Blepharo- and Dermapigmentation Techniques for Facial Cosmesis

By Giora G. Angres, MD

Cosmetic enhancement of the upper and lower eyelids by implantation of various colored pigments has rapidly become one of the more popular procedures in cosmetic and reconstructive surgery. A relatively new procedure, called "natural brows," involves implantation of pigment in the brow line in a brush stroke technique to simulate brow hair. This latter procedure is particularly useful in patients with sparse brow hair caused by previous "over-plucking" of hairs. Burn victims and those patients suffering from scarring after removal of basal cell carcinomas will also benefit from the camouflage effect of the procedure. Other uses for dermapigmentation show promise in improving lip lines, blending skin grafts, and masking skin defects.

To achieve optimum cosmetic results from blepharopigmentation, certain guidelines must be followed and a complete evaluation of the patient's ocuolfacial morphology must be undertaken prior to any surgery. Because the tissue change produced by pigment implantation is designed to be permanent, we have devised a paint-by-number technique that reduces the risk of patient dissatisfaction.

**Clinical Overview**

Many women experience difficulty in applying makeup correctly or are allergic to the ingredients in certain cosmetic preparations. The procedure of blepharopigmentation was developed in early 1979 so that these women

Giora G. Angres is chief of Surgery and Ophthalmology, North Las Vegas Hospital and Medical Center, North Las Vegas, Nev.
could enjoy the benefits of permanent eyelash enhancement without the inconvenience of conventional cosmetics.\textsuperscript{1}

Optimum results can be achieved by clinicians after thorough training and adherence to a few basic principles. This report discusses our approach to the evaluation of the patient's oculo-facial characteristics to achieve what we consider to be the "ideal" result.

Blepharopigmentation is a microsurgical procedure that implants pigment in a dot-like matrix into the base of the eyelashes along the last line.\textsuperscript{1,2} Pigment is placed between and along the base of the lashes so that it does not look like a line. A "halo" effect is achieved around the base of each lash, where no uptake of pigmentation occurs (Figure 1). This serves to break up the intensity of the pigment and enhances the subtlety of the procedure. This mosaic of dots along the lashes creates a shape and form without the actual use of a line. Thus, it is not an "eyeliner" in the cosmetic sense of the word, but an "eyelash enhancement." Our purpose is not to create an eyeliner that is subject to the changing styles of the cosmetic industry, but to create the permanent effect of darker, thicker, and longer lashes.

Because the pigment used is placed into the dermis, it will be covered by the epidermis as the healing process takes place during the ensuing two weeks. This produces a translucent effect that looks very natural and matches the patient's own pigmentation.

It is very important that the physician evaluate each patient with makeup in place. The geometry of the face can then be better visualized and placed in one of four categories: round, oval, triangular, or square. The shape of the types, the texture of the skin, the color of the hair, and the tint of the eyes should all be taken into account. We also consider the integrity of the lids and eyelashes, as well as allergies (particularly to any cosmetics). The anterior segment of the eye should be examined and the integrity of the cornea noted.

With the patient's makeup applied, many questions can be answered during the initial consultation. We require that patients always make pretreatment photographs available and that they must show the patients with their makeup. This provides a reference during subsequent dermapigmentation and helps to ensure that the surgeon is augmenting the patient's normal cosmetic appearance.

**Aesthetic Considerations**

Most patients' eyes fall into one or a combination of six categories: close-set, deep-set, wide-set, small, prominent, or oriental.

To make close-set eyes appear further apart, we place the pigment more intensely to the lateral aspects of the eyes. This gives the impression that the eyes "flow out" laterally. Ideal anatomic landmarks are the medial punctum and the lateral canthus. It should never be necessary to place pigment medial to the punctum or unite the upper and lower lateral canthus regions. It is best to leave a millimeter free of pigment in the lateral aspect of the lower lid. This allows an open impression and does not close in the eyes (Figure 2).

Optimum results are achieved by beginning the procedure approximately two millimeters lateral to the punctum on the lower lid, and extending the pigment slightly towards the punctum su-

---

**Figure 1.** Slit lamp view of "halo effect." Sleeve of nonpigmented epithelium at base of lashes.

*continued*
periorly on the upper lid. It is also necessary to be familiar with the shape of the eyes and their location to the rest of the facial features. If the patient has a large nose or a wide and flat bridge, the pigment should be kept even further laterally to the punctum.

The configuration of each patient's lashes differs. The lashes on the upper lids generally are longer and thicker, and consist of three rows laterally that taper to a single row nasally. In contrast, the lashes on the lower lid are generally very delicate and usually consist of one row. The physical characteristics of the lashes dictate both the placement of the pigment and its intensity. In the lower lid, the application should be kept very subtle and be applied in a very thin straight plane. In contrast, the lashes of the upper lid provide more of a camouflage effect, allowing the pigment to be applied more intensely.

For the patient with deep-set eyes, an illusion of bringing the eyes forward can be created by applying the pigment less intensely from the inner canthus to the middle upper lids and more intensely toward the outer canthus. In the lower lids, the application should be maintained lightly from the medial canthus to the outer canthus and then tapered medially toward the punctum. The punctum in all eyes is the most medial anatomic border and lashes rarely grow beyond this area. Therefore, it is inadvisable to apply pigment beyond this point (Figure 3).

To minimize wide-set eyes, the pigment should be applied evenly from the medial canthus, stopping short of the lateral canthus. This gives the illusion of making the eyes more symmetric and closer together (Figure 4).

In placing pigment in oriental patients, we try to emphasize the natural uplift on the lateral canthus. By starting a millimeter or so lateral to the punctum, the eyes can be made to look further apart, thus emphasizing the almond shape (Figure 5).

For patients with small eyes, the application of pigment should be contained in the base of the lashes in the lower lid. Because we are trying to make the eyes appear larger, the pigment should be applied in the uppermost row of the three rows of lashes in the upper lid. This gives the impression that the eyes are larger, while keeping the pigment within the lashes (Figure 6).

When the eyes appear to be pronounced, they tend to dominate the rest of the facial features. It is important to apply the pigment...
very lightly around the perimeter of the eye to achieve a subtle and natural effect. The pigment should then be tapered towards the punctum (Figure 7).

**Surgical Technique**

**Eyelid Dermapigmentation**

Prior to surgery, we place tetra-caine drops into each eye to reduce corneal sensitivity and allow complete cleansing of the tissues to be worked on. Each eyelid is then prepared with an alcohol swab and a Q-tip coated with an antibiotic-steroid ointment is used to clean between the lashes to remove all residual makeup.

Local anesthesia is accomplished with a superficial, subcutaneous injection of 2 percent lidocaine and epinephrine using a 30-gauge needle. Initially 0.5 cc is injected into the middle of both upper and lower lids, approximately 3 mm from the lid margin. After five minutes, an additional 0.25 cc is injected in all four lids laterally and medially towards the punctum. The needle should not be advanced in the skin because this may cause bruising.

Antibiotic-steroid ointment should be applied to each lid, as previously noted. This allows easy positioning of a blepharostat or lid speculum. It also facilitates easy removal of excess pigment.

---

**Figure 3. Deep-set eyes, before (Top) and after.**

**Figure 4. Wide-set eyes, before (Top) and after.**
Ointment is also placed on the backside of the speculum to reduce the risk of corneal abrasion.

Four- or six-power magnifying loupes are useful for precise placement of the pigment. Additionally, they allow the physician to look directly at the patient to have an overall perspective on the cosmetic appearance.

We have developed a specific (Angres) lid speculum to help keep the lid fixed and under tension so that it does not move during the application of the pigment. In placing the actual pigment, we always begin with the lower right lid, working from the lateral canthus medially. To achieve a subtle line, dots or dashes are made at the base of the lashes by following the lash line and sliding the instrument over it. To achieve a thicker appearance on the upper lid, overlapping larger circles are used and are reduced to ellipses as the pigment is applied medially. Finally, the application of pigment is tapered by applying small dashes and dots. For best results, the depth of the needle's penetrations should not be less than 0.8 mm or greater than 1.2 mm.

The blepharopigmentation procedure can easily be combined with blepharoplasty. However, application of the pigment should always be done first and the area treated with antibiotic ointment to prevent the pigment from entering the blepharoplasty wound.

**Brow Augmentation**

Approximately 25 percent of patients who have had blepharopig-
Dermatination may benefit from cosmetic augmentation of the eyebrow, particularly if brow plucking has caused a permanent deficiency of hair. Dermatination is also indicated to camouflage scars after reconstructive surgery. Although the evaluation of a patient requiring this procedure may appear to be the same as for a patient requiring eyelash enhancement, the two procedures actually pose different problems.

Eyelids are generally very symmetric, but eyebrows have a tendency to be asymmetric. The goal of eyebrow enhancement is for the pigment used to follow the natural shape of the eyebrow, staying in the brow line and maintaining the cosmetic appearance of the brow as a frame for the eyes. When indicated, brow ptosis should be corrected prior to dermatination.

The single most important factor to assess when enhancing the brow is the maintenance of a natural balance. The pigment color selected should be three to four shades lighter than the one chosen for blepharopigmentation. Brows can be classified in three basic types, and are associated with widely spaced eyes, normally spaced eyes, or eyes that are close together. The oriental brow differs from the western brow in that the brow hairs sweep downward toward the cheek rather than upward toward the hair line. Dermatination is the same as for the western brow, using a gently outward and upward stroke. Properly shaped brows can

Figure 7. Prominent eyes, before (Top) and after.

Figure 8. Well-spaced eyes showing brow position, before (Top) and after with plucked brows.
create the illusion of perfect balance (Figure 8), even if the eyes are too close together or too far apart. Thin eyebrows can make the face look flat or devoid of color and emphasize puffiness around the eyes. Heavy straight eyebrows tend to dominate the face and detract from the eyes.

It is essential, therefore, that the physician not attempt to make a radical alteration of the natural brow shape or an undesirable look will be inevitable. When little or no hair is present in the brow, creation of the ideal brow line for normally spaced eyes should start directly above the inner canthus. With the patient looking straight ahead, the point of highest elevation may be determined by placing a pencil vertically to intersect at the center of the pupil Where the pencil intersects the browline is the point at which the brow should arch highest. The brow should end just above the outer canthus.

To make close-set eyes appear wider apart, the brow line should start slightly outside the inner canthus (Figure 9). The arch of the brow should peak just beyond the center of the eye and be approximately aligned with the outer limbus. The corners of the brow should always be allowed to taper subtly just past the lateral canthus so that attention will be drawn temporarily instead of nasally.

For patients with widely spaced eyes, the brow line should be started more nasally to bring both brows closer together from the inner canthus (Figure 10). This allows the medial brow arch to be aligned slightly nasally of the limbus. The outside corners of the brow should taper and end almost directly above the outer canthus.

When plastic repair of the brows is needed, the surgeon should blend the pigment into the existing brow hairline. The surgeon can also recreate brow strokes in scars as well as in normal skin, as shown in Figure 11.

A high reciprocation speed for the tattooing instrument is vital for brow dermapigmentation. Minimum speed at the needle tip must be 250 cycles per second. This allows the needle tip to be kept in the skin of the brow line to reproduce the effect of individual brow hairs. The brush strokes possible at this speed can be made to overlap each other to duplicate the appearance of natural hair. We use a single needle for this procedure and keep the needle at a skin depth of approximately 1.5 mm. At this depth and speed, the pigmentation handpiece will glide smoothly across scar tissue or other superficial surface imperfections.

The actual surgical procedure uses the same basic preoperative preparation as for blepharopigmentation. The major difference involves placement of the pigment at a slightly deeper level using the single-needle handpiece. It is also very important to apply some tension to the brow skin and to maintain the speed of the instrument at about 270 reciprocations per second. This keeps the single-needle from ripping the skin and allows optimum depth for placement of the pigment.

Recovery time for a normal cosmetic appearance is slightly longer than with blepharopigmentation patients, because of the difference in the amount of bruising and scabbing that usually occurs. The full effect, therefore, is not normally achieved until three to four weeks after surgery.

Reconstructing the Lip Line

Reconstruction of the pigmentation of the lip line is a welcome addition to the rehabilitation of the burn patient after multiple grafts. A large number of women over the age of 60 years also benefit from the improved cosmetic appearance of well-defined lips, particularly when definition is lost around the lip margins and the lips lose color and become thinner. In these patients, wrinkles around the mouth and nasolabial folds can obliterate the lip line so that pigmentation can recreate full, lush lips to add youth and vitality to the mouth (Figure 12).

In performing dermapigmentation of the lips, the nasal septum should be used as the midpoint and a vertical guideline established prior to pigmentation. In further defining the upper lip, the "M" of the Cupid's bow is centrally placed and the lower lip extends
Figure 9. Close-set eyes showing brow position. Total alopecia after brow and lid procedure (Bottom).

Figure 10. Wide-set eyes showing brow position. Before (Top) and after.

Figure 11. Before brow scar (Top), and after.

Figure 12. Before lip accentuation (Top) and after lip procedure, no makeup.
Figure 14. Over-full lips before (Top), and after with no makeup.

Figure 15. Histologic lid section of blepharopigmentation patient 5 years after procedure (hematoxylin-eosin × 180).
slightly upward centrally.

It is always preferable to first outline the midpoints of the upper and lower lips, and then continue with the right and left sides working forward under tension. The pigment of color selected should simulate the natural color of the vermilion border and be slightly darker. We prefer to use a lighter shade to blend the pigment inwardly with a three-needle head assembly, using the maximum cycles of the pigmentation instrument.

In defining lip lines and placing pigment in lips, the instrument used should be at full speed and needle depth placed at 2 mm for lasting results. The surgeon should determine the type of lip preferred and contrast this with the actual type, such as a thin, full, or irregular lip. This should be done before starting any surgery, so that the patient's expectations can be better met. The pigments used should try to match the natural lip color, and extremes of light and dark colors should be avoided.

Thin lips are readily corrected by extending the pigment fractionally outside the natural lip line (Figure 13). Over-full lips can be made to look smaller if the pigmentation is slightly inside the natural shape using medium-toned pigment shades (Figure 14). Lips that have been subject to surgery or that have small or gross imperfections may be outlined more naturally by balancing the lip line above or below the natural shape. Shapeless lips that do not possess the natural attributes of a perfect Cupid's bow may be enhanced by emphasizing a firm center to the top lip and adding fullness to the lower, but a "natural" effect requires placing some pigmentation in both lips (Figure 15).

**Dermapigmentation of Other Sites**

Although dermapigmentation might be considered as a method for treating male pattern baldness, the only really satisfactory way for hair placement is through transplants or rotational flaps. However, the hair growth after transplantation can be incomplete, or a thin scar may be visible at the beginning of the hairline and pale skin seen around graft sites.

We have camouflaged plug transplants by using pigment to match the color of the underlying scalp to complement and blend with the transplanted hair. Similarly, the scars in flap surgery or in brows after lift procedures can be hidden with single-needle brush strokes. Dermapigmentation to cover other skin discolorations and skin graft sites shows great promise, although colors may be somewhat difficult to match.

**Complications**

At the present time, we take great care not to implant any material other than pure iron oxides. No reports of allergy to iron oxides have appeared in the literature and it is unlikely that we shall see any because of the inert properties of this material. It should be noted that over 2,500 treatments have been done by our office and clinic, and over 75,000 patients have been treated to date throughout the US. In all these procedures, to the best of our knowledge, no permanent losses of eyelashes, abnormal scarring, or glandular dysfunctions have occurred. Histologic sections have been taken from eyelids of patients more than three years following blepharopigmentation and have shown no inflammatory reactions at the pigment site or the migration of pigments (Figure 16). Pigment at the base or around the intact hair follicle has not been found. In fact, when the procedure is done correctly and high-quality instrumentation is used, virtually no complications should be encountered. However, we should stress that the surgeon not reuse the disposable surgical head because burred needles can act like fish hooks in the skin and actually macerate the delicate lid tissues.

**Summary**

Blepharo- and dermapigmentation have formed a new vista for cosmetic and reconstructive surgery. It is vitally important, however, that any aspiring practitioner learn to examine critically each patient's overall facial characteristics to realistically complement individual cosmetic preferences. The clinician should never forget that both procedures are "technique-related" and require not just the skill of a surgeon, but the eye of an artist.

---

**Bibliography**
