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## Managing Aesthetic Problems following Hair Transplantation

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### BACKGROUND

Using state-of-the-art techniques in hair transplantation, a natural-appearing result should be the expected outcome. Older techniques of hair transplantation usually did not produce this level of excellence, and poorly performed procedures usually result in an unnatural appearance as well. As a consequence, there are a considerable number of patients who have a cosmetically unsatisfactory, hair-transplant result (Figs 21.1A and B). These unfortunate patients often have unnatural-appearing hair grafts as well as emotional wounds as a result of a previous, adverse experience with their original, or several previous, hair-restoration surgeons. In addition to any technical considerations, managing the patient with cosmetic disfigurement



Figures 21.1A and B

Appearance of an unnatural hair-transplant result: This man had a hair transplant performed in the crown and frontal area at a young age. At that time he had baldness in those areas but maintained hair in the mid-scalp region. Over time he lost the nontransplanted hair, and the hair transplants have endured. The two problems illustrated by this case are the lack of planning for progressive hair loss at the time of the original procedure and the use of large plug grafts

as a result of a poorly performed or an outdated, transplant technique requires significant, emotional support and a gaining of patient confidence as well. A sound, surgical plan is especially important in these types of corrective cases for two fundamental reasons. First, these patients often present with a severe shortage of donor hair to use in the reconstructive plan. This aesthetic, reconstructive plan will likely represent the first and the last chance to address meaningfully their cosmetic problem. Second, the plan must address very precisely the patients' primary goal and realistically be aligned with their expectations. This last point is essential to avoid ongoing dissatisfaction and foster continued trust and confidence with the hair-restoration surgeon.

The two most common aesthetic problems seen in clinical practice following hair transplantation are as follows:

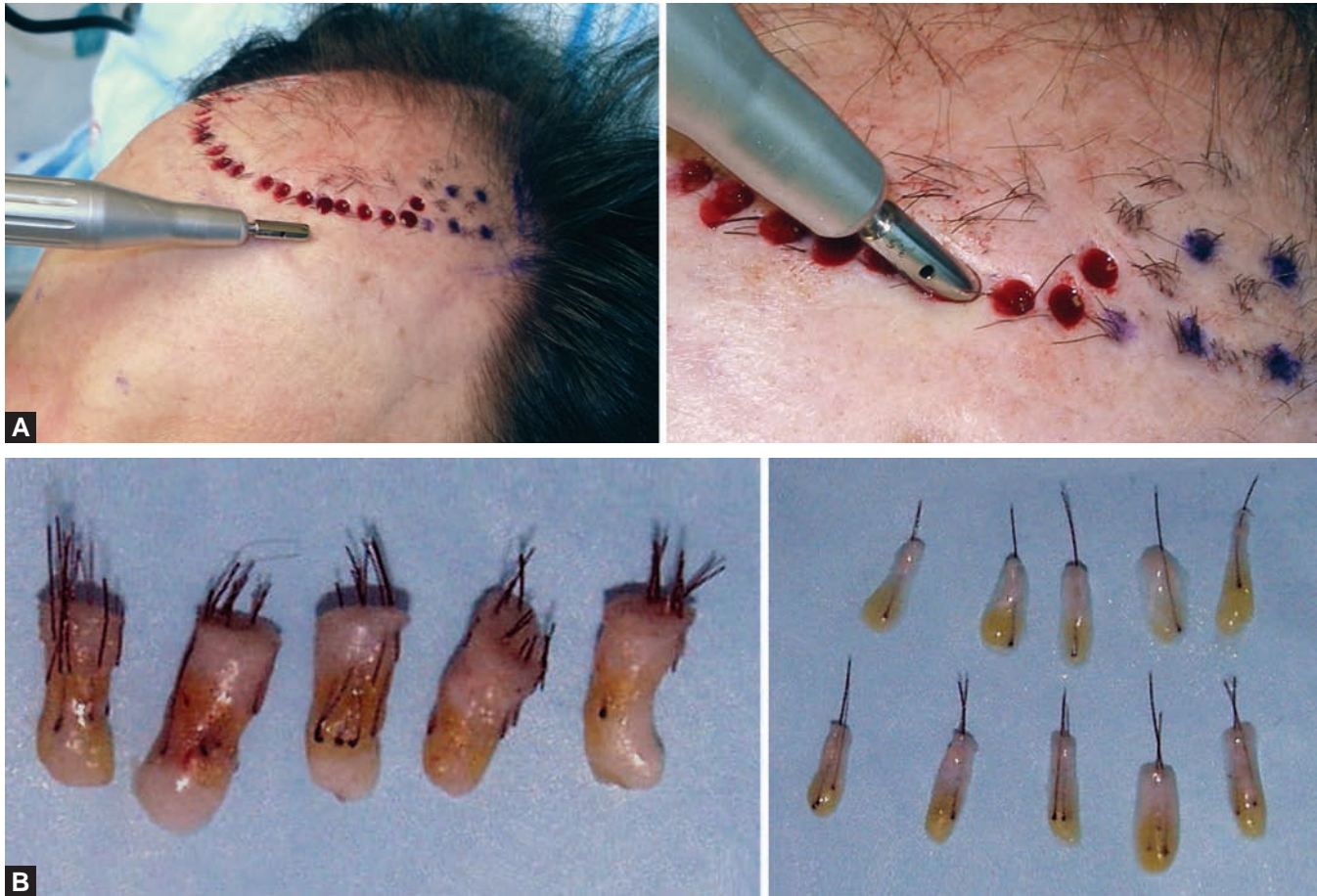
1. The consequences of progressive hair loss
2. The unsightly appearance of hair plugs

This chapter will review these two problems and outline an approach toward their improvement. A more detailed review of these problems and surgical approach is referenced.<sup>1-8</sup>

### **Consequences of Progressive Hair Loss**

Supply and demand is a central theme in many aspects of our lives and is very critical to understanding what can and cannot be achieved regarding surface coverage of the scalp. A variety of unattractive and peculiar appearances have resulted years following the performance of a transplant in an individual who has undergone progressive hair loss following the initial hair-restoration procedure. The appearance of these patients illustrates the devastating outcome that can occur when there is disregard and inattention to the progressive nature of hair loss (Figs 21.1A and B).

Clearly the best way to avoid problems that result from progressive hair loss is to develop initially a plan that considers the balance between hair supply and hair loss. Fundamentally, it is a simple matter of hair economics. This simple concept states that over time the patient will have increasing demand, i.e., baldness yet is faced with a fixed or reduced supply, i.e., donor hair, as he ages. This is an essential requirement in managing the young patient seeking a hair transplant. Neglect of this straightforward planning principle is the essential error made in many cosmetically inferior hair transplants. Seeking a balance between what can be done with limited donor supply in the presence of already high demand, i.e., major hair loss is also the guiding principle in planning the reconstruction of these problem cases as they present years later (Figs 21.2A and B). Options for management of these unfortunate cases are presented herein.



**Figures 21.2A and B**

Technique for plug reduction and recycling: (A) A 3.5-mm, power-assisted punch biopsy is used to excise a 4-mm plug; (B) Plugs are removed and immediately microscopically dissected and recycled into individual follicular-unit grafts

A conservative and principled surgical plan for the recipient site in keeping with this concept of hair economics is to focus on an initial forelock distribution for the corrective hair transplant.<sup>8-10</sup> The forelock is the area bounded anteriorly by the frontal hairline, posteriorly by the anterior crown region, and laterally by the parietal fringe. This is a commonly maintained, normal distribution of hair seen in male patients with mild to moderate hair loss. Essentially this is a Class IV pattern in the Norwood scheme.<sup>11</sup> The rationale for this approach is both to limit the requirements of donor supply and to create a natural pattern of hair loss that exists in nature (Figs 21.3 and 21.4).

The planning for hair distribution is only one part of the corrective hair transplant and often most directly addresses the problem caused by progressive hair loss. Management of the pluggy appearance is often the next important consideration.





Figures 21.3A to F



Figures 21.3A to H

Correction of cosmetic problem after hair transplant using plug reduction and recycling: (A to C) This 38-year-old man who had previously undergone a hair transplant in his mid 20s. The patient had experienced progressive hair loss with resulting exposure of previously transplanted 4-mm “plug” grafts. In addition, he was unhappy with the exposed areas of scalp above his ears that resulted in “alleys” of baldness; (D) Preoperative markings are shown prior to the first procedure. The dots indicate the location where plugs are to be removed. The irregular anterior hairline is also marked. Dome-shaped marking in the area of the lateral hump above the ears indicates planned distribution of grafts to fill in bald “alleys” of scalp; (E) Intraoperative appearance is shown following first stage PR & R and additional grafting from the traditional donor harvest; (F to H) Final result is shown following a third session of PR & R and additional grafting. In total, the patient underwent removal and recycling of approximately 252 4-mm plug grafts and implantation of 2,000 follicular-unit grafts over a 2-year period. The patient was also maintained on finasteride oral medication. Note the forelock-pattern reconstruction

### Unightly Appearance of Plugs

The essential problem with the unnatural-appearing hair graft is the high graft density and large size rendering it pluggy in appearance. Thus, the most direct approach to the pluggy graft is to reduce its size. The concept of grafting alone anterior or next to the unsightly grafts to break up the pluggy hairline almost always fails to achieve improvement. That approach alone does not address the basic problem of plug density and size. The current technique is to employ a round-punch excision that is approximately 0.5–0.75 mm smaller than the estimated size of the unsightly plug. As an example, if 4-mm plugs are being reduced a 3.25–3.5-mm punch would typically be chosen for the technique termed plug reduction and recycling (PR & R). The reason for using a smaller, round excision punch than the original plug size is to remove a substantial number of the plug hairs yet leave behind a few grafts that will look soft and natural. This technique is a personal modification of the original procedure originally described by Lucas.<sup>12</sup>

The actual technique of plug removal is very straightforward. The hairs in the plugs to be reduced are trimmed to approximately 2 mm in length and the punch





Figures 21.4A to F



Figures 21.4A to H

Correction of cosmetic problem after hair transplant using linear excision of anterior hairline and PR & R: (A and B) This 43-year-old man underwent hair transplantation when he was 23-years old. Not only did he have progressive hair loss exposing the hair grafts over time but also the 4-mm plug grafts appear very unnatural. His desire was to perform a procedure to eliminate the plugs as quickly and directly as possible; (C) Intraoperative appearance is shown immediately following linear excision of the anterior row of plugs; (D) Appearance of the excised anterior row of plugs is shown prior to recycling of the grafts; (E) Grafts are recycled from the excised specimen; and additional primary donor-site harvested grafts are immediately transplanted anterior to the closure and within the forelock distribution as the first stage of recreating the new hairline; (F) Second-stage grafting is shown to the hairline and forelock from primary occipital donor harvest as well as additional PR & R to the remaining plugs; (G and H) The final result is shown 8 months following the last procedure. A total of 2,200 grafts and 120 plugs were recycled through direct excision as well as PR & R

excision is performed. The punch excision should be deep enough to include 1–2 mm of subpapillary fat. These removed plugs are then recycled and dissected under the microscope into follicular-unit grafts. The yield of salvaged follicular-unit grafts is approximately 60–75% (Figs 21.2A and B).

An aggressive approach toward removing unsightly plugs will result in a thinner hair appearance because considerable density is conferred by the large grafts themselves. Patients need to be aware of this consequence but also understand this approach will yield the best softening of the pluggy hairline in the shortest amount of time. A partial or timid approach to plug removal will be reflected in the result. Follicular-unit extraction (FUE), in which individual follicular units are singularly punch extracted, is another technique for reducing large plugs but generally results in a less dramatic reduction in pluggy appearance per surgical session. The main reason for the reduced impact on the pluggy appearance when FUE is the plug-reducing technique is simply the smaller size of the punch extraction. Ultimately the same result could undoubtedly be achieved but not with the same efficiency per session as the larger (3–4 mm) punch. As stated earlier, a second and even third session of PR & R is often needed even when the larger punches are used. It is

unclear whether FUE results in a similar yield of follicular units that can be recycled from dense plugs.

The hair recycled from the removed plugs, as well as additional hair concomitantly harvested from the occipital region, are densely transplanted anterior, posterior, and most importantly adjacent to the plug-reduction sites. As mentioned above, a forelock distribution is often selected as the territory for distributing the recycled hair and the newly harvested hair. In the majority of cases, the plug-reduction sites are not sutured closed. Suturing the sites reduces the local blood flow and increases scalp tension, thereby reducing the success of graft growth in the vicinity of the plug-reduction sites. This last surgical detail is critical because the area immediately adjacent to the reduced plug is the most important location to maximize new hair growth and camouflage other scars, cobblestone bumps, and remaining plugs. If grafting is not performed in areas of plug reduction and plug removal is the sole goal, suturing of the open site with an absorbable suture, i.e., chromic, is routinely performed since a closed wound is easier for the patient to tolerate in the short term. Plug reduction and recycling is often the sole technique used to remove plugs in the crown/vertex region. The final appearance of the healed scar following plug reduction is essentially indistinguishable whether the site was sutured or left to heal by secondary intention.

Aggressive PR & R of the first two or three rows of plugs is usually all that is necessary to soften and naturalize the hairline and camouflage the more posteriorly positioned plugs. The density conferred by the typical 3- and 4-mm plugs does add density to the overall result so maintenance of these grafts in a central area, in many cases, is to be considered. In most cases of a forelock reconstruction, the posterior row of forelock plugs is also reduced and additional grafting is needed in the vertex to create a natural “posterior hairline” as well. While each patient’s distribution of plugs is unique, the final surgical plan is always to create a zone of natural-appearing hair at the leading edges, anteriorly as well as posteriorly and taking advantage of the centrally located plugs of higher hair density. In some instances, the patient may also prefer to soften all plugs previously grafted.

Although a single session will provide significant improvement, two and sometimes three sessions of plug reduction are usually needed to convert the unnatural hair transplant into an adequate result that does not draw curious attention. In general, a second session is performed 8 months following the first procedure (Figs 21.3A to H). Occasionally, a “faster-track” approach can be employed and additional plug reduction and grafting is performed within the first 2 months following the initial corrective procedure.



### *Linear Excision of the Anterior Hairline*

In some cases, plug reduction alone is not the best option for correcting a pluggy hairline and direct removal of the front row of grafts is warranted. The main indications for direct linear excision of the anterior hairline are as follows:

- A location of the anterior hairline that is too low. Additional grafts in front of the reduced plugs would render the hairline even more unnaturally low. Excision of the anterior hairline will effectively allow soft hair grafting at the original or at a slightly higher level.
- A severe shortage of primary occipital donor hair exists rendering the entire anterior row of grafts a primary source for recycled (donor) hair grafts.
- The patient desires to complete the aesthetic reconstruction using the most direct and rapid sequence of procedures.

Although this is a relatively straightforward procedure, linear excision of the anterior hairline should be performed in a conservative manner. It is important to avoid a large-width excision and generally limit the size of the removal to the single anterior row of plugs. The frontal scalp is typically more difficult to advance surgically and to close than assumed based on preoperative assessment. As a result, an excision of 4–8 mm is usually performed with no undermining. Undermining will cause devascularization in an area already scarred and with reduced blood flow. It should be emphasized that a conservative excision with a tension-free closure will result in the best scar and increased chances for growth of transplanted hair. A two-layer closure with absorbable suture for the deep layer and a 4-0 nylon for the skin closure is the typical repair technique. Even with a direct excision of anterior-hairline plugs, a second and possible third session of plug reduction and grafting is often necessary to obtain the optimal result (Figs 21.4A to H).

### **THOUGHTS AND PEARLS**

This chapter represents the author's current refinement of earlier published articles on the same topic. The challenge for the hair-restoration surgeon is to provide the highest level of expertise and honesty to these unfortunate patients to restore their appearance and self-esteem. Obtaining the confidence and trust of the patients is essential. When the surgeon is faced with correcting these types of problems, creativity, long-range surgical planning, and a variety of techniques described above are employed.

The exact techniques used in an individual patient will be as varied as the presenting problem itself. Fortunately, most patients with unsightly hair transplants

can expect cosmetically significant improvements, if correction of these problem cases are planned and carried out appropriately.

A combination of plug reductions, linear excision, conservative grafting, and adjunctive medical therapy, e.g., finasteride, to reduce ongoing hair loss are the key factors to treat the illustrated deformities.

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