

Intense pulsed light (IPL) is a technology used by cosmetic and medical practitioners to perform various skin treatments for aesthetic and therapeutic purposes, including hair removal, photo rejuvenation (e.g. the treatment of skin pigmentation, sun damage, and thread veins) as well as to alleviate dermatologic diseases such as acne.

IPL is increasingly used in optometry and ophthalmology as well, to treat evaporative dry eye disease due to Meibomian gland dysfunction.

The technology uses a high-powered, hand-held, computer-controlled flash gun to deliver an intense, visible, broad-spectrum pulse of light, generally in the visible spectral range of 400 to 1200 nm. Various cut off filters are commonly used to selectively filter out lower wavelengths, especially potentially damaging ultra violet light. The resulting light has a spectral range that targets specific structures and chromophores (e.g. melanin in hair, or oxyhemoglobin in blood vessels) that are heated to destruction and reabsorbed by the body.

IPL shares some similarities with laser treatments, in that they both use light to heat and destroy their targets. But unlike lasers that use a single wavelength (color) of light which typically matches only one chromophore, and hence only one condition, IPL uses a broad spectrum that when used with filters, allows it to be used against several conditions. This can be achieved when the IPL technician selects the appropriate filter that matches a specific chromophore.

Broad-spectrum light is applied to the surface of the skin, targeting melanin. This light travels through the skin until it strikes the hair shafts or the bulb (root). The bulb is usually where the highest concentration of melanin is located. As the light is absorbed, the bulb and most of the hair shaft are heated, destroying the hair-producing papilla. It is also claimed that heat conversion occurs directly in the darker capillaries that bring blood to the follicle.

At any one time, not all hair follicles are 'active', and only active hair follicles can be affected by the treatment. 'Inactive' hair follicles can be treated as they become 'active' over time. For IPL treatments, an average of 8–10 treatments is required to remove most visible hair. No common treatment protocol exists and it depends on the equipment used and patient skin type. The area to be treated should be clean shaven and free of sunburn. Treatment sessions are usually 4 to 6 weeks apart.

Contrary to what is often claimed, photo epilation is not a permanent hair removal method but a permanent hair reduction method. Although IPL treatments will permanently reduce the total number of body hairs, they will not result in a permanent removal of all hair.^[14] This distinction is only relevant in the USA because of FDA wording.

Certain skin conditions, health irregularities, and medications can impact whether it is safe for a person to receive a light based hair removal treatment.

Photo-sensitizing medications or damage to the skin are contraindications to treatment. According to Remington, manufacturer of an IPL device, all IPL and laser devices should only be used on light to medium skin tones, and work best on darker hair.

The first use of a specific IPL system developed for hair removal is reported in the literature in 1997. Hair count reduction was found to be ~60% (12 weeks), 75% (1 year), 60% (2 year). Various treatment protocols have been studied.

It is important to note that these studies utilized a variety of IPL devices on various skin areas, and used patients with varying hair and skin types. Thus the results are not directly comparable. In evaluating these results it is also important to remember that even a reduction of 75% indicates that 25% of the hair regrew after treatment.

Permanent hair removal in these studies, as defined by the FDA, means the "long-term, stable reduction in the number of hairs regrowing after a treatment regime".

The number of hairs regrowing must be stable over time greater than the duration of the complete growth cycle of hair follicles, which varies from four to twelve months by body location. No treatment to date has shown the ability to permanently eliminate all hair growth, however many patients experience satisfaction with a significant and permanent reduction.

A 2006 article in the journal "Lasers in Medical Science" compared IPL and both alexandrite and diode lasers. The review found no statistical difference in effectiveness, but a higher incidence of side effects with diode laser treatment. Hair reduction after 6 months was reported as 68.75% for alexandrite lasers, 71.71% for diode lasers, and 66.96% for IPL. Side effects were reported as 9.5% for alexandrite lasers, 28.9% for diode lasers, and 15.3% for IPL. All side effects were found to be temporary and even pigmentation changes returned to normal within 6 months.

IPL was first developed for vascular conditions. It is at least as effective as pulsed dye lasers and can penetrate deeper with reduced risk of purpura and hyperpigmentation. IPL can also be used for the treatment of dry eye conditions such as Meibomian gland dysfunction. IPL can treat pigmented lesions with rapid recovery. Dyschromia can be cleared after repeated sessions. Photo-aging treatment has been explored. A series of IPL can be used for facial rejuvenation, improving skin laxity and collagen production. IPL combined with facial injections can be used for dynamic rhytids. Home devices have been developed recently.

IPL is employed in the treatment of a range of dermatological conditions including photo damage induced dys-pigmentation and vascular changes, rosacea, acne vulgaris, sebaceous gland hyperplasia, broken capillaries/telangiectasia, vascular lesions (small blood vessels), pigmented lesions (freckles, liver spots, birth marks), melasma, actinic keratosis, photo-rejuvenation, basal cell carcinoma, and Bowen's disease (squamous cell carcinoma).