

The visualization of hair follicles by means of ultrasound scanner and follicoscope (using 640nm red visible with polarized light filter) to reduce damage for hair follicles during FUE(follicular unit extraction)

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Abstract

Follicular unit extraction has many advantages which are the minimal scar, quicker recovery time but definitely have disadvantages as well. One of them include potential for top follicle transaction rate. The disadvantage is usually thanks to blind harvesting technique. Thus we had been trying to find imaging methods which make visible technique possible. One of them is that the ultrasound scanner which is 22MHz in frequency and shows structures within the dermis. Through it we acknowledged that there have been angle differences between hair shaft out of the skin and follicle within the occipital scalp. The results were in 20.8-40.3 degree range and 12.8 degree of average. In addition there were significant differences in the average follicle angle depending on the area of occipital region. Therefore we employed its data in order to reduce the transaction rate for graft. But despite ultrasound's great ability, we weren't ready to harvest the grafts simultaneously while seeing the follicle. So we were searching for something to be capable of resolving the problem and lights gave us the good idea. We made the primary attempt with the NIR(one quite lights which is 700-2500nm in wavelength). We were able to identify the hair follicles but felt a need for further improvement. The most suitable amount of melanin to be observed in hair follicles was 640 nm red visible. We were ready to identify hair follicles using 640nm red light with PL filter. As a result, we can harvest the grafts

while looking at the hair follicles through the monitor simultaneously

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Alopecia areata (AA) is an autoimmune, reversible, initially patchy hair loss most ordinarily involving the scalp (1). Histopathology is characterized by typical inflammatory lymphocytic infiltrates in the peribulbar region and increased numbers of hair follicles in a resting phase and catagen and telogen hairs (2). Diagnosis and therapy of hair and scalp diseases were within the recent years subject to significant progress. One of the major developments was employing imaging techniques, including trichoscopy (3,4) and reflectance confocal laser scanning microscopy (5,6). Although ultrasound biomicroscopy (UBM) is one among the non-invasive imaging techniques utilized in examination of several skin diseases (7-15), no report of its role in hair and scalp diseases was found upon reviewing the literature.

Hair transplantation has come an extended way from the times of Punch Hair Transplant by Dr. Orentreich in 1950s to Follicular Unit Hair Transplant (FUT) of 1990s and therefore the very recent Follicular Unit Extraction (FUE) technique. With the arrival of FUE, the dream of 'no visible scarring' within the donor area is now looking sort of a possibility. In FUE, the grafts are extracted as individual follicular units during a two-step or three-step technique

whereas the tactic of implantation remains an equivalent as within the traditional FUT. The addition of latest automated FUE technique seeks to beat a number of the restrictions during this relatively new technique and it's now possible to realize quite a thousand grafts in one day in trained hands. This article reviews the methodology, limitations and advantages of FUE hair transplant.

Modern hair transplantation was introduced within the 1950s by Dr. Orentreich.[1] He started with the help of 4 mm punches. Then the concept of mini and micrografting,[2,3] and later in 1990s the Follicular Unit Hair Transplantation (FUT) took over. With FUT, transplantation of hair in present individual follicular units was established.[5] In these methods, donor harvesting was done by single strip method with elliptical excision of donor, followed by suturing. The significant disadvantage of single strip harvesting was the resultant linear donor scar. Though it is possible to provide a very fine linear scar with the newly described trichophytic closure, it does pose cosmetic problems for many patients particularly those who wish to wear short hair. Bernstein and Rassman started developing the FOX procedure, heralding a new surgical hair restoration procedure without strip harvesting. The FOX procedure, also known as FUE (Follicular Unit Extraction), FUSE (Follicular Unit Separation Extraction) method, Wood's technique, FU Isolation method is fast becoming an alternative method of extraction of grafts as follicular units in selected cases. While there are many limitations to this new technique, several new developments are taking place to overcome the limitations of number of grafts in one session of FUE.

This article presents a review of different aspects of FUE such as, the prerequisites of doing FUE hair transplant, indications and contraindications, procedure, limitations and the latest advancements in the field of FUE.