

Recommendations

Standard guidelines of care for vitiligo surgery

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ABSTRACT

Vitiligo surgery is an effective method of treatment for selected, resistant vitiligo patches in patients with vitiligo. **Physician's qualifications:** The physician performing vitiligo surgery should have completed postgraduate training in dermatology which included training in vitiligo surgery. If the center for postgraduation does not provide education and training in cutaneous surgery, the training may be obtained at the surgical table (hands-on) under the supervision of an appropriately trained and experienced dermatosurgeon at a center that routinely performs the procedure. Training may also be obtained in dedicated workshops. In addition to the surgical techniques, training should include local anesthesia and emergency resuscitation and care. **Facility:** Vitiligo surgery can be performed safely in an outpatient day care dermatosurgical facility. The day care theater should be equipped with facilities for monitoring and handling emergencies. A plan for handling emergencies should be in place, with which all nursing staff should be familiar. Vitiligo grafting for extensive areas may need general anesthesia and full operation theater facility in a hospital setting and the presence of an anesthetist is recommended in such cases. **Indications for vitiligo surgery:** Surgery is indicated for stable vitiligo that does not respond to medical treatment. While there is no consensus on definitive parameters for stability, the Task Force suggests the absence of progression of disease for the past one year as a definition of stability. Test grafting may be performed in doubtful cases to detect stability. **Preoperative counseling and informed consent:** A detailed consent form elaborating the procedure and possible complications should be signed by the patient. The patient should be informed of the nature of the disease and that the determination of stability is only a vague guide. The consent form should specifically state the limitations of the procedure, about the possible future progression of disease and whether more procedures will be needed for proper results. The patient should be provided with adequate opportunity to seek information through brochures and one-to-one discussions. The need for concomitant medical therapy should be emphasized and the patient should understand that proper results take time (a few months to a year). **Preoperative laboratory studies** include hemogram including platelet counts, bleeding and clotting time (or prothrombin and activated partial thromboplastin time), and blood chemistry profile. Screening for antibodies for hepatitis B surface antigen and HIV is recommended depending on individual requirements. **Anesthesia:** Lignocaine (2%) with or without adrenaline is generally used for anesthesia; infiltration and nerve block anesthesia are adequate in most cases. General anesthesia may be needed in patients with extensive lesions. **Postoperative care:** Proper postoperative immobilization and care are very important to obtain satisfactory results.

Key Words: Vitiligo, Skin grafting, Punch grafting, Suction blister grafting

The Indian Association of Dermatologists, Venereologists and Leprologists (IADVL) Dermatosurgery Task Force consisted of the following members: Dr. Venkataram Mysore (co-ordinator), Dr. Satish Savant, Dr. Niti Khunger, Dr. Narendra Patwardhan, Dr. Davinder Prasad, Dr. Rajesh Buddhadev, Lt. Col. Dr. Manas Chatterjee, Dr. Somesh Gupta, Dr. MK Shetty, Dr. Krupashankar DS, Dr. KHS Rao, Dr. Maya Vedamurthy, Ex offi-cio members: Dr. Chetan Oberai, President IADVL (2007-2008), Dr. Koushik Lahiri, Secretary IADVL, Dr. Sachidanand S, President IADVL (2008-2009), and Dr. Suresh Joshipura, Immediate Past president IADVL (2007-2008).

Evidence - Level A- Strong research-based evidence- Multiple relevant, high-quality scientific studies with homogeneous results, Level B- Moderate research-based evidence- At least one relevant, high-quality study or multiple adequate studies, Level C- Limited research-based evidence- At least one adequate scientific study, Level D- No research-based evidence- Based on expert panel evaluation of other information

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INTRODUCTION

Vitiligo is a common acquired depigmentation disorder of great cosmetic importance. The basic pathogenesis of vitiligo or for any of the putative subsets of vitiligo, still remains unknown. The medical treatment of vitiligo is dependent upon the presence of a melanocyte reservoir and is effective in only 60-70% of the patients. Certain types of vitiligo do not respond well to medical treatment and resistant lesions do persist even in those who respond. In light of these limitations of medical treatment, surgical treatment of vitiligo was first proposed in the 1960s. Over the years, the concept of surgical treatment has been expanded to include surgical “biotherapies” such as autologous, cultured melanocyte transplantation. The disease has a major impact on the quality of life of patients, particularly the Indian population, in which there is a severe stigma attached to the disease, affecting the social and psychological aspects of the patients. Due to these effects, there is a considerable need for active treatment of this disease, in contrast to fair-skinned patients in whom the disease is less apparent.

RATIONALE AND SCOPE

As such, there are no uniformly acceptable measurement tools and indices for measurement of the efficacy of outcomes of the surgical modalities of vitiligo treatment. Assessment of quality of life and global assessment should be performed because the percentage of repigmentation may not always be a good indicator of patient satisfaction. There is an urgent need for universally acceptable, objective, reproducible and easy-to-use measurements to evaluate the efficacy of surgical vitiligo studies. These guidelines provide minimal standards of care for various surgical methods of treatment of vitiligo, with a brief description of the procedures as well as their advantages and disadvantages.

PHYSICIAN'S QUALIFICATIONS

The physician performing vitiligo surgery should have completed postgraduate training in dermatology; he/she should also have had adequate training in vitiligo surgery during postgraduation. Alternatively, training in vitiligo surgery may be obtained on the surgical table (hands-on) under the supervision of an appropriately trained and experienced dermatological surgeon. The training may also be obtained in dedicated workshops. In addition to the surgical technique, training should include techniques in local anesthesia and emergency resuscitation and care.

FACILITY

Vitiligo surgery can be performed safely in an outpatient day care dermatosurgical facility under local anesthesia. The day care theater should be equipped with facilities for monitoring and handling emergencies. A plan for handling emergencies should be in place with which all nursing staff should be familiar. Transplantation for extensive areas of vitiligo may need general anesthesia and in such cases, an operation theater facility in a hospital setting and the presence of an anesthetist are recommended.

INDICATIONS FOR SURGERY AND PATIENT SELECTION

Surgery is indicated for all types of stable vitiligo including segmental, generalized and acrofacial types that do not respond to medical treatment. While there is no consensus on definitive parameters for stability, various recommendations suggest a period of disease inactivity ranging from six months to two years. The task force agrees on a year of disease inactivity as the cut-off period for defining stability (Level D). Test grafting may be performed in doubtful cases to detect stability. The choice of surgical intervention should be individualized according to the type of vitiligo, stability, localization of lesions and cost-effectiveness of the procedure. Patient counseling about the nature of the disease and about the fact that the determination of stability is only a rough guide is essential.

EXPLANATION FOR STABILITY

The outcome of surgery is good in stable lesions whereas unstable lesions respond poorly. Thus, the stability status of vitiligo is the single, most important prerequisite in case selection. However, despite many studies, there is no consensus regarding the minimum required period of stability. The recommended period of stability in different studies has varied from four months to three years. Most authors have suggested that vitiligo can be classified as being stable when there is no progression of old lesions and/or development of new lesions during the past one year. A set of objective criteria-the Vitiligo disease activity score (VIDA), was suggested by Njoo *et al.*^[7] in 1999 to follow the progress of the patient. It is a 6-point scale on which the activity of the disease is evaluated by the appearance of new vitiligo lesions or the enlargement of preexisting lesions gauged during a period ranging from < 6 weeks to one year [Table 1]. The task force recommends that surgery

Table 1: VIDA 6-point score

Disease activity	VIDA score
Active in past 6 weeks	+4
Active in past 3 months	+3
Active in past 6 months	+2
Active in past 1 year	+1
Stable for at least 1 year	0
Stable for at least 1 year and spontaneous repigmentation	-1

for vitiligo should be performed only in patients with VIDA scores of -1 or 0 (Level D).

EVIDENCE

1. Das SS, Pasricha JS. Punch grafting as a treatment of residual lesions of vitiligo. *Indian J Dermatol Venereol Leprol* 1992;58:315-9.
2. Boersma BR, Westerhof W, Bos JD. Repigmentation in vitiligo vulgaris by autologous minigrafting: Results in nineteen patients. *J Am Acad Dermatol* 1995;33:990-5.
3. Falabella R. Repigmentation of segmental vitiligo by autologous minigrafting. *J Am Acad Dermatol* 1983;9:514-21.
4. Falabella R. Grafting and transplantation of melanocytes for repigmenting vitiligo and other types of leukoderma. *Int J Dermatol* 1989;28:363-9.
5. Falabella R. Surgical treatment of vitiligo: Why, when and how. *J Eur Acad Dermatol Venereol* 2003;17:518-20.
6. Savant SS. Autologous miniature punch grafting in vitiligo. *Indian J Dermatol Venereol Leprol* 1992;58:310-4.
7. Njoo MD, Das PK, Bos JD, Westerhof W. Association of the Koebner phenomenon with disease activity and therapeutic responsiveness in vitiligo vulgaris. *Arch Dermatol* 1999; 135:407-13.
8. Falabella R. Surgical therapies for vitiligo and other leukodermas, part 1: Minigrafting and suction epidermal grafting. *Dermatol Ther* 2001;14:7-14.

In contrast, other authors have questioned the concept of stability and stated that existing parameters are arbitrary.

EVIDENCE

1. Malakar S, Dhar S. Treatment of stable and recalcitrant vitiligo by autologous miniature punch grafting: A prospective study of 1,000 patients. *Dermatology* 1999;198:133-9.
2. Malakar S, Lahiri K. How unstable is the concept of stability in surgical repigmentation of vitiligo? *Dermatology* 2000; 201:182-3.

Considering the variety of opinions, it is preferable to take multiple factors during patient selection for vitiligo surgery into account.

PARAMETERS FOR ESTABLISHING STABILITY OF VITILIGO

1. **History of progression:** Absence of new lesions
2. **Extension of old lesions:** No extension of old lesions
3. **Koebner phenomenon:** Absence of Koebner phenomenon either based on history or by checking for experimentally induced vitiligo
4. **Mini-grafting test or test-grafting:** The original test was proposed by Falabella *et al.*^[1] to select patients with stable vitiligo who may respond to melanocyte transplantation. The test was considered positive if unequivocal repigmentation took place beyond 1 mm from the border of the implanted graft over a period of three months. Although this test has been considered as a gold standard for establishing the stability and success of repigmentation, doubts have been expressed over its utility. It has been seen that even when the minigraft test is positive, the disease itself may be unstable.

EVIDENCE

1. Falabella R, Arrunategui A, Barona MI, Alzate A. The minigrafting test for vitiligo: Detection of stable lesions for melanocyte transplantation. *J Am Acad Dermatol* 1995;32:228-32.

CONSENSUS RECOMMENDATION OF THE TASKFORCE ON STABILITY

The available evidence is insufficient to recommend a single cut-off period to assess stability. To facilitate consensus on this issue, the task force attempts to provide a clear definition of stability—a patient reporting no new lesions, no progression of existing lesions, and absence of Koebner phenomenon during the past one year. Spontaneous repigmentation should be considered as a favorable sign for the transplantation procedure. A test graft may be considered whenever there is a doubt about the stability, or the patient is unable to give a clear history on stability. It needs to be stressed here that the treating physician should always consider each patient individually and exercise his/her judgment (LEVEL D).

2. **The age of the patient for vitiligo surgery:** As such, no uniformly accepted opinion exists concerning the minimum age for surgery. Vitiligo surgery is generally performed under local anesthesia, which would be difficult in children. General anesthesia for vitiligo surgery in a

young child poses unacceptable risks and the progress of the disease is difficult to predict in children. Hence, many dermatologists feel that surgical procedures should not be performed in children. However, studies have suggested that results of transplantation procedures were better in younger individuals than in older ones. Thus, no consensus exists in this aspect and physicians should exercise their judgment after taking all aspects of the individual patient into consideration. (LEVEL C)

EVIDENCE

1. Gupta S, Kumar B. Epidermal grafting in vitiligo: Influence of age, site of lesion, and type of disease on outcome. *J Am Acad Dermatol* 2003;49:99-104.
2. Gupta S, Kumar B. Epidermal grafting for vitiligo in adolescents. *Pediatr Dermatol* 2002;19:159-62.

PREOPERATIVE COUNSELING AND INFORMED CONSENT

Proper counseling is essential; the nature of the disease, procedure, expected outcome and possible complications should be clearly explained to the patient. The need for concomitant medical therapy should be emphasized. Patients should understand that proper results may take time to appear (few months to one year). The patient should be provided with adequate opportunity to seek information through brochures, computer presentations, and one-to-one discussions.

A detailed consent form (see appendix 1) describing the procedure and possible complications should be signed by the patient. The consent form should specifically state the limitations of the procedure, possible future disease progression and whether more procedures will be needed for optimal outcome.

ANESTHESIA

The recipient site is locally anesthetized by infiltration of 2% xylocaine, the pain of which can be reduced by prior application of EMLA[®] cream applied under occlusion for 1-2 hours. Adrenaline should not be used on the recipient site as it makes the judgment of adequacy of the denudation to the required depth difficult. Tumescence anesthesia and nerve blocks may be used in larger areas. If grafting is planned for extensive areas, general anesthesia may be needed in a hospital setting. (LEVEL D)

METHODS OF SURGICAL MODALITIES

Methods of surgical modalities for vitiligo include both tissue grafts and cellular grafts.

TISSUE GRAFTS

1. **Punch grafting:** In this procedure, punch grafts (of 1.2-2.0 mm diameter) are taken from donor areas over the thighs, buttocks, postauricular areas/posterior earlobe or the medial aspect of the upper arm. These are grafted into recipient sites in stable vitiligo lesions, which are created by using punches 1-2 mm in diameter. To ensure a better fit, recipient punches are generally smaller by 0.5 mm than donor punches. Smaller sized grafts may be used to yield better cosmetic results. Sockets are created in the recipient area at a distance of 5-10 mm and the harvested grafts are placed in these sockets. This allows the perigraft spread of pigment to cover the surrounding depigmented skin, the extent of which varies according to the skin color and site of the treated patch (more on exposed sites). (LEVEL B)

EVIDENCE

1. Savant SS. Miniature punch grafting. In: Savant SS, editor. Association of scientific cosmetologists and dermatosurgeons textbook of dermatosurgery and cosmetology. 2nd ed. Mumbai: ASCAD; 2005. p. 359-69.
2. Babu A, Thappa DM, Jaisankar TJ. Punch grafting versus suction blister epidermal grafting in the treatment of stable lip vitiligo. *Dermatol Surg* 2008;34:166-78.
3. Das SS, Pasricha JS. Punch grafting as a treatment of residual lesions of vitiligo. *Indian J Dermatol Venereol Leprol* 1992;58:315-9.
4. Boersma BR, Westerhof W, Bos JD. Repigmentation in vitiligo vulgaris by autologous minigrafting: Results in nineteen patients. *J Am Acad Dermatol* 1995;33:990-5.
5. Falabella R. Repigmentation of segmental vitiligo by autologous minigrafting. *J Am Acad Dermatol* 1983;9:514-21.

Dressings are postoperatively placed to ensure immobilization, and may be removed in 24 hours to check for the displacement of the grafts. Grafts are taken up in 7-10 days after which phototherapy or treatment with topical steroid is started to ensure even spread of perigraft pigment.

EVIDENCE

1. Barman KD, Khaitan BK, Verma KK. A comparative study of punch grafting followed by topical corticosteroid versus

punch grafting followed by PUVA therapy in stable vitiligo. *Dermatol Surg* 2004;30:49-53.

- Lahiri K, Malakar S, Sarma N, Banerjee U. Inducing repigmentation by regrafting and phototherapy (311 nm) in punch grafting failure cases of lip vitiligo: a pilot study. *Indian J Dermatol Venereol Leprol* 2004;70:156-8.

Advantages: This is the easiest and least expensive method and may be used satisfactorily in all areas other than the nipples and the angle of the mouth, where involuntary muscle contraction may interfere with graft uptake. It is even suitable for 'difficult-to-treat' locations such as the fingers, toes, palms and soles, etc.

Disadvantages and complications: This method is not suitable for large lesions as uniform pigmentation may not always be achieved. Other important complications include cobblestoning and a polka dot appearance.

- Suction blister epidermal grafting:** This procedure consists of obtaining very thin skin grafts consisting of only the epidermis. A physiological split is made at the dermoepidermal junction by the application of prolonged suction at a negative pressure of -200 to -500 mm of Hg to the donor site. The recipient site is dermabraded by using either a manual or a motorized dermabrader, depending on the size and site of the lesion. Thin grafts are applied to the dermabraded recipient site. Alternatively, the recipient site may be denuded by an Erbium:YAG or carbon dioxide (CO₂) Laser. Equipment needed includes specially altered disposable syringes, suction cups or glass funnels, suction apparatus and manual/motorized dermabraders. The graft may fall off in a period of a week to ten days. (LEVEL B)

Advantages: It yields excellent cosmetic results as the graft is very thin. One of the major advantages of this procedure is that chances of scarring at the donor or recipient sites are minimal as the graft is purely epidermal.

Disadvantages: The major disadvantage of this procedure is that it is time-consuming as donor site blistering requires a few hours. Large areas can not be treated by this method.

EVIDENCE

- Falabella R. Surgical therapies for vitiligo and other leukodermas, part 1: Minigrafting and suction epidermal grafting. *Dermatol Ther* 2001;14:7-14.
- Hasegawa T, Suga Y, Ikejima A, Muramatsu S, Mizuno Y, Tsuchihashi H, *et al.* Suction blister grafting with CO₂ Laser

resurfacing of the graft recipient site for vitiligo. *J Dermatol* 2007;34:490-2.

- Pai GS, Vinod V, Joshi A. Efficacy of erbium: YAG Laser-assisted autologous epidermal grafting in vitiligo. *J Eur Acad Dermatol Venereol* 2002;16:604-6.
- Split-thickness grafting:** Split-thickness skin grafting involves the free transfer of the epidermis along with a portion of the dermis from one site to another. The procedure is carried out under local anesthesia (for localized lesions) or general anesthesia (for extensive lesions). It consists of obtaining very thin, split thickness skin grafts, consisting of the epidermis and a part of the upper papillary dermis, and grafting them on the denuded (dermabraded or Laser-abraded) recipient site. The grafts are further secured with pressure and immobilization. Motorized dermatomes such as Padgett's or Zimmer's dermatomes, may be used to obtain ultra-thin, split-thickness grafts, which may give cosmetically superior results compared to those with manual dermatomes (Level B).

Instruments include dermabraders, skin-grafting knives such as the Humby's knife or any of its modifications, as well as other surgical instruments. Large areas can be grafted in a single sitting.

Advantages: This method has the advantage of treating a relatively large area in a short period of time.

Disadvantages: Taking split-thickness grafts of uniform thickness requires skill and experience. Other disadvantages include 'stuck-on' or 'tire patch' appearance, curling of the border with beaded appearance, color mismatch, milia, perigraft halo of depigmentation, and donor site scarring.

EVIDENCE

- Achauer BM, Le Y, Vander Kam VM. Treatment of vitiligo with melanocytic grafting. *Ann Plast Surg* 1994;33:644-6.
- Kahn AM, Cohen MJ. Repigmentation in vitiligo patients. Melanocyte transfer via ultra-thin grafts. *Dermatol Surg* 1998;24:365-7.
- Ozdemir M, Cetinkale O, Wolf R, Kotoğyan A, Mat C, Tüzün B, Tüzün Y. Comparison of two surgical approaches for treating vitiligo: a preliminary study. *Int J Dermatol.* 2002;41:135-8.
- Agrawal K, Agrawal A. Vitiligo: repigmentation with dermabrasion and thin split-thickness skin graft. *Dermatol Surg* 1995;21:295-300.
- Other tissue grafting procedures:** Several other methods of tissue grafting have been performed

by different authors. These methods or their modifications may be used by the treating physician depending on individual expertise and experience. Hair follicle-grafting has been performed by a few authors for treating small patches in hair bearing areas and has been found useful in treating lesions with leukotrichia. A small strip of hair-bearing scalp is taken from the occipital area; single hairs are separated and transplanted into vitiligo patches 5-10 mm apart. (LEVEL C)

EVIDENCE

1. Na GY, Seo SK, Choi SK. Single hair grafting for the treatment of vitiligo. *J Am Acad Dermatol* 1998;38:580-4.
2. Agrawal K, Agrawal A. Vitiligo: Surgical repigmentation of leucotrichia. *Dermatol Surg* 1995;21:711-5.
3. Laxmisha C, Kumari R, Thappa DM. Surgical repigmentation of leukotrichia in localized vitiligo. *Dermatol Surg* 2006;32:981-2.
4. Malakar S, Dhar S. Repigmentation of vitiligo patches by transplantation of hair follicles. *Int J Dermatol* 1999;38:237-8.

In flip-top grafting, superficial, thinly shaved biopsies that are 2-4 mm in size, are taken using a razor blade, which are then sectioned into smaller 1-2 mm grafts. A 5-mm flap of epidermis with minimal dermis is raised with a razor blade at the recipient site, and the grafts are placed under this flap. The major advantage of this procedure is that there is rapid healing and no cobblestoning. (LEVEL C)

EVIDENCE

1. McGovern TW, Bologna J, Leffell DJ. Flip-top pigment transplantation: A novel transplantation procedure for the treatment of depigmentation. *Arch Dermatol* 1999; 135:1305-7.

CELLULAR GRAFTS

These methods represent important recent advances and need specialized training and appropriate equipments. The following cellular grafting techniques have been advocated in the surgical management of vitiligo:

1. Autologous, noncultured epidermal cell suspension
 2. Autologous, cultured melanocyte transplantation
 3. Autologous, cultured epithelial grafts
- 1) **Transplantation of autologous, epidermal cell suspension (noncultured melanocyte grafting):** In this procedure, a shave biopsy sample is taken with

a dermatome. The skin sample is immersed in a trypsin solution, the epidermis separated from the dermis, and after some additional steps, a cellular suspension of keratinocytes and melanocytes is obtained, which is transplanted on the denuded recipient site. (LEVEL B)

Advantages: In comparison with other surgical methods, the basal layer suspension method has the advantage that a fairly large area can be treated with the donor-to-recipient expansion ratio ranging from 5-10 fold. (LEVEL B)

Disadvantages: Taking split-thickness grafts requires skill and experience. This technique requires a properly equipped laboratory and trained personnel.

EVIDENCE

1. Olsson MJ, Juhlin L. Long-term follow-up of leucoderma patients treated with transplants of autologous cultured melanocytes, ultrathin epidermal sheets and basal cell layer suspension. *Br J Dermatol* 2002;147:893-904.
 2. van Geel N, Ongenaes K, De Mil M, Haeghen YV, Vervaeke C, Naeyaert JM. Double-blind placebo-controlled study of autologous transplanted epidermal cell suspensions for repigmenting vitiligo. *Arch Dermatol* 2004;140:1203-8.
 3. Mulekar SV. Melanocyte-keratinocyte cell transplantation for stable vitiligo. *Int J Dermatol* 2003;42:132-6.
 4. Olsson MJ, Juhlin L. Leucoderma treated by transplantation of a basal cell layer enriched suspension. *Br J Dermatol* 1998;138:644-8.
- 2) **Transplantation of cultured autologous melanocytes:** Melanocytes are cultured *in vitro* for 15-30 days by the addition of media and growth factors. Once sufficient numbers are present, melanocytes are detached from the culture plates and suspension is transplanted onto the denuded recipient area in a density of 1000-2000 melanocytes/mm². The recipient area can be denuded by dermabrasion, CO₂, or an Erbium:YAG Laser. (LEVEL B)

Advantages: The major advantage is that the procedure can treat unlimited areas; however, it is recommended that vitiligo involving > 30% of the body surface area should not be treated surgically as chances of success are minimal in such cases. (LEVEL D)

Disadvantages: There have been some safety concerns about the use of cultured autografts in vitiligo. 12-tetradecanoylphorbol 13-acetate (TPA) used in the culture medium is a tumor promoter, making its long-term safety a

concern. But recent availability of TPA-free and serum-free media provide a solution to this problem. However, this method is expensive and requires a tissue culture laboratory setup.

EVIDENCE

1. Olsson MJ, Juhlin L. Transplantation of melanocytes in vitiligo. *Br J Dermatol* 1995;132:587-91.
2. Czajkowski R, Placek W, Drewa T, Kowalyszyn B, Sir J, Weiss W. Autologous cultured melanocytes in vitiligo treatment. *Dermatol Surg* 2007;33:1027-36.
3. Chen YF, Yang PY, Hu DN, Kuo FS, Hung CS, Hung CM. Treatment of vitiligo by transplantation of cultured pure melanocyte suspension: analysis of 120 cases. *J Am Acad Dermatol* 2004;51:68-74.

3) **Autologous cultured epithelial grafts:** Cells are seeded in a medium that allows co-cultivation of keratinocytes and melanocytes. A few weeks later, a cultured epidermal sheet is obtained, released by dispase and attached to petrolatum gauze. The recipient site is prepared as described in the cultured melanocyte transplantation section and the gauze is applied on the recipient site and dressed. (LEVEL B)

Advantages: The major advantage is that cells are expanded in the cell culture to treat a large area.

Disadvantages: The technique requires special personnel and equipments and is expensive.

EVIDENCE

1. Guerra L, Primavera G, Raskovic D, Pellegrini G, Golisano O, Bondanza S, *et al.* Erbium:YAG laser and cultured epidermis in the surgical therapy of stable vitiligo. *Arch Dermatol* 2003;139:1303-10.
2. Pianigiani E, Risulo M, Andreassi A, Taddeucci P, Ierardi F, Andreassi L. Autologous epidermal cultures and narrow-band ultraviolet B in the surgical treatment of vitiligo. *Dermatol Surg* 2005;31:155-9.
3. Toriyama K, Kamei Y, Kazeto T, Yasue T, Suga Y, Inoie M, *et al.* Combination of short-pulsed CO₂ laser resurfacing and cultured epidermal sheet autografting in the treatment of vitiligo: a preliminary report. *Ann Plast Surg* 2004;53:178-80

CERTAIN SPECIAL METHODS OF TREATMENT IN SELECTED SITUATIONS

Tattooing has been recommended as a suitable method in the angle of the mouth. Dermabrasion and chemabrasion (with cauterants such as trichloroacetic acid/phenol) have

been used in lesions on hairy areas to produce pigmentation as adjuvant to phototherapy. A 308-nm excimer Laser has been found to be successful in a few studies, with > 75% repigmentation occurring in about 30% of the patients; it is not effective in acral areas. (LEVEL C)

EVIDENCE

1. Halder RM, Pham HN, Breadon JY, Johnson BA. Micropigmentation for the treatment of vitiligo. *J Dermatol Surg Oncol* 1989;15:1092-8.
2. Taneja A, Trehan M, Taylor CR. 308-nm excimer Laser for the treatment of localized vitiligo. *Int J Dermatol* 2003;29:133-7.

EVIDENCE-BASED PRACTICE GUIDELINES FOR CHOICE OF METHOD

As already highlighted, there is no uniformly acceptable objective measurement tool to compare the surgical outcome of a given modality. Recently, an attempt has been made by the European Taskforce on vitiligo to define and assess the severity of vitiligo. A scoring system has also been suggested to evaluate the outcome of transplantation procedures in vitiligo, although it is mostly subjective and has not been validated for interobserver bias in a large sample size. (LEVEL C)

EVIDENCE

1. Falabella R. Grafting and transplantation of melanocytes for repigmenting vitiligo and other types of leukoderma. *Int J Dermatol* 1989;28:363-9.
2. Falabella R. Surgical treatment of vitiligo: Why, when and how. *J Eur Acad Dermatol Venereol* 2003;17:518-20.
3. Gupta S, Handa S, Kumar B. A novel scoring system for evaluation of results of autologous transplantation methods in vitiligo. *Indian J Dermatol Venereol Leprol* 2002;68:33-7.

Various meta-analyses of published studies have shown that split-thickness grafting, suction blister epidermal grafting, and punch grafting have comparable success rates of repigmentation. (LEVEL A)

EVIDENCE

1. Falabella R. Surgical treatment of vitiligo: Why, when and how. *J Eur Acad Dermatol Venereol* 2003;17:518-20.
2. Savant SS. Autologous miniature punch grafting in vitiligo. *Indian J Dermatol Venereol Leprol* 1992;58:310-4.
3. Taieb A, Picardo M; VETF Members. The definition and assessment of vitiligo: A consensus report of the Vitiligo European Task Force. *Pigment Cell Res* 2007;20:27-35.
4. Rusfianti M, Wirohadidjodjo YW. Dermatological techniques for repigmentation of vitiligo. *Int J Dermatol* 2006;45:411-7.

- Njoo MD, Westerhof W, Bos JD, Bossuyt PM. A systematic review of autologous transplantation methods in vitiligo. *Arch Dermatol* 1998;134:1543-9.

Similarly, all three cellular graft techniques (non-cultured epidermal cell suspension, cultured melanocytes and cultured epidermis) were found to be equally effective. However, in comparison to tissue grafts, cellular grafts showed slightly lower success rates. One explanation may be that cellular grafts are generally used to treat larger areas in comparison to tissue grafts. (LEVEL A)

EVIDENCE

- Olsson MJ, Juhlin L. Long-term follow-up of leucoderma patients treated with transplants of autologous cultured melanocytes, ultrathin epidermal sheets and basal cell layer suspension. *Br J Dermatol* 2002;147:893-904.
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When compared on the basis of adverse events, the highest incidence of adverse events was reported with punch grafting followed by split-thickness grafting and suction blister epidermal grafting. Cellular grafting was associated with the lowest number of adverse events.

EVIDENCE

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Thus, the choice of the procedure is dependent upon the site, area, availability of infrastructure (for cellular grafts), expertise of the dermatological surgeon, cost of the

Table 2: Choice of method according to area and site

	Preferred	Alternative
AREA		
<i>Small area</i>	SBEG, STG	PG
<i>Moderate</i>	NCES, STG	PG
<i>Relatively large area</i>	CM, CE, NCES, STG	
SITE		
<i>Fingers and toes</i>	PG, SBEG	NCES
<i>Palm and soles</i>	PG	
<i>Lips</i>	SBEG	PG
<i>Eyelids</i>	SBEG, NCES, STG	MPG
<i>Nipple and areola</i>	SBEG, NCES	
<i>Genitals</i>	NCES, SBEG, CM	

SBEG: suction blister epidermal grafting, STG: split-thickness grafting, PG: punch grafting, NCES: noncultured epidermal suspension, CM: cultured melanocytes, CE: cultured epidermis

procedure and the patient's preference [Table 2].

CONCLUSION

Surgical methods of treatment for vitiligo constitute an important adjuvant for medical therapy. Proper case selection based on the determination of stability of the lesions is very important but no uniform criteria exist for the determination of stability. Hence, in an attempt to build consensus on this issue, the task force suggests the following definition of stability: a patient reporting no new lesions, no progression of existing lesions, and absence of Koebner phenomenon over the past one year. Above all, proper patient counseling about the nature of the disease and the surgery is essential. Recommendations for the choice of surgical method for different types, sites, and areas are shown in Table 2 (Level D).

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Appendix 1 Consent form for Vitiligo surgery

I, (name) _____, aged _____ years, residing at (address) _____

have been advised to undergo surgery for my skin condition, Vitiligo.

I hereby give consent after being explained about the procedure by Dr. _____

- I am aware that Vitiligo is a disease with a chronic, recurrent course.
- I am aware that surgery is only a cosmetic procedure and other concomitant medical treatments may be essential. Surgery will not alter the course of the disease or prevent any recurrence.

3. My disease has been stable for the last ____months/year. I have no tendency for keloids.
4. I am aware that the exact course of the disease can not be predicted and, though the disease is stable at present, flare-ups and recurrences may occur at any time, in any part of the body.
5. I have been explained the procedure of the operation as follows:
 - a) The procedure will be done under local anesthesia.
 - b) The donor area is from back/thigh/gluteal area/inner arm.
 - c) The donor graft will be taken by punch/suction blister/grafting knife/dermatome.
 - d) Recipient area will be abraded by dermabrader and then the graft applied, sealed by dressing.
6. I am aware that avoiding movements and taking care of the recipient area is essential for optimal results.
7. I am aware that I may experience some pain postoperatively and may need to take analgesics.
8. Donor area will need dressing; the donor area may take 2-3 weeks to heal.
9. I am aware that for optimal cosmetic results, it may take from six months to one year. I may need to take medical treatment during this period.
10. I am also aware that the grafted area may not match in texture and appearance with the surrounding skin. A perfect match with the surrounding normal skin may not always be possible.

I hereby give consent to perform the transplantation and other medical procedures that may become necessary during the surgery. The consent form has been signed by me when I was not under the influence of any drugs.

Signature of the doctor

(Name _____)

Date:

Signature of the Witness 1

(Name: _____)

Date:

Signature of the patient

(Name: _____)

Date:

Signature of witness 2

(Name: _____)

Date: