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THE DEFINITIVE
**HAIR LOSS
RESOURCE**

Helping people take control on their hair loss
and face *Androgenetic Alopecia* head-on



Written by
DR. THOMAS WHITFIELD





The Definitive Hair Loss Resource

This e-book was written to help people
take control of their hair loss and
face *Androgenetic Alopecia* head-on.

3rd unabridged edition
2015

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INTRODUCTION

Introduction

Hair loss can be an extremely difficult experience for men and women at any age. Visible thinning, bald spots and receding hairlines often induce panic, worry and frustration. They can lead to feelings of self-consciousness, stress and desperation.

Luckily, hair loss sufferers can take solace in the fact that they are not alone. There are actions that we can take to slow the progression of our hair loss and even re-grow lost hair. This e-book was written to help people take control of their hair loss and face Androgenetic Alopecia head-on.

Inside you will find:

- Information about the physiological mechanisms responsible for male and female pattern hair loss.
- Explanations of existing and future treatment options.
- Tips and references for dealing with your own unique circumstances.

Hopefully, after reading this e-book, you will feel refreshed and positive – ready to take action towards strengthening your hair and your self-esteem.



HAIR

INTRODUCTION

Hair Structure and Hair Loss

The Anatomical Structure of Hair

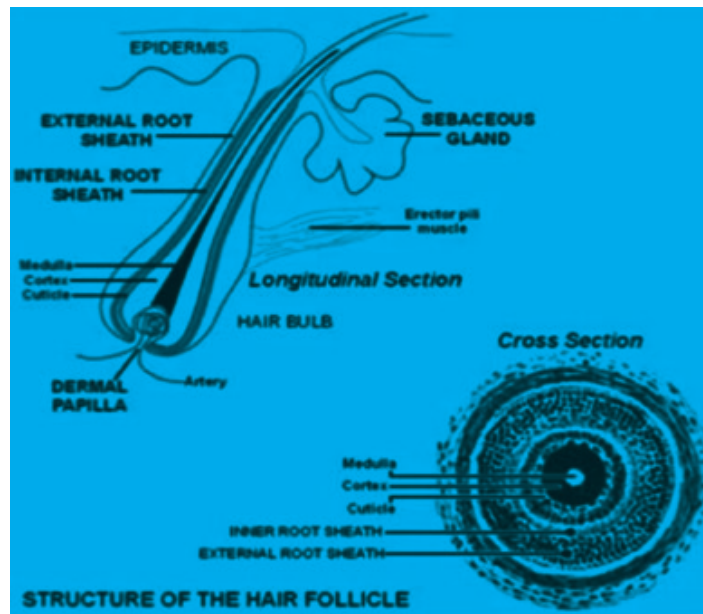


Figure 1: Hair follicle structure.

Our hair is often referred to as a “skin appendage,” meaning that it originates and grows out of our skin (other skin appendages include: fingernails, toenails and sweat).

One hair follicle produces 1-4 hair shafts. Each hair shaft consists of 3 layers.

Hair follicle layers:

- The outer root sheath (tricholemma) - the outer layer of the hair follicle; pores (from which the hair grows) form when the dermis combines with the epidermis on the surface of the skin.
- The inner root sheath - the middle layer of the hair follicle; composed of three parts – Henle’s layer, Huxley’s layer and the internal cuticle.
- The bulb - the lowest part of the hair follicle; this is where the “inner matrix cells” reside. We can determine the width of a fully grown hair by the size of its bulb and the number of accompanying matrix cells.

The hair shaft is primarily made up of a protein called Keratin. Like the follicle itself, the hair shaft has 3 prominent layers:

- The cuticle - the surface layer of the hair; this layer protects the inner structure of the hair. The cuticle is made up of transparent,

protective scale-like cells.

- The cortex - the middle layer of the hair; this layer gives strength to hair shafts and contains the pigments which give hair its colour.
- The medulla - the innermost layer of the hair shaft; only present in fully grown hair.

Why do we have hair?

Like most of our other body parts, hair serves several distinct purposes.

Hair covers our entire body (head, legs, nose, etc.), protecting our skin from dirt, heat and bacteria.

The hairs in our ears prevent dirt and water from entering; the hairs on our eyelashes and eyebrows prevent perspiration and particulates from harming our eyes; the hairs in our nose protect our bodies from bacteria; etc.

Hair regulates our body temperature.

Hair protects our skin from sun-damage and reduces the negative effects of extreme cold and heat.

The Causes of Hair Loss

Hair loss can be caused by a variety of factors:

- Genetics/hereditary
- Autoimmune diseases
- Medications/current treatments
- Poor diet and stress

There are many rumours surrounding the nature and causes of hair loss. Many of these are justified, but many are not. It is important to approach our hair loss from a factual standpoint in order to properly address symptoms ranging from hair breakage and fallout to general thinning. A more in-depth discussion of the specific physiological mechanisms responsible for hair loss can be found in section 3 of this e-book.

Male Reactions to Hair Loss

Men can react to hair loss in a variety of different ways. Many men become depressed; their self-esteem and confidence are largely reduced and they begin multiple treatment regimens in order to re-grow their lost

hair. Often times these regimens are ineffective, little more than an amalgamation of supplements and topical solutions that aren't rooted in real science. Nevertheless, this approach is common for men in the early stages of hair loss.

Although the options for dealing with hair loss are limited, there are still several efficacious treatments on the market. Information about these existing therapies will be provided later.

It can be easy to become pessimistic at the onset of hair loss. But instead of focusing on negative feelings such as hopelessness or dissatisfaction, always try to find something positive about your situation. Regardless of societal stereotypes, many men actually look better with shaved heads. Plus, savings on haircuts and shampoo are two benefits that cannot be overemphasized. Acceptance truly is the best starting place for any successful treatment regimen.

You Are Not Alone

It is important to remember that you are not the only one suffering from emotional complications related to hair loss. There are millions of men around the world that are experiencing the exact same anxiety, depression and worry.

Losing hair isn't easy at all. To the contrary it can be extraordinarily difficult. But do not stress out. I repeat, do not stress out. Often times we are our own worst critics. We expect everyone to care as much about our hair loss as we do, but most people hardly take notice.

Over 100 million people around the world are affected by different forms of hair loss. Many aren't aware of it yet, others may not even care, and most are just like you. Before turning in desperation to treatments that are risky, harmful or ineffective, take a moment to assess the situation and realize that you are experiencing a completely normal and acceptable phenomenon.

Staying positive is the first step in developing a worthwhile and effective treatment regimen.

Hair Care and Hair Products

Are you using the right hair care products?

There are presently hundreds of hair care products on the market. Unfortunately, most don't work very well. In fact, there are only 2 treatments that are actually FDA approved for the indication of treating hereditary alopecia (topical minoxidil and oral finasteride). It is important to choose treatments that are effective, safe and easy to use on a daily basis. Safety is a major issue and one should have a critical look at the long-term risks associated with some treatments (such as finasteride – more on this later on).

In this section of the e-book, we will help you select the right hair care products for your personal treatment regimen.

Choosing the Right Hair Products

Determining our specific hair type is a crucial step in selecting the shampoos and conditioners that are best suited to meet our individual needs.

For instance, if your hair is dry, look for shampoos, conditioners, and other hair styling products that are designed to manage “dry, frizzy hair.” If you have thin or oily hair, find a product that is formulated “for weak, oily hair.” For additional help on how to determine your own individual hair type, consult the bullet-points below:

- Normal hair
 - Holds style without the use of too much styling products
 - Neither greasy nor dry
 - Not permed or colored
- Fine hair
 - Becomes greasy
 - Tends to be limp (flat), difficult to manage
- Dry hair
 - Frizzy, rough
 - Easily tangles
 - Dull-looking
 - Treated with perms and other hair colouring products

Now that you are more familiar with the most common hair classifications, take a good look at your hair and see which type it most closely resembles. Select your shampoo, conditioner and styling products

accordingly. Using a product specially formulated for your specific hair type will maximize the results you hope to achieve.

Washing and Drying Your Hair

Believe it or not, there is a correct way to wash your hair. Incessant rubbing and aggressive towel-drying will only exacerbate the hair loss problems that you are already experiencing. There is a much better approach.

These directions will help you wash and dry your hair properly:

1. Wash your hair every day. Contrary to popular suspicion, washing your hair every day does not cause hair to dry out. As long as you use hair products that are suitable for your hair type, it is perfectly safe to wash every day. In fact, it is preferable to shampoo daily since it will clean dirt, oil and sebum that routinely build up on the scalp.
2. Always wash your hair with warm water. Warm water can dissolve dirt and help hair follicles breathe freely. But be careful! If the water is too hot, it might damage and burn your scalp. This deprives your hair of its natural oils, leading to a dry, brittle appearance.
3. Squeeze a considerable amount of shampoo onto your palm and work a healthy lather into your scalp and hair. Gently massage the shampoo on your scalp using your fingertips (NOT your fingernails). While massaging, periodically comb your hair using your fingers to avoid tangles.
4. Let your hair hang while thoroughly rinsing off shampoo.
5. If you are not using a 2-in-1 shampoo and conditioner, use a conditioner separately. Unlike shampoo (which is meant to concentrate on the scalp), conditioner is designed for the ends of your hair. Let conditioner settle for several minutes before gently rinsing it off with warm water. Conditioner used after shampoo can be effective for men with either short or long hair.
6. Standing under running water to rinse hair is recommended over dipping it in bath water. Adequate water pressure is necessary for proper rinsing.
7. When towel-drying, gently pat your hair with a towel. Do not rub your hair too briskly and do not blow dry your hair when it is still soaking wet.
8. Comb your hair with a wide-toothed plastic comb. This will make de-tangling easier and will not put excess strain on your hair follicles.
9. Ideally hair should be dried naturally, but should you need to use a blow-dryer, use it inches away from your hair and stop while the hair

is still a little damp. This will avoid over-drying your hair, which can lead to brittleness and split ends.

10. If you are using hair products such as gels, mousse or hair wax, apply them while your hair is still slightly damp.

How Hair Dyes Work



Figure 2: Hair dye application.

Hair loss sufferers sometimes dye their hair for a multitude of reasons: to look good, to conceal thinning hair patches, to cover up greying strands, etc.

There are two kinds of hair dyes:

- Semi-permanent – may last for only 1 to 6 weeks, but may wash out more easily with frequent hair washing. You can also wash this type of dye out with tea, beer or lemon juice if you are not happy with the colour.
- Permanent – can be applied as highlights, streaks or over the entire head. Possible hair damage may occur if, prior to application, hair has not been washed out with hydrogen peroxide to remove previous or existing colour.

Both forms of hair dye are popular and can be used at home. Still, it is always important to take the time to read the packaging and follow the instructions carefully. Hair dyes can make hair look good, but if used improperly, they can also cause considerable damage.

Effects of Gels, Mousses and other styling products on Hair

Hair styling products such as gels, mousses and hair dyes are part of a man's "hygienic routine." Many men and women suffering from hair loss apply hair gels, wax or mousse every day after taking a shower. The pur-

pose of these products is to help style hair in an effective manner that conceals hair loss and flatters facial features. Other important effects of styling products include:

- Thickening hair - styling gels and mousses provide “volume” to limp, dull-looking hair, making it appear thicker and fuller.
- Reshaping hair - this can be done by using a blow dryer and a round brush. Water-based hair sprays, mousses, gels and waxes are used to set the hair in attractive, uniform patterns.

It may be necessary to try several products before deciding on which gel, mousse or dye works best with your unique hair type.

How to Avoid Hair Damage

Every day we do cruel things to our hair without even knowing it. Here are some helpful ways to avoid hair damage:

... avoid blow drying, curling or iron-straightening your hair using extremely hot temperatures. Our hair contains air pockets that hold in moisture. Excessive heat breaks down these air pockets, damaging hair strands and drying out our hair. Always use the lowest heat setting possible and air-dry your hair whenever possible.

...stop aggressively rubbing your hair. After showering, gently pat hair dry instead of rubbing it vigorously. Too much friction can damage hair shafts and contribute to hair shedding and fallout.

... avoid back-brushing, using metal combs or brushing too much. It is recommended to use a plastic wide-toothed comb, especially on wet hair. Plastic combs create less friction when compared to metal combs, and easily de-tangle hair without tugging or breaking hair strands.

... stop perming and using harsh hair chemicals (e.g. hair dyes, bleaches, hair sprays). Perming and using strong, chemically-derived hair products can damage the hair cuticle and have adverse effects on the moisture of your hair. This can make hair shafts look weak, wiry and brittle. Realistically speaking, this might be hard for many working professionals that rely on hair sprays and chemical treatments for styling. Still, cutting down on the usage and frequency of these techniques can yield positive changes with regard to hair health.

... avoid too much sun exposure. Similar to blow drying, the direct heat

from the sun can cause hair damage, breakage and aggravation.

... do not style hair too tightly. Applying too much pressure on the hair and the scalp can directly contribute to another form of hair loss known as traction alopecia.

Maintain a Healthy Scalp

When hereditary hair loss starts to manifest, the blood supply to the scalp diminishes. This reduction occurs because blood is not needed where there is no hair. Interesting proof of this occurs after hair transplantation surgery. Blood circulation improves when there are once again living follicles at the top of the head that need nourishment.

Scalp condition and blood circulation can be directly or indirectly affected by the following factors:

- Smoking – many doctors believe that there is a connection between smoking and hair loss, but there is no scientific proof that corroborates this theory. Smoking does, however, reduce scalp circulation, but this in itself will not cause hair loss.
- Sun exposure – repeated sunburn adversely affects the scalp by shrinking hair-producing cells. Exposure to intense ultraviolet light can speed up the balding process in those already affected by genetic hair loss.
- Skin cancer – there are 3 different types of cancer and 2 of them can be deadly if they spread throughout the body. These 2 are malignant melanomas and squamous cell cancers, and they almost always appear in skin that is exposed to the sun. The hair gives the scalp protection from direct sun exposure and produces shade that lessens the risk of developing skin cancer.
- When balding starts, the scalp often becomes exposed to ultraviolet light from the sun and skin can change from a smooth, uniform color to having dark spots and discoloration.
- Dermatological conditions – there are several different conditions that affect the skin and scalp (discussed in Chapter 3).
- Folliculitis – an infection of the hair follicles where red and white

bumps or acne develop on the scalp. This can be treated by antibiotics, soaks or minor surgical incisions. The affected area should not be scratched or picked as this may cause scarring and spread the infection to other areas of the scalp that were not initially affected.

- Folliculitis rarely causes permanent hair loss, but can cause hair to prematurely enter the telogen (resting) phase.
- Chlorine and salt water – shampooing and conditioning the hair after swimming in a chlorinated pool or salt water is a must. Chlorine and salt water exposure can dehydrate the scalp and hair, causing considerable damage.



**WHY HAIR LOSS
HAPPENS**

Why Men Lose Their Hair

There are multiple explanations for how hereditary hair loss develops. But in order to properly manage the symptoms of Androgenetic Alopecia, it is important to familiarize ourselves with its causal mechanisms. In this chapter we will discuss why men and women lose their hair, and provide insight into the nature and causes of several different types of hair loss.

Identifying Androgenetic Alopecia

How can you tell if you are experiencing early-stage Androgenetic Alopecia?

For most people, hair loss isn't even noticeable until more than 50% of hair strands have miniaturized. Although excessive shedding is an early indication that hair shafts are becoming weak, even people without any visible hair loss lose an average of 50-120 hairs a day.

For this reason, we need a better way to identify pattern baldness before it becomes too obvious. Catching hair loss early is important because existing treatments are more effective when there are at least some hair follicles still functioning at the top of the scalp.

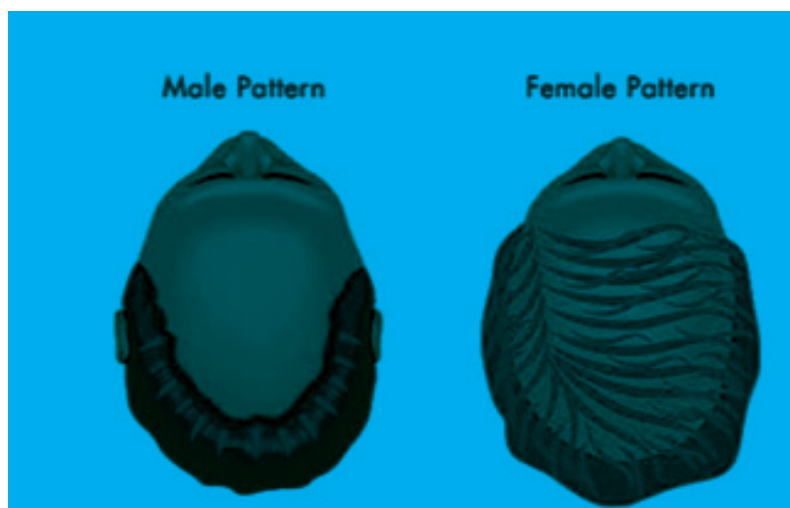


Figure 3: An image depicting male pattern and female pattern baldness.

Common Causes of Hair Loss

Hair loss can be caused by a lot of different factors. Heredity, hormones and stress can all contribute to hair fallout and miniaturization. Even though genetics is the most common factor, there are other diseases

and skin conditions that can result in hair loss.

Genes and Family History

Androgenetic Alopecia (hereditary hair loss, or AGA) is the most common form of hair loss. It can be inherited from either parent, however it is most often linked to the mother's side of the family. Most males who experience hair loss have a family history of AGA. In females, however, less than 50% of patients experience hair loss due to genetics.

- Male/Female Pattern Baldness (Androgenetic Alopecia/AGA)

AGA is the most common type of hair loss for both men and women, however it occurs most often in the male population. In men, a pattern usually develops in the form of a receding hair line and thinning crown. In women, hair is lost all over the head in a diffuse, uniform pattern. This progression rarely results in complete baldness.

- Symptoms:

Hair shedding is the most noticeable symptom of hair loss. Observe the amount of hair that you lose on a daily basis by checking your hair brush, shower strainer, pillow case and clothes. If you suspect hair loss, look at family photos to see if the condition is hereditary. Even though there is no clear explanation for the heritability of AGA, it has been observed that those with a family history of hair loss are at a much higher risk of losing their hair than others.

Testosterone and DHT

There are two primary sex hormones responsible for male pattern hair loss: DHT and testosterone.

Testosterone is converted by tissues throughout the body into a hormone known as dihydrotestosterone (DHT). DHT extends the resting phase of the hair follicle cycle and reduces the growing phase. The natural result of this phenomenon is thinning hair over time. This effect is especially prominent in men with ANA genes.

The good news for men who have not inherited this gene is that DHT and testosterone do not cause hair loss by themselves. In fact, they are

generally harmless, even to aging hair.

Both hormones are completely natural and necessary. DHT also plays a role in the growth of body, beard, eyebrow, nose and ear hair.

Blocking DHT on a hormonal level is a very common way to stop the progression of hair loss in men that are genetically susceptible. There are 5AR inhibiting drugs, such as finasteride and dutasteride, which are manufactured solely for this purpose. The only FDA-approved drug that has been proven safe and effective for the treatment of hair loss is finasteride.

However, it should be noted that at TRX2 we recommend NOT using finasteride. In short, the long-term risks of using this medication are impossible to ascertain. From a scientific perspective, a number of studies have been carried out that really call into question the safety of finasteride. Although the data might not be absolutely definitive, we don't believe anyone should take unnecessary risks with regard to their health.

To read a full analysis of finasteride and its risks please visit:

<http://www.trx2.com/community/2011/08/risks-associated-with-finasteride-treatment-for-androgenetic-alopecia>

Instead of focusing on reducing DHT on a hormonal level we target hair loss on a molecular level: The stimulation of potassium ion channels within hair follicles – more on this later on but first let's have a look on some of the other causes and manifestations of hair loss.

Hair Loss Over Time

Merely the presence of balding genes or hormones is not enough to cause hair loss. The extent of hair loss differs between individuals and can be significantly affected by DHT levels, age, environmental and other factors.

Hair loss happens in cycles and does not happen instantly. It is still unknown why people who are losing their hair experience alternating periods of slow and rapid hair loss.

Most men that develop extensive balding do so by the age of 30. However, half of the male population shows some amount of balding by the time they reach age 45-50. This progression slowly continues until they reach 60-65. Several clinical reports have demonstrated that circulating levels of DHT slowly diminish over the course of a man's life.

Those who begin the balding process into their 30s to 40s normally do not lose their hair as quickly as those who start balding in their early 20s.

The most common balding patterns are:

- Frontal hairline recession
- Bald spot in the crown area

Stress

Contrary to popular belief, stress does not cause hair loss. Still, excessive stress can contribute to hair loss through other means (hair pulling, poor hygiene, etc). Many traumatic experiences (such as being laid off from work) can exacerbate the effects of hair loss like shedding, thinning and dandruff.

One type of hair loss that can be caused by stress is Telogen Effluvium. TE is a reversible kind of hair shedding that is distinctly different from AGA.

Lack of Blood Supply

As mentioned earlier, blood circulation to the scalp ceases where hair is nonexistent; essentially because blood is no longer needed to supply hair follicles with oxygen and nourishment.

Nevertheless, there are doctors who claim that lack of blood circulation to the scalp contributes to hair loss. This may or may not be true.

What we do know is this: oxygen and nutrition is required for growing hair. When a person undergoes hair transplant surgery, hair follicles that have been transplanted to portions of the scalp that were previously devoid of hair have a larger supply of blood than the bald skin had initially.

Environmental Issues

Environmental causes for hair loss are common, but most of them can be avoided. Harmful environmental factors include harsh chemical treatments, tight braiding, restrictive head coverings and other accessories that put stress on hair follicles. Regular perming, dyeing, curling and exposure to extreme heat can also contribute to hair loss.

Impaired Potassium Channel Activity

The recent discovery that potassium ion channels exist within the dermal papilla cells of human hair follicles provided a novel therapeutic target for researchers. Potassium ion channels have been implicated in a vast array of diseases ranging from Hepatitis C to Diabetes. These small pore-forming protein structures control the transport of potassium ions across the hair follicle's cell membranes and are essential for maintaining the follicle's full biological activity and function.

Scientists have demonstrated that as people experience hair loss the function of potassium channels within hair follicles diminishes. The effect is impaired membrane potential and interrupted ion transportation across the hair follicle's cellular membranes – resulting in shrinking follicles and thinning hair.

Topically applied minoxidil (one of the most widely used hair loss treatments) is a known potassium channel opener. However, being a highly potent drug, minoxidil has well documented side-effects and measurable changes disappear within months after discontinuation of treatment. In fact minoxidil was originally developed as an oral antihypertensive drug, but a frequent side-effect was hair growth. The detailed mechanism of action of minoxidil on hair follicles is unclear.

To learn more about potassium channels and how they can be target for hair growth please visit www.potassiumchannels.com. There you will find lots of useful information and can sign up for a newsletter giving you instant access to more useful resources around this novel hair growth stimulating approach.

Diseases that Cause Hair Loss

Although Androgenetic Alopecia is the most common form of hair loss, there are other causes.

There are lots of different medical conditions that can cause hair loss or “alopecia” (the medical term for hair loss). Hair loss can also be caused by side effects related to medical treatments.

Alopecia has two categories:

- Non-scarring alopecia – hair has the potential to grow back.
- Scarring alopecia – there is a very small chance of hair regrowth even after treating this disorder; hair follicles are permanently damaged.

In this chapter, we will introduce you to several different medical causes of hair loss, their symptoms and possible treatments.

Non-scarring Alopecia

Non-scarring is the most common form of alopecia. It has several different types:

- Androgenetic Alopecia (AGA)
 - hereditary thinning
- Alopecia Areata
 - hair loss in localized round patches, or all throughout scalp
- Telogen Effluvium (TE)
 - diffuse scalp hair loss
- Anagen Effluvium Alopecia
 - more rapid and pronounced form of TE



Figure 4: An example of non-scarring alopecia.

Alopecia Areata

After AGA and TE, Alopecia Areata is the third most common type of hair loss. AA occurs when white blood cells mistakenly attack hair follicles in the body. When this happens, the affected follicles are destroyed, resulting in localized bald patches. Because AA is an autoimmune disease, its progression is sporadic and quite difficult to treat effectively.

Recently, researchers from Columbia University identified 8 genes that directly contribute to Alopecia Areata. This discovery will help patients more accurately predict the severity of their condition at the onset of the disease, and will facilitate the development of more effective treatment options.

Diagnosing the Disorder

Like most other types of hair loss, the most prevalent symptom of Alopecia Areata is severe hair shedding. In patients with AA, this shedding generally results in round, bare patches on the skin. Hair loss from Alopecia Areata is quite variable; some sufferers experience much more hair loss than others.

Treatment Options

At the present time, there is no known treatment for Alopecia Areata. However, 90% of males and females that develop this condition ultimately experience hair regrowth within a year without any medical intervention. In general, the longer the duration of hair loss, the less likely it is that hair will grow back.

There are still many experimental treatments that can be attempted, however. These include:

- Creams and shampoos for the scalp
- Minoxidil – applied directly onto the scalp. Minoxidil is more commonly used for the treatment of pattern baldness but shows signs of effectiveness for AA.
- TRX2 – this supplement contains Potassium, L-carnitine-L-tartrate, BCAA and Nicotinic Acid delivered via a proprietary potassium channel-stimulating complex. The mechanism of action is similar to minoxidil. For more information visit www.trx2.com. We recommend this treatment as it is natural, safe and very effective if taken over time.
- Irritants (anthralin or topical coal tar)
- Topical immunotherapy
- Steroids – specifically for AA treatment. Steroids are used to stop the body's immune system cells from attacking and destroying hair follicles.
- Cyclosporine – a strong immunosuppressant made specifically to inhibit T cells (immune system cells) from attacking the hair follicles.

There have also been studies published in the journal Archives of Dermatology (vol. 134, 1998; 49-52) that suggest aromatherapy oils may be effective in treating AA. The results thus far have been limited, however, and this therapy is not widely accepted.

Telogen Effluvium

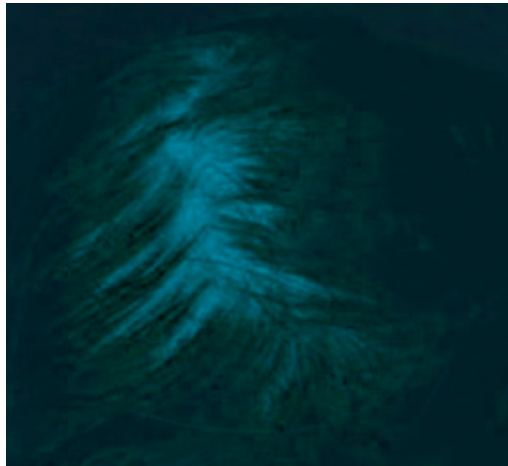


Figure 5: Hair loss caused by telogen effluvium hair shedding.

Telogen Effluvium (TE) is a type of non-scarring condition that results in excessive hair shedding. Although TE is the second most common type of hair loss, there has been relatively little research conducted to determine its underlying causes. Where the acceptable amount of fallen hair strands is usually around 100, patients experiencing TE may lose over 400 per day. Telogen Effluvium can affect people of all ages and races.

Causes:

- Postpartum alopecia (recently gave birth)
- Crash dieting/dietary deficiencies
- Physical trauma (e.g. car accident, etc.)
- Usage of anti-depressants
- Surgery
- Chronic stress

Treatments:

- Treatments for TE depend on what circumstances initiated the condition.
- For short-term TE that was triggered by having surgery or giving birth, follicles will start to recover and hair will grow back within a relatively short time period.
- For persistent TE, the factor that is causing the condition must be removed (stress, dietary deficiency, etc.)

Most TE conditions are normally not permanent and hair will eventually grow back. TE usually lasts between 6 and 12 months.

Tinea Capitis

Tinea capitis is a fungal infection caused by dermatophytes (mould-like

fungi). It is also known as “ringworm of the scalp,” “ringworm of the hair,” “herpes tonsurans,” and “tinea tonsurans.”



Figure 6: An image of hair loss caused by tinea capitis.

Tinea capitis infection is contagious. It can be transmitted either by direct contact or through contact with a contaminated item. Tinea capitis can occur at any age.

Common symptoms:

- Dandruff
- Bald patches
- Severe itching of the scalp
- Small black dots on the scalp
- Scaly lesions on the scalp that may be inflamed

Treatments:

Oral medicines are usually prescribed to treat tinea capitis infections. These generally require usage with a ketoconazole based shampoo.

In order to avoid catching tinea capitis, it is important to maintain good hygiene, avoid contact with infected persons and shampoo the scalp regularly.

Thyroid Conditions and Hair Loss

The thyroid is one of the endocrine glands responsible for making hormones. It helps set our metabolism, which distributes the different nutrients we receive from eating.

There are 2 types of thyroid disorder:

1. Hypothyroidism: This is the most common type of thyroid disorder.

Symptoms include weight gain and constant fatigue.

2. Hyperthyroidism: This is the result of a thyroid that is too active. This can lead to weight loss, heart palpitations or heat sensitivity.

How Thyroid Conditions Affect our Hair

Thyroid disease (whether hyperthyroidism or hypothyroidism) can often cause rapid hair loss.

However, those suffering from thyroid disease may lose hair in places other than their scalp. For instance, hair loss on the outer edge of the eyebrows is common.

Thyroid Disease Treatments

Treating thyroid disease means keeping thyroid hormones balanced and stable.

Thyroid treatments:

- Medical therapy with anti-thyroid drugs
- Radioactive iodine and the destruction of the thyroid gland
- Surgery to remove the thyroid gland

Scarring alopecia

According to the American Hair Loss Association, Scarring Alopecia (also known as “cicatricial alopecia”) refers to a collection of hair loss disorders that may be diagnosed in up to 3% of hair loss patients. Scarring Alopecia occurs around the world in otherwise healthy men and women of all ages.

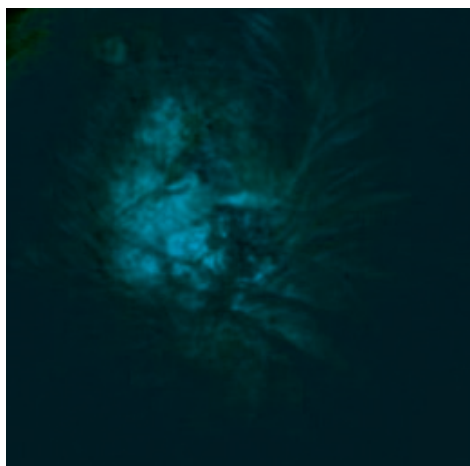


Figure 7: Hair loss caused by scarring alopecia.

In Scarring Alopecia, hair loss happens in areas where scars manifest. No hair will grow back in the area where scarring alopecia occurs.

Lupus

Lupus is an autoimmune disease that causes organ tissues to become inflamed. At some point during the development of the disease, 50% of those suffering from lupus also experience hair loss. This mostly occurs in the temple area.

There are 2 types of lupus:

- Systemic lupus erythematosus (SLE) – may cause non-scarring hair loss. Once this disease is successfully treated, hair eventually grows back.
- Discoid lupus erythematosus – can manifest anywhere in the body, but most commonly on the head and neck. It may cause scarring hair loss and irregular patches of dark skin (hyperpigmented) or almost white skin (hypopigmented).

Symptoms:

- Reddish facial rashes
- Sensitive to the sun
- Mouth ulcers
- Arthritis
- Low fevers
- Fatigue

There is no treatment for hair loss that is caused by lupus, but medications for the disease itself may help restore hair growth.

Other Causes of Hair Loss

Hair Loss as a Result of Medication

There are a number of medications for which hair loss is a common side effect. Listed are some of the most common ones (courtesy of Hair Loss for Dummies):

- Acne medications, such as isotretinoin (Accutane)

- Anti-inflammatory drugs, such as naproxen (Naprox), indomethacine (Indocin), and naproxen (Naprosyn)
- Antidepressives, such as paroxetine (Paxil), fluoxetine hydrochloride (Prozac), and sertraline hydrochloride (Zoloft)
- Beta blockers, such as nadolol (Corgard), propranolol (Inderal), metoprolol (Lopressor), and atenolol (Tenormin)
- Birth control pills
- Blood thinners, such as warfarin sodium (Coumadin) and heparin
- Cholesterol-lowering drugs, such as gemfibrozil (Lopid)
- Gout medications, such as allopurinol (Lopurin or Zyloprim)
- Seizure medications, such as trimethadione (Tridone)
- Ulcer medications, such as famotidine (Pepcid), cimetidine (Tagamet), and ranitidine (Zantac)

Rare Causes of Hair Loss

We have already covered the most common conditions that cause hair loss. In this section, we will outline two conditions that are slightly less common.

OCD: Hair Pulling

Many people aggressively pull their hair when they feel frustrated or upset. This is a fairly obvious reason for hair fallout.

Every once and awhile hair pulling can be understandable, but it can also be indicative of a disorder known as OCD (Obsessive Compulsive Disorder); where one literally pulls out his/her hair repeatedly.

This type of OCD is called Trichotillomania (TTM). Luckily, once pulling and tugging stops, hair can grow back because TTM is a non-scarring form of hair loss.

TTM is more commonly found in children than adults and is most common among women.

Trichotillomania can be categorized into 2 groups:

1. Those who feel pleasure from pulling their hair / those who intentionally pull out their hair due to itch or pain.
2. Habitual hair pulling; non-intentional.

Trichotillomania treatment options:

1. Cut hair short (this works well, especially with children)
2. Seek therapy with a professional (i.e. psychiatrist). Medication like

Clomipramin (anti-depressant) may reduce symptoms and self-monitoring of the behavior can also be an option.

Traction Alopecia

Traction alopecia refers to the gradual loss of hair due to continuous follicular tension. People who wear their hair in tight hairstyles (braids, ponytails, pigtails, etc.) are especially prone to traction alopecia. Traction alopecia can also be a result of tight roller curlers and hair straighteners.

Traction alopecia is more common in women than in men. Although reversible when it is caught in its early stages, this form of hair loss can lead to scarring when it becomes persistent. The only treatment for late-stage traction alopecia is surgical hair transplantation.



**WAYS TO CONCEAL
HAIR LOSS**

Wig It



Wigs and toupees have been present for a very long time. In fact, their lineage can be traced back thousands of years to ancient civilizations.

Wigs are convenient because they instantly provide thick hair and are available in almost any style. Although modern wigs can look very natural, many men find them to be tedious and expensive. People use hair replacement systems for different reasons. We will discuss hair replacement systems in more detail during this chapter and provide tips on how to use them most effectively.

A Brief History

Hair loss has been a nuisance since the beginning of time. A man's hair has often been seen as a symbol of stature; the fuller a man's hair, the younger and more powerful he is thought to be. Here is a short timeline that documents the progression of the hair system:

- 3200-3100 B.C. - a hair system was found in a tomb in Egypt (near the ancient city Hierakonpolis); we have also seen Pharaohs wearing hair systems.
- 17th century – Julius Caesar tried wearing a hair system to cover up his hair loss. King Louis XIII also began wearing wigs for his balding head and it soon became the “in” fashion all over France.
- 19th century – the United States followed England's use of hair

systems

- Present – in America alone, there is an estimated 350,000 men who wear hair systems. Today, hair systems are heavily promoted. Salons and specialty shops regularly use and sell hair systems to loyal patrons. Along with their rising popularity, the quality of hair systems has increased immensely.

Hair Replacement Systems

Hair systems have come a long way since the powdered wigs of the 1700s. Today, the use of real human hair provides high-quality hair systems with very natural textures, colors and appearances.

Featured below are several positive and negative aspects of hair systems. They are intended to help you decide whether or not a hair system is right for your personal situation. The pros and cons of hair systems are as follows...

PROS:

- Relatively low cost compared to hair transplantation
- Quick results without surgery
- New technology has made hair systems less noticeable and more natural

CONS:

- Systems need regular maintenance and repair
- Insufficient durability
- Attachment mechanisms may cause accelerated hair loss
- Systems can lead to slight feelings of anxiety and paranoia (wondering whether or not people can notice)
- Costs add up over time

Hair systems are delicate and should be regularly brought to your seller for cleaning and repair. Systems usually only last for a year or two (even with routine maintenance) because a plethora of different factors, including heat, perspiration, and strong shampoos, shorten their lifespan.

Where do I shop for hair systems?

Shopping for hair systems can be difficult. Because advertising is minimal, many people find it hard to research their options. Still, conducting adequate research is a must.

Budget considerations:

When shopping for a hair system, cost is a major factor. Systems can be slightly less expensive than hair transplantation, but maintenance and replacement costs can add up quickly. For this reason, patients considering a system should be prepared for a long-term economic obligation.

The price of a hair system is usually determined by two factors – materials and quality:

- Human hair – high quality; has a natural look and feel; prices start at around \$1200.
- Animal hair – made of goat or horsehair or other animals such as yak; moderate quality.
- Synthetic – least expensive option; least natural look and feel; minimal maintenance.
 - Combinations of human hair and synthetic fibres are also available.
- Machine-made – low quality, low price; normally used for costume parties, not as a hair replacement.
- Handmade – high quality, natural and realistic; more expensive than other systems.

Finding a specialty shop:

Once budget considerations are taken care of, it is important to locate a shop that can fit your aesthetic and economic needs. Because word-of-mouth is limited in this industry, the best way to locate a specialty store is via the internet. Browse the web for “wigs,” “hair systems,” or “non-surgical hair replacement” to find a list of outlets near you.

Before making a purchase, you should always ask the following questions:

- How long has this shop been in business?
- What is the owner’s background in hair replacement?
- What materials do they use?
- Do they offer a warranty?
- What are the total costs including fitting and adjustments?
- How often will I need maintenance on this product?
- How long does a wig last?

***We know that hair systems need regular maintenance and that no wig, even the most expensive one, lasts forever. So watch out for their

answers! A competent provider should answer these questions openly and honestly.

Choose your style

Choosing a new hairstyle can be overwhelming. There are so many colours, styles and lengths to choose from that you may want to experiment with several.

When it comes to picking a look for your new hair, keep in mind the following:

- Choose a hair colour that suits your skin tone
- Choose a style that compliments the shape of your face
 - Keep in mind, you can always ask the salesperson or stylist for help finding the perfect hair for you.

Maintenance and Care for Your New Hair

Caring for hair systems is much more complicated than it seems. There are many maintenance considerations that should be addressed before a system is purchased. Otherwise, the results will be inadequate and may become noticeable. The following will help you achieve results that will lead to an unnoticeable hair system:

- Keeping your hair on even when staying active

Even though hair system providers show advertisements of men wearing systems while doing labor-intensive physical activities, one should be cautious doing so. It might work on television, but not in person. Generally speaking, hair systems work for sports that are not too extreme – like golf, tennis, aerobic exercises and running.
- Maintain regular care

Hair systems need routine maintenance to look healthy and natural:

 - Set up a schedule for your hair system to be washed either by yourself or by a professional.
 - If you have a weave, have it adjusted by a professional two or three times a month so that it does not become loose as hair grows.
 - If your hair system includes wefts, have it serviced before it comes detached from the hair base.
 - Regularly check for potential problems.

- Remember to also maintain a spare hair system in case backup back-up is needed for any unforeseen circumstances.
- Know when it's time for a replacement.

In summary, keeping your hair replacement system clean and well-maintained is the key to a natural result. Although maintaining one (or two) can take practice, it is essential that you create and keep a schedule when it comes to caring for your hair system. This will help you avoid many future problems such as discomfort, detection and damage.

Fibres, Sprays and Particle Hair Concealers

Hair concealers come in many different forms. These forms differ in how they are applied and what results can reasonably be achieved. In this section, we will take a look at several different types and help you choose the best concealer for your personal situation.

How Hair Concealers Work

Hair concealers can be a helpful hair loss solution for many people, especially those that are just beginning to notice miniaturization. No surgical procedures are involved, detection is difficult, cost is minimal and results are instantaneous. With many brands, particulates are merely “sprinkled” on the hair and results are visible in seconds.

In this part, we will be talking about hair concealers; their benefits, their limitations and how they can be used for optimal results.



Figure 8: An illustration of the before and after results of hair concealers.

The Wonders of Hair Fibres

There are 2 popular fibre products that can make hair shafts appear thicker: Toppik and Xfusion. These products consist of organic keratin fibres (similar to what makes up the human hair). The fibres cling to hair through static electricity, making thin areas instantly appear thicker and fuller. These products are usually sprinkled on, an application process that usually takes less than a minute.

Spray-on Hair Concealers

Spray-on concealers are quick and easy to use. Unlike fibre concealers, spray-on concealers darken the scalp, filling in thin areas by creating the illusion of greater coverage. One popular brand of hair concealer is Full-more.

- Application is simple: Just hold the spray-can eight inches away from your head and spray in an even pattern. The tiny fibres that match with your hair colour will naturally stick to your hair and darken your scalp.

*Spray concealers provide instant results, but may not be as natural looking as fibre concealers.

Disadvantages of Hair Concealers

Hair concealers provide immediate results. They are also inexpensive and easy to apply. Still, there are many limitations to concealers that buyers should be aware of:

- Sometimes application is messy.
- Concealers do not work on those that are completely bald. Fibres need at least some hair to hold on to.
- Some brands (and several types, such as spray-ons) may not give a natural look.
- Concealers do not treat hair loss, they merely hide it. You definitely should combine the usage of concealers with a solid treatment regimen such as TRX2, minoxidil and a ketoconazole based shampoo.

If you are looking for a treatment for your hair loss, hair concealers are not for you. If you are looking for a temporary solution that can provide you with instant results while waiting for another treatment to show posi-

tive results, then hair concealers might be a great option.

***Remember, keeping your expectations realistic and familiarizing yourself with the advantages and disadvantages of each hair product are important precautions that will help avoid confusion and disappointment.

Research and Compare Before Buying

There are different kinds of hair concealers:

- Solid: an example of this would be DermMatch. Solid hair concealers are hard-packed, coloured powders that are safe to use every day.
- Sprays: this kind of hair concealer can be difficult to apply, and you may need a little practice before results are acceptable. Prothik and Fullmore are popular spray-on hair concealers.
- Particles: the most popular choice among consumers. Particle hair concealers are not creams, cover-ups or any other type of traditional cosmetic product. They come in custom containers that allow you to shake their contents onto thinning areas. No rubbing is involved and particles will quickly intertwine with existing hair. These particles will be difficult to notice and will stay securely in place all day because of their static electrical charge. Particle-based concealers provide the most natural results and last much longer than substitutes. Popular brands are Nanogen and Toppik.

There is no doubt that hair concealers are convenient options for instant hair replacement. Although price can be a problem for some people, concealers are relatively affordable on most budgets (especially if they are used effectively and sparingly). Many people use DermMatch and Nanogen together for the best results. The decision of whether or not one should combine concealers in this fashion ultimately comes down to personal preference, however.

On a day off from work, experiment with different types of concealers (spray, solid, or particles) to decide which option is the best for you.

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**LASER, TOPICAL AND
PHARMACEUTICAL
TREATMENTS**

Prescribed Medications for Hair Loss

There are relatively few prescription medications available for the treatment of hair loss. At the present time, there is no “miracle” medication that will completely halt the onset and progression of hair loss. However, some treatments can provide dramatic improvements. In this section we will discuss these therapies, outlining their advantages, disadvantages, costs and results.

Level Your Expectations

Many people are disappointed with the results they receive from hair loss medications because their expectations are not realistic. It is normal to desire the best response, but it is important to know that results are variable between patients. Before starting any medication, it is always important to familiarize yourself with the general indications of each treatment.

***When pharmaceutical treatments are used, patience is a virtue. It is not unusual for results to take between 6 months and a year to become visible (and sometimes even longer). Medication must be taken in perpetuity in order to maintain the results. For this reason, long-term cost and side-effects are major considerations.

Finasteride (Propecia)

Finasteride-based treatments are best represented by the adage “an ounce of prevention is worth a pound of cure.” While they can be quite effective in delaying the progression of male pattern baldness, they do very little for people that already have extensive hair loss. Nevertheless, 5-alpha-reductase inhibitors like Propecia and Proscar are currently widely used weapons available in the war on baldness. However, beware of their side-effects and unknown long-term indications (at TRX2 we do not recommend taking Finasteride-type products).

History: In 1992, Finasteride was approved by the FDA for the treatment of Benign Prostatic Pyperplasia (BPH). In 1997 Merck and Company marketed the product as a hair loss treatment (although at a different dosage) after noticing its positive effects on hair growth. 13 years later, Finasteride remains 1 of only 2 FDA approved medications for the treatment of androgenetic alopecia.

Method of Action: The enzyme 5-alpha-reductase is involved in the conversion of testosterone into its active form of dihydrotestosterone (DHT – the androgen primarily responsible for male pattern baldness). Over time, DHT shrinks hair follicles until they no longer produce visible hairs. Finasteride is a 5-alpha-reductase inhibitor. By reducing circulating levels of DHT, androgen receptors in the hair follicle are protected from its adverse effects.

Usage: Finasteride is generally administered in the form of once daily pills. Results are not typically visible for period of about 6 months (with optimal results occurring around 12 months). After a period of 5-6 years, these results steadily diminish.

How Finasteride Works

Finasteride is primarily designed to halt the progression of hair loss. Finasteride is most efficacious at the crown and vertex areas of the scalp, and generally does not affect (positively or negatively) the frontal scalp.

Starting Finasteride early is the key to its success. Often at the first sign of hair loss, patients ask their doctor about starting a regimen that includes Finasteride pills like Propecia or Proscar. Although new hair growth will not be visible, it is important to remember that Propecia aims to stop hair loss from becoming worse (i.e. it does not aim to regrow hair). The treatment needs to be taken life-long as patients who quit Finasteride, thinking that it has not provided any results, often lose a great amount of hair shortly after discontinuing regular use.

The combination of topical minoxidil (more details on this treatment later on) and finasteride is popular because both treatments can be used in synergy. Minoxidil and finasteride work in different ways; minoxidil stimulates hair growth by opening inactive potassium channels and finasteride blocks the negative effects of DHT. Together, these effects can produce noticeable results but one should be aware of the side-effects finasteride can come along with (see below).

Proper Dosing of Finasteride

1 mg of Finasteride is the recommended dose for the treatment of Androgenetic Alopecia. Taking a higher dosage will not result in any additional benefits.

Finasteride is also available in a 5 mg dosage under the brand name

Proscar. Some people purchase Proscar (because it is less expensive) and cut the tablets into several pieces. Others simply take the entire 5 mg. Once again, there is no scientific proof that this is as effective as the 1 mg dose of Finasteride.

***Pregnant women should not handle Finasteride. Broken or crushed tablets can be absorbed by the skin, leading to several serious complications.

Side-effects of Finasteride

As with other medications, there are several side-effects that can manifest while taking Finasteride. Most of Finasteride-induced side-effects are temporary and will diminish quickly if Finasteride use is discontinued. However, recent studies indicate that many side effects, such as sexual dysfunction may in fact be permanent. This is still a subject of debate among industry professionals. Before starting any Finasteride-type treatment, it is important to be aware of these possible complications:

- low sex drive
- temporary impotence
- decreased volume in the amount of semen

Some serious side-effects include:

- changes in breasts (lumps, pain, etc.)
- allergic reactions (itching, rash, hives)
- testicular pain
- permanent sexual dysfunction

After conducting a substantial amount of research into this area, we highly recommend replacing finasteride with a safe and natural alternative (such as TRX2).

This suggestion comes after careful consideration of several important factors:

1. In December 2008, the Swedish Medical Products Agency completed a safety investigation of Propecia. They concluded that the use of Propecia might result in irreversible sexual side-effects. The Agency's updated safety information now includes "persistence of erectile dysfunction after discontinuation of treatment with Propecia" as a possible adverse reaction to the drug. To read the full article – visit <http://www.lakemedelsverket.se/english/Search-the-website/?q=propecia>
2. In December 2009, the Medicines and Healthcare products Regulatory Agency in the UK announced new drug safety data on finasteride. After carefully reviewing the results of several controlled studies, the agency wrote "an increased risk of male breast cancer

associated with finasteride use cannot be excluded.” On the basis of this information, it was recommended that a warning should be included in the product information for all medicines containing finasteride mentioning the possible risk of breast cancer. To read the full article – visit <http://www.mhra.gov.uk/home/groups/pl-p/documents/websiteresources/con065504.pdf>

3. This 2006 research paper, published in the CNS Drug Reviews medical journal, raises the possibility that finasteride can cross BBS and interfere with neurosteroids. This could have a noticeable impact on brain function. To read the full article – visit <http://www.ncbi.nlm.nih.gov/pubmed/16834758>
4. The majority of available clinical data on finasteride comes from various 5-year studies. The long-term implications of finasteride consumption remain unknown. Because finasteride treatment must be continued indefinitely, this is an important consideration.
5. Merck’s clinical data reveals that the side-effects of finasteride include impotence (1.1% to 18.5%), abnormal ejaculation (7.2%), decreased ejaculatory volume (0.9% to 2.8%), abnormal sexual function (2.5%), gynecomastia (2.2%), erectile dysfunction (1.3%), ejaculation disorder (1.2%) and testicular pain.

We understand that finasteride is a popular treatment option for many customers. Nonetheless, safety should be your foremost concern. Finasteride works by inhibiting 5-alpha-reductase, the androgen responsible for converting testosterone into dihydrotestosterone (DHT). Unfortunately dihydrotestosterone is not only found in hair follicles. It is also synthesized in the testes, prostate and adrenal glands. Thus, the suppression of DHT may have a negative impact many other important biological processes.

We feel it is imperative for customers to know exactly what they are ingesting when they take prescription medication. While it is true that finasteride has a respectable safety profile in comparison to other pharmaceuticals, the risks still greatly outweigh any potential benefits.

Luckily, there are other options for the treatment of pattern hair loss. TRX2™ Molecular Supplement capsules are completely free of side-effects. Used exclusively or, to maximize effects, in combination with 5% minoxidil, our product has been proven to slow the progression of hair loss and revitalize miniaturized hair follicles. More safe and affordable than any alternative, our unique line of TRX2 treatments is changing the way customers approach their hair loss – for more information or to order visit www.trx2.com

Minoxidil (Rogaine)

Minoxidil (distributed under brand names Rogaine™ and Regaine™) is perhaps the best-known treatment for male pattern baldness. Minoxidil is unique because of its topical formulation and availability to both men and women.

History: Minoxidil was initially used as a treatment for high blood pressure, marketed under the brand name Loniten. After hair growth was discovered as a common side-effect, Minoxidil was reformulated by Upjohn Corporation into a 2% topical solution. In 1988, after clinical trials had concluded, Rogaine became the first treatment approved by the FDA with the indication of treating androgenetic alopecia.

Method of Action: Although Minoxidil is the oldest existing medication for AGA, its precise method of action remains unknown. Minoxidil is a potassium channel agonist; meaning that it facilitates in the movement of ions between cells within the body. How this function relates to male-pattern baldness is still being investigated.

Usage: Minoxidil is applied twice daily to the scalp, either in foam or liquid form. Patients often report excessive shedding when they start regimens that include Minoxidil. This shedding period is mostly temporary, however, and generally ceases once the body becomes accustomed to the treatment.

Unlike Finasteride, Minoxidil has the ability to regrow new hair, albeit in very small quantities. It is most effective rejuvenating hairs in the vertex and crown areas of the scalp. Minoxidil has also been found to be quite effective in patients with diffuse thinning.

It should be noted that results will only be seen after 4-6 months of continuous application. Hairs rejuvenated with Minoxidil are generally sparse, weak and often colorless. Once Minoxidil treatment is stopped, these gains can be lost within a period of 6 months.

Cost: Rogaine can be purchased over-the-counter at most local pharmacies. A month's supply of treatment costs approximately 30 US dollars, but bulk rates and discounts are available.

How Minoxidil Works

Initially, Minoxidil was marketed as an oral medication for blood pres-

sure. But doctors began to notice hair growth as a popular side-effect.

Researchers developed a topical formulation of Minoxidil that is directly applied to the scalp. Studies conducted since have supported the notion that Minoxidil can cause significant hair growth. However, in many cases the response rates are limited and efficacy decreases or disappears over time after continued use.

The exact mechanism that makes Minoxidil effective remains unknown. However, recent studies reveal that the ability of minoxidil to bind to potassium channels and function as an effective channel opener within human hair follicles varies among customers. This may be because every customer has different genetic susceptibilities. Hence many patients choose to complement a minoxidil based treatment regimen with TRX2 supplementation (more info on www.trx2.com), as both treatments together share synergies (both target potassium channels) and can increase overall efficacy significantly.

Side-effects of Minoxidil

Since Minoxidil (Rogaine) is a topical treatment, it is only used externally. Avoid getting Minoxidil into your eyes, nose or mouth. Minoxidil should also be used singularly, as other topical solutions might increase its absorption rate and exacerbate side-effects. Side-effects are only minor, but be observant and consult your physician if you experience:

- skin irritation
- itching
- contact dermatitis
- dryness or flaking of the scalp (dandruff)
- nausea or lightheadedness
- swelling of the face, ankles, hands or stomach
- difficulty breathing
- rapid heartbeat
- chest pain

Applying Minoxidil Onto the Scalp

Doctors recommend that Minoxidil is applied directly to the scalp twice a day, once in the morning and once in the evening. The solution should be applied to all the thinning areas to regain lost hair.

Low-Level Laser Therapy

Low-Level Laser Therapy (LLLT) is a new medical approach used to heal

soft-tissue and provide acute and chronic pain relief. The two primary devices that employ this technology in relation to hair growth are the HairMax Laser Comb and the X5 Laser.

How Laser Therapy Works

Low level laser therapy is a non-invasive, painless treatment option for hair loss. The laser light decreases inflammation and cellular metabolism. Cells of LLLT, according to further European studies, increases the blood and lymph to the root of the hair and scalp, stimulating hair growth. Whether or not laser therapy is truly effective is a common point of debate among industry professionals.

5.1.12 Low-level Laser Therapy for Hair Loss

History: In 2007, the HairMax Laser Comb received a 501(k) clearance from the U.S. Food and Drug Administration. It is currently the only medical device approved by the FDA to be marketed to individuals suffering from certain classes of male pattern baldness (NW1-NW2V).

Method of Action: The HairMax Laser Comb claims to reverse miniaturization and stimulate dormant hair follicles with laser photo therapy. This approach has been hypothesized to increase blood circulation, promote cellular activity and reverse apoptosis (natural degradation of cells) in various tissues throughout the body. Within the follicle this increased circulation fosters a nutrient-rich environment and eliminates waste, promoting healthier hair overall.

It is also theorized that the concentrated light energy emitted by the HairMax Laser Comb increases the production of adenosine triphosphate (ATP). This molecule provides cells with usable energy, increasing their propensity to grow and repair.

Cost: The most popular LLLT device, the HairMax Laser Comb, costs roughly 500 dollars. It can be purchased via the HairMax website and comes with a two-year warranty. Various payment options are available.

Handheld Laser for Home Use

Usage: Using the HairMax Laser Comb is quite easy. The device is held at the front of the hairline and slowly moved backward towards the crown at four-second intervals. This progression is then repeated in the

opposite direction. For best results it is recommended that this process is performed for 15 minutes, 3 times per week.



Figure 9: Handheld home use laser.

Results experienced by the HairMax Laser Comb are minimal at best. There is insufficient data to suggest definitively that this process works, but a recent clinical study performed by the company confirmed limited efficacy with no major safety concerns.

Advantages of handheld device:

- less expensive and more convenient than doctor visits
- may permit the laser better access to the scalp

Disadvantages of handheld device:

- can be easy to forget and tedious to use on a regular basis
- it may be difficult to determine whether or not the treatment is working and when use should be discontinued.
- the efficacy of lasers against hair loss is controversial and not thoroughly proofed by scientific publications

Potential risks of LLLT

Handheld lasers are considerably safe devices for hair/scalp use. Although there are no scientific studies that specifically promote their efficacy, handheld lasers can provide results for some people. No safety issues have ever been reported.



**ADVANCED HAIR
LOSS SOLUTIONS**

Hair Transplant Surgery

Hair Transplantation is currently the only method of restoring terminal hair growth to patients with established baldness. Although the process still has many limitations, recent advances in medical technology have made hair transplantation much more desirable. So long as it is performed by a reputable surgeon, a hair transplant can provide noticeable and natural results.

There are two primary methods of hair transplantation surgery, defined in terms of how hair follicles are harvested from the “safe zone” donor area:

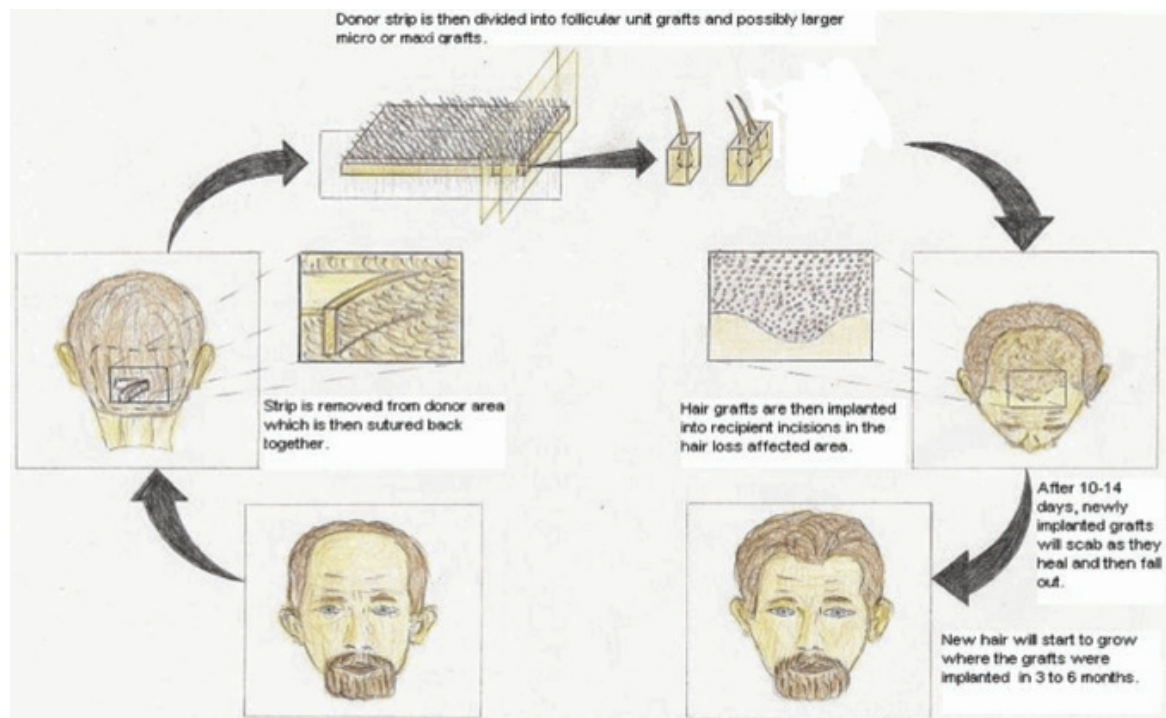


Figure 10: Hair transplant sketch diagram.

1. Strip (FUT, FUSS) – A hair-bearing strip of scalp is surgically removed from the back of the patient’s head. This strip is microscopically dissected into grafts (small pieces of tissue) that are subsequently transplanted into balding areas. The Strip method of hair transplantation results in an unavoidable linear scar that spans from ear to ear. These scars are easily concealed by existing hair, but are clearly visible if hair is shaved down. This treatment has an approximate recovery period of 2 weeks.
2. Follicular Unit Extraction (FUE) – Hair follicles are individually removed from the patient’s donor area with tiny punches typically .7

mm to 1.2 mm in diameter. These follicles are then inserted into the patient's recipient (balding) area. Since this micro-removal harvests hair follicles one by one, the resulting scars resemble miniature dots. These scars, like those that form after Strip excisions, are usually concealed by existing hair. This treatment has an approximate recovery period of 7 days.

Are you a candidate for hair transplant surgery?

Not everyone is a good candidate for hair transplant surgery. It is very important not to make impulsive decisions with regard to permanent and invasive procedures.

Candidates for hair transplant are mostly men suffering from male pattern baldness, not other underlying conditions.

In general good candidates have:

- Male pattern baldness
- Sufficient hair in the donor area to provide to the balding areas
- A flexible scalp (referred to as "donor laxity")
- Coarse hair (hair shaft diameters with reasonable bulk)
- A good and clear understanding of the procedure
- Reasonable expectations
- Enough money to afford future procedures when future loss occurs

Those Who Don't Qualify For a Hair Transplant

People with the following characteristics are most likely not good candidates for hair transplantation:

- Those who have unhealthy donor supply
- Most women (women tend to lose hair all over the head, including the occipital scalp where there should be healthy hair for donor use)
- Those with low hair densities, fine hair or inelastic scalps
- Those with limited budgets (continuous surgeries may be needed over time as hair loss progresses)
- People expecting perfect, thick and youthful results

Those Who May Qualify For a Hair Transplant

The most important determinant in the ultimate success of hair transplantation surgery is a healthy donor area. Men who are over the age of

30 with a recognizable pattern of hair loss are traditionally the best candidates. Still, all patients must do extensive research before undergoing the procedure.

Unfortunately, many surgeons will take advantage of patients that experience hair loss at a very young age (under the age of 25). In general these patients are susceptible to panic and make impulsive decisions for instant gratification. Young males should think very carefully before undergoing a hair transplant surgery – future loss may be imminent!

Ask yourself the following questions:

- Have I considered all other options?
- Have I tried available medications and waited long enough to see the results?
- Have I thought about the amounts it will cost?
- What pattern of hair loss will I ultimately develop?
- Will my results look natural over time?

Hair transplant doctors must always make sure that their patients are emotionally and psychologically prepared for surgery.

A word of advice: Never undergo an invasive procedure unless you completely understand the potential risks and limitations.

Those with realistic expectations who are well-educated with regard to hair loss treatment options are generally the most satisfied with their results.

Having Enough Hair for a Transplant

The primary limitation to hair transplantation is donor availability. Hair transplants are often described as “zero-sum,” meaning that hair must be removed from one area in order for it to grow in another. No new hair is actually created, so there is a limited number of hairs that can actually be moved in this fashion. Patients with large bald areas generally do not have enough grafts in the “safe-zone” to complete a full restoration. If patients do not plan for future loss, results may look unnatural.

Considering the Costs

Hair transplantation is generally considered a cosmetic procedure. As such, hair transplants are not covered by most insurance agreements.

The results of a hair transplant will last a lifetime. For this reason it is crucial to hire the best possible surgeon to carry out the procedure. Hair transplants become expensive over time, but that should not deter you from hiring a quality doctor. It might sound harsh, but allocating extra money towards your procedure is preferable to permanent disfigurement.

Before choosing a doctor, conduct several consultations with various surgeons. Ask representatives how much their clinic charges per graft and how much procedures similar to yours typically cost. Also ask patients that have undergone surgeries with various doctors about their experiences. Communicate your expectations with your doctor and only choose a surgeon that is open, honest and concerned with your future satisfaction.

***Although the internet can be an incredible resource for this type of research, always see several results in person before choosing to undergo a transplant. Costs will add up over time, so you need to be prepared physically, financially and emotionally to begin the “hair transplant journey.”

Choose the Right Doctor

Not all hair transplants are the same. Patients considering hair transplant surgery should research several doctors and make an informed decision based on a variety of personal factors. Given that the results will last a lifetime, price and location should be nonentities.

Companies like Bosley Medical and New Hair Institute are recognized around the world for their extensive ad-campaigns and large market share. Unfortunately, their legacy has been tainted by a history of false advertising and patient dissatisfaction. Because of their large size and high-visibility, these organizations are often unable to provide the personalized care that patients deserve during invasive elective procedures.

Although Bosley and NHI have many happy customers, patients considering this hair transplantation need to be aware that there are other options available.

Looking for a place to start your research? The following physicians are world-renowned for their consistent, high-quality results and innovative contributions to the hair transplant industry:

Dr. Rahal (Ontario, Canada) – Strip

www.rahalthairtransplant.com

Drs. Hasson and Wong (Vancouver, Canada) – Strip

www.hassonandwong.com

Dr. Alan Feller (Great Neck, New York) – Strip and FUE

www.fellermedical.com

Dr. Bijan Feriduni (Hasselt, Belgium) – Strip and FUE

www.hairdocs.info

Of course there are many other good surgeons, but this list should serve as an important starting point.

Meeting For the First Consultation

Hair transplantation is not well regulated. For this reason, there are countless clinics that deliver sub-par results and charge exorbitant prices. Conducting several consultations with various offices is crucial to finding the best surgeon for you.

Your first meeting should start with these steps:

1. Basic information about the procedure should be provided to you by the doctor or by a knowledgeable representative (preferably one that has undergone the procedure)
2. Fill out a basic medical history form to determine your candidacy for the procedure
3. A qualified nurse practitioner/assistant or physician may assess your hair loss
4. A more knowledgeable interviewer may try to determine whether your expectations are realistic

If possible, the consultation should be conducted with the surgeon present. Most reputable clinics will oblige this request. During the consultation, the doctor should:

- educate you about the procedure
- become familiar with your medical history
- conduct physical examination
- discuss options, persuade you to consider all other options
- estimate the number of surgeries it will take to achieve the desired result
- review the total costs
- provide you with a large list of references, testimonials and re-

sults

The Right Questions to Ask

Questions to ponder on before making the final decision to undergo an operation (from Hair Loss for Dummies):

1. Did the doctor spend time answering all your questions? Did the doctor provide you with clear explanations and address your long-term goals?
2. Is the doctor experienced in the hair restoration field? How is his reputation in the medical community?
3. Did the doctor provide you with a document with the full outline of his prognosis? It is important that the complete details of his proposal are written in paper just in case you forget some information.
4. How many surgeries will be required?
5. How will the total cost be computed?
6. Are you being pressured to undergo the surgery?

***If you ever get the feeling that a surgeon is trying to “sell” you a hair transplant, immediately leave. A competent surgeon will be concerned with your health and safety, not the bottom-line.

Seeing Results for Yourself

This step might seem obvious, but many patients neglect to see results in-person before undergoing a hair transplant. The only way to develop realistic expectations is by seeing several patients in-person. Pictures and videos can be deceiving, always see results up close.

Before Surgery

Here are some of the most common pre-surgery recommendations (from Hair Loss for Dummies):

- Ask if there are any food or drinks you should or should not have before the surgery.
- Stop taking any aspirins or blood thinners (if you’re on any) 10 days before the surgery.
- If you are taking any other medications, consult your doctor prior to the surgery.
- The doctor might ask you to use anti-bacterial soap on your hair and scalp the night before and the day of the surgery.

Review all the documents you have before the day of the surgery. This should be the proposal we talked about in “Asking the right questions”. Make sure everything is clear and jot down specific questions you want to ask the surgeon before your procedure starts.

During Surgery

Hair transplant surgeries are conducted under local anaesthesia so you will be awake during the entire surgery (although somewhat sedated).

The procedure can either be done sitting up in a surgical chair or lying down. Typical surgeries last between 4 and 7 hours, depending on the number of grafts being transplanted. Before the surgery starts, your doctor will design a hairline and discuss hair distributions throughout the scalp. Your doctor will also review the pertinent legal papers and consent forms. Only after these steps are completed should you be given a sedative.

Local anaesthesia should be administered with relatively little pain. Aside from small, mosquito-bite shots, there should be minimal discomfort.

Possible Complications

Make no mistake, hair transplantation is an invasive surgical procedure. You need to be extensively familiar with the risks and shortcomings of hair transplantation before considering it as a treatment option. Here are some of the most common risks:

- Anaesthesia reactions
General anaesthesia is rarely used for this procedure. Here are some risks and their percentage that a patient may experience:
 - allergic reactions (less than 1 percent)
 - irregular heartbeat (less than 1 percent)
 - heart attack within one month after the surgery (less than 0.001 percent)
 - sensitivity to epinephrine (less than 1 percent)
 - temporary light headedness (less than 1 percent)
- Wound healing
Wound healing is a variable occurrence. Wounds take time to heal and often to not heal perfectly. Here are some wound ir-

regularities that may apply to your donor and recipient areas:

- temporary effects of redness, pinkness or superficial crusting
- crusting of the skin around the suture edges
- stretched, widened scar, thickened or raised scar

- Pain

Pain is limited during hair transplant procedures due to the use of anaesthesia. Still, mild discomfort might arise.

Staples or sutures are used to close the patients' wounds. When the staples or sutures are removed, the pain related to the surgery goes away.

- Numbness

The cutting of fine nerve fibres in the scalp can cause numbness which will slowly disappear over several months.

Your doctor's experience in hair transplant surgery is of great importance in avoiding temporary or permanent sensory defects in the back of the head. The probability of such defects occurring is increased in those that have undergone more than one surgery.

- Swelling

Swelling after surgery is only experienced by a small number of patients. Placing ice packs or any cold compress over the frontal area may lessen the swelling.

If swelling should happen, it will appear 3-4 days after the surgery and will only last for 2 days at most. Ask your doctor about possible remedies for moderate swelling.

- Infection

Contracting an infection during hair transplantation is rare. Surgical teams generally administer antibiotics at the beginning of surgery to reduce the probability of patients acquiring infections. Still, the possibility exists.

Here are some symptoms of infections:

- swelling
- redness
- pus or tenderness
- chills or fever

***Contact your doctor promptly if any of these symptoms occur.

Hair Care Post-Op

In order to stay healthy and ensure maximum graft survival, it is important to take special precautions after your hair transplant surgery. Every

individual surgeon will have specific post-operative instructions. You must completely adhere to these guidelines in order to achieve the best result.

Recovering After Anaesthesia

The local anaesthesia used during hair transplant surgeries is similar to that used by dentists.

The effects of this anaesthesia will only last for a day. Although hair transplants are outpatient procedures, it is not advisable to drive during the remainder of the surgery day.

After 4-6 hours, mild discomfort will arise, but the greatest discomfort is felt during the first night after the surgery. This typically subsides over several days.

Keeping Your Head Crust-free

Do not be afraid to touch your grafts. The secret to good post operative care is keeping the recipient area clean. In order to do this, gentle contact must be made.

Crusts will persist if you have poor washing techniques. You can safely remove the crusting within the first two days after surgery if you follow these simple steps (from *Hair Loss for Dummies*):

- Never rub the transplanted area.
- Shampoo once or twice daily. Use a sponge filled with water and shampoo in a gentle rolling motion over the recipient area (NEVER back and forth as it may pull out the grafts). A back and forth motion is safe on the donor area.
- Don't rinse your hair with water directly from the shower. Use your hand as a barrier and place it between the shower head and your scalp. Let the water run off your hand and onto your transplanted areas. Pat the area dry with a clean towel.
- Do not let the grafts stay wet for too long because the area may swell. Once the scalp dries however, any raised bumps will disappear.

Hiding Your Head

It is normal to feel self-conscious after hair transplant surgery, and visible wounding can make it hard for many patients to face the public with

confidence. Going to work, seeing family and explaining the situation to significant others can be very difficult.

Luckily, many patients can undergo hair transplants little visible scarring. If hair is kept long before surgery, it can be combed down over the removed donor area. The recipient area has minimal scarring, so very few people will notice that any surgery occurred. Two weeks after surgery, a hair transplant becomes very difficult to detect.

Limiting Your Amount of Physical Activities

Discuss with your doctor if you are going to participate in any form of physical activities because the impact of exercise differs between people. A simple jog or exercise may be acceptable, but extreme sports can damage newly transplanted hair.

Hair Transplant Complications

Although surgical hair replacement conducted by a competent doctor is generally a very safe outpatient procedure, there are risks involved with any invasive therapy. This section will go into detail regarding possible problems that you might experience after hair restoration surgery.

Post operative brow and facial swelling

Swelling is normal after hair transplant surgery, but it can be problematic. Swelling happens on the 3rd or 4th day after the surgery and usually lasts for 2 days at most. Ask your doctor for techniques to deal with excessive swelling. If significant swelling lasts for more than 2 days, notify your medical professional.

Failure of transplanted hair to grow

Hair transplant surgery results cannot be guaranteed. Although it is rare, sometimes transplanted hair will not grow. This risk is diminished if the surgery was performed by a renowned and competent surgical team. Still, insufficient growth is a problem that affects approximately one percent of hair transplant patients.

There are 3 usual causes why hair transplants fail to grow:

The body's immune system attacks the follicles.

The H (human) factor: technical failures by the surgical team, sloppy sur-

gical methods.

The X (unknown) factor: no identifiable cause for the problem.

Hair loss

After hairs are transplanted, they usually shed within a few weeks. This is referred to as “shock-loss” and it is a completely normal phenomenon. Once these hairs shed, transplanted follicles will permanently replace them with stronger hairs.

In order to mitigate the effects of “shock-loss” the use of Finasteride and Minoxidil after surgery is often advised.

Finasteride is also prescribed for a more important reason. Hair loss is a progressive condition. In order for hair transplant results to last as long possible, patients need to prevent as much future loss as possible.

Preventing “shock-loss” and future hair loss are extremely important goals after hair transplant surgery. They are crucial for the patient’s long-term aesthetic satisfaction. TRX2 supplementation can assist in reducing shock loss to a minimum (more info on www.trx2.com).

Sun damage

It is important to keep your scalp protected from the sun. Powerful UV rays emitted by the sun can affect the healing process of newly transplanted hair. It is also possible that sun-damaged skin might inhibit or slow down new hair growth.

Wearing a hat or a scarf around your head is the best way to protect your newly transplanted hairs from harmful rays. Also, you can (and should) apply sunscreen to your scalp once the crusts have fallen off.

Doing it again

Consider these questions before going for a second surgery (from Hair Loss for Dummies):

- Have your goals been achieved?
- Did the transplants cover the balding area?
- Is the hair full enough?
- How did the wound heal?

After an interval of at least 8 months has transpired, decide whether or not a second transplant will improve your situation. Once 80-90% of grafts have grown, it is possible to assess the situation and plan future surgeries accordingly.

Future Treatment For Hair Loss

Treatments for hair loss are currently limited. Nevertheless, science is working towards improving the solutions available for those suffering from Androgenetic Alopecia.



HAIR LIFESTYLE

Feeding Your Hair Right

Every nutrient and vitamin that we digest ultimately circulates throughout our entire body; including our hair. Yet whenever we talk about hair care, we usually only refer to shampoos, conditioners, brushing and styling. Regrettably, diet and lifestyle changes are almost always neglected.

Even though the gains may not be significant to every individual, it is undeniable that the food we eat can affect our hair. After all, the nutrients we derive from the foods we digest form the foundation of our skin, hair and nails.

Essential Protein and Calorie Intake

Having enough protein is essential for hair growth. The amino acids created from the proteins we consume can have very positive effects on the look and feel of our hair.

Some foods rich in amino acids are:

- lean meats
- nuts
- grains
- soy
- fish
- eggs
- dairy products

The Good Fat

Omega 3 and Omega 6 oils are essential fatty acids vital for healthy bodily functions. These “good fats” can only be given to the body through proper diet because they are not created by the body itself.

Foods rich with essential fatty acids are:

- fish (tuna, salmon, sardines)
- plant (flaxseed, soybeans, pumpkin seeds)
- nut oils

A deficiency in essential fatty acids may lead to hair dryness, change of hair colour, redness of the scalp and flaking. While fatty acids can have positive effects on hair growth, don't eat too much. Eating any fat in excess can contribute to hair loss and have other negative effects on your

health.

Your Daily Vitamins

Vitamins are necessary to healthy living. Our body receives vitamins from the foods and supplements we digest. There are several vitamins that specifically help hair growth:

1. *Vitamin A*

Vitamin A is beneficial to hair growth because it acts as a lubricant that keeps the root of the hair follicle greased and nourished.

Some foods rich in Vitamin A are:

- red, yellow and orange vegetables (e.g. carrots, squash)
- green leafy vegetables
- liver
- eggs
- cheese
- milk
- peaches

Vitamin A, although an important vitamin for over-all good health, should be taken in moderation. Unlike Vitamin B, the body does not break down Vitamin A very easily. Limit Vitamin A intake to normal amounts.

2. *Vitamin B complex*

Vitamin B is water-soluble, not fat-soluble, so the body breaks it down rather easily. Other Vitamins in Vitamin B complex are:

- Para-Aminobenzoic Acid - prevents hair from graying.
- Niacin (Vitamin B-3) - promotes blood circulation to the scalp.
- Panthenol (Vitamin B-5) - most hair loss supplements contain Panthenol as it may stop hair loss and promote hair growth.
- Biotin (Vitamin H or B-7) - essential for preventing hair loss; required for cell growth, metabolism of amino acids and production of fatty acids. A deficiency in Biotin has been related to hair loss.
- Inositol - controls hair loss and keeps healthy cellular level for hair follicles.
- Vitamins B-6 and B-12 - both play a role in growing healthy hair.

Vitamin B is known to be the best vitamin for hair growth.

Some foods that are rich in Vitamin B:

- whole grains
- fresh fruit
- brewer's yeast
- eggs
- fish
- turkey
- chicken
- meat
- milk
- cereals

3. *Vitamin C*

Most popular for its ability to prevent coughs and colds, Vitamin C is also a helpful vitamin for hair growth. It is essential for maintaining healthy collagen in the body, including the collagen that surrounds the hair follicles.

Vitamin C is an anti-oxidant that protects cells by reducing damage caused by free radicals.

Foods rich in Vitamin C are:

- citrus fruits (e.g. kiwi, oranges, strawberries, pineapples)
- tomatoes
- green and red peppers

4. *Vitamin E*

Vitamin E is a well-known antioxidant that helps promote good skin and hair. It also enhances scalp circulation. Vitamin-E is the collective name for eight fat-soluble vitamins.

Foods rich in Vitamin E:

- nuts
- asparagus
- corn
- dried beans
- whole grains

Live Active for a Healthier Head of Hair

Diet and exercise not only prevent hair loss and breakage, they also restore energy and self-esteem (two peripheral problems that arise in tandem with hair loss).

How Exercise Affects Hair Growth and Hair Loss

There are countless hair loss treatments on the market today. From pills, capsules, shampoos, serums, hair transplants and laser therapy, if you name it it's out there. Many of these are available with or without prescriptions, over-the-counter and online. Although each product operates with a distinctly different method of action, they all promise the same thing: efficacy.

Nevertheless, some of these treatments are more effective to others. Before investing our money into therapies that have not been proven to work, we can make important lifestyle changes to keep our bodies (and therefore our hair) as healthy as possible.

While waiting for the positive results from supplements or treatments to appear, make sure that you free yourself from excessive stressors. Use physical activities, new hobbies and other types of emotional releases as stress-outlets. It is always good to find a healthy way to release stress from our bodies, so make sure to exercise regularly and get enough rest. These steps considerably reduce stress, relax muscles and promote healthy hair growth.

Make Exercise an Additional Hair Loss Treatment

We now know how important having a proper diet is to our health and our hair. But having a good, healthy diet does not only mean eating healthy. It also means living a healthy lifestyle. And that means exercise.

We need to keep our muscles active in order to dispel toxins, burn calories and sweat out excess fats. Having a healthy lifestyle, with moderate alcohol intake and little to no smoking, reduces stress and enhances hair growth. Don't ever discount the value of taking a brisk walk for 30 minutes around your neighbourhood.

Having a healthy lifestyle also means avoiding things that you know are detrimental to your health. For instance, cigarettes, binge-drinking, crash

dieting, etc. Eliminating these noxious activities is one of the most important steps in preparing your body to derive the maximum benefit from vitamins, pills, supplements and pharmaceutical therapies.

You may think these steps are too easy or too convenient to actually be effective, but what have you got to lose?

Living healthily is an important adjunct to any hair loss treatment regimen. All of the potential gains from vitamins, pills, lotions and shampoos are nullified when our body is unhealthy. Reducing alcohol intake and eliminating bad habits like smoking and tobacco use can reduce stress and keep hair strong. Exercise energizes the cells in our body, including the ones that directly contribute to healthy hair growth and rejuvenation.

If for no other reason, adopt a healthy standard of living to improve the look and feel of your hair. If you are serious about improving the condition of your hair loss (which is evident by virtue of the fact that you are taking the time to read this e-book), get serious about diet and exercise. Putting a healthy regimen into action might take several months, but the positive results are well-worth the wait, time and effort.



**COMPANIES
RESEARCHING NEW
TREATMENTS**

The main contenders in the race to bring more effective hair loss treatments to the masses are Histogen, Follica, Trichoscience, Aderans. Although the exact mechanisms behind each one of these treatments are proprietary and quite complex, we have decided to provide brief overviews of the research conducted to date.

Histogen is currently conducting Phase I/II clinical studies for its injectable Hair Stimulating Complex overseas. The Wnt Proteins contained in HSC have been proven to elicit new hair growth in individuals with Androgenetic Alopecia. Although Histogen is currently facing a lawsuit from one of its primary competitors, SkinMedica, the company plans to carry out further studies in Singapore during 2011. The earliest date for commercialization is 2013.

Follica gained significant media attention in May of 2007 when its lead researcher, George Cotsarelis, published a paper that proved wound healing could induce to follicular neogenesis in adult mammals (a feat presumed to be impossible). In 2008 the company stated that a small proof of concept study was underway, but no results were released. Follica has since been silent, but their recent appearance at the 2010 Bio-Windhover Partnering Conference seems to indicate that they are moving toward clinical trials.

TrichoScience gained notoriety in 2009 when announced plans to begin a Phase I clinical trial in Europe starting late 2010. The company revealed that they had been conducting research since 2000, keeping quiet until they were more confident in their technology. The TrichoScience technique involves multiplying dermal sheath cup cells in culture and injecting them into recipient areas affected by pattern hair loss. TrichoScience has thus far given no date for commercialization, however they have several significant investors including Canadian-based Berkley Resources.

Aderans is currently conducting a Phase II clinical study in several major metropolitan areas across the United States. In February of 2010 the company announced that they would increase the breadth and scope of this phase by adding several new treatment centers and enlisting dozens of extra trialists. The Aderans approach is quite complex, multiplying several different types of cells in culture and introducing them into the skin with extra-cellular matrix bioscaffolds. In internal messages to shareholders, Aderans has estimated a 2014 release date.

Oxford BioLabs, the company behind TRX2, is pursuing a platform tech-

nology distinct from any other research approach to date. Their science is based on the recent discovery that potassium ion channels exist within human hair follicles. By targeting these small pore-forming structures, TRX2 products aim to restore full vitality and function of miniaturized hair follicles. The company's team is made up of world-class scientists and innovators.

For more information on each of these companies, check out their websites:

www.histogeninc.com

www.follicabio.com

www.trichoscience.com

www.aderansresearch.com

www.oxbiolabs.com; www.trx2.com



**SUMMARY - WHAT
SHOULD I DO NOW?**

After reading all this information you may ask yourself what to do next. As outlined in this ebook you have plenty of options to go ahead with, all of which have their advantages and disadvantages. In the end it will come down to your individual circumstances and preferences.

If you decide to go ahead with any prescription medicine you certainly consult your doctor to avoid any long-term health risks. In any case it is always a good idea to do your own research in order to understand the pro and cons of each treatment. Never get fooled into anything you do not understand and feel positive about (do critical questioning even what your doctor may prescribe).

At TRX2 we have a wealth of experience with available products and treatment options. Please feel free to drop us a line on contact@trx2.com - our Scientific Support team (comprised out of PhD level researchers) will be glad to consult you in an objective manner whatever question you may have. Our company has spent the last seven years investigating a new therapeutic platform that utilizes the latest breakthroughs in potassium-ion channel research. We are currently focused on formulating an innovative portfolio of hair loss solutions related to our core technology. Safety, efficacy and affordability (ordered in terms of importance) are our primary concerns.

Science behind TRX2

The following section will outline briefly the approach our company is taking and tell you a bit about our product. Although TRX2® may not be a suitable treatment option for some patients (please feel free to contact us if not sure) we have shown that it can significantly improve the appearance for the majority of customers after a prolonged period of use. Here some science:

The recent discovery that potassium ion channels exist within the dermal papilla cells of human hair follicles provided a novel therapeutic target for researchers. Potassium ion channels have been implicated in a vast array of diseases ranging from Hepatitis C to Diabetes. These small pore-forming protein structures control the transport of potassium ions across the hair follicle's cell membranes and are essential for maintaining the follicle's full biological activity and function.

TRX2® scientists have demonstrated that as people experience hair loss the function of potassium channels within hair follicles diminishes. The effect is impaired membrane potential and interrupted ion transportation

across the hair follicle's cellular membranes – resulting in shrinking follicles and thinning hair.

Based on this research, TRX2® devised an elegant solution for promoting hair growth on a molecular level: **The stimulation of potassium ion channels within hair follicles.**

TRX2® Molecular Hair Growth Supplement consists of natural substances that our body normally manufactures at sufficient levels in healthy hair, but at insufficient quantities as we experience hair loss. TRX2® Molecular Hair Growth Supplement is a patent pending composition of normal metabolites that has been shown in laboratory experiments to reduce hair loss and reactivate the growth of hair follicles by:

1. Maintaining the membrane potential of hair follicles
2. Stimulating the de novo synthesis of potassium channels
3. Restoring potassium channel activity & functionality
4. Hyperpolarizing hair follicles

TRX2® is a natural food supplement with minimal side-effects. Improvement in hair thickness, regrowth and hair texture can be dramatic. Studies have decisively demonstrated that TRX2® Molecular Hair Growth Supplement re-grows miniaturized hair follicles, postpones hair loss and strengthens hair growth in the majority of patients that use it for 6 months or longer.

The breakthrough technology has had extraordinary success in both pre-clinical and early human testing and is scientifically proven to promote hair growth in 86% of men and women.

Clinical Study Results

We are proud to present the results of our long-term 18 month clinical study. 59 participants (47 men and 12 women) entered the study and completed 18 months of therapy. The randomized, double-blind, placebo-controlled study was focused on evaluation of efficacy and safety of TRX2®. The data show statistical significance at four major efficacy parameters:

1. Hair count (Mean number of hair in an area of 2×2 cm): +35.1% (after 9 months) and +49.2% (after 18 months)
2. Hair Thickness (Mean weight of hair - bundle of 30 strands): +22.5% (after 9 months) and +38.7% (after 18 months)
3. Terminal hair change (% change from vellus to non-vellus): +23.2% (after 9 months) and +36.4% (after 18 months)
4. Self-evaluation of satisfaction (score between 0-10 cm with 10 being

the most satisfied): 7.8 ± 2.0 cm (after 9 month) and 8.6 ± 1.6 cm (after 18 months)



Individual results varied depending on the participant's type of hair loss and individual metabolism. Within the active treatment group 87% of participants recorded cessation of hair loss and a significant increase in the number of hair/hair thickness after 9 month of treatment. Those results are extremely encouraging for men and women suffering from hair loss. The efficacy of TRX2 combined with its safety and excellent tolerability may make this product a viable and attractive alternative to common treatments such as finasteride and minoxidil.

To read the the full research article online visit <http://www.trx2.com/store/clinical-study-results/>

Questions?

Many general questions about hair loss and most questions about our product can be quickly answered via our new Knowledgebase or FAQ section.

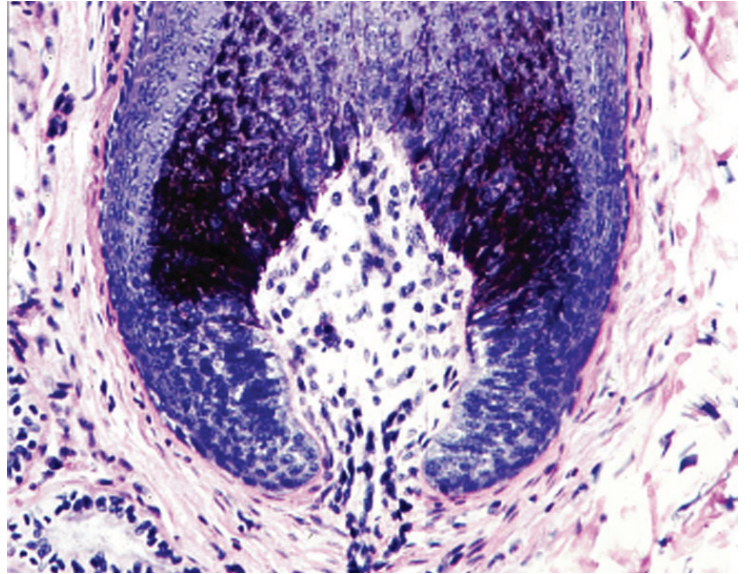
Our Knowledgebase already contains over 100 entries and will be built up further during the next months. Click here for access:

<http://support.trx2.com/categories/20004457-trx2tm-knowledge-base>

Would you like to speak with one of our Support Team? Please drop us a line on contact@trx2.com

We very much welcome any questions you may have. Feel free to simply drop us a line and tell us about your circumstances and how you currently deal with hair loss. We are here to help and improve your situation.

Your Oxford BioLabs Team



For more information
or to order

www.trx2.com

Money Back Guarantee!



TRX2[®] Promotes Molecular Hair Growth*

At Oxford, United Kingdom, a prize-winning team of scientists has been conducting pre-clinical studies on hair loss. By combining powerful metabolic stimulants (Potassium, BCAA, Nicotinamide) with a natural energy-generating substance (L-carnitine), the researchers discovered they could promote hair growth on a molecular level¹.

The result is TRX2[®], a patent pending molecular hair growth supplement.

During controlled studies, TRX2[®] users have experienced:

- The Cessation of Hair Loss***
- The Re-growth of Hair Follicles***
- Stronger & Thicker Hair Shafts***
- Visible Hair Nourishment***

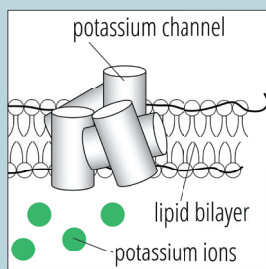
¹ Read more about this scientific team's discoveries and related scientific articles at www.trx2.com

*These statements have not been evaluated by the medicines regulatory agencies. This product is not intended to diagnose, treat, cure or prevent any disease. This product is a patent-pending food supplement containing nutrients to help sustain healthy growth of hair. THIS PRODUCT IS NOT A DRUG OR MEDICINE.

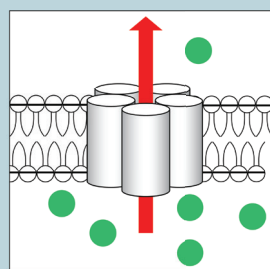
TRX2® promotes healthy hair follicle function, reduces hair loss and promotes hair growth on a molecular level.*



Healthy Hair Needs Functional Potassium Channels*



Affected by hair loss



Healthy

TRX2® Molecular Hair Growth Supplement acts on potassium channels, small pore-forming protein structures that control the transport of potassium ions across the hair follicle's cell membrane. TRX2 scientists have demonstrated that as people experience hair loss the function of potassium channels within hair follicles diminishes. The effect is impaired membrane potential and interrupted ion transportation across the hair follicle's cellular membranes – resulting in shrinking follicles and thinning hair. TRX2® synthesizes the latest scientific knowledge on the molecular mechanisms behind hair loss into an elegant solution: the stimulation of potassium ion channels within hair follicles. Taking TRX2® everyday helps to facilitate the entry of fuel (amino acids, lipids and regulatory compounds) into the hair follicle and stimulates the production of new potassium channels resulting in the cessation of hair loss and the growth of hair.*

**VISIT www.trx2.com TODAY!
BE AMONG THE FIRST TO EXPERIENCE
YOUR SECOND GENERATION OF HAIR!
Money Back Guarantee**

FAQ

What are the most commonly reported benefits?

The most common benefits reported by those who regularly consume TRX2® Molecular Hair Growth Supplement capsules include: the cessation of hair loss, the promotion of hair growth (including the frontal region and temple area) and visibly stronger, thicker hair shafts.*

How long will it take to see results?

For some individuals, first results appear as early as 12 weeks. For others, results are not apparent until 8-12 months after the initiation of treatment. However, in the majority of patients, first visible results are expected after 5 months.*

Are there any side effects?

The ingredients in TRX2® Molecular Hair Growth Supplement capsules consist entirely of drug free compounds – all of which occur naturally or are synthesized as normal metabolites within the human body. Occasionally, consumers report transitory gastrointestinal effects, such as an upset stomach. Therefore we recommended taking TRX2® with food. In rare cases the occurrence of allergic reactions, such as skin flushes, have been reported. Should this happen, please consult with your healthcare professional. Pregnant women and nursing mothers should avoid consuming TRX2® due to the lack of long-term safety data.

How do the data of the scientific study look like?



Baseline

9 month

18 month

9 months (active treatment group)

1. Hair count (Mean number of hair in an area of 2x2 cm): +35.1%
2. Hair Thickness (Mean weight of hair – bundle of 30 strands): +22.5%
3. Terminal hair change (% change from vellus to non-vellus): +23.2%
4. Self-evaluation of satisfaction (score between 0-10 cm with 10 being the most satisfied): 7.8 ± 2.0 cm

To view the full study visit www.trx2.com/store/clinical-study-results

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