Blandade publicerade studier, infom & försök med Low-Level-Laser-Theraphy !!

ISHRS Press Release

Low-Level Laser Therapy is Now a Do-It-Yourself Hair Loss Treatment
NEW YORK (October 16, 2003)- While lasers are best known as high-energy beams of coherent light that can cut through a variety of materials including human tissue, low-energy laser light has been found to be capable of modulating beneficial biologic effects in human, animal and plant cells. The biomodulating effects of low-level laser light on human cells has been adapted to medical uses such as enhanced wound healing and treatment of some types of pain, and to cosmetic uses associated with effects on human skin. Low-level laser light has also been found to have biomodulating effects on human hair and hair follicles. The effectiveness of low-level laser light in hair restoration was described today by Martin Unger, MD, Toronto, Canada, in a presentation at the 11th Annual Meeting of the International Society of Hair Restoration Surgery (ISHRS). The ISHRS is meeting October 15-19, 2003, at the Marriott Marquis Hotel, New York City. Clinical studies have shown that low-level laser light is effective both cosmetically and physiologically in hair restoration, Dr. Unger said. The cosmetic effects include improvements in hair sheen and strength, characteristics that enhance the perception of "fullness" in overall hair appearance. Physiologic effects on hair follicles observed in both men and women include (1) prevention of hair loss, and (2) stimulation of hair regrowth in areas of hair loss. Dr. Unger, a physician hair restoration specialist, is medical director of a firm that makes a hand-held low-level laser therapy device for home use in hair restoration (HairMAX LaserComb, Lexington International, Boca Raton, FL). The device is accepted as a Medical Device in Canada, and advertising is allowed to make therapeutic claims that it (1) increases strength of scalp hair in men and women, (2) prevents scalp hair loss in men and women, and (3) causes regrowth of scalp hair in men and women. In the United States it is accepted by the Food and Drug Administration (FDA) for use as a Cosmetic Laser Product. Approval by the FDA as a Medical Device is pending while appropriate clinical trials are completed. The device is also sold in other countries outside North America. Low-level laser medical therapy is currently approved by the FDA for treatment of carpal tunnel syndrome and for relief of discomfort, Dr. Unger said. The device described by Dr. Unger is a hand-held, wand-like instrument with laser-light ports arranged across its surface like the teeth of a comb. Laser light in the visible red light spectrum is generated in a laser diode. The energy level is far below that of laser beams that cut or burn tissue. Rather, the low-level red laser light has a very low absorption rate in human tissue. Low-level laser therapy for hair restoration is also delivered in a hood-like device that fits over a patient's head much like a hair dryer in a beauty salon. The mechanism of action of low-level laser light on human cells is not completely understood. The interaction of laser light with cells has the basic feature of modulating cell behavior without causing significant temperature increase inside the cells; higher-energy lasers used to treat some types of cancer destroy cancer cells by heating them from the inside. A resulting photochemical reaction inside cells treated with low-level laser light may alter physical and chemical properties of molecules important to cellular activities. Two of the most significant effects of low-level laser light in wound healing and in pain control, Dr. Unger said, are improved arterial and venous blood flow and decreased inflammation. The effects of low-level laser light associated with its effects of hair and hair follicles are not known with precision. In clinical trials, 97% of patients have had some benefit in improvement of hair characteristics, stabilization of hair loss, or hair regrowth, Dr. Unger said. Hair regrowth is defined by Dr. Unger and colleagues as an increase of hair count of 11% or more from baseline count. In the most recently conducted FDA clinical trials of the device, patients studied were men and women with thinning hair in the scalp area. The patients received two low-level laser light treatments per week over a six-month period. Results have shown:

- 100% of men had stabilization of hair loss in frontal and vertex (top of the head) areas;
- 84.6% of men had hair regrowth (11% of more from baseline) in the frontal area;
- 82.8% of men had hair regrowth (11% or more from baseline) in the vertex area;
- 87.5% of women had stabilization of hair loss in the frontal area;
- 100% of women had stabilization of hair loss in the vertex area;
- 75% of women had hair regrowth (11% or more from baseline) in the frontal area; and,
- 96.4% of women had hair regrowth (11% or more from baseline) in the vertex area.

No side effects of low-level laser therapy have been observed, Dr. Unger said. There have been no reports of eye damage from exposure to low-level laser light. Patients with medical conditions such as a history of skin cancer,

persistent scalp infections, and photosensitivity to laser light were excluded from the study. The ISHRS is the world's largest not-for-profit professional organization in the field of hair restoration surgery, with 512 physician members in 45 countries. The organization was founded in 1992 to promote the enhancement of the specialty of hair restoration surgery through education, information-sharing, and observance of ethical standards.

Laser Hair Therapy - Scientific Proof

The Principles of Low Level Laser Therapy or photo-biotherapy are as old as sunlight itself. Harnessing and refining the therapy with low reactive lasers, like BHC Laser Light Hair Therapy, is relatively new. Low level lasers are “soft” lasers, often referred to as “cold” lasers, and do not have the thermal-component to cut, burn or vaporize tissue. Low Level Laser Therapy (LLLT) is based on the scientific principal of photo biotherapy. Photobiotherapy occurs when laser light is absorbed by cells stimulation cell metabolism and causing damaged cells to repair themselves. Photo-biochemical changes in cells can only be achieved with the correct amount of light energy, delivered at the appropriate wavelength. According to laser researcher, Dr. David G. Williams, “Low Level Laser Therapy, or LLLT, is a miraculous healing tool.”

Normal white light produces a thermal effect in the skin. This is due to its relatively high energy output, with a large share of it’s light in the infrared spectrum being absorbed by the water in the outer cell structures. Laser light, with one specific wavelength, penetrates deep into the layers of skin and is absorbed, provoking a photo-biochemical chain reaction. The BHC Laser Light Hair Therapy device has 15 diode lasers mounted in a half sphere, which rotate around the entire head, delivering laser energy to the tissues of the scalp. Laser energy (photons), penetrate deep into these tissues and are absorbed by deeper cell structures, resulting in a photo-biochemical chain of cellular and sub-cellular events. BHC Laser Light Hair Therapy is clinically proven, in European studies, to stimulate these cellular and sub-cellular events, leading to a dramatic increase in micro-circulation of blood supplies, cessation of hairloss and stimulation of hair regrowth. Various light sources including lasers have been used in attempts to stimulate hair growth and stop the progression of hairloss since the 1950’s. Some of these studies have included light sensitive drugs. Such studies are not presented here.

- In 1969, Dr Brian E. Johnson reported his attempts to stimulate hair growth on C57B mice by 260 nm irradiation. Inhibitions were reported in the wavelength range 280-310 nm.
- Professor E. Mester reported in 1968 that unfocused 694 nm Rubin laser-light initially increased hair growth in C57B mice.
- In 1984 Dr Trelles showed in one study that patients with alopecia areata who were treated with HeNe Laser 632.8 nm showed a good response. Dr Trelles reported that most of the patients with alopecia areata responded well after only 6 to 8 treatments administered twice a week for four weeks. The HeNe laser was placed 30 centimeters from the alopecia area with dosages ranging from 3-4 joule per sq. cm. No fibers or lenses were used. In the same study, microscopic evaluation of the hair shaft structure on the alopecia areata irradiated areas showed a clear modulla rich in Keratin after treatment. Daily treatments appeared to prevent regrowth, causing irritation with a probable increase in hairloss.
- At the 4th Annual Meeting of the Japan Laser Therapy Association in 1992, success was reported with an increase in both hair growth and the density of the hair follicle in the laser treated areas of both male and female stress alopecia and alopecia areata patients, with only one failure out of 40 cases reported in two papers.

Two clinical double blind controlled studies have been completed on BHC Laser Light Hair Therapy

1. Cessation of hairloss, increased regrowth of hair with improved hair quality.
2. Increased circulation in scalp blood flow.

The results of these clinical studies are to be published in scientific journals.

A double blind comparative study of laser treatment with placebo laser (LED)5 for treatment of Hereditary Androgenetic Alopecia in young males. Abstract: A double blind placebo controlled study was carried out to evaluate at he effect of laser therapy by comparing BHC Laser Light Hair Therapy (inGaAl, 670 nm) and a placebo laser (LED). The duration of hairloss and baldness, according to Hamilton Classification, were recorded. A skin biopsy for histological examination was taken before and after treatment. In addition a photograph was taken of the patient at the same time. Hair shaft thickness was measured with hair stretched equipment where the hairs can be stretched on a graded scale from 0-10, normal value of hair shaft being 0.5.

The results were confirmed by histological examination. All patients with the exception of one in the laser-treated group showed a complete cessation of hairloss. All patients except 3, showed a clear regrowth of hair with a reduction of as least one category in the Hamilton classification. Pre-treatment typically showed the dermis with large, relatively normal amounts of follicles. Most of them were in the telogenphase and did not show any real hair Some of the follicles were widened with keratin taps at the follicle opening. Post-treatment showed the dermis with almost the same amount of hair follicles as pre-treatment, although a number of new follicles could be seen with clearly noticeable hair growth. 50% of the follicles were now in the anagen phase. A clearly visible regrowth of hair was found in post-treatment sample comparison. When comparing the histological findings, transformation into more anagenic hair follicles could be observed in 83% of the patients on laser treatment, but in none of the placebo patients.
Out of 18 patients, 14 showed an increase in hair thickness, and all 18 patients showed improvement in general hair shaft quality. When measured with the hair stretcher, the results showed no improvement in the placebo group or any adverse effects of the treatment. The present doubje-blind study definitely showed that regrowth of new hair can be achieved in most middle-aged and younger males, with typical male pattern baldness, when the scalp is irradiated with BHC Laser Light Hair Therapy for 30 minutes twice weekly for 5 weeks, with follow-up maintenance treatments.

The effect of hair lasers on skin blood flow. Abstract: The effect of hair lasers on skin blood flow were measured on three different devices to establish the effect of scalp blood flow. The hair lasers used were BHC Laser Light Hair Therapy (lnGaAl ,670nm) with 15 rotating diode lasers, an Italian manufactured laser (HeNe,632.8nm) marketed as the Boston Laser, and containing a single laser transferring light via lenses to the patient, and a laser identical to BHC Laser Light Hair Therapy in which the 15 diode lasers were replaced with (placebo) Light Emitting Diode (LED). The difference in the laser systems are illustrated by the fact that BHC Laser Light Hair Therapy increased scalp blood flow rate by 54%. The HeNe laser, or Boston laser, had no effect, and the LED (placebo) decreased the blood flow rate by 36%. In addition, skin temperatures measured before and after the treatment showed little change.

Client / patient undergoing treatment with BHC Laser Light Hair Therapy may experience a sensation of heat, accompanied by a tingling feeling from the scalp to the neck during treatment. BHC Laser Light Hair Therapy has no thermal component, and the warm feeling can be attributed to stimulation of microcirculation of blood supply. Furthermore, initially an oilier scalp is often noticed. The scalp usually normalizes after two to four treatments. Conversely, a scalp that was oily before treatment will normalize in the same way. This condition has not been fully explained, but is believed to be the result of the normalization of

the sebum (lipid) secretion from the sebacious gland during treatment, after inactive hair follicles have been stimulated, the sebum (5a-reductase) is thought to play a role in hairloss and regrowth. The described reaction to treatment is a natural reaction, which indicates that the therapy is working.

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BACKGROUND: Alopecia areata is loss of hair from localized or diffuse areas of hair-bearing area of the skin. Recently there are reports of efficacy of the 308-nm excimer radiation for this condition. OBJECTIVE: To study the effect of the 308-nm excimer laser in the treatment of alopecia areata. MATERIALS AND METHODS: Eighteen patients with 42 recalcitrant patches (including 1 adult with alopecia totalis) were enrolled in this study. The lesions were treated with the 308-nm excimer laser twice a week for a period of 12 weeks; one lesion on each patient was left as a control for comparison. RESULTS: There were 7 males and 11 females in this study. Regrowth of hair was observed in 17 (41.5%) patches. Thirteen of the 18 lesions in scalp showed a complete regrowth of hair. The extremity regions failed to show a response. Atopic diatheses had an unfavorable effect on the outcome in our patients. CONCLUSION: The 308-nm excimer laser is an effective therapeutic option for patchy alopecia areata of the scalp and for some cases with patchy alopecia areata of the beard area. It does not work for patchy alopecia areata of the extremities.

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BACKGROUND: Alopecia areata is a rapid and complete loss of hair in one or several patches, usually on the scalp, affecting both males and females equally. It is thought to be an autoimmune disease which is treated with different modalities with variable success. Laser treatment of different wavelengths has been used in the management of this problem. OBJECTIVE: To study the effect of the pulsed infrared

diode laser (904 nm) in the treatment of alopecia areata.Methods. Sixteen patients with 34 resistant patches that had not responded to different treatment modalities for alopecia areata were enrolled in this study. In patients with multiple patches, one patch was left as a control for comparison. Patients were treated on a four-session basis, once a week, with a pulsed diode laser (904 nm) at a pulse rate of 40/s. A photograph was taken of each patient before and after treatment. RESULTS: The treated patients were 11 males (68.75%) and five females (31.25%). Their ages ranged between 4 and 50 years with a mean of 26.6+/-SD of +/-13.8, and the durations of their disease were between 12 months and 6 years with a mean of 13.43+/-SD of +/-18.34. Regrowth of hair was observed in 32 patches (94%), while only two patches (6%) failed to show any response. No regrowth of hair was observed in the control patches. The regrowth of hair appeared as terminal hair with its original color in 29 patches (90.6%), while three patches (9.4%) appeared as a white villous hair. In patients who showed response, the response was detected as early as 1 week after the first session in 24 patches (75%), while eight patients (25%) started to show response from the second session. CONCLUSION: The pulsed infrared diode laser is an effective mode of therapy with a high success rate for resistant patches of alopecia areata.
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BACKGROUND: Super Lizer trade mark is a linear polarized light instrument, which has been used with good effect in orthopedics and anesthesiology to treat arthralgia and neuralgia with a high output of infrared radiation. AIM: To test Super Lizer trade mark 's efficacy for the treatment of alopecia areata. METHODS: Fifteen patients over 18 years of age, diagnosed with alopecia areata and displaying symptoms of patchy hair loss, were topically irradiated with infrared radiation using the Super Lizer trade mark. The patients were irradiated intermittently for an interval of 3 min once every week or every 2 weeks. RESULTS: Seven of 15 (46.7%) of the irradiated areas

showed hair regrowth 1.6 months earlier than the nonirradiated areas (chi2 official approval, P = 0.003). With regard to adverse effects caused by Super Lizer trade mark treatment, only one patient complained of a sensation of heat in the irradiated area. CONCLUSIONS: These findings suggest that Super Lizer trade mark, with its noninvasive properties, is a useful apparatus for the treatment of mild forms of alopecia areata.

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Comparative effects of exposure to different light sources (He-Ne laser, InGaAl diode laser, a specific type of noncoherent LED) on skin blood flow for the head.

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BACKGROUND AND OBJECTIVE: This study assessed the effects of optic stimuli emitted by three different light sources on head skin blood flow. MATERIALS AND METHODS: The irradiation effects of the He-Ne laser (632.8 nm, 10 mW, total energy appr. 9.4 J), the InGaAl diode laser (670 nm, 60 mW, appr. 108 J) and monochromatic light (635 nm, 112.5 mW, appr. 202.5 J) were measured using laser Doppler technology. The corresponding fluences (energy densities) varied from 0.01 J/cm2 (He-Ne) to a range of 0.12-0.72 J/cm2 (InGaAl) and 0.22-1.36 J/cm2 (LED). The investigation was completed under single-blind, placebo-controlled conditions where the subjects (10 male healthy volunteers) were exposed on two occasions to the placebo (LED)-device against the laser (He-Ne or InGaAl). RESULTS: A short lasting vasodilation, a 54 per cent increase ($p < 0.05$) in skin blood flow was seen after the InGaAl irradiation (fluences between 0.12-0.36 J/cm2) whereas the non-coherent monochromatic irradiation (0.68-1.36 J/cm2) used in this particular study decreased blood flow by 36 per cent ($p < 0.05$). The He-Ne irradiation (0.01 J/cm2) had no effect. Skin temperature changes were insignificant. CONCLUSIONS: Skin

blood flow changes seemed to be related more on radiant exposures then coherency.
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Effect of low-intensity (3.75-25 J/cm2) near-infrared (810 nm) laser radiation on red blood cell ATPase activities and membrane structure.

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OBJECTIVE: The biostimulation and therapeutic effects of low-power laser radiation of different wavelengths and light doses are well known, but the exact mechanism of action of the laser radiation with living cells is not yet understood. The aim of the present work was to investigate the effect of laser radiation (810 nm, radiant exposure 3.75-25 J/cm(2)) on the structure of protein and lipid components of red blood cell membranes and it functional properties. The role of membrane ATPases as possible targets of laser irradiation was analyzed. BACKGROUND DATA: A variety of studies both in vivo and in vitro showed significant influence of laser irradiation on cell functional state. At the same time another group of works found no detectable effects of light exposure. Some different explanations based on the light absorption by primary endogenous chromophores (mitochondrial enzymes, cytochromes, flavins, porphyrins) have been proposed to describe biological effects of laser light. It was suggested that optimization of the structural-functional organization of the erythrocyte membrane as a result of laser irradiation may be the basis for improving the cardiac function in patients under a course of laser therapy. MATERIALS AND METHODS: Human red blood cells or isolated cell membranes were irradiated with low-intensity laser light (810 nm) at different radiant exposures (3.75-25 J/cm(2)) and light powers (fluence rate; 10-400 mW) at 37 degrees C. As the parameters characterizing the structural and functional changes of cell membranes the activities of Na(+)-, K(+)-, and Mg(2+)-ATPases, tryptophan

fluorescence of membrane proteins and fluorescence of pyrene incorporated into membrane lipid bilayer were used. RESULTS: It was found that near-infrared low-intensity laser radiation changes the ATPase activities of the membrane ion pumps in the dose- and fluence rate-dependent manner. At the same time no changes of such integral parameters as cell stability, membrane lipid peroxidation level, intracellular reduced glutathione or oxyhaemoglobin level were observed. At laser power of 10 mW, an increase of the ATPase activity was observed with maximal effect at 12-15 J/cm(2) of light dose (18-26% for the total ATPase activity). At laser power of 400 mW (fluence rate significantly increased), inhibition of ATPases activities mainly due to the inhibition of Na(+)-, K(+)-ATPase was observed with maximal effect at the same light dose of 12-15 J/cm(2) (18-23% for the total ATPase activity). Fractionation of the light dose significantly changed the membrane response to laser radiation. Changes in tryptophan fluorescent parameters of erythrocyte membrane proteins and the increase in lipid bilayer fluidity measured by pyrene monomer/excimer fluorescence ratio were observed. CONCLUSIONS: Near-infrared laser light radiation (810 nm) induced long-term conformational transitions of red blood cell membrane which were related to the changes in the structural states of both erythrocyte membrane proteins and lipid bilayer and which manifested themselves as changes in fluorescent parameters of erythrocyte membranes and lipid bilayer fluidity. This resulted in the modulation of membrane functional properties: changes in the activity of membrane ion pumps and, thus, changes in membrane ion flows.
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Phototherapy of androgenetic alopecia with low level narrow band 655-nm red light and 780-nm infrared light

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Background: The therapeutic application of low energy laser has been used for photobiostimulation and low level laser therapy causes an increase of microcirculation of tissue and a reduction in inflammation. However, the effect of low level laser therapy on the stimulation of hair growth has not been investigated.

Object: To examine the effects of 655-nm red light and 780-nm infrared light on patients with androgenetic alopecia (AGA).

Methods: Patients treated their scalp by themselves, using a portable light source (655 nm and 780 nm), and irradiation was performed for 10 minutes once a day. Hairs in precisely defined circle at vertex (AGA region) and occipital sites of the scalp in 24 AGA male patients were evaluated using global photography and phototrichogram. Each circumscribed area of the scalp, centered with a dot tattoo to ensure reproducibility, was photographed just after shaving and two days later, the same area was again photographed. From the photo-images the hair density and anagen/telogen ratio (A/T ratio) were determined by image analyzer program. Each patient was evaluated at 0, 4, 9, and 14 weeks of phototherapy. After 14 weeks, the degree of satisfaction of patients and physicians were assessed.

Result: The results can be summerized as follows: (1) The mean hair counts of baseline were 137.3/cm2 on the vertex and 153.3/cm2 on the occiput, with the hair density of the occiput being significantly higher than that of the vertex. (2) The mean hair counts after 14 weeks, at the end of treatment, were 145.1/cm2 on the vertex and 163.3/cm2 on the occiput. Therapy with 655-nm red light and 780-nm infrared light significantly increased the density of hairs on both the vertex and occiput ($P < .005$). (3) The ratio of anagen/telogen (A/T ratio) of baseline was 79.7 on the vertex, 89.6 on the occiput and A/T ratio at the end of treatment were 84.7 on the vertex and 91.9 on the occiput, respectively. (4) The number of satisfied patients at the end of treatment was 20 (83.3%). No side effects were reported.

Conclusion: The hair counts was affected beneficially in the vertex and occipital regions of the patients with androgenetic alopecia after 14-weeks of phototherapy with 655-nm red light and 780-nm infrared light.

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Laser Hair Regrowth: Clinically Proven Treatment

It may seem strange to hear about a laser being used for hair regrowth, but this type of treatment has been around for some time and was discovered accidentally by a scientist testing the effects laser radiation on mice. It was in 1967 soon after the first working laser was invented that Dr Endre Mester at Semmelweis, university in Hungary was carrying our research to see if laser radiation cased cancer in mice. No cancers were found, but what surprised him was that hair grew back much more quickly on a shaved test area of the mice than on the mice in an untreated group. This effect called low level laser therapy (LLLT) also known as laser biostimulation, photobiomodulation and cold laser therapy is now used for the treatment of hair regrowth.

Possibly due to the then high cost of laser technology, very little research was carried out over

the two decades after the first experiments were conducted. During the 1980s LLLT started becoming available as an expensive treatment through a number of exclusive hair clinics. The lasers used were large complicated fixed devices where patients had to sit under a hood similar to a salon hair dryer. Treatments were performed as frequently as 2-3 times per week, this was often inconvenient for individuals who might have to travel many miles to the nearest clinic or salon. However the results achieved were very good and soon, many salons all over the Europe, Asia and later in the US began offering treatments.

This laser hair regrowth treatment has now been backed up as an effective hair loss treatment by many scientific studies. In 1982 Trelles, M., and Mayayo, E, published "The Growth of Hair Under Laser Influence of the HE-NE Beam". In this study, patients with alopecia areata responded with positive results after only 6 to 8 twice weekly treatments. Later studies in the 1990's tested lasers working at different wavelengths and pulsing the laser to find the most effective laser configuration for treating hair loss. Most therapeutic lasers now operate at a wavelength in the range 600-1000nm where the wavelength is related to how far the light penetrates the scalp. The best wavelength to use is still argued over but it should be sufficient to penetrate at least 5-6mm depth to target the hair bulbs. Many current LLLT devices operate using visible red light at a wavelength of 660nm which can penetrate down to a depth of about 8-10mm. Higher wavelength lasers at 800-900nm are also used these can penetrate to a depth of about 30-40mm but these are mainly used for treating joints and muscle related problems.

More recent LLLT laser hair regrowth studies have started to reveal the reasons why and how laser light therapy helps stimulate hair regrowth. These studies have shown that laser light increases the levels of a chemical compound called adenosine triphosphate (ATP) which is known to stimulate living cells including the hair follicles. LLLT also has the effect of increasing the circulation of blood to the hair root which delivers the nutrients to cells that make up the hair follicle. The increased blood flow is also thought to help flush away the damaging waste products that may affect the hair growth cycle. This helps to improve the scalp environment to help stop thinning hair and promote new hair growth.

Over the last few years laser technology has advanced to a stage where a laser devices can now be manufactured to a size smaller than your small finger nail and at very low cost. In 2000 a company developed and patented the first miniature LLLT laser hair regrowth device using the new laser technology. This made possible for the first time an effective LLLT hair loss treatment that was cheap and small enough be used in your own home without having to go to an expensive hair clinic. The new device comes in the form of a hair comb/brush that needs only be used for 10-15 minutes three times per week. The manufacturers claim that while users experience will vary, 45% of users will see positive results after 8 weeks of treatment with another 45% seeing benefits from 10-16 weeks onward.

In February 2007 the U.S. Food & Drug Administration (FDA) cleared the laser comb device for use in the treatment of hair regrowth. The laser comb is now one of only three treatments cleared by the FDA for use in hair regrowth the others being Finasteride and Minoxidil. The laser hair regrowth device now brings new hope to the many men and women suffering from premature hair loss.

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