IADVL

IADVL SIG Dermatosurgery (IADVL Academy) Newsletter

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Welcome Note!

Happy Sculpting, Happy Suturing and Happy Learning!

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Dear Readers,

We welcome you to the 2nd issue of our SIG-Dermatosurgery Newsletter!

This venture by Special Interest group on Dermatosurgery was initiated with a vision to apprise IADVL Members regarding our activities. It was also meant to showcase informative and illustrative write-ups on various aspects of Dermatosurgery. We hope that we are able to fulfil our vision through the brief articles in this issue and the previous one.

From last issue to this one, the team SIG has been reconstituted; nevertheless, the commitment towards promoting and popularizing dermatosurgery remains the same. We are working at reinitiating the Dermatosurgery workshops in locations all over India.

Dermatosurgery today is an ever-expanding field with more and more dermatologists taking over challenging procedures and accomplishing them with panache! The numerous innovations brought in by bright young minds have simplified surgical procedures to the extent that they can be done in resource poor settings as well as with minimal training. At the same time, dermatosurgery is also standing at the cross-roads in its development, where the need for regularizing its content and standardizing dermatosurgery training as a part of specialization in Dermatology is increasingly being felt. The IADVL is instrumental in designing and getting approved fellowship programs in dermatosurgery which have now been approved by the National Board. SIG Dermatosurgery, over the years has played an important role in these efforts.

This issue of the newsletter reports on the dedicated SIG Dermatosurgery session held during DERMACON 2019 at Bengaluru. It also carries articles on innovations simplifying vitiligo surgery. Also, there are articles on scar revision techniques and surgical excision techniques for malignant and pre malignant lesions. I hope that these will inspire readers to take up dermatosurgery in a big or a small way, but make a start nevertheless.

The IADVL and IADVL Academy remains committed to adding value to the practice of dermatology in our country, by helping all fellow dermatologists upgrade their skills and offer platforms for free exchange of ideas and techniques. We, at the SIG-Dermatosurgery mould our actions to suit this purpose. We are very thankful to the 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.

From the Editor's Desk

This newsletter is an endeavor of SIG Dermatosurgery members to update your knowledge with the latest developments and innovations in the field of dermatosurgery. We have made a sincere effort to supplement each article with a lot of pictures and tables so as to make it easy to comprehend and remember. Particular emphasis has been given to explain the details of the procedure in a lucid manner. Further, all the esteemed authors have gratefully mentioned their e-mail ids, and so remain accessible to all readers in case of any doubt or confusion.

Lastly, I would gently remind all readers that dermatosurgery is a procedural field – no amount of reading is enough until we start doing the procedure ourselves and then realize their advantages and pitfalls. This newsletter is another effort to remove the initial roadblock and pave the way for a glorious dermatosurgical career.

So pick up your scalpels and start right away…..

Dr Ankur Talwar

Pearls From SIG Dermatosurgery Session (DERMACON INTERNATIONAL)

17-20th Jan. 2019. Bengaluru, Karnataka

Dr.Siddhartha Das

Surgical Management of Keloid and Hypertrophic Scars

Keloid and Hypertrophic scars are very difficult to treat because of their chances of recurrence is very high. Different Modalities of treatments are available. But Surgical Management has got very impressive role in the treatment. Surgical Management can be done by a) Simple Excisional surgery and b) Debulking Surgery.

KELOID (Before Surgery)

KELOID (After Surgery)

Simple Excisional Surgery

Ideally small and pedunculated lesions can be treated by this method. Elliptical incision is made and the whole lesion is excised and Injection Triamcinolone is infiltrated in the base and margin of the lesion and stitched by Prolene. The stitches are removed after 10 days. Injection Triamcinolone 40 mg /ml infiltrated in the stich line two weeks after removal of stitches and Silicone sheet was placed .Injection Triamcinolone was repeated every monthly for 4-6 months and Silicone sheet was placed for 4-6 months till complete flattening. The result was very good and the recurrence rate was 15%.

(Before Surgery)

(After Surgery)

Debulking Surgery

Very innovative Technique .The medium and large lesions can be treated by this method. Many sessions can be done in a large lesion. The flap is raised above the lesion.The fibroblastic mass is completely removed and flap is re aligned .Injection Triamcinoloe 40mg/ml infiltrated in the base and the margin. The incision is stitched by Prolene and the stitch is removed after 10 days and Injection Triamcinolone infiltrated 2 weeks after removal of stitches and Silicone sheet applied. Injection Triamcinolone given once monthly for 4-6 month and Silicone sheet applied for 4 – 6 months .The result is excellent with recurrence rate is only 15%.

Surgical Management of In growing Toe nail

Dr. Vineet Relhan

Ingrowing Toe nail is a very serious problem and it gives lots of complications. The toe become very tender and patient feel continuous pain and could find difficulty in walking. Various procedures are available for the treatment. Many surgeons just remove the Toe nail but this will give further recurrence because the Nail matrix is to be destroyed otherwise there will be recurrence of the ingrowing toe nail. The nail matrix to be destroyed by cauterising by chemical or by Elecctrosurgical procedure. Nail block is given for anaesthesia and wedge shaped excision of the nail is made till matrix and the matrix is destroyed chemically. This procedure gives excellent result and the recurrence rate is nil.

Dermal grafts in the Management of Atrophic scars

Dr. T .Salim

This is a very innovative technique. The Dermal grafts are obtained by using different reagents. The Epidermis is separated and the Dermis become malleable and very soft. Small hole is made and the dermal grafts is placed through the hole and the gap area in then filled up with this dermal grafts and the Atrophic area is elevated giving a normal appearance . It gives excellent result but little bit complicated.

Platelet Rich Plasma in the Management of Acne scars

Dr. Anirudha Gulanikar

Platelet Rich Plasma has become very important tool in the management of Acne scars. Various modalities are available for the treatment of Acne scars. Platelet rich plasma has got lots of different kind of growth Factors which promotes the growth of collagen .Platelet rich plasma is derived by the standard procedure. Microneedling is done and PRP is injected in the Acne scars. Couple of sessions are needed for the treatment of Acne scars. This gives excellent result and becoming very popular procedure in the Management of Acne scar nowadays.

Platelet Rich Fibrin in Non-Healing Ulcers

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Introduction

Platelet rich fibrin (PRF) is a second-generation platelet preparation in a fibrin framework, which was being used by dental, Maxillo facial surgeons and orthopedicians for enhancing healing affect in a wound.

Inconsistency in results with the use of PRP is due to lack of standardization in PRP treatment protocol, short duration growth factors availability and difference in the method used to prepare PRP concentrates.

PRF is being used in Dermatology as fillers and wound healing. It enhances wound healing as a nonspecific agent irrespective of cause. The application of blood clot to wound promotes the healing process by controlling inflammation, facilitating angiogenesis and having the necessary wound repair and remodeling factors.

Mechanism

PRF was developed in France by Choukroun et al in 2001, mainly in use by Dental and maxillofacial surgeons. During early wound repair a provisional fibrin clot is formed whose surface serves for fibroblasts migration and tissue remodeling, these fibroblasts produce vital extracellular matrix proteins such as collagen to develop granulation tissue.

A similar process of polymerization begins during centrifugation, entrapping platelets and leukocytes. Platelets contain alpha granules which acts as an intracellular storage pool of proteins and growth factors vital to wound healing.

The polymerization leads to a fibrin matrix which acts as a scaffold for cellular migration, entrapment of platelets, leading to slow release of growth factors from platelets which helps in differentiating undifferentiated mesenchymal cells and neoangiogenesis thus aiding in tissue regeneration.

Preparation of PRF

10 ml of venous blood is drawn into a plain centrifuge tube containing no anticoagulant and spun at 2000 RPM for 10-12 min, On finishing, tube shows bottom RBC and a top clear dense fluid, following which few drops of Calcium chloride or Calcium gluconate is added to centrifuged blood to enhance process of coagulation .The centrifuged tubes shows three layers(Fig 1) a bottom compact RBC, middle Fibrin clot and a top layer of straw colored plasma.The plasma is discarded and the fibrin clot is compressed in a sterile gauge to extrude excess fluid to form a fibrin sheet (Fig 2). The fibrin gel sheet is prepared fresh for every dressing.

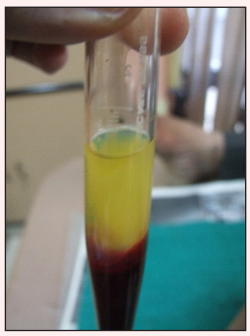

Fig 1: Centrifuge tube with three layers of RBCs , Fibrin and Plasma

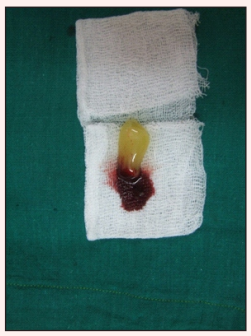

Fig 2: The fibrin clot in a sterile gauge piece

Protocol:

Chronic non-healing ulcers of more than 6 weeks were taken, irrespective of etiology of the ulcer. The ulcers resulting from Cutaneous poly arteritis nodosa (Fig3a), SLE, Calcinosis cutis and Stasis ulcers were taken up. The wound was cleaned with saline and Fibrin gel sheet was used to cover as much area of the wound as possible, either as a single sheet or cut into pieces , dressed up with sterile paraffin gauge. The dressing and fresh fibrin gel sheet was used every week for 4 weeks, if not healed next two dressing was done at 2 weeks interval, most of the wound healed by then(Fig3b).

Fig 3: Cutaneous vasculitic ulcer prior to treatment

Fig 4: TResults after 4 sessions of PRF treatment at weekly intervals

Conclusion:

Platelet Rich Fibrin matrix dressing can be used as an adjuvant to wound healing in any chronic ulcers irrespective of etiology. No adverse reactions were noted in a pilot study, being strictly autologous. Since no bovine thrombin is added,the remote chance of developing antibodies to human factor leading to coagulopathies and bleeding also is avoided.

Tumescent Anaesthesia: It's Application in Dermatosurgery

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Introduction

The word 'tumescent' means filling up the space to make it turgid or swollen. In Dermatosurgery this will mean to fill up the subdermal space that makes it taut. An added advantage of this would be to lift the skin and its structures away from the underlying vital organs.

The concept of Tumescent Anaesthesia is commonly associated with Liposuction. This was mooted by Dr Jeffrey A. Klein, a dermatologist, pharmacologist and statistician of immense repute who spent a life time working with Lidocaine. He discovered that Lidocaine has certain peculiar properties (c/w other caine products) that make it ideal for use in performing Liposuction and other dermatosurgical procedures.

Dr Jeffrey Klein conceived the concept of Tumescent Anaesthesia solution which consists of Lidocaine 2%, Adrenaline 1:1000, Sodium bicarbonate 7.5% in 0.9% normal saline1. An example of the dosing is given in Table 1.

Table 1. Tumescent Anaesthesia Solution in 1 L of Normal Saline

Lidocaine 2%	**50mls**	**1000mg**
Adrenaline 1:1000	**1ml**	**1mg**
Sodium bicarbonate 7.5%	**10mls**	

The above example gives 1 L of Tumescent Anaesthetic solution that is infiltrated into the subcutaneous adipose layer for performing liposuction on the abdomen or thighs or arms. For certain more sensitive areas and/ or fibrous fatty areas like the breast, chin and cheeks and upper abdomen the amount of lidocaine and adrenaline is increased to give more pain relief and vasoconstriction.

For Liposuction, the dose of the Lidocaine and Adrenaline is calculated dependent upon the body weight of the individual and the area of the body that is to be treated. It has been proven by Dr Jeffrey Klein in his extensive experiments that a total dose of upto 35mg/kg Lidocaine is safe for liposuction2. In very obese individuals, the total dose of Lidocaine can be increased to upto 55mg/kg. This is because Lidocaine is very lipophilic. This means that it adheres to the adipocytes and does not get absorbed into the systemic circulation. In addition, the adrenaline in the solution causes vasoconstriction which further delays the systemic absorption of lidocaine. Overall the two effects, lead to very low systemic levels of lidocaine at any given time after infiltration. The systemic levels of Lidocaine have ranged between 1.9 and 4.4 g/ml when levels were measured every two hourly forupto 24 hours after infiltration with/ without Liposuction. The toxic blood levels of Lidocaine (6 g/ml) were not reached upto 24 hours after the infusion. Furthermore, more than 70% of lidocaine gets metabolized in the liver to its metabolites (Monoethyl glycine xylidide& Glycine xylidine) as soon as it gets absorbed into the systemic circulation which significantly reduces the chances of toxic drug levels. However, it becomes very important to know a detailed medication history from the patient preoperatively. This is to avoid lidocaine toxicity arising out of a drug interaction. Lidocaine is metabolized by the Cytochrome P 450 enzyme system which gets inhibited or stimulated by certain drugs. A brief list of the drugs that inhibit the Cytochrome P 450 enzymes system is given in Table 2.

Table 2. Drugs that inhibit Cytochrome P450 system (lead to increase in blood lidocaine levels)3

Antifungal medications Fluconazole Itraconazole Ketoconazole Miconazole **Benzodiazepines** Alprazolam Diazepam Flurazepam Midazolam Triazolam **Protease inhibitors** Indinavir Nelfinavir Ritonavir Saquinavir	**Calcium Channel blockers** Amlodipine Diltiazem Felodipine Nicardipine Nifedipine Verapamil **Macrolides** Clarithromycin Erythromycin Troleandromycin **SSRIs** Fluoxetine Fluvoxamine Nefzodone Paroxdtine Sertraline	**Miscellaneous** Acetazolamide Amiodarone Anastrozole Caffeine Canabinoids Cimetidine Ciprofloxacin Cyclosporin Danazol Grapefruit juice Isoniazid Mexiletine Metronidazole Nevirapine Norfloxacin Rifampicin Omeprazole Tacrine Terfenadine Troglitazone Zafirlukast

Many of the drugs listed are taken for various common ailments. HIV + patients who are on anti-retroviral therapy (ART) will end up with drug interactions when large doses of lidocaine are employed. Hence it is fair to confirm that Liposuction using large doses of lidocaine in such patients should be avoided.

Lidocaine toxicity can occur due to wrong dosing or drug interactions resulting in rapid uptake of lidocaine or impaired hepatic metabolism. Table 3 gives symptoms of Lidocaine toxicity at different blood levels.

Table 3: Lidocaine levels and toxicity [4,5,6]

3- 6µg/ml	Subjective toxicity Lightheadedness, euphoria, digital and circumoralparaesthesias, restlessness, drowsiness
5 -9µg/ml	Objective toxicity Nausea, vomiting, tremors, blurred vision, tinnitus, confusion, excitement, psychosis, muscular fasciculations
8 -12µg/ml	Seizures, cardiorespiratory depression
12µg/ml	Coma
20µg/ml	Respiratory arrest
26µg/ml	Cardiac standstill

The guidance is that the anaesthetic solution should be prepared fresh just prior to injection. The doses should be written by the dermatosurgeon and the preparing nurse should be well versed with the agents that have to be added. She should not be distracted with other issues at the time of preparation so as to avoid any mishaps with wrong dosing.

Use of Tumescent Anaesthesia in other dermatosurgical procedures

Tumescent anaesthesia with dilute does of lidocaine and adrenaline can be used in all dermatosurgical procedures that require large areas of skin to be anaesthetized. This concept is most commonly employed in Hair Transplant surgery where a large area of scalp in the donor area needs to be anaesthetized. So a dilute solution is prepared using a tailored down version of the above formula. Here a 100ml solution of 0.9% Normal Saline is mixed with 30ml of Lidocaine 2%, 0.5 - 1ml of Adrenaline 1:1000 and 1 ml of Sodium Bicarbonate 7.5%. This is injected intermittently in the subcutaneous layer to tumesce and raise the scalp skin as the area for extraction of grafts progresses during the procedure. This helps to make the grafts stand on their end (the angle of emergence becomes less acute) making it easier to cut and extract them. The dilute solution reduces the amount of lidocaine and adrenaline required to anaesthetize a large part of scalp.

Tumescent anaesthesia can also be used in the following procedures:

- Excision of large skin tumors or cysts including Mohs surgery
- Skin grafting (donor area) during harvesting
- Large area dermabrasion
- Laser therapy to large lesions ie. Scars, facial rejuvenation, tattoo removal
- Intralesional injection of large keloids
- Intravascular vein ablation
- Breast reduction surgery

Technique of injection:

Once the patient is received in the operating theatre all efforts are made to keep the patient calm and relaxed. This can be achieved by having a dedicated nurse attendant who can speak with the patient and hold hands. Calm relaxing music can be of immense utility.
The area to be anaesthetized is marked using a skin marker. It is then prepped using Povidone Iodine solution and Spirit. The sterilized area is covered using drapes.

An entry point is decided. This is numbed using 2% lidocaine and adrenaline. Around 2 mls of solution is injected under the marked point. Once numb, an opening is made using either a round punch of size 1.5/ 2mm or sometimes directly infiltration is started with a sterile spinal needle. After the opening is made, the bag containing tumescent solution (freshly prepared for the procedure) is attached to the pressure bag or the infiltration pump using the appropriate intravenous tubing. The patient end of the tubing is attached to the infiltration cannula (a blunt tipped cannula with multiple small holes all around its circumference in the top 3 inches) or a spinal needle 20G as is decided by the surgeon. The author uses spinal needle for infiltration when performing liposuction on breast areas and to give anaesthesia for dermabrasion or large lipoma excisions. It is mandatory to make sure that air in the tubing is removed prior to inserting it into the subcutaneous compartment.

During infiltration, especially while doing liposuction, the skin and the underlying fat is grabbed in the palm of non-dominant hand and then the cannula is inserted in the deep fat compartment. The cannula tip is inserted at 45 deg angle at the skin level and immediately afterwards it is progressed horizontally under the skin. The give way feeling encountered once the skin is pierced is the indication that the tip is in the fat compartment and then the cannula is progressed in a horizontal plane parallel to the skin. This avoids poking the patient and causing intense pain. Since the patient is not under anesthesia, it is highly important that such unpleasant incidents are avoided. This helps in keeping the patient relaxed and hence co-operative. The cannula or spinal needle is continuously moved forwards and backwards. The direction is changed only when the cannula is withdrawn to a significant extent. This prevents the cannula from pushing on the fibrous bands within the fat compartment and avoids pain. Puckering of the overlying skin makes it evident if the cannula is not withdrawn enough while the direction change is attempted. One

the area around the tip of the cannula or needle is infiltrated enough the flow of fluid slows down or even stops. Then the cannula needs to be moved to a different area. When the marked area is fully infiltrated as is confirmed with a tumesced and blanched appearance, the process is stopped. The cannula is withdrawn and the area is covered. It is advised to wait for at least 30 minutes before the procedure should be initiated so as to allow the vasoconstriction to happen and the lidocaine to cause adequate numbness of the overlying tissues.

The advantage of employing a 1.5/2mm cannula for infiltration is that the cannula starts to make channels in the fat compartment through the vertical bands that then act as the pathways for the suction cannulas to go through. However, the spinal needle helps significantly in reducing the pain of sudden tissue stretch. So it is advised to decide the use of spinal needle or cannula or both for infiltration as deemed suitable by the surgeon on table.

Advantages of employing Tumescent anaesthesia in dermatosurgical procedures

1. Lifting up of lesions on skin from underlying superficial nerves and vessels especially on face and neck (Here the concept of Bilevel anesthesia first described by Prof Lawrence Field is used along with tumescence)7
2. Reducing the amount of drug required to anaesthetize large areas
3. Prolonged periods of anaesthesia in the post operative period obviating the need for strong analgesics. This is thought to be because a longer length of sensory neuron axons get exposed to blocking concentrations of lidocaine.8
4. Excellent hemostasis reducing the blood loss during surgery and even afterwards. 9
5. Antibacterial effect of tumescent anaesthesia – near complete absence of post-operative infections in cases where tumescent anaesthesia is used (1 in 6000 cases performed by Dr Klein)10
6. Very fast recovery with short downtime following procedures done using tumescent anaesthesia. This is because of avoidance of sedating anaesthetic drugs and pain killers.

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Hair Transplantation in Scarring Alopecia

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Introduction

- Hair transplantation into scarring alopecia can be more challenging
- Inflammatory stage of the scarring alopecia must be inactive.
- Reactivation of the inflammatory stage may also occur post-transplant and lead to loss of the transplanted hairs.
- Proper diagnosis of scarring alopecia entails performing a detailed history and scalp examination.
- Additionally, scalp biopsy is highly recommended.
- Transplant should only be performed into primary cicatricial alopecia if the involved areas have been inactive for 1-2 years.
- Therefore, the disease should be quiescent, and we do not anticipate further progression of the disease.

Signs And Symptoms

- Affected areas of the scalp have redness, scaling, increased or decreased pigmentation, pustules, or draining sinuses.
- Hair loss happens quickly, and can cause severe itching, pain, and burning.
- Some cases may show signs of inflammation.
- In few cases, the inflammation that destroys the follicle is below the skin surface and there is usually no scar seen on the scalp.
- The affected scalp is usually left bare and smooth without hair and without the usual pore markings.

Proposed Working Classification Of Primary Cicatricial Alopecia

Primary cicatricial alopecia is classified according to the predominant type of infiltrate seen in histopathology.

Category	Dermatological condition
Group 1: Lymphocytic	Discoid lesion of lupus erythematosus Lichen planopilaris • Classic LPP • Frontal fibrosing alopecia • Classic pseudopelade (brocq's alopecia) • Central centrifugal alopecia • Alopecia mucinosa • Keratosis follicularisspinulosadecalvans • Graft vs host reaction
Group 2: Neutrophilic	• Folliculitis decalvans • Dissecting cellulitis
Group 3: Mixed	• Acne keloidalis • Acne necrotica • Erosive pustular dermatosis
Group 4: Non Specific	• Cicatricial pemphigoid • Busulfan induced alopecia

Cicatricial Alopecia: Key Points

- In cicatricial alopecia there is potential of permanent destruction of hair follicle.
- It is caused as a result of irreversible damage to the epithelial hair follicle stem cells.

Cicatricial alopecia has two forms. Cicatricial alopecia can be either a primary process, whereby it directly attacks the hair follicles, or a secondary process, whereby it indirectly attacks the hair follicles.

- In the primary form, the target is destructive process of the hair follicle.
- In the secondary form, the hair follicle is a bystander, destroyed by another cause. This can be due to a severe burn, an infection, radiation, or a tumor.
- If the stem cells and sebaceous gland are destroyed, there is no possibility for regeneration of the hair follicle, leading to permanent hair loss.
- The actual mechanism that causes scarring alopecia involves destruction of the top section of the hair follicle.

Biopsy

Two biopsies of 4mm punch should be taken.

- One biopsy should be sectioned vertically and should be divided into two,one for DIF and other for H&E STAINING.
- The second biopsy should be sent for horizontal sectioning. Scalp biopsy can be used for diagnosis when there is loss of hair follicles on the scalp.
- The biopsy identifies which type of cell is involved, where and how much inflammation is present and whether the oil gland is present.
- The biopsy helps to diagnose the type of cicatricial alopecia.

Microbiological evaluation: Skin swabs from pus or exudate or even portion from scalp biopsy

Hair Pull Test:

Hair-pull test can be done to identify areas of active disease where hairs are easily pulled
A microscopic evaluation can be done for the hair bulbs to determine if the hairs pulled out in a hair-pull test are resting hairs or growing hairs

Practical Tips For Hair Transplant:

- Packing of the grafts should not be too dense
- Chubby grafts containing 2 to 3 follicles are ideal
- It is highly recommended to perform a small, test area before undergoing a larger transplantation session.
- A 1-2 square centimeter area can be transplanted initially.In 9-12 months, depending on the assessment of graft survival in the test area, a larger session can be performed.
- A 10-25 follicular units per square centimeter is recommended.
- The patient is counseled that 2-4 sessions may need to be performed every 9-12 months minimum and that with each session higher densities can be achieved.
- Candidate for hair transplant must have reasonable good donor area
- Minoxidil 5% must be started 2 to 3 months before surgery and after surgery
- Autologous fat transplantation can also be tried as it enhances graft uptake
- If possible try to use plain 1% lidocaine ,use of adrenaline should be limited
- Using blades or needles for making slits should be of better depth control
- In primary scarring alopecias there is tendency of progression and to recur intermittently with time.
- Medical therapy should be initiated as soon possible before irreversible scarring occurs
- Hair transplantation can be taken only in non active and stable primary scarring alopecia and it is advisable to confirm the disease being inactive at least for 2 years.

Other Options

Along with this hair restoration surgeries following procedures can be performed specially in large scarred area of hair loss

- Scalp repair using tissue expanders
- Serial Scalp reduction
- Scalp reduction and the frechet triple flap repair
- Transposition of Scalp Flaps
- Repair of wide donor scar multiple W plasty along with follicular grafting with micropigmetation

Before transplant **After Transplant**

Before transplant **After Transplant**

Scar Revision Surgery: How To Choose!!

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Background: Scar revision is unique in the spectrum of dermatosurgery. Facial scars are considered unattractive and patients regard them as a disfigurement, so want to get it camouflaged or corrected. Aesthetically unacceptable scars include wide, raised, depressed, red, pigmented or those that transect relaxed skin tension lines. Scar revision techniques are employed in camouflaging otherwise functional and aesthetically unacceptable scars. The reconstruction of complex defects created after wide surgical excision is best treated by flaps, to avoid excessive tissue tension or anatomical distortion associated with fusiform closure. Scar camouflage is the major advantage of flaps. Dermatosurgeon performing scar revision and excision surgeries for premalignant/malignant lesions should evaluate scars and lesions to be excised, to choose the appropriate technique to obtain the best result. This paper addresses various scar revision techniques and excision surgeries for benign and malignant lesions with in safe oncologic limits.

Scar revision

In medical terminology scar is "non-regenerating wound healing". Scar is defined as ''the fibrous tissue that replaces normal tissue, destroyed by injury or disease''. Scars are the end result of nature's healing process.Majority of people regard the scars as a disfigurement.The type and site of traumatic wounds, disordered wound healing and a keloid tendency are all factors which may lead to an unsatisfactory scar, requiring later revision .The international advisory panel on scar management has classified scars into 6 typesvizmature scar, immature scar, linear hypertrophic scar, widespread hypertrophic scar, minor andmajor keloid.Cosmetic surgeons are frequently asked to revise or improve scars. Before embarking on this endeavor, the surgeon must consider several factors like patient's expectations, etiology, location, contour and type of scar. Available corrective modalities for scar (Scar Revision) includenon- surgical and surgical approaches. Non surgical modalitiesof management are medical & lasers. Surgical interventions include excision (punch,marginal, serial & simple), Excision & closure, GLBC, plasty(WPlasty, Z Plasty) and other methods.

Indications

Indications for scarmanagement includestretched scar with cross hatch marks, indented/ depressed/ discolored scars, contracted /puckered scar.Itching, pain and hypersensitivity of scar is an indication for scar revision irrespective of appearance of the scar.

Evaluation

Patient's evaluation forms an important aspect before venturing into scar revision. Misconceptions about creating an invisible scar must be corrected.Hence keeping patient's expectations in mind, scar should be assessed properly along with required investigations and inquiring detailed relevant medical conditions and medication. Patient's genetic predisposition, reaction to previous injuryand RSTL lines surrounding skin are also taken into consideration before planning for surgery. Thorough examination of appearance, etiology and age of the scar is to becarried out.The scars are also carefully observed for erythema, pigmentation, tethering, widespread telengietatic, hypertrophy, keloid and tattooing.

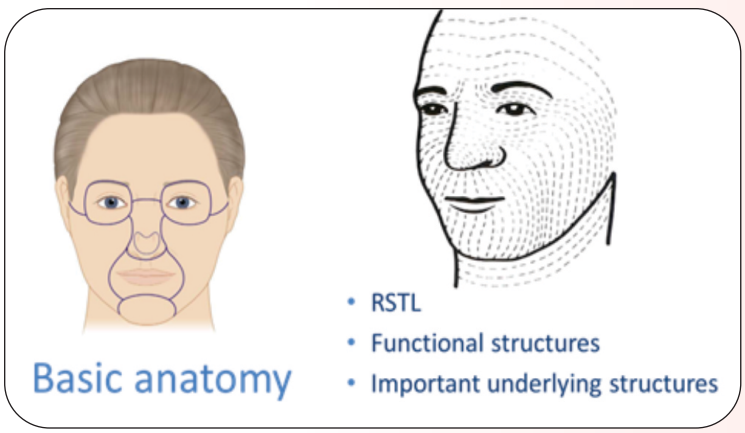


Fig 1: Basic Anatomy

Before proceeding to scar revisionprocedures basic anatomical considerations like RSTL, functional structures and important underlying structuresare looked for.(Fig 1)For optimizing facial surgery incisions to be placed into relaxed skin tension lines and observing the formation of the lines with animation of the face (e.g. grimace, frown, smile, pucker etc), while the patient being seated becomes an important part of pre-surgical evaluation.

Tips of scar revision(Fig 2)

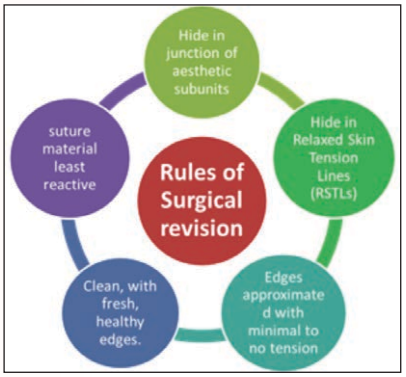


Fig 2 : Rules of surgical revision

- Aim of successful aesthetic surgical intervention include providing optimal alignment of the skin edges under minimal tension, adequate undermining of tissue, use of Burrow's triangles, appropriate use of corner sutures, and selection of the proper plastic closure for the defect / lesion to be removed.This is done withhigh quality closureand bylayered closure, tension forces that tend to pull the skin apart can be diverted to the deep structures, limiting scarring on the visible surface area.
- Good surgical revision also includes hidingof junction of aesthetic subunits and Relaxed Skin Tension Lines (RSTLs), approximating edges with minimal to no tension, maintaining clean, with fresh, healthy edges and selecting suture material which is least reactive.
- Aesthetic and functional considerations include hiding incision in orifice, Transconjunctival, sublabial, intranasal, etc, hiding incision in hair, beveling edges, being aware of future balding, hiding behind anatomic prominence(Ex: retroauricular, submental) and providing optimal alignment of the skin edges under minimal tension.
- Hence basic factors to be taken into account are adequate anesthesia, proper instruments, suture materials, closure of dead space, careful handling of tissue and precise closure of dermal layer. Choosing the optimal technique for scar revision procedure is important, based on different criterias.

Procedure

An informed consent to be obtained from the subject. The detailed history, clinical examination and necessary Investigations are reviewed on day of surgery. Photo and paper documentation of each patient must be recorded. The standard instrument tray for excision surgery including scalpel blade 11, 15, BP handle 3, iris forceps , iris scissors, adsons forceps, skin hook and needle holder with appropriate suture materials must be ready. The appropriate technique must be chosen and marked based on scar morphology. Adequate local anesthesia with 2% lignocaine with adrenaline is infiltrated. Hemostasis much be maintained throughout surgery. After surgery, wound is dressed with gentle pressure dressings. The patients are followed up on day 3 and wound is left for Open dressing with topical antibiotics , Suture removal is done on day 7 to 10. Post operative Scar massage and lasers are optional therapies.

Techniques(Fig 3)

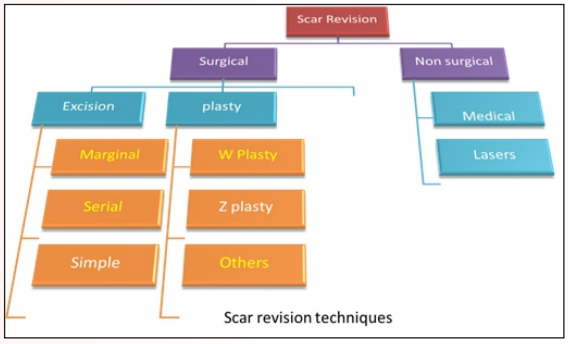


Fig 3: Scar revision techniques

1. **Scar excision and closure:** If it is apparent that the poor scar is a result of poor technique or post-operative infection, then simple excision of the scar and resuturing may be helpful in attaining a good appearance.If scar is already in RSTL and small Chicken pox scars can be excised and closed.Adjunct therapy is also required.Fig 4



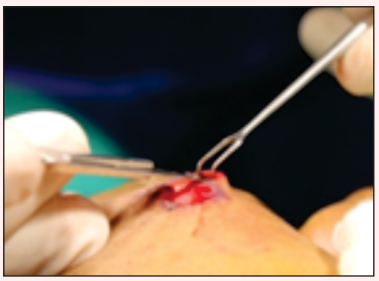

Baseline **Excision** **Closure** **3 months**

Steps of Excision & Closure

2. Z Plasty:It is a double transposition flap where the scar to be excised lies along the central limb of the Z with two peripheral limbs parallel to each other. After transposition, the centerlimb orients perpendicular to original scar. Z-plasty is one of the most versatile scar revision techniques available. As a transposition flap, Z-plasty allows for 2 adjacent undermined triangular flaps, constructed from the same central axis, to transpose over each other and to lie in the other's originating bed. In essence, these 2 triangular flaps are transposed from areas of relative excess into areas of relative deficiency and eventually lie at near right angles to the original central axis.Fig 5The usefulness of Z-plasty in scar revision rests in its ability to reorient a scar to lie more favorably in the direction of RSTLs; reorient the scar or anatomic landmark into a more favorable location or position; break up the length of the scar, thereby rendering it less visible; increase the scar length (ie, lengthen a contracted scar), thereby decreasing the prevailing scar contractile force and permitting better conformation to contoured surfaces and allow the surface-revised scar to run in a different angle to the deeper, more established scar, thus decreasing the tendency of the final scar to become depressed.

Baseline

Marking, excision of Z and raising Z flaps



Undermining

Approximation of Z flaps

Fixing flaps with key sutures and closure

After 3 months

Fig 5: Z plasty

3. **W Plasty:** It is designed to make a linear scar irregular, such that majority of the limbs lie along RSTL.While performing the W plasty, some amount of normal tissue is excised along with the scar such that the final scar is irregular, in the shape of multiple W's lined side-by-side. The W plasty consists of multiple small triangular advancement flaps on either sides of the scar such that the closure occurs in an interdigitating fashion. **Fig 6** The advantages of W plasty are that it is easy to plan and execute and It breaks a straight scar into multiple small segments many of whom lie along the RSTL.The disadvantages of W plasty includes- it may lead to a longer scar, it needs adjacent tissue laxity and sometimes regular repetitive pattern makes the scar noticeable W-plasty. The primary utility of the W-plasty (also termed the running W-plasty or zig-zagplasty) is in rendering a lengthy linear scar irregular. In addition to linear scar revision, the W-plasty is useful in the closure of semicircular incisions in which the sweeping unbroken curvilinear scar is more noticeable and under greater tension and, thus, over time more likely to become depressed or pincushioned. W-plasty makes irregular a linear scar and spares unwanted lengthening that may arise from using small multiple Z-plasties, the final result is often readily visible because the eye easily can follow the predictable zig-zag configuration. Finally, in its basic execution, this technique incorporates neither transposition nor rotation of adjacent flaps; therefore, the final scar is not elongated but only increased in the final total length.

Baseline

Marking, incision and excision of W limbs

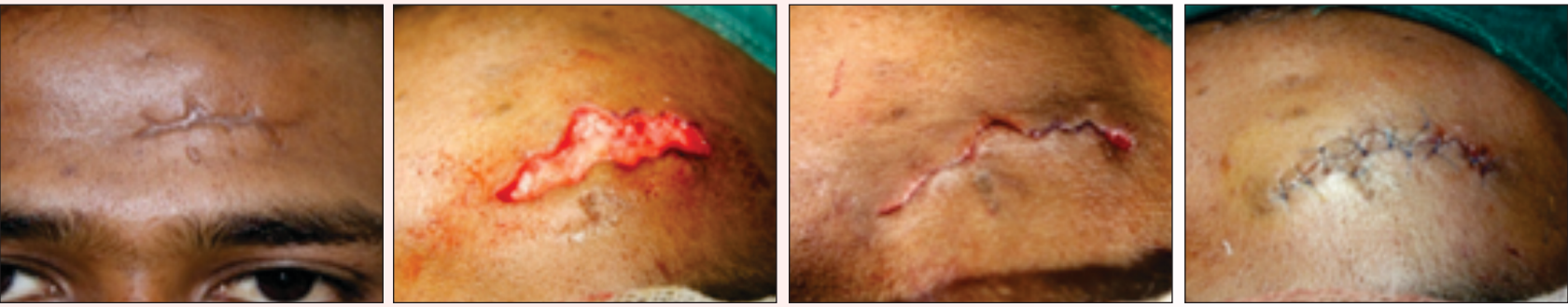
Approximation of Flaps

Closure

After 3 months

Fig 6: W plasty

4. Geometric broken line closure :It is designed to convert a long linear scar into a randomly irregular scar.Interdigitating geometric lines are drawn in such a manner that triangles, rectangles, squares. and even semicircles are created on either side of the scar in a random fashion. Majority of the lines should lie along the RSTL. After excision along these lines, the advancement flaps from both sides interdigitate so as to create a randomly irregular scar. Like in W plasty, ends have to be closed using 30° angulations to prevent the dog ear which may occur if higher angles are used. Alternatively, a fusiform excision should be done at the end perpendicular to the terminal limb of the excision. A practical way of performing a geometric broken line closure is – A dotted line is drawn around the scar and another concentric line 5 mm around this inner line. Multiple randomly placed interdigitating geometric figures are then drawn within these two lines such that the ends merge into angles less than 30° to create a randomly irregular pattern after closure. **Fig 7**



Baseline **GBLC Excision** **Closure** **Closure**

Fig: 7 Geometric Broken Line closure

5. Dermabrasion :It is performed using a power source, hand piece, cord and a diamond fraise or a wire brush. Manual dermabrasion can be performed using sterilized sandpaper. Dermabrasion removes the epidermis and superficial dermis. It causes reorientation of collagen fibers parallel to the lines of wound tension, which may account for some of the scar contour smoothing effects noted after the procedure.Skin is held under tension either by tumescent infiltration or by mechanical stretching. The area to be dermabraded is stained with Gentian Violet. The pull of the dermabrader should be unidirectional and perpendicular to the plane of rotation of the hand piece. Initial pass should be made at 45° to the axis of the scar and subsequent passes should be made perpendicular to the initial pass. The presence of diffuse pinpoint bleeding indicates entry into papillary dermis. The presence of yellow chamiose colored parallel strands indicate entry into the superficial reticular dermis and frayed strands indicate entry into the deep dermis. Entry into the deep dermis should be avoided at all costs since it results in unacceptable scarring.

Contraindications

Patients with unrealistic expectations, uncontrolled diabetes, bleeding disorders and with large scars.

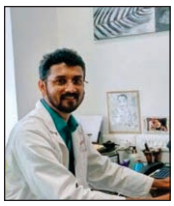
Complications

The postoperative complications include wound rupture, postoperative hematoma , Secondary infection, superficial skin necrosis and stretched scar. These can be prevented by following tips of surgery

Conclusion

Scar revision is a well-established procedure, techniques serve to improve a scar's functional capability, enhance cosmetic appearance, or both. No single method is ideal for every patient or each type of scar. A cosmetic surgeon should be well versed in the plethora of options available. A significant degree of proper technique, artistic ability and individual modification is required for consistent results. Scar revision surgeries are simple, reliable and useful reconstructive tools. However careful selection of each patient is required for optimal results.

Simplifying Vitiligo Surgery For The Dermatologist. Need Of The Hour



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"The ability to simplify means to eliminate the unnecessary so that the necessary may speak'- Hans Hoffman

Vitiligo surgery is one of the procedures which every dermatologist irrespective of their capacity and infrastructure availability, should take up for more than one reason. Primary reason is that vitiligo is a purely dermatologic condition which needs to be managed surgically when the time is ripe. This is where the stability of the disease comes to play, for which the dermatologist is the best judge. A right surgery at the wrong time can deliver disastrous results.

The next reason is that there is a vitiligo surgery that can be undertaken depending on the doctor's expertise. Be it the Mini Punch Grafting [MPG] or the Suction Blister Epidermal Grafting [SBEG] or the Melanocyte Keratinocyte Transplantation Procedure [MKTP] one should always attempt to offer something to the patient when indicated because the patient will not get a better treatment from any other specialist.

Why is vitiligo surgery seemingly complex? Isn't there a way out?

1. Attitude matters: It is the attitude of the doctor that needs a change. Once that is corrected, one can always start doing small procedures and go higher as they gain experience.
2. Expertise: Lack of expertise is another reason. One cannot be an expert overnight. Daring to do and learning from mistakes makes the beginner an expert in due course.
3. Infrastructure is indeed a problem when it comes to procedures like MKTP only. MPG and SBEG can be undertaken even in resource poor settings without much difficulty.
4. Bad results are demoralising: choosing the right procedure for the right patient at the right time to operate is the only solution to this issue.
5. Affordability of the patients: MPG and SBEG doesn't really cause much cost burden for the patient and hence can be carried out at reasonable expenses

Simplifying vitiligo surgery:

These are some of the tips, tricks and techniques from published literature to make the procedure simple and user friendly, at the same time without compromising the end outcome.

The correct ambience:

It is very rarethat vitiligo surgery is done under general anesthesia which means the patient is awake and conscious throughout the procedure time. Making the patient feel at ease helps the surgeon also to be comfortable to do the procedure. A procedure room with a TV is an idea optionin this scenario.Soothing music in the procedureroom or patient listening to his favourite music on the ear phonesare good alternatives. This helps to keep the patient distracted and hence calm during the long hours of the procedure.

The surgical tray:

The stainless-steel plate [the Indian thali / dinner plate] is one good accessory where all the instruments can be kept in place in the designated compartments and will be useful in small centres with space constraints.[1]

Simple dermabrasion:

There has been reports of dermabrasion alone giving excellent repigmentation in vitiligo. It is always worth attempting a test procedure instable patches where a reverse Koebner kind of response is induced which becomes a positive outcome towards disease correction.[2]

Alternatives to dermabrasion

Dermabrasion of the recipient area is a problem when the doctor is not experienced enough or does not have access to motoriseddermabraders. The results are good when the dermabrasion is optimal. Manual dermabrasion is doable and also RF device, needles and even ordinary sandpaper has been reported to be used for this procedure. [3,4,5][Figure 1]

Fig 1. Sand paper dermabrasion near the eye lids

Answer to shortage of grafts

SBEG has the notorious problem of unpredictability of blisterformation and partially formed blisters can be made larger by injecting normal saline into blister by approaching from the normal skin and going underneath. This can increase the graft size and morerecipient area can be covered in this manner [6,7][**Figure 2**]

Promoters of blister formation:

Rapid induction of blisters has been achieved by heating the area with UV lamps or injecting some normal saline into the dermal area prior to placing the syringes at the donor site[8,9]]

Splitting the graft

In the case of non-availability of grafts due to graft failure, the ones that are ready can be easily cut by placed on to the butter paper that comes sandwiching the paraffin dressing. This technique helps to cut the grafts at any desired size and can easily be places in delicate areas like the eye lid margin etc. [10][**Figure 3**]

Overcoming wrong side graft placement

The response is going to be nil if the graft is placed upside down. Ideallydermal side is facing the dermabradedrecipient area. During the graft preparation there are chances for this mishap to happen especially for the beginners. To avoid this problem writing the number '4' on the donor area prior to raising the blister has been found to be useful. In short, we raise a blister, harvest and spread the graft with "4' readable from the other side of the glass slide and place the graft where the "4" is readable as it was on the donor site [11]

Modified chalazion clamp

Chalazion clamp has been modified to facilitate vitiligo surgery. The normal sized chalazion clamp does not have enough room for the dermabrasion as in surgery of the lips. The modified chalazion clamp also facilitates a handle to hold the lips without slipping off, while doing the procedure [12][**Figure 4**]

Dermabrading near vital structures

Dermabrasion of the eyelids is another delicate situation for obvious reasons. The eye shield used by the ophthalmologist can be placed inside the eye lids to prevent injury to the globe during dermabrasion. The sand paper can also be use to dermabrade the lids at ease[5, 13]**Figure 5]**

Reagents and their alternatives

Use of trypsin inhibitor can be avoided by washing the trypsinized graft in Dulbeco's Modified Eagles Medium [DMEM] or Phosphate Buffered Saline [PBS] twice or thrice. The patient's own serum can be used an alternative for DMEM with equally good results.[Figure 6]This technique has been found to increase the viscosity of the suspension as well.The viscosity of the MKTP suspension can be increased by using hyaluronic acid. [14]

Scar free donor and recipient:

The brushed tissue, collected by manual dermabrasion canbe used to trypsinize and do MKTP.This has the advantage that graft harvesting doesn't need any expertise and also makes the donor and the recipient area scar free. [15]

Room temperature incubation:

The use of incubator itself has been bypassed by placing the graft in normal temperature for trypsinisations but for a longer time period. [16]

Tissue separation made easy:

The six well plate technique is where only PBS has been used to wash the trypsinizedgraftas well as to separate epidermis and the dermis. It is asequential procedure done in six petridishes and hence the name. The only reagents needs are Trypsin EDTA and PBS.[17].

Fig 2. Injecting normal saline into the blister to increase the size before graft harvesting

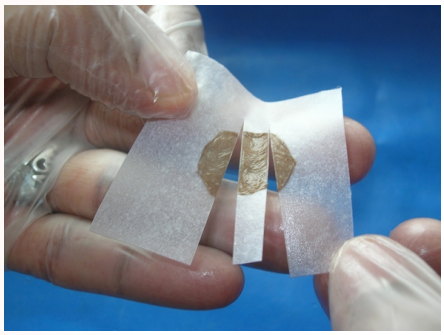

Fig 3. Splitting the blister graft using a butter paper

Fig 4. Modified chalazion clamp for safe dermabrasion of the lower lip

Fig 5. Placement of the eye shields under the eye to prevent accidental injury during motorised dermabrasion of the lids.

Fig 6. Trypsinized Tissue immersed in patient serum in MKTP

4 Chamber method:

Kumar et all uses a single Petri dish with four chambers instead of separate Petri dishes. This reduces the need for multiple petri dishes and space requirement on the laboratory table. [18]

All said and done, it is the dermatosurgeon who has to decide which is the most ideal technique for the specific patient situation after discussing with them. I am sure the above-mentioned techniques will lessen the apprehension of taking up vitiligo surgery among the youngsters.

The primary question that every dermatologist has to ask oneself with regard to vitiligo surgery is "If I don't do this, who will?"

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