

## PUNCH GRAFTING IN VITILIGO

**Dr. Venkataraman Mysore**

Medical Consultant (dermatology)

Salmaniya Medical Complex

Manama.

### Abstract:

Vitiligo, a common depigmenting disorder of possible autoimmune etiology, is generally managed by the use of PUVA therapy. However, this approach has limitations, as it is effective in producing cosmetically satisfactory pigmentation in only 50-60% of cases. Surgical methods have been increasingly used in recent years for treating stable lesions of vitiligo, and are now recognized as useful forms of treatment. Different surgical methods, such as thin thiersch grafting, suction blister grafting and punch grafting have been used. We hereby report our experience in punch grafting - an extremely simple and effective method of grafting, needed minimum equipment and surgical skill.

### Introduction:

Vitiligo is a chronic depigmenting disease of the skin, characterized by loss of melanocytes, of possible autoimmune etiology and with hereditary basis<sup>1</sup>. The disease causes immense emotional stress to the patient because of the disfigurement, particularly in the dark skinned races. Through out history, and in different parts of the world, patients of vitiligo have suffered much social stigma. The social stigma caused by the disease is best summarized by Omar Qayyam who remarked that "A black spot on a whole face is a blessing. But a white spot on a dark face is a curse"<sup>2</sup>. This stigma has persisted to the present day, as is evident by the following moving account of the feelings of a female patient<sup>2</sup>.

### Vitiligo-the white disaster

"I have this thing called Vitiligo, since what appears to be ages. People seem to believe it should not bother me. Sure it isn't painful, but causes all the same. I have been told it looks funny maps all over me, or like some one threw a bottle of bleach at me or I just have been in a terrible fire. People look at

me with a gasp-God, is she ever messed up!' or 'here she comes, the walking horror show!' or 'the bleach lady'. All I want is to make friends, but the sight of me makes people feel, that they would rather if I felt. I have felt that life stopped at 23 when it all started and ever since, I have been in a limbo waiting for a miracle cure. My doctor tells me that it is all a mistake in my pigment cells and immunity-to me; I am a mistake. To be rid of Vitiligo would be like being reborn for me. Oh! How I wish for a normal skin.

While the exact etiology of vitiligo is not known, it is generally believed to be an autoimmune disease, though other hypotheses such as self destruction hypothesis and neural hypothesis have also been also proposed<sup>1,2</sup>. There is also a definite hereditary predisposition in nearly 30% of cases and several studies have shown association with HLA antigens. In a study in Oman we found that HLA Bw6 and DR7 were associated in Omani patients with Vitiligo<sup>3</sup>.

The medical modalities of therapy in vitiligo have serious limitations. Firstly, cosmetically satisfactory pigmentation is obtained in only 50-60% of cases. The response to treatment is poor in lesions on non-hairy, acral and bony areas. Further, segmental and acral types of vitiligo do not respond to PUVA therapy satisfactorily. In view of these limitations of medical treatment, surgical treatment for carefully selected cases has become popular in the last few years. This article will report our experience and review the surgical methods of treatment of vitiligo, with particular emphasis on punch grafting.

### Indications for Surgery and selection of cases:

Surgery can be considered for any patient who is not responding to standard medical treatment and satisfies the following criteria:

- 1- Localized types of vitiligo, such as segmental and localized vitiligo vulgaris.
- 2- Other causes for leucoderma such as piebaldism, naevus depigmentosus, post-burn leucoderma.
- 3- Stable lesions with well defined, pigmented border, absence of spreading and no fresh lesion for at least 2 years.
- 4- Well informed, motivated patient
- 5- No systemic disease or tendency for keloid formation.

Proper selection of cases is of utmost importance and the surgeon should not yield to the demands of the patient to perform the surgery early. The patients should also be informed about the limitations of the surgery, that it is not a treatment of underlying cause and lesions could recur later and informed consent should be obtained. All patients should undergo photographic documentation and routine investigations, such as haemogram, serology for hepatitis, syphilis and HIV.

### Correspondence:

Dr. Venkataraman Mysore, MD, DipRCPath (Lond)

Medical Consultant (dermatology)

Salmaniya Medical Complex Manama.

Tel. No. 255555-7008(Off) 254354(res)

Email; venkatm@batelco.com.bh

**Keywords:** vitiligo, punch grafting.

**Methods of surgery:**

**Donor area:** Donor area is usually from the thigh, gluteal area, Arm and retroauricular area are chosen when lighter skin is required, as in vitiligo on face.

The different methods for harvesting donor grafts are:

1. Thin thirsch grafting<sup>5-9</sup>
2. Suction blister grafting<sup>10,11</sup>
3. Punch grafting<sup>12-16</sup>

**Recipient area:** Several methods have been used to prepare the recipient area and to remove the lesional skin. These include:

1. Dermabrasion of the lesion-the most popular methods<sup>5</sup>.
2. Cryoblistering using application of liquid nitrogen to produce a blister after 24-48 hours<sup>10</sup>.
3. Punch grafting<sup>12-16</sup>
4. PUVA therapy to produce blistering<sup>17</sup>

While each of these methods have their advocates, this article will elaborate on punch grafting, in the light of our experience of the technique.

Punch grafting: is a simple technique, first described by Fallabella<sup>12</sup>, and involves harvesting small grafts under local anesthesia, by using the biopsy punch.

**Principle of punch grafting:** The underlying principle of all surgical methods in vitiligo is that normal skin, when transplanted to stable lesions of vitiligo show the phenomenon of donor dominance and hence pigment transfer/spread is possible from the grafted skin<sup>18</sup>. The success of surgery in vitiligo is a demonstration of the reverse Koebner's phenomenon<sup>19</sup>. Punch grafting uses the fact that pigment spread from a grafted punch can be up to a diameter of 2-3 mm from the donor graft and hence the area of graft required is much smaller than the actual area of the lesion. PUVA therapy is then used to further enhance the pigment spread. Thus, the method is similar to the perifollicular spread of pigment that occurs during PUVA in hairy areas, with the punch grafts serving as reservoirs of melanocytes<sup>14, 20</sup>.

**Calculation of no. of donor punches:** Though the no. of donor punches can easily be judged by an experienced surgeon, the following method will be helpful for a beginner; Area of each punch: area of a circle =  $\pi r^2$  (where  $\pi$  is 3.14 and r is the radius of a circle).

Area of a 2.5mm punch (radius 1.25mm)= $3.14*1.25^2$  -4.90 sq.mm.

Area of graft + pigment spread =  $3.14*3.25^2=33.16$  sq.mm

(If the predicted pigment spread is 2 mm, then the radius of the graft+pigment spread would be 3.25mm).

The area of the lesion is similarly calculated, depending on the shape of the lesion (such as a circle, rectangle, quadrilateral etc) using the appropriate geometric formulae. No. of punches required = The area of the recipient lesion / the estimated area of pigment spread.

**Operative procedure:**

**Donor area:** (Fig-1) The donor area is shaved if it is hairy and the area for grafting marked with a marker pen. The procedure is performed under local anesthesia, under routine

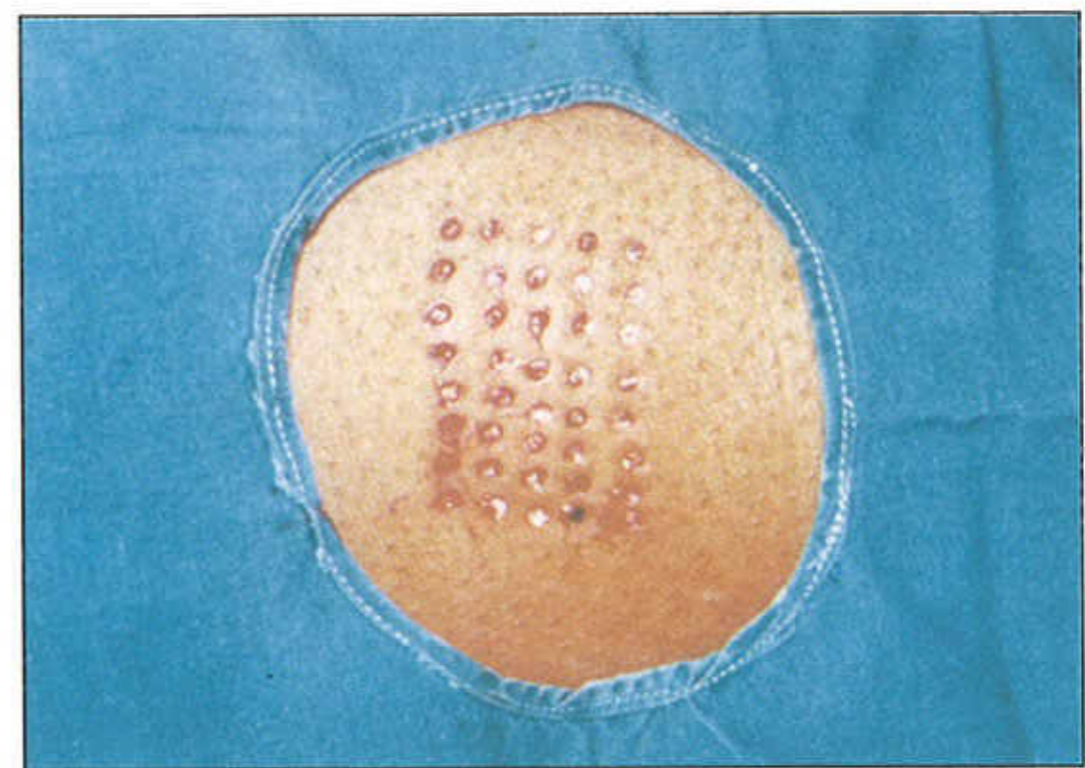


Fig. 1: Donor area (thigh) showing punches being dug out.

surgical aseptic precautions.

A 2.5 mm biopsy punch is used to take the required no. of punches. A good donor punch should have the following characteristics:

1. It should be superficial, only upto upper dermis and not deep as in a biopsy
2. It should be circular in shape. The skin should not be stretched while taking a punch graft, to prevent it from taking an oval shape.
3. Punches larger than 3mm should not be used, as the risk of cobble stoning and spotty pigmentation (referred to as pulkadot appearance in Indian literature<sup>11</sup>) is more with larger punches.
4. The space between punches may be as less as 2mm.

The donor punches are then placed in a petri dish containing saline. The bleeding from donor site is usually minimal, and can be controlled with pressure. The donor area is then given a dressing with sofratulle or a biological dressing such as

duoderm.

**Recipient area:** Recipient is subjected to similar aseptic care and local anesthesia and the area for grafting marked with a marker pen. Punches are dug out using a 2mm punch, with a space of 2mm between each punch. The graft are then carefully placed and pressed with a gauze. It is very important that the grafts sit snugly and not pop out. So each donor punch is chosen according to the shape and size of the recipient site. If the 'graft-fit' is not proper, the recipient site can be dilated with a dilator, the punch itself or a sterile cotton stick swab of appropriate size. Pressure with cotton stick swab is very useful in obtaining proper hemostasis. A good recipient punch should have the following characters :

1. It should be 0.5 mm less in diameter, than the donor punch. This is to ensure proper fitting of graft in to recipient sites, as the recipient site expands after punch due to loss of natural skin tension. It also helps in prevention of cobblestone appearance
2. It should be circular in shape
3. It should be slightly deeper than the donor punch so that the donor punch does not bulge out.
4. The area between each punch can be up to 3-4 mm. Larger spaces between grafts leads lack of uniformity in pigmentation, with graft sites being darker and surrounding area being lighter (pulka-dot appearance).

#### **Fixation of grafting:**

This is a very important step for getting optimum results and can be done by any of the following methods:

1. Dressing using sofratulle
2. Plastic seals, using materials such as opsite spray or flexible collodion
3. Immobilization with plaster of paris splint (for lesions on fingers, toes)

#### **Postoperative Instructions and follow-up of patients:**

Patients are prescribed analgesics and antibiotics. Specific instructions are given to maintain immobilization. Removal of dressing is done after 7 days. Flexible Collodion or opsite seal is removed using acetone. Both donor and recipient areas are cleaned and usually no further dressings are necessary. PUVA therapy for recipient area may be started any time after one week. Pigment spread is usually evident by one month and complete by 2-3 months.

**Complications:** These are often related to the nature of disease and can be prevented by proper case selection.

1. Koebnerization<sup>21</sup> causing fresh lesions at the site of both donor and recipient area. This is rare if the selection of cases is proper, particularly if the lesions have been stable

for at least two years. It can be further prevented by first doing a test graft to detect the activity of disease, with 6-8 punch grafts on a small selected area and observing for pigment spread over 6-8 weeks.

2. Keloid formation
3. Scarring at donor area-this is usually very minimal
4. Relapse of the disease
5. Secondary infection

One specific complication of punch grafting is cobblestone appearance of recipient area. It can be avoided or minimized by the following methods:

1. Proper harvesting of donor punches and their placement in recipient area as explained above
2. Use of silicon sheets for dressing of recipient site<sup>22</sup>.
3. The author has used steristrips of appropriate size for dressing of recipient area
4. The author has also used the following modification for grafting lesions on face and scalp, where profuse bleeding hinders proper placement of grafts, causing the grafts to pop out and later leading to cobble stoning.

The usual practice is to first dig out all the recipient punches from the recipient areas and then place the donor punches one by one. Instead, for grafts on face, after each recipient punch is dug out, pressure is applied with a cotton stick swab of proper size and immediately the graft is placed, which then acts as a hemostat itself. This is repeated for each punch site and allows the surgeon to place each graft properly with minimum bleeding.

It should also be emphasized that if despite these precautions, cobble stoning is still seen, it usually disappears at the end of 6 months-one year. If at the end of the year, cobble stoning is still persistent, spot dermabrasion can be done under local anesthesia to resurface the same.

Our experience (fig. 2,3) : Our experience in ten patients treated with surgery, both at Al Nahdha Hosptial, Muscat, Sultanate of Oman (five cases) and Salmaniya Hosp, Bahrain (five cases) has been satisfactory. Of these, three patients had segmental vitiligo and seven had localized Vitiligo vulgaris. The patients had lesions over different areas such as face (three cases), legs (two cases), foot (two cases), thigh (one case) and dorsa of hands (two cases). A total of 20 patches have been treated. These patients have been followed up to a maximum of 3 years. The results show excellent take of the graft in nearly 94% of lesions. The pigment spread was very quick and in three cases subsequent PUVA was also not required. At the end of three months, cosmetically satisfactory results have been obtained in nearly 90% of lesion grafted. Cobble stoning was seen in only one case (which was also our first case) and in all



Fig. 2: Recipient area-before grafting



Fig. 3: Recipient area-three months after grafting. Note the complete repigmentation and absence of cobble stoning.

subsequent cases, cobble stoning has been minimal. Recurrence was noted in only one lesion. Donor area showed only mild pigmentation in all cases.

#### Discussion:

Punch grafting is the simplest of all surgical methods of treating vitiligo, as it is only an extension of punch biopsy technique, which is familiar to every dermatologist. It also does not need any special instruments and can be carried out in the routine office surgery units. The complications are minimal and the cosmetic results are satisfactory, if the right techniques is adopted. Any no. of punches can be grafted, even up to 200. The procedure can be quite in experienced hands, particularly if a trained assistant is available. It can be adopted to any site including face, scalp, lips and even palms. In fact, it is the only surgical technique suitable for palm. Because of the phenomenon of pigment spread, it can be planned as an adjuvant to PUVA and one need not wait till completion of PUVA treatment.

#### Comparison with other surgical methods:

Thin thiersch graft<sup>5-9</sup>, taken with a surgical blade or skin grafting knife (electrical or manual) has the advantages that it can yield a large graft and is a quick procedure. But it needs surgical skill and practice and may often need general anesthesia. The recipient area often shows a different texture. Millia formation is common. It is ideal when lesions are large.

Suction blister Grafting<sup>10-11</sup>, involves application of suction with a suction apparatus, up to 200 mm Hg. Over a period of 1-2 hours over back. Suction procedure blisters by separation at the dermoepidermal junction. The roof of bulla is separated and used as the graft. This method is easy, is done under local anesthesia, needs no specialized equipment and gives excellent cosmetic results. However the disadvantages are the small size of the graft and the prolonged time involved in producing the blister. Among all the three methods of grafting, it gives the best cosmetic results and it is particularly suitable for small lesions on face.

The author is experienced with all the different surgical techniques for vitiligo and would like to recommend punch grafting in the following situations :

1. For a beginner
2. In a center without extensive setup for instructions and theater
3. As an adjuvant for PUVA
4. As a test graft before any surgical method is contemplated.
5. The method is particularly suited for palms, though any area can be grafted

#### Summary:

Punch grafting for vitiligo is thus an excellent, safe and easy procedure which should be offered in selected cases. Education of patients about the nature of the disease and the role of surgery are very important and proper counseling should be done before the procedure. Only stable lesions showing no signs of activity should be selected for grafting. Punch grafting can be used as an adjuvant with PUVA. Proper technique and practice is essential to prevent cobble stoning.

#### REFERENCES:

- 1- Kovacs SO: Vitiligo. *J Am Acad Dermatol* 1998; 38:647-66.
- 2- Ortone JP; Mosher DB; Fitzpatrick TB : Vitiligo and other hypomelanoses of hair and skin. Newyork: Plenum book company; 1983; 172-6.
- 3- Venkataram MN; White AG; Leone WA; et al : HLA antigens in Omani patients with vitiligo. *Clin. Exp Dermatol.* 1995; 20:35-7.

- 4- Goldstein E : Non-psoralen treatment of vitiligo. Part II Less commonly used and experimental therapies. *Int. J Dermatol.* 1992 May; 31(5):314-9. Review.
- 5- Behl P : Treatment of vitiligo with homologous thiersch grafts. *Curr med pract..* 1964; 8:218-21.
- 6- Kim HY; Kang KY : Epidermal grafts for treatment of stable and progressive vitiligo. *Dermatol Surg.* 1995. Apr; 21(4):295-300.
- 7- Agrawal K; Agrawal A : Vitiligo: repigmentation with dermabrasion and thin split-thickness skin graft. *J Am Acad Dermatol* 1998; 38(4):580-4.
- 8- Behl PN; et al : Treatment of vitiligo with autologous thin Thiersch's grafts. *Int. J Dermatol* 1973 Sep-Oct; 12(5):329-31.
- 9- Behl PN : Vitiligo - treatment by dermabrasion and epithelial sheet grafting. *A Am Acad Dermatol* 1994 Jun; 30(6): 1044-5.
- 10- Suvarnaprakorn P; Dee-analap S; et al : Melanocyte autologous grafting for treatment of leukoderma. *J Am Acad Dermatol.* 1985; 13:968-74.
- 11- Gupta S; Jain VK; Saraswat PK: Suction Blister Epidermal Grafting Versus Punch Skin Grafting in Recalcitrant and stable vitiligo. *Dermatol Surg* 1999 Dec; 25(12):955-958.
- 12- Fellabella R: Repigmentation of segmental vitiligo with autologous minigrafting. *J Am Acad Dermatol* 1995; 32: 228-32.
- 13- 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(2):133-9.
- 14- Falabella R: Treatment of localized vitiligo by autologous minigrafting. *Arch Dermatol* 1988 Nov; 124(11): 1649-55.
- 15- Boersma BR; Westerhof W; Bos JD : Repigmentation in Vitiligo vulgaris by autologous minigrafting: results in nineteen patients. *J Am Acad Dermatol* 1995 Dec; 33(6): 990-5.
- 16- Behl PN : Repigmentation of segmental vitiligo by autologous minigrafting. *J Am Acad Dermatol* 1985 Jan; 12(1 Pt 1):118-9.
- 17- Sheno SD; Sreenivas CR : Treatment of stable vitiligo with autologous epidermal grafting and PUVA. *J Am Acad Dermatol* 1997 May; 36(5 Pt 1).
- 18- Graft exchange in vitiligo. *Studies on the outcome of exchanging biopsies from vitiginous skin to normal, pigmented skin an vice versa.* *Acta Derm Venereol.* 1986; 66(4):311-5.
- 19- Malakar S; Dhar S : Spontaneous repigmentation of vitiligo patches distant from the autologous skin graft sites : a remote reverse Koebner's phenomenon? *Dermatology* 1998; 197(3): 274.
- 20- Na GY; Seo SK; Choi SK : Single hair grafting for the treatment of vitiligo. *J Am Acad Dermatol* 1990 Jan; 22(1):87-91.
- 21- Hatchome N; Kato T; Tagami H : Therapeutic success of epidermal grafting in generalized vitiligo is limited by the Koebner phenomenon. *J Am Acad Dermatol.* 1990 Jan; 22(1): 87-91.
- 22- Agarwal US; Jain D; Gulati R; et al : Silicone gel sheet dressings for prevention of post-minigraft cobble stoning in vitiligo. *Dermatol Surg.* 1999 Feb; 25(2):102-4.

#### Acknowledgements:

The authors thankfully acknowledges Dr. Khaleel Arrayad, Chief of skin unit and Assistant undersecretary for hospital, Ministry of Health, Bahrain and Dr. Abdul Raouf Al Suwaid, Chief of Dermatology & Genitourinary Medicine, Sultanate of Oman, for their active encouragement, without which this work would not have been possible.

Dr. Venkataram Mysore, MD Dip RCPATH (Lond)  
Medical Consultant (dermatology)  
Salmaniya Medical Complex  
Manama.