

Methods of hair restoration for men and women

Hair loss can be a very stressful experience for both male and female patients. In this article we will look of different methods to help this problem, and the pros and cons of each.

Causes of hair loss

Male pattern hair loss, known as androgenic alopecia, is a familiar condition. However, hair loss is multifactorial and is determined not just by genetic but also extrinsic factors, such as: endocrine problems; drugs; autoimmune diseases; systemic illness; infection; dermatological scalp conditions; and lack of certain nutrients in the diet. Therefore, a careful history and examination are necessary as well as blood tests to help with the diagnosis. Making the correct assessment will help to direct the patient to the right place for treatment, for example, to the endocrinologist, hair transplant clinic, or dermatologist. Sometimes the patients can be referred from a trichologist who needs to conduct further investigations to explain the hair loss. The usual investigations for this purpose are:

- ▶ Diet-related: checking levels of zinc, folate, B12, vitamin D, iron reserves (ferritin)
- ▶ Hormonal: checking levels of thyroid hormones.

Additional checks include testing for diabetes (HbA1c), infections (full blood count and erythrocyte sedimentation rate). More sophisticated tests are now available that also look at the genetics of the patient as well as the extrinsic factors that may be associated with them. This information is taken from the patient's history. As a result, the patient receives a full report explaining, among other things, their genetic characteristics and its relationship to hair treatment. Because a patient's genetics do not change throughout their life, only one genetic report is required (Fagron Trichotest, 2023).

Types of hair loss

There are many different types of hair loss including:

- ▶ Alopecia areata (unpredictable, autoimmune disease with patchy no scarring hair loss)
- ▶ Alopecia totalis is a complete hair loss of the scalp and is a variation of alopecia areata
- ▶ Alopecia universalis is a complete loss of hair in the scalp and body
- ▶ Scarring alopecia is an inflammatory condition which results in destruction of hair follicles and hair loss
- ▶ Traction alopecia is due to constant pulling of hair

due to hairstyles, such as a high, tight ponytail or hair extensions

- ▶ Androgenic alopecia is the most common cause of hair loss in men and women, and is characterised by hair loss from the top of the head sparing the occipital area. This type of alopecia is decided by hormonal and genetic factors
- ▶ Patchy hair growth, for example patchy hair growth in the beard for men or in the eyebrows for men and women, can be due to no particular reason. Sometimes there can be a scar from earlier trauma which is the reason why hair stops growing in that particular area. The only treatment for this is a hair transplant.

Treatments for hair loss

We will discuss in more detail the non-surgical and surgical treatments for hair loss. This will mainly refer to androgenic alopecia as the most common type of alopecia for both men and women, and when treated can provide long-lasting and near permanent results, as opposed to other types of alopecia which have more unpredictable treatment outcomes.

Non-surgical methods

Most of these are thought to stimulate hair growth or stabilise further hair loss, with the exception of scalp micropigmentation which only masks/camouflages the hair loss.

Correcting the underlying problem—deficiencies: if there is deficiency of zinc, iron, B12, folate or vitamin D, they needs to be added as a supplement if not adequately sourced from the patient's diet. If the patient is diabetic, optimum control of their blood glucose must be achieved. If the patient has an infection, this should be appropriately treated. If they have an under active thyroid, then they should be placed on thyroxine. This can not only stop the hair loss but stimulate the hair follicles that have become dormant during the period of deficiency.



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Man with alopecia areata on head, spot baldness, hair fall problem

Correcting the underlying problem—5- α reductase inhibitors (Ha et al, 2020): hormonal factors play a major role in androgenic alopecia. Dihydrotestosterone (DHT) levels are increased in a balding scalp when compared to a non-balding scalp (Bingham and Shaw, 1973). The enzyme 5- α reductase converts testosterone to DHT. Therefore, using drugs that inhibit the enzyme can help in androgenic alopecia. Finasteride, also sold in 1mg tablets, works by inhibiting type 2 5- α reductase and blocks the peripheral conversion of testosterone to DHT (Schweikert and Wilson, 1974; Kaufman, 1996; Kaufman et al, 1998).

Androgen receptor blockers: decrease both testosterone and DHT by binding to the androgen receptor. They are only suitable for women because of their side-effects in men, such as impotence, feminisation and gynaecomastia. Cyproterone acetate is a progestin and androgen receptor inhibitor (Shapiro, 2001). Spironolactone is an aldosterone antagonist and its androgenic effect is mild. It is mostly effective in hirsutism (Shapiro, 2001).

Minoxidil: the first agent shown to promote hair regrowth. It was used as an antihypertensive drug and some of its side-effects were noted to be hypertrichosis. A topical solution has now been developed to treat hair loss. It increases the duration of anagen and enlarged the suboptimal and miniaturised hair follicles. In order to be effective, 1ml of minoxidil must be used twice daily, every day for an indefinite period (the effects are reversible upon

stopping treatment). The topical solution is safe and the most common side-effects are mainly dermatological, such as contact dermatitis. Another side-effect is facial hyperhidrosis, especially in women, which is reversible upon stopping the drug. There are now many different combinations of minoxidil with other substances that work synergistically for a better effect (Shapiro, 2001).

Tretinoin: also known as all-trans retinoic acid, it is a biological response modifier. It promotes and regulates epithelial cell growth. It may help hair growth by stimulating the growth of suboptimal hairs and acts synergistically with minoxidil to produce more dense hair growth than either compound alone (Bazzano et al, 1986).

Platelet-rich plasma (PRP): the fraction of blood that contains platelets after separation of the red blood cells. This is achieved with centrifugation. Once the two fractions are separated, the platelet-rich fraction is collected for use and the red cell fraction discarded. Studies have shown that concentrations 2–6 times higher than the normal platelet count is required for optimal outcomes (Weibrich et al, 2004). PRP has many uses, from medical to cosmetic. In terms of hair growth, it has been described as a promising treatment for hair restoration (Justicz et al, 2020). This is due to the number of growth factors and cytokines it contains that can accelerate tissue restoration. It has been shown that PRP can increase the survival of hair follicle cells through antiapoptotic effects and stimulate hair growth by extending the anagen phase of the hair cycle (Li et al, 2012). This theory was further

supported by the results of microscopic examination which demonstrated an increase in the number of follicular bulge cells, hair follicles, epidermal thickening, vascularisation, and a higher number of Ki67+ basal keratinocytes in PRP-treated scalp tissue compared with placebo (Gentile et al, 2017). A review paper on the effects of PRP in hair loss (Paichitrojjana and Paichitrojjana, 2022) concluded that PRP can be used as a therapeutic option for hair loss, including androgenetic alopecia and female pattern hair loss, either as a monotherapy or an adjuvant to conventional therapy or hair transplantation. PRP is also considered a safe, effective, steroid-sparing and alternative treatment for alopecia areata (Paichitrojjana and Paichitrojjana, 2022).

Mesotherapy: a minimally invasive procedure which has long been used in the cosmetic field for skin rejuvenation, fat reduction and hair regrowth. It involves specifically designed substances, such as vitamins, hyaluronic acid, and fat dissolving products being injected into the skin or subcutaneous level in order to carry out certain functions including lipolysis, rejuvenation and increased circulation. In the case of hair growth, it is claimed that injections of 'cocktails' of natural plant extracts, homeopathic agents, vasodilators, finasteride, minoxidil and vitamins used once a month promote hair growth (Mysore, 2010). Of these, only minoxidil and finasteride have an established role in the management of hair loss. Both the mechanism of action and the efficacy of other agents are not established and are doubtful (Mysore, 2010).

However, mesotherapy has achieved some exciting results in hair loss. A review article on the application of mesotherapy in pattern hair loss concluded that mesotherapy is an effective treatment (Tang et al, 2022). Future research is required to get more evidence.

Exosomes: the new buzz word. Exosomes are extracellular vesicles first described as such 30 years ago and implicated in cell–cell communication, and the transmission of disease states. They are also known to carry myriad of growth factors. Therefore, exosomes are attractive treatment options for hair growth. However, to date, there is only one publication reporting the effects of exosomes on hair growth. The authors showed that in a mouse model proliferation of human double positive (DP) cells and induced secretion of growth factors such as vascular endothelial growth factor (VEGF) and insulin-like growth factor (IGF)-1, which are essential for hair growth. In addition, when mice were intradermally injected with exosomes an increased anagen to telogen ratio was evident, which suggests that exosomes might have the potential to promote hair growth (Rajendran et al, 2017). Further studies will be necessary to investigate the exosomes on hair follicle cycling.

Low-level laser therapy (LLLT): originally shown to grow hair in mice who have lost their hair because

of chemotherapy. Laser phototherapy is assumed to stimulate anagen re-entry in telogen hair follicles, prolong the duration of the anagen phase, increase rates of proliferation in active anagen hair follicles and to prevent premature catagen development. The exact mechanism of action of LLLT in hair growth is not known; however, several mechanisms have been proposed (Bingham and Shaw, 1973).

Laser-emitting diode (LED) red light therapy for hair loss: works by emitting energy-producing packets of light deep into the scalp. The light creates cellular energy) which strengthens both the cells and thus helps hair growth.

High frequency, microcurrent and fractional radio frequency: all believed to stimulate hair growth by increasing the blood supply to the scalp. That in turn improves the oxygen supply and nutrition of the hair follicles. There are many such devices on the market that claim to active hair growth. The patients will usually need a series of treatments (Verner and Lotti, 2018).

Surgical methods

Surgical methods do not treat the underlying cause but treat the consequences—the areas of reduced or absent hair. The surgical methods are called hair transplant surgery and can be divided into follicular unit transplant (FUT) and follicular unit extraction (FUE) types.

FUT: a type of hair restoration surgery where a strip of the scalp containing hair follicles located at the back of the head is harvested and those follicles are extracted and placed back into the scalp where there is hair loss. The surgery is the one of the older methods of hair transplant and has the advantage of being faster but the disadvantage of leaving a scar at the back of the head which can remain visible if the patient decides to wear a shorter hair style. It is also commonly used for female patients who are undergoing eyebrow or hair transplant and would prefer not to shave the donor area for obvious reasons.

FUE: the more modern approach to hair transplant which involves extraction of individual hair follicles from the back of the head and transplanting them into the areas that need more hair. It has an advantage in that it does not leave a large scar. The scars are usually in a small circular pattern and blend well with the rest of the hair. This method is not suitable for all hair types and is much slower, but it is preferred by most patients that are suitable for this type of transplant.

Combination method: involves a combination of the two techniques, and is used for those patients that have a very large recipient area and a poor donor area. It involves

taking a strip of scalp and then harvesting individual hairs around that area to gain more grafts.

Conclusion

Many male and female patients seek treatment for alopecia. There are different techniques and in the case of androgenic alopecia, best results are achieved by combining non-surgical and surgical methods. Hair transplant surgery has a high success rate; however, it is important to go to a reputable clinic to avoid complications, such as infection and poor cosmetic results. The patient has to have realistic expectations which need to be explained during the consultation as the results depend on the quality and amount of donor hair. ◀ JAN

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Key points

- Hair loss although not life-threatening can be very distressing for patients, and it can affect their mental wellbeing and self-esteem
- Scalp hair restoration is still the most popular demand from patients, but there is also increasing demand for facial hair restoration, such as beards in men and eyebrows in women
- Each individual case must be analysed carefully and diagnosis has to be made based on the patient's medical history, clinical examination and, when necessary, investigations including scalp biopsy
- Androgenic alopecia can sometimes respond surprisingly well to medical therapies, but ultimately surgery is required for restoration of large areas of receding hair

CPD reflective questions

- How might genetic engineering be used in the future to treat the patients with androgenic alopecia before they lose their hair?
- Robotic hair transplants have become increasingly popular, but how does it compare with other techniques in terms of efficacy and outcomes?
- Will there be more definitive and predictable treatments for other types of alopecia (alopecia areata, scarring alopecia)? What might these be?

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