

Enhancing Donor Area Regrowth and Graft Survival in Follicular Unit Extraction (FUE) Hair Transplantation through Partial Transection of Dermal Papilla Stem Cells and Adjunct PRP/PRF Therapy

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Abstract

Follicular Unit Extraction (FUE) has become a cornerstone in hair transplantation due to its minimally invasive nature and precision. However, challenges related to donor area regeneration and long-term graft survival continue to impact patient outcomes. This paper introduces a novel approach that involves the partial transection of dermal papilla stem cells during FUE extraction, which has the potential to foster donor site regeneration. Furthermore, we detail Evolved Hair Restoration's combined use of Platelet-Rich Plasma (PRP) and Platelet-Rich Fibrin (PRF) to enhance both graft survival and regeneration in donor and recipient areas. Our findings, based on a 12-month clinical study, demonstrate the feasibility and effectiveness of this technique in optimizing both donor area regrowth and graft survival.

Keywords: Follicular Unit Extraction (FUE) • Partial transection • Dermal papilla • stem cells • Hair follicle regeneration • Platelet-Rich Plasma (PRP) • Platelet-Rich Fibrin (PRF) • Donor area regrowth • Graft survival • Hair transplantation • Regenerative medicine

Introduction

Follicular Unit Extraction (FUE) has revolutionized hair transplantation by offering a less invasive alternative to traditional strip-harvest methods. Despite its many advantages, concerns about the regenerative capacity of the donor area and the survival of transplanted grafts remain. These challenges are particularly pertinent in cases where extensive extraction depletes the donor supply. This study proposes a method aimed at mitigating these concerns by preserving partially transected dermal papilla stem cells during the extraction process. Additionally, the use of regenerative therapies, such as PRP and PRF, is explored to maximize graft survival and wound healing, reflecting a growing trend toward incorporating biologics in hair restoration.

Methods

In the proposed method, a portion of the dermal papilla and its stem cells is intentionally left intact during FUE extraction, a technique theorized to encourage follicular regeneration within the donor site. PRP is applied to the grafts prior to implantation, while PRF is introduced to the donor area post-extraction to facilitate wound healing and enhance the regenerative environment. Patients received monthly PRP treatments with micro-needling for three months post-surgery to both the donor and recipient areas, aiming to stimulate cellular activity and support hair follicle recovery and growth.

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Results

The partial transection technique is grounded in the established role of dermal papilla cells in hair follicle regeneration, supported by prior research [1,2]. In combination with PRP and PRF therapies, this technique shows potential for improving both donor area regrowth and graft survival. In our 12-month clinical study involving 20 patients, we observed enhanced donor area regeneration in 80% of the cases, as evidenced by increased follicular density and improved hair quality. Graft survival rates were notably higher in the PRP-treated recipient areas compared to standard FUE procedures. This suggests that the combined approach of partial transection and biologic therapies may offer a synergistic effect that improves both graft outcomes and donor site preservation.

Discussion

This study aligns with a growing body of evidence supporting the role of regenerative medicine in hair restoration. Dermal papilla stem cells play a crucial role in hair follicle cycling and regeneration, and their preservation during FUE may enable partial regrowth of extracted follicles. PRP, known for its rich concentration of growth factors, has demonstrated efficacy in promoting both hair growth and wound healing [3,4]. Additionally, PRF's fibrin matrix provides a scaffold for the slow release of growth factors, contributing to sustained regenerative effects [5]. The combination of PRP and PRF therapies with micro-needling enhances these effects by activating the wound healing cascade and stimulating dermal repair processes, potentially leading to more robust graft survival and reduced scarring in the donor area. Our findings suggest that the partial transection technique, when combined with these biologics, can mitigate some of the key challenges associated with FUE.

Conclusion

This study introduces a novel approach to FUE that integrates the partial transection of dermal papilla stem cells and adjunct PRP/PRF therapy. Our results suggest that this technique may significantly enhance donor area

regrowth and improve graft survival rates, providing a potential solution to long-standing concerns in hair transplantation. As regenerative medicine continues to evolve, techniques that leverage the body's natural healing processes-like the one presented here-could become central to advancing the field of hair restoration.

Acknowledgement

None.

Conflict of Interest

The author states no conflicts of interests.

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