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TABLE 7.3 Preoperative Care Instructions for Patients Undergoing Treatment With Scalp Micropigmentation

Patient should avoid blood thinners, including aspirin, nonsteroidal anti-inflammatory drugs, vitamin E, ginkgo biloba, and ginseng ¹
Patient should be advised to not change hairstyle
Instruct patient to shampoo hair day of procedure
Patient should avoid using hair products before the procedure
After the procedure, patients should not wash their hair for 48 hours
Patients may wear a hat after the procedure, if desired

TABLE 7.4 Surgical Instruments and Supplies Used for Scalp Micropigmentation

Markers
Antiseptic and alcohol solution (e.g., Microdacyn) to cleanse the scalp)
Vibrating devices
Loupe with magnification
Dermatoscope
Topical anesthetic (e.g., Emla cream)
Xylocaine 1% with epinephrine (1:100,000); 0.25% bupivacaine can also be used and can last up to 8 hours ³
Bicarbonate (dilutes epinephrine)
Syringe with 30G and 33G needles
25G cannula (nerve block)
Elastic tape
Sterile gauze
Sterile drapes
Dermograph instrument that supports one to six needles
Pigments (colors vary)

▶ of the procedure. Video 7.2 provides a visual of the preoperative process. The area of hair loss that will be treated should be cleansed with antiseptic and alcohol solutions (Fig. 7.2), then marked with a surgical pen based on the preoperative consultation. A vibrating device is given to the patient to hold onto their chest, and two more vibrators are placed around the patient's forehead.



Fig. 7.2 Preoperative Anesthesia. Preoperative anesthetics used for scalp micropigmentation. Top row from left to right: sublingual ketorolac (systemic medication for pain relief), microdacyn, bicarbonate, lidocaine with epinephrine 2%, bupivacaine, and Emla cream (topical anesthetic). Bottom row from left to right: gloves, 33g needle, 5cc syringe, and marker.

One of the authors (SS) uses these maneuvers to minimize the patient's discomfort with the procedure.

Local anesthesia is achieved by injecting 1% xylocaine with epinephrine using a 33-gauge needle into three different injection sites on the scalp. These three areas will be the entry points for the 25-gauge cannula used to perform a nerve block.

Pigment Selection

A nonvisible area of the scalp is selected for a pigment color test. Whether or not the same color should be continued or changed to a lighter or more intense pigment is decided at this point. Different pigments can be mixed to match the color of the patient's hair. A test is recommended prior to performing the entire procedure to ensure that the right color is used to produce a natural result. Most pigments (Fig. 7.3) are composed of iron oxide, glycerin, and isopropyl alcohol.⁵

Procedural Technique

Fig. 7.4 illustrates a dermatographic instrument with a single-needle tip. This device is used to insert microdroplets of pigment through the skin and into the upper dermis (Fig. 7.5), approximately 1.5-2 mm from the surface of the skin.² This machine can also support one to six needles and cycles between 100 to 150 cycles per second in normal skin. The cycle velocity correlates with the quality of the dots: a slow velocity results in larger



Fig. 7.3 Surgical Tray. Top row from left to right: pigments (range of tones), hair comb, pigment containers, and Vaseline (to moisturize the scalp). Bottom row from left to right: dressing gown, sterile solution (to dilute pigment), dermograph instrument, magnifying glasses, two needles (single-needle tip and three-needle tip), sterile spatula for Vaseline, sterile protection for scalp micropigmentation machine.



Fig. 7.4 Dermograph Service. Instrument used to conduct scalp micropigmentation with a single-needle tip. (Courtesy Goldeneye Micropigmentation.)

dots, and a fast velocity results in a dot that appears dull with little uniformity. Video 7.3 further illustrates the technique in which pigment is deposited into the scalp.

The technique used to cover the area of hair loss depends on several factors. If the patient has short hair, small dots (points) of pigment are used, in contrast to patients with long hair that will require small dots and small lines. In addition, when placing the dots of pigment into the scalp, avoid superimposing the dots or placing them too close together. This will result in patchy areas of pigment on the scalp that can produce an unnatural appearance.⁶ The dots should be placed in an irregular pattern and not in a continuous line.^{1,6} The

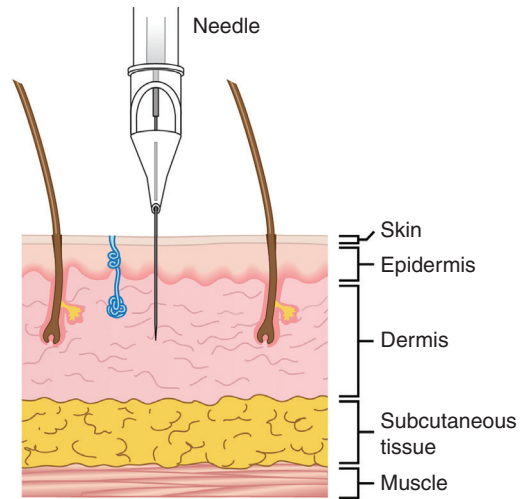


Fig. 7.5 Depth of Needle. Needle depth through the skin and epidermis into the upper dermis.

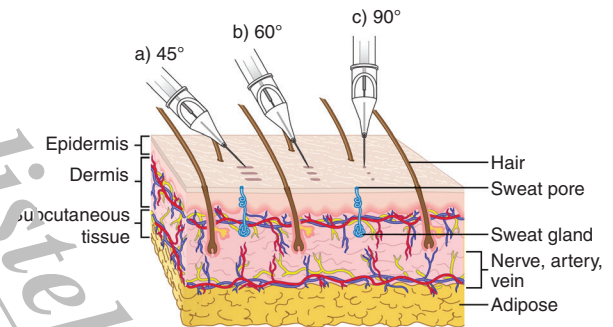


Fig. 7.6 Angle of Single Needle Tip Relative to Scalp. (A) 45-degree angle, (B) 60-degree angle, (C) 90-degree angle. Smaller angles result in more superficial pigment. (Courtesy of Sheila Macomber.)

angle of the needle relative to the scalp can vary between 45, 60, and 90 degrees¹ (Fig. 7.6). Larger angles result in deeper penetration, darker tone, and longer duration of the pigment, while smaller angles result in a more superficial implantation with a lighter tone, opaque hue, and less durability of the pigment (Pearl 7.8). In addition, the needle should be positioned at a more perpendicular angle (90 degrees) when a dot is needed, and at a 60-degree angle for a line. Moderate pressure throughout the entire procedure should be used to obtain uniformity in color, and special attention should be made to any changes in angulation and/or depth of the needle.

PEARL 7.8: Larger angles result in deeper penetration, darker tone, and longer duration of the pigment. Smaller angles result in more superficial implantation with a lighter tone, opaque hue, and less durability of the pigment.

Postoperative Care

Postoperative photography is recommended to monitor clinical success of SMP treatment. Immediately after the SMP procedure, the treated area of the scalp will appear red and inflamed for approximately 2 to 4 days. Petroleum (e.g., Aquaphor or Vaseline) may be applied immediately after the procedure, then daily. Hair washing with a mild shampoo is allowed after 2 to 3 days.⁷

A superficial crust will develop over the tattooed (pigmented) areas. This will resolve slowly over the next week, resulting in a lightened tone after the scabs and excess pigment have been expelled from the skin surface (stratum corneum and stratum granulosum).⁷ The patient must be cautioned not to remove the scabs and to allow the scabs to fall off naturally. The remaining pigment is in the stratum spinosum within the track created by the needles, and in the papillary dermis.⁷

After 3 to 4 weeks, and when the scabs have completely healed, a second procedure to darken any areas of alopecia is recommended. In general, it is common for the pigment to fade over time. Patients should be advised that additional SMP procedures may be necessary in the future to enhance pigment intensity and if hair loss worsens.⁶ As natural hair may become gray with time, patients should also be informed that it may be in their best interest to dye their hair a dark color if they develop many gray hairs that do not blend with the SMP pigment.⁶

Scar Correction Procedure

Correcting scars on the scalp with SMP is less invasive than surgery and thus is beneficial in patients who may develop a phobia of surgery.⁶ SMP can be used to camouflage scars on the scalp with different causes. Examples include scars from a hair transplant procedure, rhytidectomy, surgical excision/biopsy, or trauma.^{5,6}

In a study conducted by Park et al., 43 Korean patients underwent SMP for AGA and scalp scars.^{6,16} There were six patients treated for scalp scars, five of whom had scars from previous hair transplants, and

PEARL 7.9: When the needle is inserted deeper than necessary, even by a minimal amount, the pigment may spread to neighboring tissue.

one of whom had a scar from an accidental fall.⁶ Favorable outcomes were achieved among all six patients undergoing micropigmentation to cover their scars.⁶ The evaluation of outcome was determined by satisfaction of cosmetic appearance according to the patient and surgeon.⁶

The procedure to camouflage scar tissue is complicated. The operator performing this technique should have ample experience performing SMP on patients with AGA and gauging needle depth.⁶ The needle needs to penetrate at an adequate level of the scar tissue or else the outcome will not be favorable.⁶ When the needle is deeper than necessary, even by a minimal amount, the pigment may spread to neighboring tissue (Pearl 7.9).⁶ Conversely, if the needle is placed superficially, the pigment may not hold within the tissue.⁶

The scar correction procedure is depicted in Video 7.4. The first step in this procedure is to select the pigment that matches the skin surrounding the scar. Position the dermatograph device with linear or circular three- or five-pointed needles at an angle of 45 degrees (Fig. 7.7). Set the dermatograph to a medium velocity, and use a scanning method to place

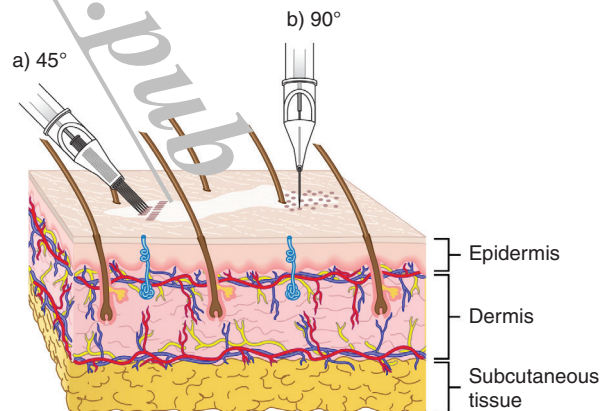


Fig. 7.7 Scar Concealment Protocol. (A) 45-degree angle of three- to five-tip needle to cover hypopigmented scar in a scanning motion. (B) 90-degree angle of a single-tip needle to add dots or lines to cover scar tissue. (Courtesy of Sheila Macomber.)

the pigment superficially over the scar. Once the hue of the scar is blended with the scalp, position the dermograph at an angle of 90 degrees with a single needle tip to create pigmented dots on the scalp. The dots should follow an irregular stippling pattern that matches the direction of hair growth (see Fig. 7.7). Once the scar is completely covered, randomly add dots around the scar into the normal tissue to blend the scarred tissue with the normal tissue, creating a “feathering” effect.⁵ This is achieved by gradually decreasing pigment and the number of dots placed at the ends of the scar tissue.⁵

Clinical Correlates

- ▶ Videos 7.5 and 7.6 and Figs. 7.8-7.11 depict clinical cases provided by one of the authors (S^c). Each case

provides pre- and postoperative photography for SMP, microblading, or scar concealment.

PREVENTION AND MANAGEMENT OF ADVERSE EVENTS

Table 7.5 lists the complications that may occur after SMP. Many of the complications can be avoided through use of carefully selected pigment and a good understanding of the variables in the skin that can change from patient to patient. Complications after SMP usually result from improper technique. Improper needle insertion can result in pigment bleeding.^{3,5} This results in leaking of the color from the original site of implantation. Other adverse events include postoperative edema and redness, which are usually transient and can



Fig. 7.8 Clinical Correlate: Androgenetic alopecia. (A) Male patient with androgenetic alopecia. (B) Results after three scalp micropigmentation sessions.

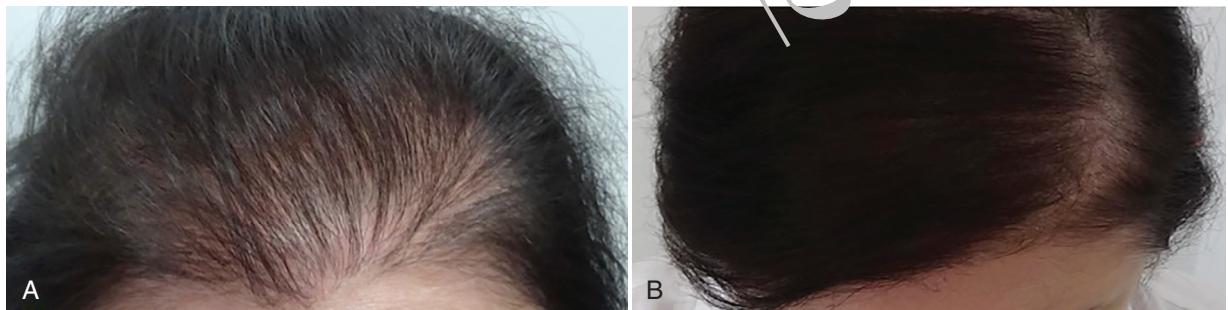


Fig. 7.9 Clinical Correlate: Female Pattern Hair Loss. (A) Patient with female pattern hair loss. (B) Added density after one scalp micropigmentation session.

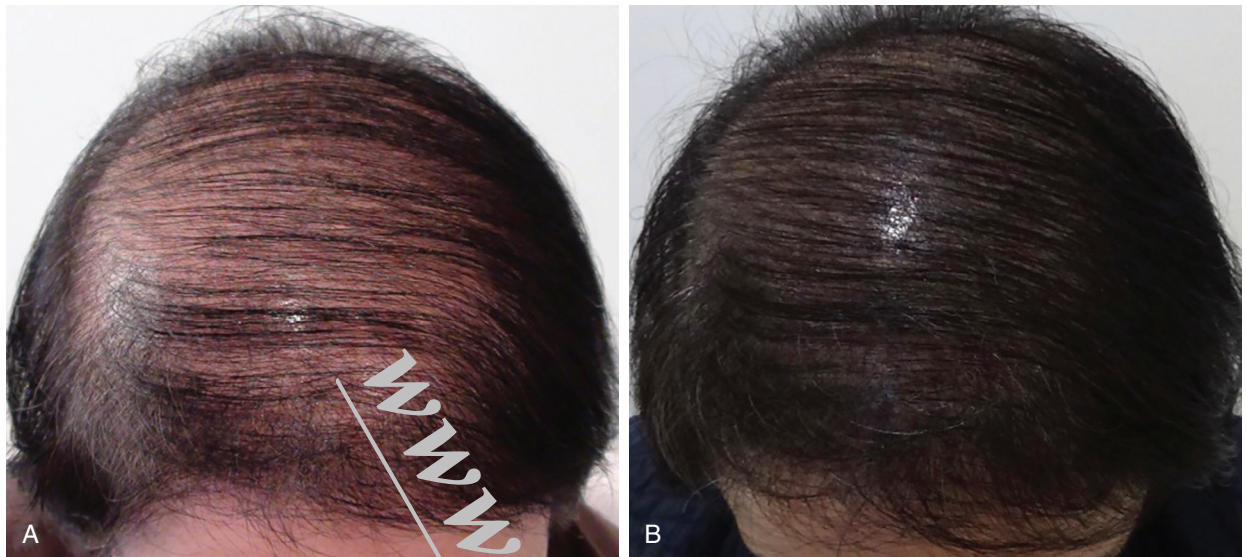


Fig. 7.10 Clinical Correlate: Hypothyroidism. (A) Female patient with hypothyroidism and thinning all over the head. (B) Results after three scalp micropigmentation sessions.



Fig. 7.11 Clinical Correlate: Microblading for Thinning Eyebrows. (A) Female patient with thinning eyebrows. (B) After two scalp micropigmentation sessions. (Image courtesy Dr. Mary Matsuda, Brazil)

be treated with systemic corticosteroids (level of evidence: 5)^{1,18}. If a skin infection occurs postoperatively, systemic or topical antibiotic therapy is initiated. Color changes may occur with repeated sun exposure. Iron oxide-based inks usually turn a reddish tinge. In this case, strict sun protection is recommended to maintain

pigment color in the skin. This unwanted pigment can be lightened by laser surgery with a Q-switched Nd:YAG laser on a low fluence setting using a spot size of 3 to 4 mm (level of evidence: 4).¹⁹⁻²¹ Skin pigment can be lightened with a Q-switch laser.^{3,7,19,21} Rare complications include allergic reaction to the ink, koebnerization,



Fig. 7.12 Clinical Correlate: Microblading for Alopecia Areata. (A) Male patient with alopecia areata. (B) After one scalp micropigmentation session. (Image courtesy Dr. Mary Matsuda, Brazil)

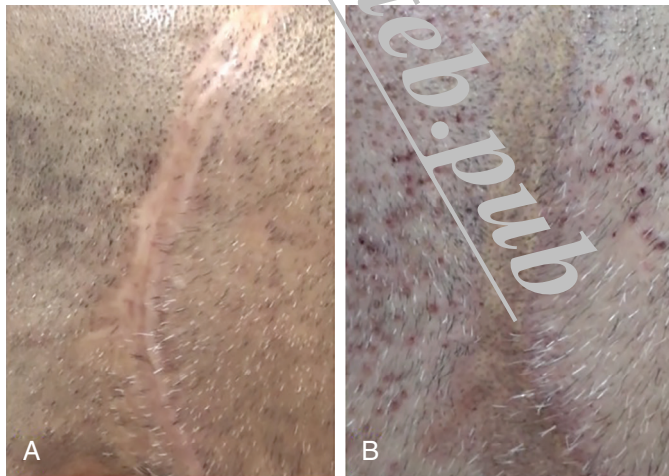


Fig. 7.13 Clinical Correlate: Scar After an Accident. (A) Male patient with linear scars on both sides of the head from an accident. (B) The scars have been concealed after one scalp micropigmentation session.