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Figure 3. In the second patient, a 1-mm × 1-mm papule appeared near the upper lip after the first HMME-PDT session. HMME-PDT, hemoporfin-mediated photodynamic therapy.

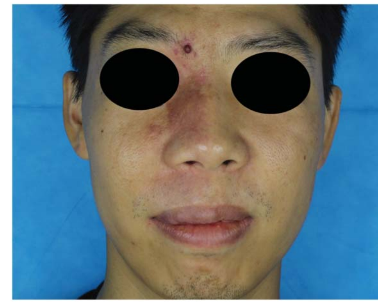

Figure 4. A papule appeared on the PWS of the third patient after his 5 sessions of photodynamic therapy. PWS, port-wine stain.

as previous injury, pharmacologic agents, pregnancy, laser therapy, and cryotherapy. However, recent research indicates that somatic mutations may also affect the development of PG.[2] The study identifies the BRAF c.1799T > A mutation as a driver mutation in the pathogenesis of secondary PG, which originates from cells of the PWS. Nonetheless, according to our clinical findings, we posit that PDT or its postoperative repair may have a correlation with the development of PG in PWS patients. Further studies are needed to determine whether there is a causal relationship between PDT, somatic mutations, and PG formation.

Researchers showed that most nodules in PWSs are PGs and arteriovenous malformations.[3] PWS patients are more likely to develop nodules because of the formation of microscopic arteriovenous anastomoses within the context of ectatic capillaries. However, Tan and colleagues[4] argued that PWS shows impairments in arterioles and venules, and no normal arterioles or venules are phenotypically or morphologically present. This suggests that the vascular pattern of PWS may need to be reconceptualized, challenging the designation of PWS lesions as arteriovenous anastomoses or arteriovenous malformations. The subtle relationship between different types of vascular anomalies deserves further study.

In conclusion, the cases of these 3 patients with PG after treatment of PWS with HMME-PDT could serve as a valuable reference for future research concerning the development of PDT protocols and the pathogenesis of PG.

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The Challenge of Regrowing Hair With Lasers in Androgenetic Alopecia

Androgenetic alopecia (AGA) affects millions of individuals worldwide, yet current treatment options are of limited efficacy and often result in relapse after treatment discontinuation. The frontotemporal recession (FTR) of male AGA remains a therapeutic challenge. Fractional photothermolysis (FPT) has emerged as a potential hair growth therapy with promising results in murine models.[1] Studies of different FPT modalities conducted in humans, with and without adjunct topical treatments, have yielded varying clinical results.[2–4] In this split-scalp study, we evaluate the effectiveness of various combinations of fractional 1,550-nm

TABLE 1. Hair Count Changes in Patients After Treatment (Fractional Photothermolysis and/or Topical Minoxidil or Finasteride)

			Percentage Change in Hair Counts from Baseline (%)		
		Therapy Received (Side of Scalp)	Week 6	Week 12	Week 18 (Post-fractional Photothermolysis Discontinuation)
Fractional photothermolysis (L) + topical minoxidil (M) group	Patient 1*	Combination (L + M) (right)	−5.9	18.5	
		Minoxidil only (left)	−8.0	−6.7	
	Patient 2	Combination (L + M) (right)	57.4	94	48.9
		Minoxidil only (left)	8.3	31.3	35.4
Fractional photothermolysis (L) + topical finasteride (F) group	Patient 3	Combination (L + F) (right)	120.5	102.6	94.9
		Finasteride only (left)	23.6	32.7	−1.1
	Patient 4	Combination (L + F) (left)	10	68	14
		Laser only (right)	19.6	−17.9	−35.7
	Patient 5†	Combination (L + F) (right)	14.3	−1.4	−12.9
		Combination (left)	40	21.5	−15.4

* Patient 1 was unable to attend the week 18 follow-up appointment.
† Patient 5 inadvertently applied topical finasteride to both sides of his scalp during treatment period.

laser and concurrent use of common topical AGA therapies in patients with FTR.

This study was approved by the University of California, Irvine, institutional review board. Male AGA patients with bilateral FTR not currently using any hair loss treatment were eligible for enrollment. Patients were treated with 8 passes of fractional 1,550 nm laser (Fraxel Re:Store, Solta Medical, Pleasanton, CA; 10–12 mJ, 86 MTZ/cm^2, total energy 0.1–0.81 kJ) every 2 weeks for 6 sessions. After laser treatment was completed, patients were monitored for 8 weeks (±4 weeks). Patients were instructed to use topical minoxidil 5% or finasteride 1% (Chemistry Rx Compounding Pharmacy, Philadelphia, PA) daily on the left, right, or bilateral scalp during the laser treatment and follow-up periods. All treatments were delivered from the frontal hair line (defined by a horizontal line drawn from the widow's peak to the current temporal hair line) to the current frontotemporal hairline.

Clinical progress was followed quantitatively with optical coherence tomography (OCT; Beckman Laser Institute, Irvine, CA), and qualitative serial photography and patient-reported outcomes at baseline, 6, 12, and 18 weeks. OCT imaging was performed at the same 2 predetermined points bilaterally within the FTR. Vertical sections of each 5- × 5- × 7-mm OCT image were taken at 25%, 50%, and 75%, creating digital images mimicking histologic sections of a scalp biopsy. The

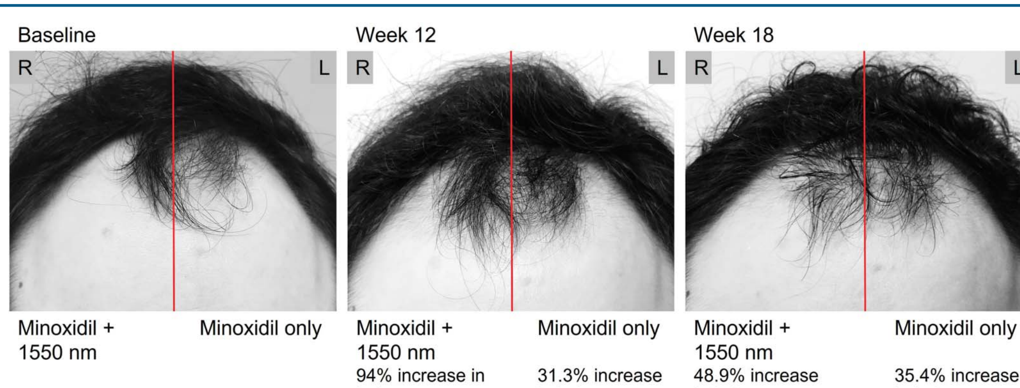

Figure 1. Clinical images of patient 2 treated with topical minoxidil to both sides of the scalp and in combination with 1,550-nm laser (6 times, 2 weeks apart) to the right scalp only from baseline to weeks 12 and 18.

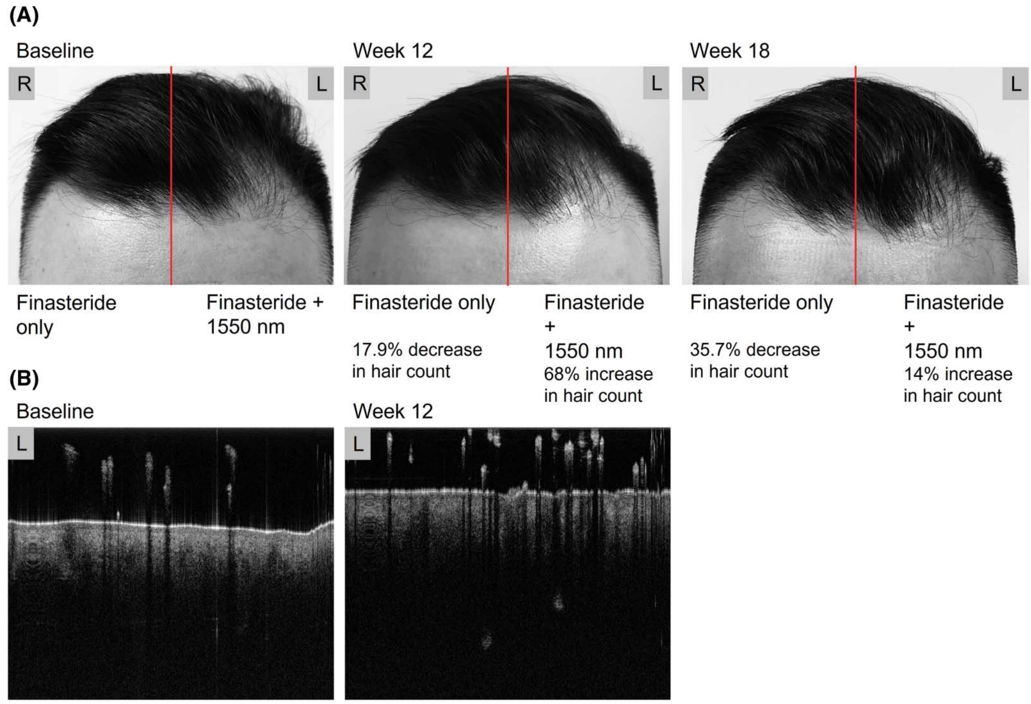

Figure 2. (A) Clinical images of patient 4 treated with topical finasteride to both sides of the scalp and in combination with 1,550-nm laser (6 times, 2 weeks apart) to the left scalp only from baseline to weeks 12 and 18; (B) OCT vertical slices capturing an increase in this patient's hair density from baseline after 6 sessions of 1,550-nm fractional photothermolysis with topical finasteride. OCT, optical coherence tomography.

number of hair follicles in each area were summed and trended over time. Patient-reported outcomes were completed using a 5-point Likert scale Global Assessment of Change ("worse," "no change,", "improved,", "much improved,", and "very much improved").

Five male AGA patients (age range: 24–39 years) participated in this study. All patients received 6 laser sessions, with 2 patients receiving topical minoxidil 5% daily, and 3 patients receiving topical finasteride 1% daily (Figures1 and 2). Patients 1 and 2 were treated with topical minoxidil to both sides of the scalp and right (R)-sided laser. Both patients demonstrated hair growth bilaterally, however more so on the side receiving combination therapy. Patients 3 to 5 were treated with laser or topical finasteride or both to the FTR. The side treated with both therapies demonstrated increased growth compared with the sides with laser alone or finasteride alone (Table 1). All patients reported "improved" to "much improved" on the Global Assessment of Change at weeks 6, 12, and 18. The most commonly reported side effects during laser treatment were mild pain and discomfort ($n = 5$), and a mild "sunburn-like" feeling that resolved in 1 to 2 days ($n = 2$). No serious adverse events were reported.

Lasers are an effective topical drug delivery system allowing for deeper penetration of topical medications by facilitating permeation through microthermal treatment zones at uniform depth and even spacing. By overcoming the epidermal barrier and increasing the surface area for skin infiltration, adjuvant laser treatment before topical drug administration promotes drug uptake by hair follicles and enhances effects.[5] Our pilot study represents a summary of our efforts to improve on current AGA therapies using a combination of laser and topical minoxidil or finasteride. Our initial efforts to reproduce previously published data on hair growth induction in AGA patients with a 1,550-nm laser alone were not clinically satisfactory. In our clinical experience, lasers induce growth of vellus-like hairs (<1 cm long, fine hairs); however, they would not transform to terminal hair and would fall out after laser discontinuation.

Considering the sharp decrease in hair count after discontinuation of laser therapy in the minoxidil-treated patients, it can be surmised that minoxidil does not induce terminal development of the hair follicles activated by laser therapy (Patients 1 and 2). Even with minoxidil therapy alone, some patients may continue to lose hair, suggesting that the progression of AGA outpaces what laser or topical therapy alone (or in combination) can account for (Patient 1). In contrast, after using laser and topical finasteride, hair counts do not return to baseline, nor do they reach the same level of hair loss as laser alone after 18 weeks, suggesting finasteride may have a role in terminal hair development possibly by reducing hair miniaturization (Patients 3 and 4).

One challenge with FPT treatment of alopecia is the high level of patient burden because of frequent, costly treatments. Cessation of treatment may lead to a decrease in hair density and hair thickness, meaning FPT is a long-term commitment. It is important that clinicians have an in-depth discussion with their patients outlining the benefits and pitfalls of FPT for hair regrowth before initiating treatment. Patients with darker skin phototypes (IV to V) may have a limited clinical benefit from FPT because parameters with lower energy are used to avoid postinflammatory hyperpigmentation (Patient 1). Because we were testing multiple parameters to determine which combination therapy was most effective, our sample size is small and homogeneous, and thus our results may not be generalizable.

Clinicians should be aware of all novel and developing alopecia therapeutic options because many of the available modalities do not work effectively, have high rates of relapse, or may be associated with unwanted side effects. Preliminary results using FPT for alopecia are promising. Low-energy, high-density, 1,550-nm laser every 2 weeks in combination with 1% topical finasteride may be an effective therapy for male patients with AGA affecting the FTR. Further research is needed to determine optimal treatment parameters such as FPT treatment frequency, total number of treatment sessions, and choice of topical treatment.

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Beard and Body Hair Transplantation by Follicular Unit Excision Using a Skin-Responsive Device: A Multicenter Study

Follicular unit excision (FUE) is a favored hair transplantation method that avoids linear scars and facilitates the utilization of nonscalp (beard and body) hair, which is valuable for extensive baldness (Figure 1),[1] or corrective hair transplant repair situations of limited donor capacity. In some instances, nonscalp hair can better match recipient hair traits, enhancing natural outcomes, such as using leg/forearm hairs for eyebrows or softer hairlines.[1] Despite its advantages, conventional nonscalp FUE faces challenges because of variations in skin and hair characteristics. For instance, as the surgeon moves centrifugally and caudally from the neck, body hair changes direction and becomes subcutaneously more angled. Furthermore, different body areas present unique challenges, including thicker skin on the back, steeper angles for pubic hair, and abdominal movement during breathing. These factors lead to increased ergonomic challenges, reduced surgeon adoption rates,[1,2] and high graft transection rates (TRs) of 10% to 20% (beard) and 20% to 30% (body).[2]

Previously, we introduced a skin-responsive FUE device (SRFD) that achieves low TR in African-descended patients by accommodating varying hair curliness and skin characteristics.[3] Here we report the application of this technique in beard and body FUE procedures.

Deidentified patient data from 4 multinational hair restoration clinics (the United States, Colombia, Mexico, and India) with FUE practitioners skilled in nonscalp hair transplantation using the Dr. UGraft Zeus FUE device (Dr. U Devices, Manhattan Beach, CA)[3] (Figure 2) were retrospectively analyzed. Patients were head donor–challenged and underwent beard/body hair transplantation between May 2022 and February 2023. We assessed patient demographics, donor site traits, settings, and FUE outcomes of TR, patient satisfaction, and surgeon favorability.