

Innovation and Quality in Hair Restoration Surgery

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The past 25 years have produced incredible advances in hair transplantation and these advances seem to be accelerating. The 1,200+ members of the ISHRS, many of whom are active in meetings, workshops, and publishing, are surely the driving force of this change. The *Forum's* ability to distribute information quickly to its membership has been a great enabler in this regard. The inspiration for the recent advances seems to be a response to the challenges presented by follicular unit extraction (FUE), which now makes up over half of all hair transplants performed worldwide and whose popularity—mostly patient-driven—continues to rise.

The challenge of FUE is the fragility of the harvested grafts (compared to those that are microscopically dissected from a strip). The cause of the increased fragility can be divided into two, somewhat interrelated, categories. The first is intrinsic to the FUE process itself and the second is more technically dependent.

The first issue is that current FUE procedures separate the follicular units from the surrounding connective tissue on the sides, but not at the base. Therefore, when the follicular units are removed from the scalp, either by forceps or by suction, the bulbs of the grafts are often left exposed (the pant-leg phenomena). This can be mitigated with improved dissection techniques, but not entirely avoided, and the ability to manually free up (dissect) the base of the unit becomes more problematic with the trend towards smaller FUE grafts.

A solution for the first problem has been to protect the delicate FUE grafts better once they are outside of the body. Improved holding solutions have helped in this area. The main insight has come from the knowledge that the practice of chilling grafts in saline or lactated Ringer's to slow their metabolism also shuts down the cell's ATP pumps. This allows Na⁺ to freely flow into the cell risking injury from intracellular edema. The use of holding solutions containing

macromolecules, which keep water out, and the addition of ATP to provide energy directly to the cells, can potentially increase the survival of these more fragile grafts.

Another way to protect these follicular units is with the use of mechanical implanters. Although first introduced several decades ago, the demand for FUE has created a revival in this technology. A recent study has attested to their effectiveness in protecting FUE grafts. Fortunately for patients, improved holding solutions and the use of implanters can benefit those having both FUE and FUT procedures.

The second problem in FUE is the reliance on the visual cues provided by the exiting hair and/or the "feel" of the tissue to estimate the position of the underlying follicles. These hairs not only curve and splay outward in the deep dermis and subcuticular space, but they also follow a different overall direction than the hair on the surface of the skin. The lack of visibility and the difficulty for the cutting tools to account for the variable path of follicles under the skin make transection a significant issue.

There have been a multitude of FUE devices created to solve the risk of transection. The development of the sharp/blunt technique that became the basis of the S.A.F.E. System (and which was later incorporated into the ARTAS™ Robot) was a particularly creative way to overcome the problem. The Trumpet Punch, with its splayed distal end and oscillating motion, was another clever technique designed to mitigate transection. Some form of dermal illumination or other means of subcuticular "visualization" would, of course, be helpful as well.

With 1,200+ pairs of eyes now focused on these issues, progress in our field is sure to accelerate even more. Perhaps the technologies will eventually coalesce around a single solution that will solve the complex problems of hair restoration surgery or multiple techniques will remain. We look forward to reading the *Forum* over the next 25 years to find out! ■