:307-10.

6. Mutalik S, Ginzburg A. Surgical management of stable vitiligo: A review with personal experience. Dermatol Surg. 2000;26:248-54.

7. Malakar S, Lahiri K, Malakar RS. How unstable is the concept of stability in surgical repigmentation of vitiligo? Dermatology. 2000;201:182-3.

8. Parsad D, Gupta S, Force IDT. Standard guidelines of care for vitiligo surgery. Indian J DermatolVenereolLeprol. 2008;74 Suppl:S37-45.

9. Falabella R, Arrunategui A, Barona MI, Alzate A. The minigrafting test for vitiligo: detection of stable lesions for melanocyte transplantation. J Am AcadDermatol. 1995;32:228-32.

10. Gupta S OM, Kanwar AJ, Ortonne JP. Surgical Management of Vitiligo. 1st ed. Massachusetts: Blackwell Publication Limited. 2007:69-79.

11. Parsad D, Kanwar A. Oral minocycline in the treatment of vitiligo--a preliminary study. Dermatologic therapy. 2010; 23:305-7.

12. Lahiri K. Evolution and evaluation of autologous mini punch grafting in vitiligo. Indian J Dermatol 2009; 54:159-67

13. Kumar A, Mohanty S, Sahni K, Kumar R, Gupta S. Extracted Hair Follicle Outer Root Sheath Cell Suspension for Pigment Cell Restoration in Vitiligo. Journal of Cutaneous and Aesthetic Surgery. 2013; 6(2):121-125.

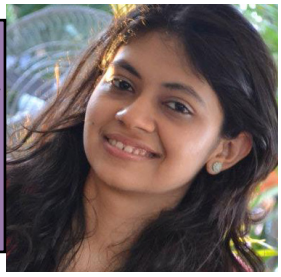
CALENDER 2015 - UPCOMING EVENTS

Date	Event	Venue
July 3-5	DAAS Summit	New Delhi
Sept 4-6	9th South Asian Regional Conference of Dermatology, Venereology, Leprology (SARCD 2015)	Mysore
Sept11-13	39th National Conference of Indian Association for the Study of Sexually Transmitted Diseases (IASSTD) & AIDS	Coimbatore, Tamil Nadu
2-4 Oct	Annual Conference of Indian Society for Pediatric Dermatology (ISPD)	Mumbai
Nov 19-21	XXXVI Symposium of the International Society of Dermatopathology	New Delhi
Nov 20-22	3rd International Summit on Nail Diseases (ISND) and 4th Onychocon	New Delhi
January 21-24, 2016	44th National Conference of Indian Association of Dermatologists, Venereologists & Leprologists (IADVL)	Coimbatore, Tamil Nadu

HAIR TRANSPLANTATION

Dr. Manjot Marwah, MD,
National Hair Clinic,
Hamirpur, Himachal
177001.

Dr. Aayushi Mehta,
PG-2, DY Patil School of
Medicine,
Nerul, Navi Mumbai



Hair Transplantation is the surgical modality for hair restoration. Modern hair transplant surgery as mini punch grafting, was first started by Dr. Orentreich in the early 1950s. However, due to the unnatural '*doll hair look*' resulting from punch grafting, other techniques such as follicular unit transplantation (FUT) and follicular unit extraction (FUE) have now become popular. The basic steps involved in hair transplantation are, pre-operative selection of donor area and recipient area, local anaesthesia, harvesting of grafts (via FUT or FUE) and implantation of grafts.

Definitions

1.Follicular Unit Transplantation (FUT)

Technique by which hair is transplanted in its individual follicular units, after dissection of strip from donor area, grafts are slivered and separated under a microscope to preserve natural anatomy of the follicular unit and minimize transection rates.

2.Follicular Unit Extraction (FUE)

First described by Bernstein and Rassman. It involves blind harvesting of follicular units via punches. The site of attachment of the erector pili muscle to the hair follicle is the area where the follicle is most tightly bound. Once this area is dissected, the rest of the unit can be easily extracted through a very small hole or opening (0.8-1mm). This results in inconspicuous scarring, preservation of normal follicular anatomy, and a better cosmetic outcome.It can be done manually, semi-assisted (via automated devices) or via robotics (Artas® Robot)

3.Body Hair Transplantation (BHT)

This technique was first reported by Woods, based on the principle of recipient site influence on hair growth. This principle shows that when body hair is transplanted into the scalp, it grows thicker and longer. Donor hair is extracted by FUE technique, usually from areas such as beard and chest.

Rationale for hair transplantation

The occipital scalp hair is not androgen-dependent. Thus, these hairs are preserved throughout life and not affected by patterned hair loss. Due to the principle of donor dominance, this occipital hair can be harvested and relocated to the frontal scalp where it will grow normally[1]. Thus, hair transplantation remains one of the only modalities of treatment giving considerable benefit and outcomes in MPHL.The Safe

Donor Area (SDA) is an area of the scalp where, even in advanced stages of MPHL, a significantly good hair follcile density is maintained. Thus, the hair follicles within this zone are thought to be 'permanent' hairs, being relatively spared from the effects of advancing MPHL. It is believed that only when these 'permanent' hair follicles are transplanted onto other areas of the scalp, do we get truly permanent results of hair restoration.

Indications for hair transplantation

The major indication for hair transplantation remains Androgenetic Alopecia (MPHL), predominantly in males. Patients with Norwood types 3-5 Androgenetic Alopecia are always the best candidates for hair transplantation[2].

Other rare indications include[1]:

1. Eyebrow, beard and moustache reconstruction.
2. Scarring alopecia that is stable and does not show any activity on biopsy.
3. Vitiligo vulgaris (stable patch on hairy area).

Hair transplantation procedures are relatively contraindicated in patients with early evolving alopecia and those with unrealistic expectations.

Table 1 summarizes the steps in the hair transplantation procedure.

Table 2 gives the advanages of FUT and FUE

Postoperative complications

These are usually minimal. Administration of antibiotics and analgesics may be required. Triamcinolone acetonide may be added to the solution for tumescent anaesthesia to prevent post-operative edema, but its use remains controversial. Inclusion cysts are also seen frequently in case of buried grafts.

Tips for beginners:

1. Start with smaller number of grafts per session (100 to 500 in first session)
2. Start with cases which would require smaller patches, eg Vitiligo
3. Select patients appropriately, for the technique best suited for them

Photos before and after hair transplantation by FUE method.

Photos courtesy: Dr. Manjot Marwah

Table 1 - Steps in the procedure[2,3,4]:

FUT	FUE
Case selection, counselling, and informed consent.	
Donor area hair partially trimmed for excising strip	Donor hair over entire occipital scalp trimmed to 1-2 mm length
Local anesthesia – usually lignocaine/xylocaine /bupivacaine. Tumescent anaesthesia and nerve blocks are often used.	
Single strip dissection of donor area – strip centred around occipital protuberance: Width – 1-1.3cm **Suturing of donor site** with absorbable/ non-absorbable sutures without tension **Slivering** – The hair bearing tissue is divided into slivers(sections) approximately 1mm thick **Cutting/Microscopic dissection** – These slivers are dissected under stereomicroscope to grafts containing 1-4 hairs per graft.	Grafts are extracted from donor area using 0.8/0.9/1 mm **micropunches** Punches may be sharp or blunt depending on surgeon's preference **Extraction of follicles** done under magnification with forceps. Recently vacuum assisted automated devices are being used for this.
Recipient site anaesthesia – Infiltration with lignocaine at the hairline. Supraorbital/Supratrochlear nerve block can also be used And tumescence is infiltrated into the entire area.	
Creation of recipient sites with Nokor needles/rectangular punches/blades to create slits, followed by **implantation** done with angled plain forceps. **Stick and place technique**- simultaneously making slits and placing grafts at the same time. **Implanters** – devices used to implant with precision, ease and maintenance of angle of grafts. (E.g. Choi Implanters)	

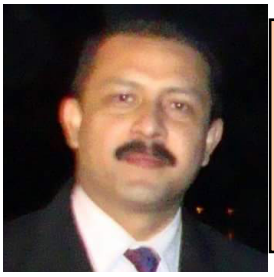
References:

1. Patwardhan N, Venkataram. M. Hair transplantation: Standard guidelines of care. Indian J DermatolVenereolLeprol 2008; 74: S46-S53.
2. Mysore Venkatram, NarendraPatwardhan. Follicular Unit Hair Transplantation. In: Mysore Venkatram, Chief Editor. ACS(I) Textbook on Cutaneous and Aesthetic Surgery, 1st Ed. Jaypee Brothers Medical Publishers, 2012. p. 656-668.
3. Mysore Venkatram. Newer methods in hair transplantation. In: Mysore Venkatram, Chief Editor. ACS(I) Textbook on Cutaneous and Aesthetic Surgery, 1st Ed. Jaypee Brothers Medical Publishers, 2012. p. 669-677.
4. Dua A, Dua K. Follicular unit extraction hair transplant. J Cutan Aesthet Surg 2010; 3: 76-81.

Table 2 - Advantages of FUT and FUE

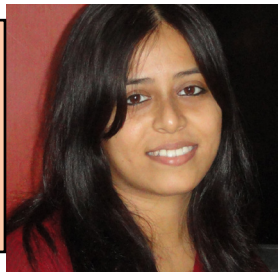
		Follicular Unit Transplantation	Follicular Unit Extraction
Advantages of FUT	**Skill of surgery**	Quicker, easier to perform	Longer time, more tedious, more tiring for both patient and surgeon
	Transection rate	More precise, lesser transection rate (1-2%)	Blind procedure, higher transection rate (2-10%)
	Learning curve	Easier to learn, however, training required for techniques such as slivering and trichophytic closure	Longer learning curve, expertise required to maintain low transection rates
	Time of surgery	Patient is more comfortable, shorter duration of surgery (4-5 hrs for 2,000 grafts)	Patient relatively uncomfortable, graft harvesting takes longer time (8-12 hrs for 2,000 grafts)
	Cost	Less expensive	More expensive
	Donor area	Possible to confine within the proposed SDA (Unger)	May extend outside the Safe Donor Area (SDA) in cases requiring higher number of grafts
	Second session	Easier to perform	Larger sessions/subsequent sessions difficult, requires adequate experience by the surgeon
	Ideal Candidates	Scarring alopecia, smaller patches, female patients, elderly patients	Smaller areas, cases where lesser number grafts required, additional grafts after first FUT
Advantages of FUE	**Healing**	Heals with a linear scar, usually 1-3mm wide Healing of donor area takes longer duration (2-3 weeks)	Heals with multiple tiny pin point scars interspersed with hair follicles Healing takes 5-7 days
	Post-op pain	Minor pain after procedure	No pain after procedure and patient can get back to work on the next day
	Post- op hair length	Post operatively, patient has to maintain adequate length of hair for coverage of donor scar	Not necessary, patient can have short hair
	Body hair transplants	Cannot be done	Can be done
	Technicians	Larger number of assisting staff required	Fewer staff required

APPROACH TO: A CASE OF MOLE



Dr. Shyamanta Barua,
Assistant Professor,
Assam Medical College and
Hospital, Dibrugarh, Assam

Dr. Seujee Das,
PG- 2,
Assam Medical College and
Hospital, Dibrugarh, Assam



Moles or melanocytic nevi are benign proliferations of melanocytes, the pigment-producing cells that constitutively colonize the epidermis. As the prevalence of melanoma in the brown-skinned races is low therefore, melanocytic nevi are of relatively less concern to the Indian patients or the dermatologists. Cancer registries in India report that the age specific incidence rates for cutaneous malignant melanoma are less than 0.5 per 1,000,000. Melanocytic nevi may be either congenital or acquired or dysplastic.

Questions that are to be asked in a patient with mole:

1. Is the lesion present since birth or acquired later on?
2. Site: photo exposed or non-photo exposed part
3. Number of lesions
4. Size of the lesions
5. Any recent change in colour, size, shape or border
6. Any itching, pain, bleeding, crusting, oozing or ulceration
7. Any satellite lesions
8. History of sun exposure
9. Family history
10. History of surgical excision- Incomplete removal of a nevus by shaving or excision often stimulates the remaining tissue to proliferate to an extent that it resembles a melanoma called "*pseudomelanoma*" of traumatically activated nevus.

How to examine a patient with mole:

Examination of the whole body is important.

1. Assessment of skin type- Skin type I and II have the greatest risk of melanoma
2. Examination of the patient for freckles and hair and eye colour- People with freckles, red or blonde hair and blue or green eyes are at high risk
3. An "*ugly duckling sign*" is to be looked for in the skin of the patient, such as a spot that looks different from all other marks in his skin.
4. ABCDE diagnostic system is to be followed when examining moles.

The ABCDEs are:

A. Refers to Asymmetry. One-half of the mole is different than the other half. An imaginary line through the middle of the mole does not produce matching halves.

B. Refers to Border. The mole's edges are irregular, uneven or blurred or have notched or scalloped edges.

C. Refers to Colour. The mole shows colour changes in areas, with shades of black, brown, tan, and sometimes other colours.

D. Refers to Diameter. Increasing diameter. Diameter of mole larger than 6 mm.

E. Refers to Elevation. The beginning

of a bump or thickness increase in a mole, even if the increase is small, often signifies a melanoma that is entering a dangerous phase.

Risk factors for malignant melanoma:

1. Congenital melanocytic nevi especially the giant variety of CMN (≥ 20 cm in diameter)
2. The junctional variety of acquired melanocytic nevi
3. Numerous typical or ordinary nevi
4. Skin types I and II
5. People with freckles, red or blonde hair and blue or green eyes
6. Presence of a dysplastic or atypical nevi
7. Ultraviolet radiation exposure- blistering sunburns at any time in life; intermittent or sporadic high levels of exposure as well as excessive chronic exposure to sunlight. Sunburns acquired during childhood and early adolescence carries the greatest risk
8. Family history of melanoma and history of prior melanoma
9. Mutation in p16, BRAF or MC1R
10. Immune deficiency

How to investigate?

1. Dermoscopy- It is a useful adjunct for examining lesions. It is commonly used to help determine subtle colour or contour variations on the surface of the mole.

2. Total body photography- Also known as mole mapping is an essential tool for clinical care of individuals with dysplastic nevi. The photographs serve as medical record allowing determination to be made as to whether a lesion has changed. TBP not only allows for the detection of melanomas at earlier stages but also reduces unnecessary biopsies of benign lesions and is cost effective.

3. Histopathological examination- It is the gold standard. Current recommendations are to excise the entire suspected nevus with a 2 mm margin for initial histological assessment.

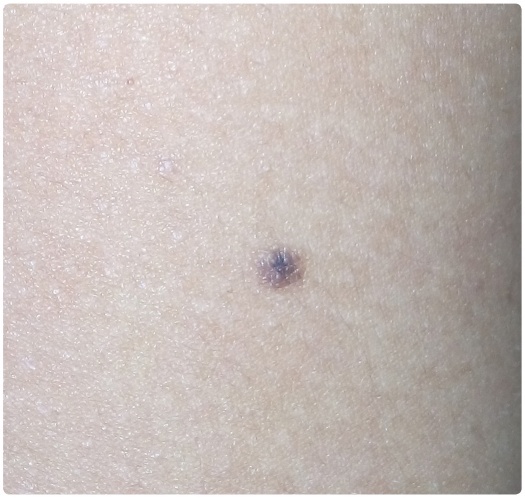
What are the prognostic factors?

1. Clinical prognostic factors:

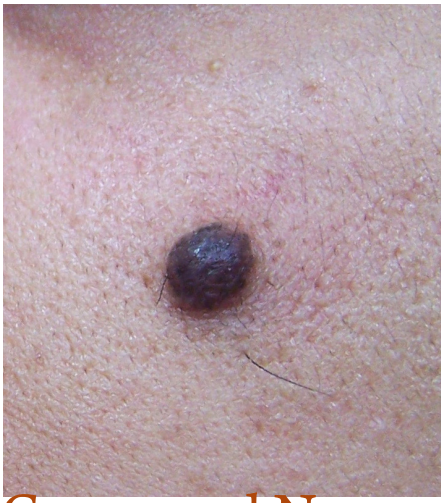
A. Age- Older patients have a worse prognosis with respect to overall survival rates

B. Sex- Women survive melanoma longer than men do

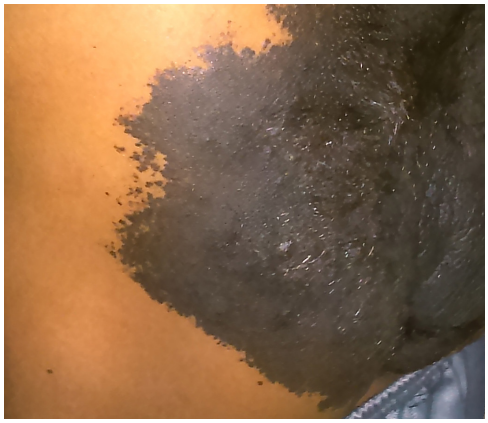
C. Site- Lesions on the limbs have a better prognosis than on the trunk or



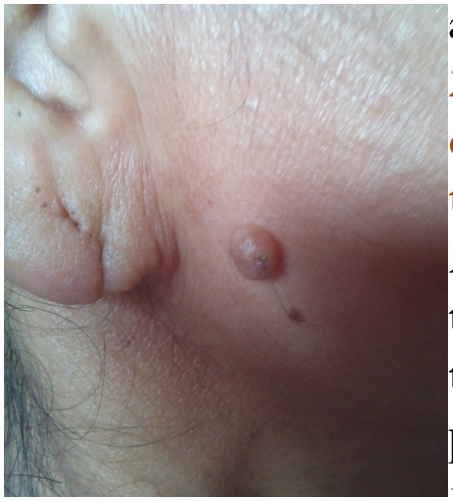
Junctional Nevus



Compound Nevus



Congenital Melanocytic Nevus



Intradermal Nevus

acral areas

2.Histological prognostic factors:

A. Tumour thickness- It is the most important prognostic factor for survival and clinical management. Breslow thickness refers to the thickness of the tumour. Survival decreases with increasing Breslow depth

B. Presence of ulceration in a melanoma worsens the prognosis

C. Tumours with greater number of mitoses have a worse prognosis

D. Invasion of lymphatic vessels or capillaries is a poor prognostic sign

E. Microscopic satellites indicate a poor prognosis

F. Sentinel lymph node status is a predictor of melanoma outcome

G. Presence of partial regression may correlate to poorer prognosis and in-

Table 1: Different types of melanocytic nevi

Congenital melanocytic nevus	Acquired melanocytic nevus	Dysplastic nevus
• Present at birth, has a tendency for larger size • Usually solitary • Satellite lesions may be found • May develop coarse hair often during puberty	• First appear in early childhood • Progressively increase in number during adolescence • Junctional nevus- flat, pigmented macule • Compound nevus- Slightly raised, circular plaques having a smooth or papillated surface • Intradermal nevus- Very similar to compound nevi; often flesh-coloured	• They appear in late childhood • Continue to appear throughout the adult life • Clinically larger and more irregular than acquired nevi. • Most frequent on sun-exposed areas, especially intermittently exposed.They are mottled brown lesions • Irregular and ill-defined fuzzy margins back
• Histological features include – ○ Presence of nevus cells in the reticular dermis ○ Extension of nevus cells in between collagen bundles in a single row (Indian file appearance)	• Junctional nevus- epidermal melanocytic proliferation is seen at the dermo-epidermal junction • Compound nevus- the nevus cells migrate to the dermis while continuing their junctional activity • Finally the junctional component regresses to form intradermal nevus	• Histologic features include – ○ Presence of immature, disordered growth pattern ○ A lymphocytic host response ○ Random cytologic atypia in Melanocytes

Table 2: What are the types of primary cutaneous malignant melanoma?

	Superficial spreading melanoma	Nodular melanoma	Lentigo maligna melanoma	Acral lentiginous melanoma
Site	Any site, preference for back in men and the legs in women	Any site, most frequently on trunk followed by head and neck and legs	Sun-damaged skin. Face, especially nose and cheeks, in elderly white people	Palms, soles, nail unit. Sole is the most common site. Subungual lesions are commoner on the hands
Radial growth	Present	Absent	Present	Present
Clinical features	Commonest variety in light-skinned people. Patchily pigmented macule light brown to jet-black with an irregular border that gradually develops into a thin plaque. Papules and nodules may develop within it and show ulceration and crusting	Most aggressive, rapidly growing black or blue papule, nodule or plaque that may show ulceration or crusting. The nodule may be pedunculated or polypoid or sometimes may be amelanotic	Light brown macule of about 1 cm with irregular borders. Slow growing, gradually increases in size, pigmentation becomes variegated and nodules may develop within the lesion	Commonest variety in indian and other dark-skinned patients. Pigmented macule with irregular borders and variegated pigmentation. Parts of it become raised and indurated with time, and ulceration may develop
Histopath	There are nests of atypical melanocytes arranged irregularly along the basal layer and the dermis which spread laterally and up into the epidermis; horizontal spread is more than the vertical component. Epithelioid cells are the predominant cell type	Aggregates of atypical melanocytes in the dermis with some extension into the epidermis directly overlying the tumour. Vertical component is prominent. Predominant cell types are epithelioid and spindle cells	Proliferation of atypical melanocytes predominantly along the dermo-epidermal junction. Prominent solar elastosis in dermis is seen. When dermal invasion occurs, the cells are usually spindle-shaped	Hyperkeratosis, marked acanthosis and proliferation of atypical melanocytes along the bases and sides of rete ridges in a lentiginous pattern. Prominent upward spread into epidermis is seen and the cells are heavily pigmented. Spindle cells are predominant

Table 3: Differential diagnosis

Superficial spreading melanoma	Nodular melanoma	Lentigo maligna melanoma	Acral lentiginous melanoma
1. Atypical nevus 2. Common nevus 3. Seborrheic keratosis 4. Pigmented basal cell carcinoma	***Pigmented*** 1. Common nevus 2. Blue nevus 3. Pigmented spitz nevus 4. Pigmented BCC ***Amelanotic*** 1. BCC 2. Hemangioma 3. Pyogenic granuloma	1. Solar lentigo 2. Pigmented actinic keratosis 3. Flat seborrheic keratosis 4. Superficial pigmented BCC	1. Plantar wart 2. Hematoma 3. Palmoplantar nevus 4. Longitudinal melanonychia 5. Onychomycosis 6. Pyogenic granuloma

creased risk of metastasis

H. Presence of a large number of lymphocytes between the tumour cells is a good prognostic sign.

What is Hutchinson's sign?

Subungual lesions of acral lentiginous melanoma begin as discolouration of the nail plate in an irregular or striate pattern. The discolouration involving the proximal nail fold is called the *Hutchinson sign*.

What is Breslow thickness?

It is a method of measuring the tumour thickness from the top of the granular layer to the lowest invasive tumour cell. It is the strongest prognostic variable. Current staging, based on American Joint Committee on Cancer (AJCC), divides Breslow thickness to: < 1 mm, 1-2 mm, 2-4 mm and > 4 mm.

What is sentinel lymph node biopsy?

It is a staging and prognostic tool to detect occult metastases in regional lymph nodes.The sentinel lymph node is the first node that drains a particular area. Lymph and thus metastasis from the area first reaches this node before going to other nodes in the group. If the sentinel node doesn't show metastasis, complete excision of the entire group of regional lymph nodes is avoided.

How do we treat?

The standard therapy for primary cutaneous melanoma is *Wide Local Excision (WLE)*. The purpose of the wider excision is to prevent local recurrence by complete excision with histologically confirmed tumour free margins. Apart from tumour thickness, factors

such as anatomical location and histological type of melanoma are also to be considered when choosing the size of margins. Regular lifelong follow up is recommended after the primary excision, as late recurrences may occur. The current standard therapy for microscopic or macroscopic melanoma in lymph nodes is *complete lymph node dissection (CLND)* of the involved regional basin.

The recommended margins:

In situ lesions: 0.5 cm
Melanomas upto 1mm thick: 1 cm
1-4mm thick melanoma: 1-2 cm
>4 mm thick melanoma: 2-3 cm
Histologic confirmation of negative margins is especially important for Lentigo Maligna (Melanoma in situ) and Lentigo Maligna Melanoma subtypes, which are characterized by a propensity for extensive subclinical peripheral extension. Standard recommendations of 0.5 cm margins for LM and 1 cm margin for LMM < 1mm thick are often insufficient.

A variety of surgical techniques have been advocated:

1. Standard excision with more comprehensive vertical sectioning (bread-loafing)
2. Mohs micrographic surgery with frozen horizontal sectioning with or without immunostains
3. Mohs micrographic surgery with formalin-fixed permanent horizontal sectioning (slow Mohs)
4. Staged mapped excisions with vertical sectioning (square technique)

Medical management for advanced melanoma:

1. **Dacarbazine-** Treatment of stage IV melanoma
2. **Adjuvant therapy-** Interferon-alpha, Interleukin-2
3. **Ipilimumab** (monoclonal antibody that targets CTLA-4)- Approved for metastatic melanoma
4. **Vemurafenib-** An oral inhibitor of mutated BRAF; has shown promising results in the treatment of metastatic melanoma

IADVL EC is pleased to invite applications from IADVL PLMs or LMs for AAD Annual Meeting Scholarships for March 2016, Washington.

There are 2 types of scholarships-1.2 Scholarships for Registration 2. 2 Poster Exhibit Scholarships. Applicants need to apply before 30th June to iadvlsecretary2014@gmail.com, provided they fulfill the following criteria -

1.You HAVE to be an IADVL Member-PLM/LM and need to quote that.
2.You should either be a PG or within 3 years of postgraduation.
3.YOU NEED TO STATE CLEARLY whether you have received AAD or any other scholarship ENDORSED by IADVL before. If you have, IADVL would not endorse for a second time from now. Information should be clear.
4.You should have a letter from Head of the Dept that you are doing PG in his/her dept.

Application should include:

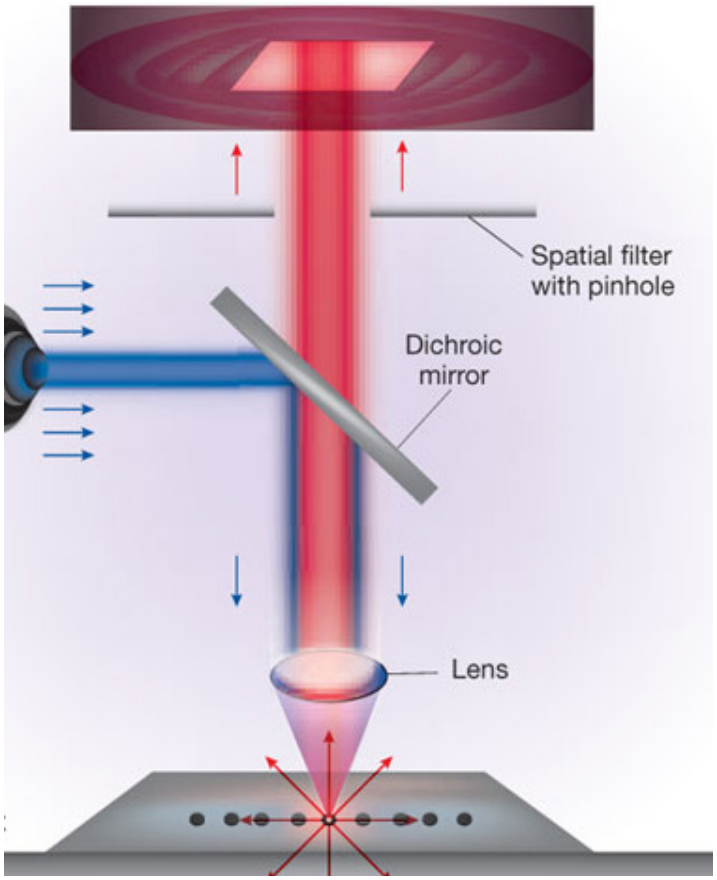
1.Short CV of 1 page (Publication list can be attached).It should not be more.
2.Your abstract for poster or oral presentation(for registration).

NEWER INSIGHTS

CONFOCAL MICROSCOPY

Dr. Avtar Kishan Jaisinghani, PG-3
People's College Of Medical Sciences
& RC, Bhopal (M.P.)

INTRODUCTION: Confocal microscopy, developed and patented by Marvin Minsky in 1955, is an emerging non-invasive technique in optical imaging for histo-morphological analysis of skin in vivo and has shown its applicability for dermatological research as well as its value as an adjunct tool in the clinical management of skin cancer patients. It provides very-high-quality images with fine detail and more contrast than conventional microscopy. Also, when multiple sections are combined, virtual 3-D images of the tissue can be reconstructed.



Confocal microscopy - From: Nwaneshiudu A et al. Introduction to confocal microscopy.J Invest Dermatol 2012;132.

PRINCIPLE: In confocal microscopy, a beam of incoming light (the excitation beam) is focused through the microscope objective on a small spot inside the tissue, which can be almost as small in diameter as the wavelength of light itself-about 0.5 µm. The same objective gathers the reflected or fluorescent light coming back from the tissue, but unlike conventional light microscopy, this light is projected (like a slide projector) and not directly viewed. It uses point illumination via a spatial pinhole to eliminate out-of-focus signals.

The excitation light in confocal microscopy is usually provided by a diode laser to generate high intensities of fluorescence or reflectance from the focal spot. In optical terms, the pinhole is placed in a conjugate focal plane as the tissue specimen (hence the designation"*confocal*").A sensitive light detector, such as a photomultiplier tube, on the other side of the pinhole is used to detect the confocal light. This technique allows the specimen to be imaged one point at a time.

TYPES:

1.Laser Scanning Confocal Microscopy(CLSM): a) Reflectance Confocal Microscopy (RCM):The reflected light from the tissue is gathered by the microscope objective and projected to the photo detector. RCM can be used for real time microscopy and uses melanin

as a natural contrast agent, which has been shown to improve melanoma diagnostic accuracy by identifying both malignant features in apparently benign lesions and benign features in clinically appearing malignant lesions. b) Fluorescent Confocal Microscopy: FCM uses dyes added to the tissue specimen that fluoresce when stimulated by laser beam("fluorophores"). Fluorophores improve sensitivity and specificity by increasing the signal-to-noise ratio and allowing better and sharper detection of the target. FCM is commonly used for in vitro and ex-vivo studies.

2.Spinning-disk confocal microscopy (SDCM) SDCM do not require laser scanning and uses an alternative design, specifically a series of moving pinholes on a disk, called the Nipkow disk, to scan and obtain the confocal images.

3.Scanning Confocal electron microscopy (SCEM) SCEM uses electron beam for illumination instead of light. Hence, SCEM is lethal and cannot be used to image living cells. Resolution is higher than in optical microscopy.

Dermatological Indications:

1. Microscopic examination of healthy skin, hair and nails.
2. In vivo imaging of skin lesions and their margins minimizing the need for skin biopsy.
3. Tumors:

a)Malignant melanoma- early diagnosis and treatment.

b) Actinic keratosis

c) Basal cell carcinoma

4. To study inflammatory dermatoses like allergic contact dermatitis, psoriasis
5. Dermatophytoses(fungal spores, hyphae)
6. In-vivo mite detection- Sarcoptes scabiei and Demodex folliculorum.
7. To study the hair abnormalities in trichothiodystrophy.
8. Monitoring response to medical or surgical treatments.
9. Ex-vivo examinations of edge incisions of a micrographically controlled surgery (tumor excisions and frozen sections)
10. Study of age-related changes of different parameters of the whole epidermis.
11. To study morphological differences between benign and malignant pigmented skinlesions, tumor margin mapping.

Advantages:

1. Non-invasive microscopy.
2. High-resolution, high-contrast images.
3. Reconstruction of 3-D images.
4. In-vivo microscopy to a skin depth of about 200 micron.
5. Absence of artifacts (shrinkage, loss of fat, no blood flow).

Limitations:

1. High cost compared to conventional microscopy.
2. Depth of imaging is limited(upto 200 micrometer) by optical penetration upto superficial dermis only due to tissue-induced scattering and aberrations.
3. Limited field of view.

References:

1.Nwaneshiudu A, Kuschal C, Sakamoto F, Anderson RR,Schwarzenberger K, Young RC. Introduction to confocal microscopy.J Invest Dermatol2012;132

2.Misri R, Pande S, Khopkar U. Confocal laser microscope. Indian J DermatolVenereol Leprol2006; 72: 394-7.

3.Rajadhyaksha M, GonzalezS, Zavislan JM, Anderson RR, Webb RH. In vivo confocal scanning laser microscopy of human skin II: Advances in instrumentation and comparison with histology. J Invest Dermatol 1999;113:293-303.

NEWER INSIGHTS
DERMOSCOPY

Dr. Suvina Attavar
PG-2, Bangalore Medical College & Research Institute, Bangalore, Karnataka

Introduction

The most critical step towards healing is having the right diagnosis and we as dermatologists encounter a kaleidoscopic range of lesions in our daily practice, the minute details of which are often missed on naked eye examination. Dermoscopy, initially developed as a tool for examining pigmented lesions, has now found widespread application in various other diseases.

The term dermoscopy was coined by *Leon Goldman* and he was the first dermatologist to use it to evaluate pigmented cutaneous lesions.

Dermoscopy is also known as skin surface microscopy, epiluminescence microscopy or episcopy. Just as a magnifying lens is a dermatologist's third eye, a dermoscope gives an extra edge by enhancing the microstructures in the epidermis, dermo-epidermal junction and the papillary dermis. Dermoscopy may be carried out with a classic dermoscope, stereomicroscope, dermoscope connected to a digital camera or a videodermoscope. A classical dermoscope consists of an achromatic lens paired with a bright halogen beam allowing a 10-fold magnification and power supply.

Principle

Dermoscopy is based on the principle of transillumination of a lesion with or without a polarizing device and studying it under high magnification to visualize the subtle features of the lesion. Light incident on the skin undergoes refraction, reflection, diffraction and absorption depending on the physical properties of the lesion producing an array of patterns which are carefully studied.

Technique

The dermoscope is placed on top of the lesion to be examined, gently pressed with enough pressure to eliminate air bubbles and then viewed.

Three types of techniques are currently used:

1. Classic/ standard contact non polarized dermoscope
2. Polarized contact dermoscope
3. Polarized non-contact dermoscope

Dermoscopes using nonpolarized light require direct contact between the skin and the scope, and require a liquid interface, such as an ultrasound gel or alcohol, to be placed between the skin and glass plate of the dermoscope.

Uses

1. **Dermoscopes** have been largely used for the study of melanocytic nevi, melanoma and non-melanocytic conditions like seborrheic keratosis, basal cell carcinoma,

angiokeratoma and dermatofibroma. The pigmented lesions are evaluated in terms of colour and structure.

Colours found include black, brown, red, blue, grey, yellow and white.

Characterization of dermoscopic structures include:

I. Symmetry/asymmetry
II. Homogeneity/ heterogeneity
III. Distribution of pigment
IV. Skin surface keratin
V. Vascular morphology and pattern
VI. Border of the lesion
VII. Presence of ulceration

Numerous methods like the ABCDE rule, Pattern analysis, 7 point checklist, Menzies method, 4x4x6 rule and the 3 point check list have been devised to aid in the diagnosis of melanoma.

2. **Inflammoscopy** is used in the diagnosis of various papulosquamous dermatoses. A few of the commonly encountered dermatoses are enlisted below.

i. **Chronic plaque psoriasis** is characterized by a uniform distribution of red dots on a light pink homogeneous background.

ii. **Wickham striae** is the most characteristic dermoscopy finding in lichen planus.

iii. The **collarette scales of pityriasis rosea** become more evident on dermoscopy.

iv. **Seborrheic dermatitis** is characterized by the presence of arborizing vessels and atypical red vessels with the absence of red dots or globules, differentiating it from scalp psoriasis.

3. **Trichoscopy** is used in the diagnosis of hair and scalp disorders particularly alopecia areata wherein black dots, yellow dots, short vellus hair and tapering hair can be noted. Dermoscopic diagnostic criteria for Female pattern hair loss has also been described. Dermoscopy also helps in identifying hair shaft disorders.

4. **Entomodermoscopy** includes dermoscopic patterns that have been described for several infectious skin diseases, including those of viral, fungal and parasitic origin. Of note,in the Indian scenario would be scabies wherein a small dark brown triangular structures located at the end of the burrows, giving an appearance reminiscent of **a delta-wing jet with contrail** can be identified.

5. It can be used for **nail fold capillaroscopy** in systemic sclerosis and systemic lupus erythematosus. The scleroderma pattern corresponding to the presence of dilated capillaries, loss of capillary loops, micro-bleeding and neoangiogenesis can also be observed in systemic sclerosis,mixed connective tissue disorders, dermatomyositis and overlap syndromes. Tortuous and meandering capillaries, bizarre loops and a prominent subpapillary plexus gives a clue towards systemic lupus erythematosus.

6. Dermoscopy facilitates the recognition of **vitiligo**, by revealing characteristic depigmentation patterns and might be useful for assessing the stage of the disease.

7. Dermoscopy is also useful in assessing vascular lesions such as the red lagoons and white collarette of pyogenic granuloma or the reddish –blue colouration of Kaposi sarcoma.

Advantages

1. Dermoscopy aids in diagnosis and differentiation of pigmented lesions and may alleviate the need for a biopsy.

2. It allows digital surveillance and monitoring of melanocytic lesions.
3. It enhances confidence in the clinical diagnosis.
4. It improves the diagnostic accuracy, sensitivity, and specificity for the diagnosis of melanoma.
5. It helps isolate suspicious areas within a lesion to help guide step-sectioning, which is performed by the pathologist.
6. It reassures patients and physicians.

Disadvantages

1. Dermoscopes are not commonly used in developing countries because they are expensive and not readily available.
2. Sometimes dermoscopy may result in lower diagnostic accuracy if the physician does not recognize or correctly interprets the significance of structures.
3. It may not detect early melanomas that have not yet developed any specific dermoscopic criteria.
4. Lower diagnostic accuracy when lesions are diagnosed using dermoscopy alone, without clinical context.

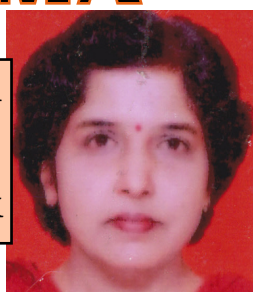
Conclusion

In the current era of rapid diagnosis, a dermoscope has immense potential in becoming the dermatologist's stethoscope. It helps in examining both pigmented lesions of uncertain nature along with non-melanocytic lesions, hence, breaking the shackles of misdiagnosis. With experience, dermoscopy with its myriad uses can open up new dimensions in the management of skin diseases.

NEWER INSIGHTS
PLATELET RICH PLASMA

Dr. Ashish Amrani
PG 2nd Year Resident
PGIMS, Rohtak

Dr. Surbhi Dayal
Professor, Skin and V.D
PGIMS, Rohtak



Platelets synthesize numerous proteins which include various coagulation factors and growth factors (GFs) promoting angiogenesis and wound healing. Uses of platelet rich preparations have recently been studied in dermatology and other medical specialities.

Platelet Rich Plasma (PRP) is autologous plasma concentrate containing abundant platelets in small volume of plasma. It is also known as autologous platelet gel, plasma-rich growth factors, platelet-concentrated plasma and autologous platelet concentrate.

History

The development of platelet rich concentrates dates back to 1970s. In 1985, *David Knighton* applied for first patent for the use of activated platelet releasate in chronic wounds. However, its use was not popular until 1999, when *Anitua* devised an outpatient method for obtaining PRP. Its clinical application was popularized by *Marx* in 2001 documenting successful use of PRP in dental and craniofacial surgeries and paved the way for its use in dermatology.

Classification

Ehrenfest et al. (2009) have classified platelet concentrates in 4 families, depending on their cell and fibrin content.

1.Pure Platelet Rich Plasma (P-PRP) - PRP preparations without leucocytes and with low density fibrin network on activation.

2. Leucocyte and Platelet Rich Plasma (L-PRP) - PRP preparations containing leucocytes and low density fibrin network after activation.

3. Pure Platelet Rich Fibrin (P-PRF) – Platelet rich fibrin preparations without leucocytes and with high density fibrin network. These products exist only in activated gel form and cannot be injected like traditional PRP preparations.

4. Leucocyte and Platelet Rich Fibrin (L-PRF) – second generation PRP products containing leucocytes and high density fibrin network.

Concentration of PRP

The mean blood platelet level is 20000±75000/µl. A platelet concentration of more than 1 million/µl, is generally regarded as effective therapeutic concentration (4-7 times of blood platelet levels). However, the effective therapeutic platelet concentration of PRP has not yet been standardized.

Principles and methods of PRP preparation

Preparation of PRP is done on the principle of differential centrifugation. Here, sedimentation of certain cellular components is achieved by adjusting the accelerating forces, based on the differences

in their specific gravity.

As stated in The American Association of Blood Banks technical manual, manual double spin method is preferred over the previous single spin method due to failure to achieve effective therapeutic concentration with the latter.

Whole blood (30-75 ml) is first collected by venipuncture and then transferred to 15-20 ml conical tubes containing anticaogulant citrate dextrose solution (ACD-A) or sodium citrate. The blood is then centrifuged based on principles of double spin method.

The first centrifugation separates blood components, owing to the differences in their specific gravities i.e. RBCs being heaviest settle down at the bottom, followed by WBCs and platelets being lightest stay at the top of the buffy coat layer. The first centrifugation is slow (light spin) to avoid spinning down of platelets and to isolate plasma. In second heavy spin, buffy coat, either alone, or with some superficial RBCs, are aspirated and centrifuged in high speed to obtain P-PRP or L-PRP respectively after discarding supernatant platelet poor plasma.

It is important to maintain viability of platelets throughout the process, which is ensured by carrying out the entire process at the temperature of 20-22°C and confirming the viability of platelets by trypan blue staining of the concentrate. Viable platelets do not take up the stain.

Activation of PRP

Activation of PRP is achieved by addition of thrombin or calcium chloride ($CaCl_2$) as activators which promote degranulation of alpha granules of platelets and secretion of various GFs to yield "activated PRP".

Various automated devices or readymade commercial PRP kits are available. Some of these devices which have been approved by USFDA are Smart PRep®, PCCS®, BioMet GPSII® etc.

Indications of PRP in dermatology

PRP has been studied and has been found effective for treatment of various dermatological conditions. Following are important indications:

1. **Androgenetic alopecia (AGA)** - Takakura et al, revealed that PDGF signals play crucial role in hair canal formation and dermal mesenchymal growth. PRP has been used as different modes like intra-follicular injections, mesotherapy and in adjunct with hair transplant in various studies and has shown promising results.
2. **Other alopecias**- PRP has been studied and been found effective in treatment of telogen effluvium and alopecia areata. However, there is paucity of literature for use of PRP in these conditions.
3. **Skin rejuvenation**- Use of PRP for facial rejuvenation is popular by the name of Vampire facelift. It has been used as topical application under occlusion, direct intradermal injections and as adjunct to lasers and microneedling.
4. **Acute and chronic ulcers**- Recombinant PDGF-beta (becaplermin) is FDA approved for use in diabetic foot ulcers. PRP being rich source of PDGF and various other GFs can be effective tool in treatment of acute and chronic non-healing ulcers. It has been tried as topical spray and intralesional injections. It has also been found useful for improving the viability of grafts for treatment of recalcitrant ulcers
5. **Scars and contour defects-** PRP has become a useful adjunct to soft tissue

augmentation procedures, correction of contour defects and scars. It is effective for acne scars when used as an adjunct to microneedling. PRP has been found to be effective filler for nasolabial folds. PRP increases survival of fat grafts when used as adjuvant with autologous fat grafting.

6. Others- PRP has been studied and claimed to be effective in lipodermatosclerosis, lichen sclerosus, hidradenitis suppurativa and pyoderma gangrenosum.

Conclusion

The application of PRP in various dermatological and aesthetic indications has shown promising results. Being entirely autologous in origin, application of PRP is relatively a safe procedure. Being safe, easy and efficacious, the span of PRP application in dermatology and aesthetics is expanding in recent times. However, lack of consensus regarding its preparation and application guidelines, paucity of comparative studies with other modes of treatment and lack of multicentre randomised controlled trials are some limitations of PRP therapy. Further studies and research is the need of the current time, to further evolve the usefulness of this therapy.

References

1.Arshdeep, Kumaran MS. Platelet-rich plasma in dermatology: Boon or a bane? Indian J Dermatol Venereol Leprol 2014; 80 (1): 5-14.

2.Dhurat R, Sukesh MS. Principles and methods of preparation of Platelet-Rich Plasma: A review and author's persspective. J Cutan Aesthet Surg. 2014; 7 (4): 189-97.

3.Montero CE, Santos ME, Fernandez RS. Platelet rich plasma: applications in dermatology. Actas Dermosifiliogr 2015. 106 (2): 104-11.

4.Budamakuntla L, Suryanarayan S, Sarvajnamurthy SS, Hurkudli SD. Autologous platelet rich plasma in pyoderma gangrenosum - two case reports. Indian J Dermatol 2015. 60 (2): 204-5.

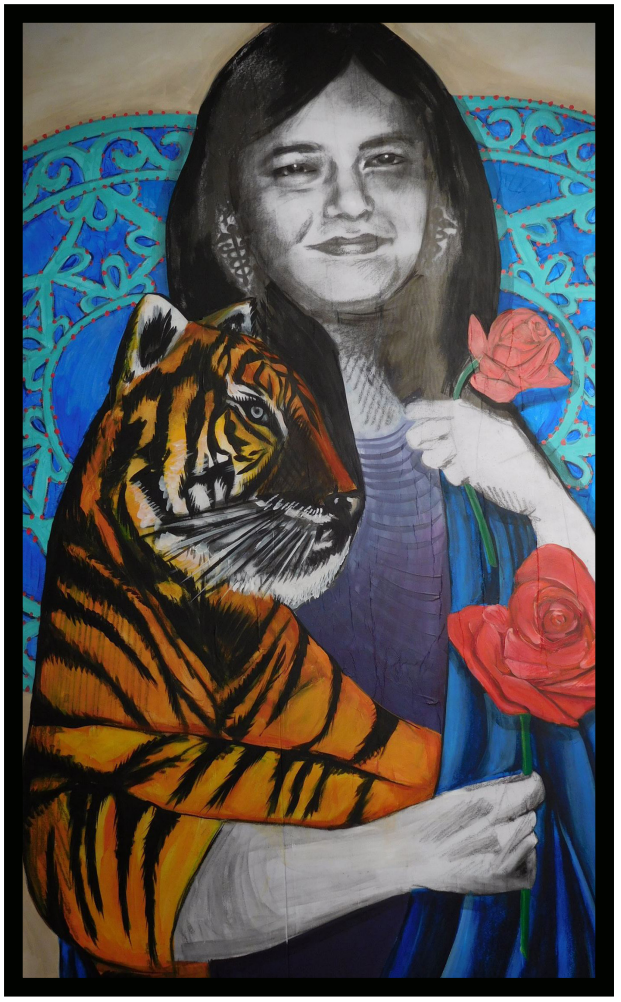
Table 1: Contents of Platelet Rich Plasma

Category	Proteins
Adhesive proteins	VonWillebrand factor, fibrinogen, fibronectin, vitronectin
Coagulation factors	Protein S, Factor Va, antithrombin III, high molecular weight kininogen
Fibrinolytic factors	Plasminogen, alpha-2 antiplasmin, alpha-2 macroglobulin
Growth factors	PDGF, TGF-beta 1& 2, EGF, IGF-1, VEGF, bFGF, HGF, CTGF, BMP- 2, 4 & 6
Chemokines and cytokines	IL 8, FasL, endostatins, osteonectin, sialoproteins
Proteases and anti-proteases	TIMPs 1-4, MMPs 1, 2, 4 & 9, C1 inhibitor, alpha-1 antitrypsin
Anti-microbial proteins	Thrombocidins
Others	Albumin, chondroitin 4 sulphate, immunoglobulins

At the World Congress of Dermatology 2015 held at Vancouver, it was a proud moment for Team ResiDream, as our beloved Dr. Rashmi Sarkar ma'am was selected as a Woman Leader in Dermatology by the Women's Dermatologic Society.

She was honoured for the same by the talented painter "Miss Me", who completed a live painting of 4 women leaders from across the world, including our dear mentor and guide, Rashmi Ma'am.

Ma'am you will forever be an inspiration to all us!



TRAILING TRICHOLOGY

Dr Sukesh M.S
Consultant Dermato- Trichologist, Bangalore.
M.D, DNB (LTMMC, Mumbai)
IADVL Training Fellowship in Lasers (AIIMS, Delhi)
Editorial Board Member – IJSHD, Reviewer- IJDVL
Member – IADVL Special Interest Group - Trichology

Trichology is an indispensible branch of dermatology.The word trichology is derived from the Greek word 'tricho' meaning hair. It initially began as a disciplined area of study in London, England in 1902. From then, it has evolved over the years from primitive ways of diagnosing and managing hair-related problems by barbers, hair saloon workers, beauticians; to scientific understanding of the subject and utilization of the state-of-the-art diagnostic tools, techniques, and medications by a qualified 'dermato-trichologist'. With growing awareness and self consciousness about hair among the patients, it has gained much importance in the recent years.

My interest in trichology started right from my PG days, working with my mentor and H.O.D – Dr Rachita Dhurat. I was fortunate to spend substantial time in specialty hair clinic getting vast exposure to various cases of hair disorders. It played a vital role in helping me to understand, hand in hand-learn and experiment new therapies and modalities of treatment. Active interaction and regular discussions helped in simplifying the concepts. Her active encouragement in all walks of my life is the reason behind whatever little work I have done till date and I owe everything to her.

My thesis on trichoscopy escalated my interest to examine and analyze various cases of cicatricial and non cicatricial alopecia. Work on clinico-trichoscopic -pathological correlation of yellow and white dots seen in non-cicatricial and cicatricial alopecia (first of its kind of study), microneedling and PRP in hair growth, photography in hair growth monitoring etc helped immensely in understanding of the subject.

A big leap in my enthusiasm towards trichology happened when I got a scholarship to present a paper at the European Hair Research Society Annual Conference 2012,at Barcelona during my second year of PG. It was a great academic feast where I was fortunate to meet and interact with the 'Whos' Who?' of Trichology. That made me realise the huge potential and scope trichology had to offer.

From then, one activity led to the other, spanning from presentations at various national and international conferences, publications, to being an Associate faculty member for review on trichology studies in F1000 journal, co-authoring chapter on 'Hair and scalp disorders' in the 4th edition of IADVL textbook of dermatology and on 'Platelet rich plasma' in the upcoming IADVL 'Cosmetic Dermatology: A practical

and Evidence based approach', Assistant editor and contributor to the 'Textbook On Hair Transplantation' by Indian Authors (Editor in chief – Dr Venkataram Mysore); active speaker and faculty at conferences and workshops. Well, these are early steps and there's a long way ahead!

In the present day, trichology cases account for around 30 to 40 percent of cases in dermatology practice. Every hair patient is a challenge to treat. Resistant cases of AGA , female pattern hair loss, alopecia areata like totalis and universalis, scarring alopecia like LPP, FFA , DLE, folliculitis decalvans etc. , genetic syndromes, endocrine and metabolic influences, hair shaft and pediatric hair disorder cases offer a test to the knowledge and expertise of a dermatologist.

On the other side hirsutism and hypertrichosis is also a growing concern. Understanding PCOS and its management is a challenge requiring the multi-disciplinary approach. Laser hair removal is being readily sort after by patients in the era of continuous advancements in technologies of Ndyag, Diode, IPL and its combinations! Research awaits in treatment of pigmentary hair disorders like premature greying, genetic conditions, hair tumors, hair nutrition, evolving controversial treatments,usage of biomimetic peptides, stem cell therapy, hair cosmetics etc.

Hair transplantation is an exciting field for those who are interested in dermatosurgery. Advancement in FUE, beard and body hair transplant has opened up opportunities for dermatosurgeons to pursue and practice transplant along with dermatology. However, it has a substantial learning curve and striking a balance between dermatology and hair transplant practice, is itself a challenging task! On the other hand, if it is mastered well, it offers a high satisfaction score, besides the monetary advantage.

With respect to the Fellowships offered in trichology in India, there is a definite paucity. One year fellowship is available through Tamil Nadu Dr.M.G.R. Medical University,Chennai under Dr Murugusundaram. The conferences in regard to trichology in India include Hair India International Trichology conference (once in 2 years) and Haircon (annual). The prominent International conferences abroad conferences include World Congress of Hair Research (annual), European Hair Research Society Conference (annual),Meetings of International Society of Hair Restoration Surgery and North American Hair Research Society (NAHRS).

International Journal of Trichology is a quarterly, peer-reviewed journal of the Hair Research Society of India,dedicated solely to hair and related disorders.

IADVL has a Special Interest Group in Trichology, which includes dermatologists interested and active in the field of trichology (Current Convener- Dr BS Chandrasekhar, Bangalore) to promote hair related activities across the country.

One concern is that though hair loss accounts for major bulk of cases, there seems to be a gap with respect to understanding hair and its disorders, utilization of appropriate

diagnostic tools and techniques and treatment modalities; by dermatologists and post graduates. Concepts like hair diameter diversity, differentiating features of every disorder, utilization of trichoscopy, trichogram, trichoscopictrichogram, trichoscan for diagnosis and monitoring, appropriate global photography and serial documentation of cases , maintaining registry , evidence based treatment modalities and research are yet to be fully implemented in many post graduate institutes .This is a 'need of the hour' so that the new generation of dermatologists can effectively tackle hair related conditions and be a true 'Dermato-Trichologist'

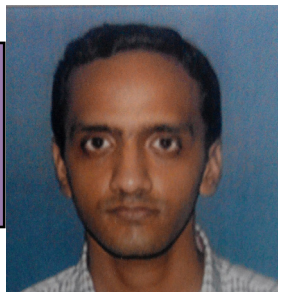
To conclude, trichology has become an integral part of dermatology practice and keeping abreast with the latest advancements in the field is a must. The thrill of diagnosing, treating and bringing back the confidence in a patient, is second to none. The satisfying part is that results are evident to everyone and the treating doctors' name is literally carried over (their scalp!) by the satisfied patients! Practicing and promoting ethical, scientific and evidence based approach and treatment of hair disorders, especially in the era of commercialization, market driven advertisements and unrealistic claims by the unqualified; is a duty of every dermatologist.

Long live 'Trichology'!
Long live 'Dermato-Trichologist'!!

LASER TATTOO REMOVAL IN INDIAN PATIENTS: PITFALLS

Dr. Ishad Aggarwal, MD
Senior Resident, IPGMER, Kolkata

Dr. Asad Ansari
Junior Resident, IPGMER, Kolkata



LASER is an acronym for "Light Amplification by Stimulated Emission of Radiation". Lasers have been rightly termed as "a solution looking for problems". Laser light works on the principle of "Selective Photothermolysis" which was proposed by Rox Anderson[1,2].In this article we are going to focus upon the pitfalls of lasers used for tattoo removal in Indian patients.

Properties of Laser

Laser light has 3 properties:-

1. **Monochromatic-**All waves have the same wavelength.
2. **Collimated-** All waves are parallel to each other and there is very little divergence between them.
3. **Coherent-** All waves are in phase with each other in both time and space.

Tattoos have become a fashion statement in recent times. There has been a dramatic increase in the prevalence of tattoos in last few decades. Moreover, multiple coloured inks are used for making tattoos in recent times making tattoo removal difficult. As a result, different lasers need to be used on the same tattoo for different colours.

Light of wavelength from 290nm upto the range of 1200nm is absorbed by melanin. At longer wavelengths, absorption is lower and the penetration is deeper as compared to the shorter wavelengths. QS lasers produce ultra-short bursts of light (5-100 nano-seconds) and target ink particles in the dermis allowing removal or lightening of tattoos. QS Lasers are the current gold standard treatment for the removal of tattoos[1,2,3.]

Q-switch stands for Quality switched or Quantum switched.The technique is mainly applied for the generation of ultra-short nanosecond pulses of very high energy and peak power.

The tattoo ink particles are generally placed at a depth of 1.1- 2.9 mm. A wavelength that penetrates 1-3mm into the dermis is suitable for targeting deeper dermal pigmentation such as found in tattoos[1, 2, 3.]

Q-switched lasers work on the principle of selective photo-thermolysis.They cause explosion of target such as ink particles by an additional *"photoacoustic effect"*. QS lasers are effective in tattoo removal as

their pulse duration (5-100 ns) matches the Thermal Relaxation Time (TRT) of tattoo ink particles(0.1-10ns)[1,2].

Double frequency Nd-YAG laser has a wavelength of 532 nm and emits green light. Nd-YAG laser is passed through potassium-titanyl-phosphate crystal which doubles the frequency. Due to shorter wavelength, it is absorbed more superficially in the epidermis by melanin.

All past history of medications, surgeries, allergies should be taken. Pre-procedure and post-procedure photographs should be taken for each session. A written and informed consent is mandatory before starting treatment.

Table 1: Commonly used lasers for tattoo removal in India

Sr. No.	Laser	Wave-length	Indication
1.	QS Nd-YAG laser	1064 nm	Blue-black tattoo
2.	QS Alexandrite laser	755 nm	Green tattoo (Gold standard)
3.	QS Ruby laser	694 nm	Blue-black tattoo, green tattoo
4.	Double frequency Nd-YAG laser	532 nm	Red tattoo

Table 2: Contraindications of lasers[4, 5, 6]:

Sr. No.	Absolute contraindications	Relative contraindications
1.	Photo-aggravated conditions like SLE, Dermatomyositis.	Patient has taken Isotretinoin or other retinoids in the past 6 months.
2.	Active infections in the area to be treated like herpes simplex, staphylococcal infections, etc.	History of herpes simplex or herpes zoster for increased risk of reactivation.
3.	Tattoo granuloma	Keloid or keloidal tendencies.
4.	Unstable vitiligo and psoriasis due to risk of koebnerization.	Uncooperative patient and patients with unrealistic expectations.
5.	Localized reactions like urticarial and granulomatous reactions can occur in tattoos following laser treatment.	

As Indian skin is darker, risk of complications is greater with laser tattoo removal in Indian skin.

Pitfalls in using lasers for tattoo removal in Indian skin

1. Lasers can cause retinal damage. Hence, proper eye shields and goggles should be worn by patient and doctor throughout the treatment procedure.
2. Spot size or beam diameter should be 5-7 mm. Smaller spot size results in greater laser energy absorption by epidermis and hypo/hyperpigmentation. Risk of post-treatment hypo/hyperpigmentation is greater with double frequency Nd-YAG laser, as it has smaller wavelength and gets absorbed more by epidermal melanin. The PIH usually clears itself in a few weeks. However, sun-protection should be advised.
3. Spot size should not exceed the size of the lesion, otherwise, there will be pigmentary changes in the surrounding normal skin.
4. End point in laser treatment is tattoo whitening or frosting which occurs immediately following treatment.
5. Fluence or the energy density should be limited till the point of producing frosting or whitening. Higher fluences can result in pin-point bleeding, blister formation and atrophic scarring.
6. Ice packs should be applied immediately over the treatment area after each session. This helps to reduce the pain and burning sensation over the treated area. Air cooling or cryo can also be used for cooling.
7. Strict sun-protection is advised before and after laser treatment. This helps in preventing tanning of the skin.
8. An antibiotic cream is given after each session for 7-10 days to prevent infections.
9. Treatments should be scheduled after a minimum interval of 6-8 weeks. This is the time taken by macrophages to remove the tattoo ink particles through the lymphatics.
10. Permanent leukotrichia can be seen[7].
11. Local allergic reactions can occur specially in mercuric-chloride containing red tattoos. Use laser with caution in such patients as the pigment may disperse and cause severe allergic reaction post-treatment.
12. Tattoo shadow or ghost image may persist even after several sessions of tattoo removal. It is more common with professional tattoos.
13. If sub-optimal results are obtained after a few sessions, fluence can be increased gradually. However, it is safer to start with low fluence.

Recent advances in laser tattoo removal

Laser tattoo removal requires 5-20 sessions. Number of sessions required is higher for professional tattoos. This increases both the time and cost of treatment leading to frustration on the part of both the patient and the doctor.

Recently, however, few western literatures have shown that *R20 method*, which uses low fluence Q-switched Nd: YAG Laser for consecutive 4 passes with a 20 minute interval in between is very effective in removal of tattoo ink in minimal number of sessions. However there were no such publications from India.

Recently, there has been a case report published by *Zawar et al* on modified R20 method in Indian patients[8]. It is generally believed that Indian skin, being darker

and type five, may produce lot of post inflammatory hyperpigmentation if four passes of laser are given in a single session. However, modified R20 method that uses only 2 consecutive laser passes per session, appears to be promising in Indian patients with only slightly increased risk of complications. Meticulous cooling should be done between the sessions to reduce the risk of PIH and burns.

References

1.Anderson RR, Parrish JA. Selective photothermolysis: precise microsurgery by selective absorption of pulsed radiation. Science. 1983; 220:524–527.

2.Barlow RJ, Hruza GJ. Lasers and light tissue interactions. In: Goldberg DJ, Dover JS, Alam M, editors. Procedures in cosmetic dermatology: Laser and lights Volume 1. 1 st ed. Philadelphia: Elsevier; 2005. p. 1-11.

3.Aurangabadkar S, Mysore V. Standard guidelines of care: Lasers for tattoos and pigmented lesions. Indian J Dermatol Venereol Leprol [serial online] 2009 [cited 2014 Feb 11]; 75: 111-26

4.Kilmer SL. Laser eradication of pigmented lesions and tattoos.Dermatol Clin. 2002;20:37-53.

5.Goldberg DJ. Pigmented lesions, tattoos, and disorders ofhypopigmentation. In: Goldberg DJ (Ed). Laser DermatologyPearls and Problems, 1st edition. Massachusetts: BlackwellPublishing; 2008;71-114.

6.Kilmer SL, Garden JM. Laser treatment of pigmented lesionsand tattoos. Semin Cutan Med Surg. 2000;19:232-44.

7.Liu XJ, Huo MH. Permanent leukotrichia after Q-switched 1064 nm laser tattoo removal. Indian J Dermatol Venereol Leprol 2011;77:81-2

8.Zawar V, Sarda A, De A. Bindi tattoo on forehead: Success with modified R-20 technique using low fluence Q-switched NdYAG laser: A case report. J Cutan Aesthet Surg 2014;7:54-5.

FEEDBACK

We hope you liked the 5th issue of our ResiDREAM newsletter. The ResiDREAM newsletter is of the residents, by the residents, and for the residents. If you have any comments, queries, suggestions or contributions, please write to us at: *residreamiadvl@gmail.com*. We are eagerly waiting to hear from you!

Signing off with love, until next time,

Team ResiDREAM!