Lasers and Light in Pattern Hair Loss
Prof. Ralph M. Trüeb, M.D., Center for Dermatology and Hair Diseases, Bahnhofplatz 1A, CH-8304 Zurich-Wallisellen, Switzerland, www.derma-haarcenter.ch

In the course of the evolutionary loss of our body pelage, maintenance of scalp hair is probably related to our upright walk with the scalp maximally exposed to ultraviolet radiation (UVR) and in need of effective photoprotection. While the natural selection advantage of pattern hair loss (PHL) in the course of the evolution remains unclear, the result is the loss of natural protection of the scalp from UVR from a gradual decline in visible scalp hair density. A number of pathologic conditions of the scalp are evidently related to UVR, particularly photosensitive diseases affecting the balding scalp, and disorders of the photodamaged bald scalp. While the consequences of sustained UVR on unprotected scalp skin are well appreciated, the effects of UVR on the evolution of PHL have largely been ignored. However clinical and morphological observations, as well as theoretical considerations suggest that UVR has some negative effect. Since all of these disparate disorders of the balding scalp share the common feature that under some circumstances they are induced or exacerbated by exposure to sunlight, it has been proposed that PHL represents a photoaggravated dermatosis, and demands photoprotection. On the other hand, there is evidence that laser and light sources may enhance hair growth, such as observations of PUVA-induced hypertrichosis, and paradoxical hair growth from photoepilation. In fact, the ability of lasers to induce hair growth was incidentally noted as early as 1967 when Mester and colleagues used low-level laser therapy (LLLT) to treat cancer in mice with shaved backs. Since then, hypertrichosis has been recognized to be a possible side effect of laser treatment. First described in 2002 with IPL therapy, this phenomenon has now been widely acknowledged to occur with an incidence rate ranging from 0.6 to 10 percent with low fluences and all laser types It is thought to be the result of suboptimal fluences that are too low to induce thermolysis, but high enough to stimulate follicular growth. Eventually, LLLT has been developed for treatment of PHL. In 2007, the HairMax Laser Comb® received 510(k) clearance from the FDA for the treatment of PHL for males, and 2011 for females. This clearance means that the device is considered a moderate-risk medical device by the FDA and is thereby solely screened for safety, not efficacy. The HairMax Laser Comb® has been tested in a company-sponsored study of 110 male patients with the claim of significant increase in mean terminal hair density when compared to a sham device. Avram and Rogers conducted the first independent blinded study of LLLT and hair growth with 7 patients and found that on average, there was a decrease in the number of vellus hairs, an increase in the number of terminal hairs, and an increase in shaft diameter. A consensus written by hair loss experts states that based on anecdotal experience, LLLT, particularly 650 to 900 nm wavelengths at 5 mW, may be an effective treatment option for patients. This group also found that even if no regrowth was appreciated, patients noted improvement in the texture and quality of hair. From our own experience we share with the authors the opinion that LLLT represents a safe and potentially effective treatment option for patients who do not respond or are not tolerant to standard treatment of PHL with minoxidil and/or finasteride. This technology appears to work better for some people than for others. Predictive factors who will most benefit from low-level laser treatment are yet to be determined.

Further Reading