

# **Improvement of Hair Transplantation in Postcicatricial Alopecia**

## **Abstract:**

**Background:** Because scarred tissue has less blood flow than normal tissue, fewer hair grafts are taken, and the patient may require many sessions to achieve acquired density, resulting in a lengthy treatment duration of up to five years. Using PRP improves these findings.

**Material and Methods:** A prospective randomized controlled study was conducted among 15 patients suffering from cicatricial alopecia and candidate for follicular unit extraction (FUE) hair transplantation, with ages between 25 years and 60 years.

**Results:** Functional and aesthetic outcomes were achieved from adding PRP regimen to follicular unit extraction hair transplantation in cases presented to us with post cicatricial alopecia. The improvement noticed in early recovery time & increase in density

**Conclusion:** PRP therapy after hair transplantation improves density and reduces recovery time in situations of cicatricial alopecia.

**Keywords:** Hair Restoration; FUE Hair; PRP and Hair; Post cicatricial alopecia.

## **Introduction:**

Scars that occur in regions where hair develops can be quite noticeable. Some scars are minor and easily concealed, while others require scar healing. Scars can appear on the hairy areas for a variety of reasons, including an accident or a burn. Hair transplant surgery using follicular unit extraction (FUE) is used to help conceal scars in hairy places. <sup>1</sup>

The follicular unit extraction (FUE) technique is used to remove hair from the donor location on the body or head and transplant it into the scar tissue. We want to increase the rate of transplant development and survival in scar tissue. <sup>2</sup>

Hair can be grafted into scar tissue, and the grafted follicles will develop with time. Scar tissue, on the other hand, frequently has lower levels of blood supply than normal tissues. Hair follicles require blood to survive; thus, this is an issue. The transplanted hair follicles will die or be unable to function effectively if the blood supply is insufficient. PRP injections before the surgery boost blood flow in scarred tissue, which improves graft take, and PRP injections after the procedure improve graft survival and take. <sup>1</sup>

Scars on the hairy areas are caused by a variety of things, including car accidents, sports injuries, birthmarks, and burn injuries. After healing, the wounded areas are frequently hairless. Hair restoration treatments such as FUE transplantation, on the other hand, make scars unnoticeable. <sup>3</sup>

Although hair follicle transplantation into scar tissue is successful in the vast majority of cases, various individual factors can influence the final cosmetic outcome. If the scar is hypertrophic, for example, it can limit the amount of blood that reaches the newly grafted hair follicles, preventing them from developing and functioning normally. This has an impact on the overall outcome of the hair scar removal technique. Scar tissue that is atrophic, on the other hand, maybe too thin to hold transplanted follicles. This indicates that the graft acceptance will be lower than anticipated. <sup>1</sup>

Treating scars in hairy places is a difficult task for the surgeon. Because graft take is not as consistent as in healthy, non-scarred skin, it may be necessary to repeat the procedure to attain appropriate density. The degree of hair loss and availability of donor's hair, as well as scar tissue quality, will indicate whether or not the patient is a candidate for follicular unit extraction (FUE). The scalp, beard, and brow are the most commonly affected locations. <sup>4</sup>

This procedure is not suitable for individuals having not enough donor hair to cover the non-hair bearing defects, males who have advanced male pattern baldness themselves, or a significant family history of advanced male pattern hair loss (which limits the size of the safe occipital scalp donor area) and inflammatory dermatological conditions that are

contraindications to hair transplantation (for example, lichen planopilaris). Patients may also be unsuitable for hair transplantation because there are multiple other reconstructive surgical priorities for functional rehabilitation that are higher on the priority list<sup>5</sup>

**Surgical options for management:**

The surgical options for treating burn alopecia will depend on the location of the hair-bearing area affected and the size of the defect. These include one or a combination of the following techniques:

Serial excision with or without tissue expansion.

Hair bearing flaps with or without tissue expansion.

Hair bearing full-thickness grafts.

Hair transplant surgery.

**Follicular Units Extraction hair transplantation methods:**

Follicular hair transplantation focuses on follicular units extracted from the donor zone in the scalp: the posterior and lateral zones (nonbalding areas), as these produce the most natural results. The idea of the donor: recipient ratio refers to the amount of hairs available in the donor area vs. the number of hairs necessary to cover a damaged area.

Each punch site in FUE surgery leaves a little round dot scar that can be covered with short hair. Punches with diameters ranging from 0.8 to 1.2 mm are coupled to a portable automated drill gear. Unlike strip hair transplantation, this procedure does not create a linear scar.<sup>6</sup>

Although, large harvesting sessions need shaving the entire donor area, and the grafts tend to have less tissue around them, necessitating extra care in handling. When this operation is repeated several times, the donor area can thin out. Because the scalp in post-burn alopecia is frequently very tight in these cases, strip FUT is not recommended because only a small area may be removed, limiting the amount of hair that can be transferred, and closure under strain will result in scar enlargement and/or hypertrophic scarring. The FUE method can also be used to harvest beard hair for beard-to-beard or beard-to-scalp transplantation. Body hair can also be extracted with FUE, although it has a distinct development pattern than scalp and beard hair, with a shorter growing phase and a longer resting period. This means that body hair transplants to the scalp may cause hair density changes as the body hairs to enter the resting phase of their prolonged hair growth cycle. The implantation is the same regardless of the method used to collect hairs, and it is the angle and direction of the transplanted hairs, as well as the hairline design and recipient site density, that determine a good hair transplant result. Follicular unit grafts can be inserted into pre-made incisions with a scalpel or implanters; the implanters can

also be used to make incisions while the graft is being implanted. The advantage of the prefabricated opening is that the entire design of the transplant area is completed before the start of graft implantation, whereas the implanter has the advantage of not missing any incision sites. Hair transplant surgical complications are mostly related to the aesthetic outcome with density. Infection is extremely rare. Skin necrosis at the donor or recipient location is also uncommon.<sup>5</sup>

Patients with post-burn scar alopecia frequently have dense hair around the alopecia patches. As a result, many treatments are required to obtain acceptable hair density, which should be explained to the patient during the consultation. It can take up to 18 months for transplanted hairs to mature and allow for evaluation of the transplanted results. Several processes could take up to five years to complete. Micro-pigmentation tattooing, which can give scars a color comparable to hair, can be used to hide the scar for a long time.<sup>1</sup>

#### **PATIENTS AND METHODS:**

This study was done on 15 patients suffering from post cicatricial alopecia and candidate for follicular unit extraction (FUE) hair transplantation, with ages between 25 years and 60 years which divided into two groups:

Group (1): cases group which include ten patients (posttraumatic{x} 6 patients and post burn{y} 4 patients) and managed by injection of Platelet Rich Plasma (PRP) 4 sessions before hair transplantation, a session every week, one week separate the last session from hair transplantation. Then follicular unit extraction hair transplantation with adding PRP injection of 0.1cc for every square centimeter in the recipient area; during the procedure, the grafts were kept in PRP soaked gauze.

Post-operative regimen for the group (1): day one after hair transplantation preparation of PRP then spray it with a syringe without injection and repeat this daily for first week then starting injection one week post-operative; 2 weeks post-operative; 3 weeks post-operative; Then each month for four consecutive months(cases 1,2,3)

Group (2): control group, which includes five patients (posttraumatic{x} 2 patients and post burn{y} 3 patients) and managed by four sessions of PRP only post-transplantation session every week. (Case 4)

The evaluation was done by the analysis of grafts take density and patient satisfaction up to 1year.

**Operative Technique:**

We had used in this study Follicular unit extraction hair transplantation based on micromotor & straight handpiece, Jewelers Micro Forceps (Extraction & implantation), punches of size 0,8 mm & needle holder with slits or blade knife no.11.

**Site of donor:**

Back & sides of the scalp.

**Anesthesia:**

Local anesthesia with 2% xylocaine concentration & adrenaline 1 mg for both donor and recipient.

**Donor site anesthesia**

For the ring block, at the donor site, we had prepared a solution of xylocaine 30 ml with the addition of 30 ml normal saline with the concentration of adrenaline (1:1000) for donor & recipient block.

We inject at the posterior hairline for the proper block of the posterior occipital nerve.

**Recipient site anesthesia:**

Local infiltration of scar area with local anesthesia.

**Procedure:****Harvesting of hair grafts:**

Follicular units harvested by sharp punches we have used in this study 0,8 mm diameter-sized punches.

We stored grafts in PRP put on gauze during procedure time.

**Creation of recipient sites and implantation of hair grafts:**

Creation of the recipient sites in the recipient area with blade width about 1 mm or with scalpel knife No. 11 carried on the needle holder. Insertion of the graft with using of implantation jewelers.

**Dressing:-**

The dressing was exposed or closed according to site and patient tolerance; the closed dressing was removed daily post-operative for PRP application.

**Case 1:**



**Case 2:**



### Case 3:



### Case 4 :



### PRP preparation:

The sample is first collected in tubes containing anticoagulants, roughly 1 ml of sodium citrate for every 10 ml of blood, in the double centrifugation process of PRP. PRP is extracted from a sample of the patient's blood taken during treatment. A 10 cc venous blood draw will provide 1-2 cc of PRP, which is obtained through a double centrifugation procedure in which the sample is first collected in tubes containing anticoagulants containing around 1 ml sodium citrate for every 10 ml of blood.

The first spin step was performed at 2500 rpm for 4 to 5 minutes for the separation of whole plasma from RBCs.

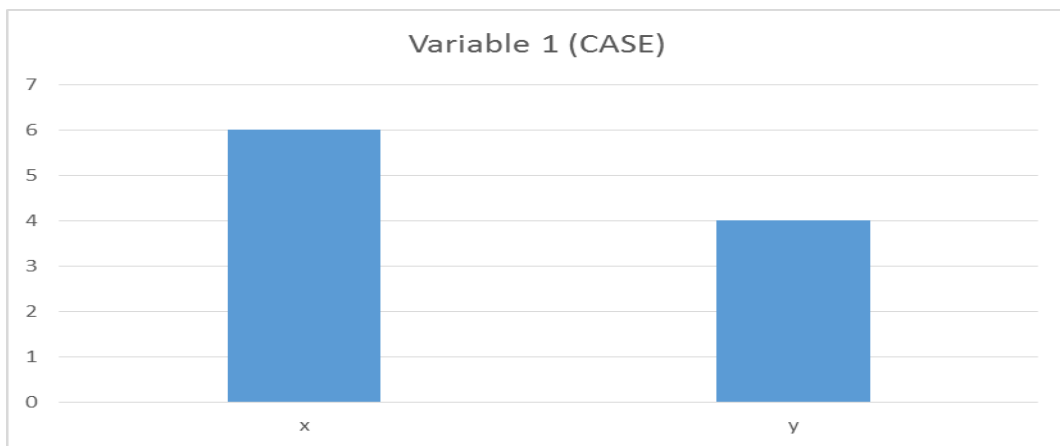
For the production of pure PRP, the upper layer and superficial buffy coat are transferred to an empty sterile tube.

The second spin step was performed at 3500 to 4000 rpm for 15 minutes for sedimentation of buffy coats and the creation of PRP.

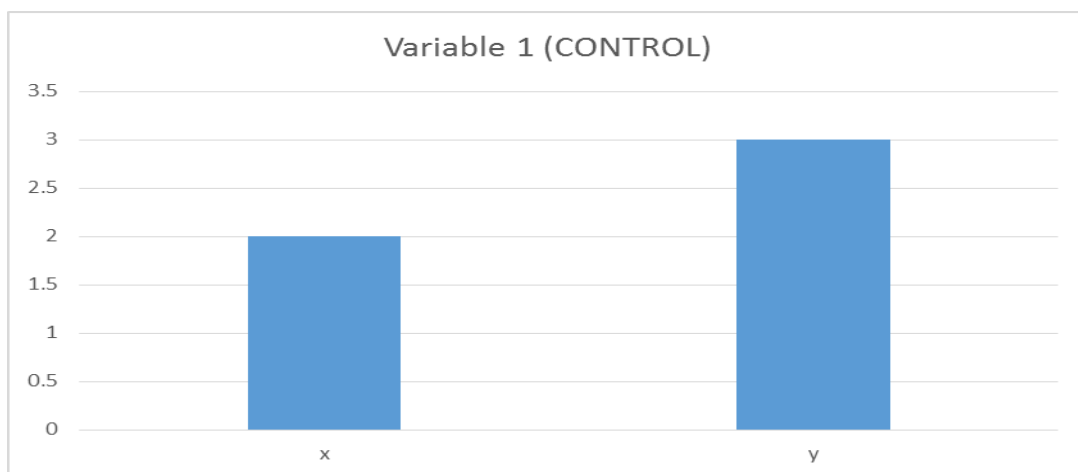
The upper portion of the volume that is composed mostly of PPP (platelet-poor plasma) is removed. Pellets are homogenized in lower 1/3rd (5 ml of plasma) to create the PRP (Platelet Rich Plasma).

**Result:**

Group 1 which includes 10 patients (6 posttraumatic {x} and 4 post burn {y}). Histogram 1.  
Group (2): control group which include 5 patients (posttraumatic{x} 2 patients and post burn{y} 3 patients) histogram 2.



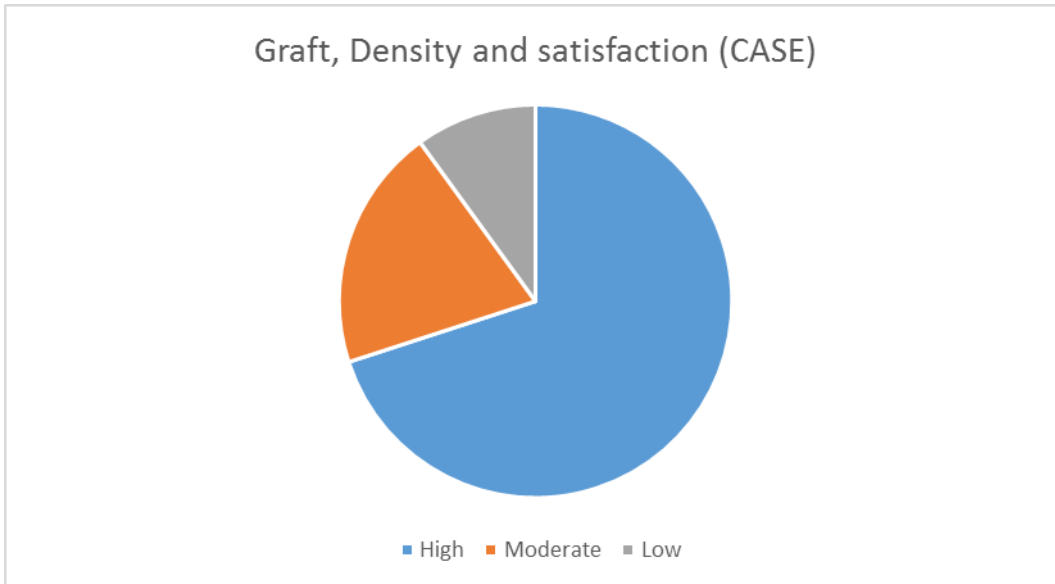
histogram 1





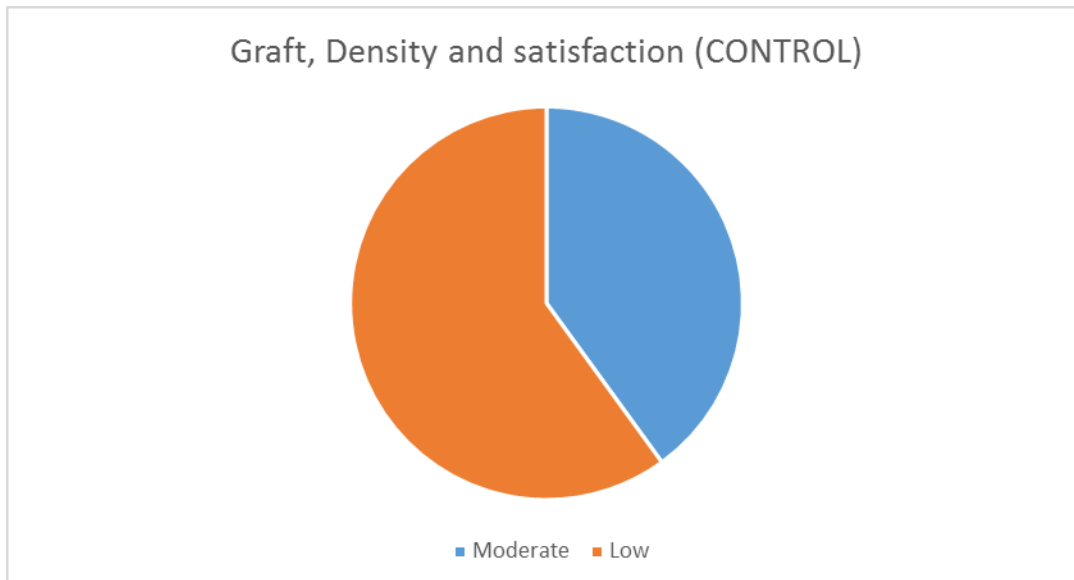
## Histogram 2

In group (1): 7 patients have high-density graft take and their satisfaction is high, two patients have moderate graft take, moderate density, moderate satisfaction, and one patient only have low graft take less density and low satisfaction, pie chart 1.



Pie chart 1

In group (2): three patients have moderate graft take, moderate density, moderate satisfaction, and two patient only have low graft take less density and low satisfaction, pie chart 2.



pie chart 2

**Discussion:**

PRP therapy helps to improve the skin quality of grafted areas by stimulating cell proliferation and differentiation, inhibiting apoptosis, and increasing neovascularization, making grafted areas more suitable for newly transplanted hair. It also aids in the formation of new hair follicles, resulting in increased survival, activity, and the appearance of new recovered hair as early as three months. PRP injections under the skin are thought to minimize hair loss and enhance hair diameter and density, according to most research.<sup>7</sup>

When follicular units are prepared with PRP before implantation, there is a considerable improvement in hair density and stimulation of growth, which leads to higher patient satisfaction.<sup>8</sup>

In this study, we used PRP-preserved hair grafts using the FUE technique, which resulted in a significantly increased percentage of hair graft uptake in the implanted area.<sup>9</sup> (cases 1, 2, 3)

A significant visual difference in the hair cross-section. Microscopic findings showed a thickened epithelium, proliferation of fibroblasts and collagen fibers, and increased vessels around the new follicles.<sup>9</sup>

The effect of autologous PRP injections on the affected area of alopecia was studied. Three months after the treatment, the patients presented with clinical improvements in hair count, hair thickness, and hair root strength.<sup>9</sup> of the other cases which treated only with post-operative PRP( case 4), the density of hair was less and needed more than the session.

Mahapatra et al. did a study with 177 patients in 2016. They found that PRP injections resulted in considerably more hair per square centimeter than controls (mean difference, 17.90; 95 percent confidence interval, 5.84–29.95; P = 0.004). They also found that the PRP group had a considerably higher hair thickness cross-section per 104 mm<sup>2</sup> (mean difference, 0.22; 95 percent confidence interval, 0.07–0.38; P = 0.005).<sup>10</sup>

In consistence with Sexana et al., the quality of scarred tissue improved following hair transplantation with the addition of PRP therapy since skin atrophy in the cicatricial areas looked to be reduced. This could be explained by the PRP's activity, as well as the fact that the transplanted hair causes neovascularization and dermal rearrangement.<sup>1</sup>

In our study, adding PRP therapy with post cicatricial alopecia hair transplantation gives the patient more advances with high patient satisfaction in scar quality, hair density & length results which are evaluated by patient questionnaire sixth month's post-operative follow-up.

Our study can explain and in agreement with Uebel et al., that PRP, with its action of tissue regeneration and remodeling with angiogenesis, has the potential to revitalize the

scarred tissue, improve its vascularity to make it more receptive for transplant, and help increase the donor yield. Such PRP can serve as an adjuvant to hair transplant in compromised recipient areas as seen in scarring alopecias.<sup>11</sup>

Garg looked into the results of intraoperative injected platelet-rich plasma therapy for 40 patients who had follicular unit extraction hair transplantation. The number of patients with multiple grafts was substantially higher in the PRP-treated group (20 patients) than in the non-PRP-treated group (20 patients), and 65 percent of the PRP-treated group had more than 10 mm hair shaft length. Only 10% of patients in the non-PRP treated group had a shaft length of more than 10 mm.

Garg noted that after three months of hair transplantation, all twenty patients in the PRP group had numerous grafts regrowing and exploding out. Only 60% of patients in the non-PRP group had multiple grafts at six months, compared to 80% in the PRP group.

Also, in our study, we noticed the same results, mainly on cicatricial alopecia. PRP decreases the time of regrowth and appearance of grafts again at the end of the sixth month.<sup>12</sup>

After a year of follow-up, we found that not only the PRP injections but also the handling of grafts, storage, graft harvesting techniques, and overall time of operation made a significant impact in FUE hair transplantation for scalp baldness.

## **CONCLUSION**

Hair transplantation with PRP therapy results in more density and a shorter recovery time after cicatricial alopecia.

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