

## Research Progress in the Treatment of Alopecia

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### Abstract

Alopecia is a hair regeneration disorder caused by genetic factors, organ specific autoimmune disorders, stress, nutritional deficiencies, severe smoking, alcohol consumption, and other factors. According to the different causes of hair loss, the clinical treatment of hair loss is roughly divided into androgenic alopecia, alopecia areata and other kinds of alopecia. Commonly used treatments include minoxidil and finasteride, but all have certain side effects. Promising new approaches include stem cell therapy and platelet-rich plasma therapy. It is worth noting that hair loss can also affect the mental health of patients, causing severe social stress to patients. Therefore, we should pay special attention to the mental health of alopecia patients in treatment process.

### Keywords

Hair loss; Androgenic alopecia; Alopecia areata; Psychological problems; Treatment

### Introduction

In recent year, the situation of hair loss (alopecia) among people around the world is more and more serious (Phillips, Slomiany, & Allison, 2017). Alopecia is defined medically as abnormal hair loss caused by genetic, immune, stress, taking certain drugs, endocrine disorders, or a normal part of aging and etc., resulting in

hair thinning or bald spots (Alessandrini, Bruni, Piraccini, & Starace, 2021). Anyone can lose hair on their head, especially in men. Symptoms of hair loss may include gradual thinning on top of head, circular or patchy bald spots, sudden loosening of hair, full-body hair loss and patches of scaling that spread over the scalp. Therapeutic methods contain taking medicine and hair transplantation, but these methods have some problems which cannot be solved at present now (Vañó-Galván & Camacho, 2017).

There are several types of hair loss (Phillips et al., 2017). A. androgenic alopecia, it is caused by a hereditary condition that happens with aging (family history), which is the most common cause of hair loss. B. alopecia areata, it is caused by hormonal changes due to pregnancy, childbirth, menopause and thyroid problems. It is also related to immune system and causes patchy hair loss, scalp infections such as ringworm, and a hair-pulling disorder called trichotillomania. C. side-effect alopecia, this kind of hair loss is caused by medications and supplements. Hair loss can be a side effect of certain drugs, such as those used for cancer, arthritis, depression, heart problems, gout and high blood pressure. Then we have the cause of radiation therapy to the head. The hair may lose the ability to grow back as the same as before after having radiation therapy. D. A very stressful event could cause hair loss as

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well. Many people experience a general thinning of hair several months after a physical or emotional shock, but this type of hair loss is always temporary. E. cicatricial alopecia, which is developed when inflammation destroys hair follicles. When it is destroyed, a hair follicle cannot grow hair. Diverse conditions such as pulling hair for a long-term can cause this. Sexually transmitted infection is another cause. Left untreated, a sexually transmitted infection (STI) can lead to hair loss.

In this article, I will summarize the growth mechanism of hair, the treatment progress of different kinds of alopecia, and then analyze the advantages and disadvantages of different treatment methods. I will also put forward the relevant solutions for the corresponding disadvantages, as well as provide relevant reference for the treatment of alopecia.

## **Literature review**

### **The growth mechanism of hair**

#### ***Structure of the hair***

Hair is an appendage to the skin. The part of the hair located outside the skin is called the hair shaft, the part located within the skin is called the hair root, the bulging part of the hair root is called the hair bulb, contained in the hair follicle formed by epithelial cells and connective tissue, the concave part of the lower end of the hair bulb is called the hair papilla, contained in the hair follicle formed by epithelial cells and connective tissue, the concave part of the lower end of the hair bulb is called the hair papilla, containing connective tissue, nerve endings and capillaries, providing nutrition for the hair bulb, and hair follicle stem cells exist in the hair follicle carina. Hair is composed of concentric circles arranged keratinized epithelial cells, from the inside to the outside can be divided into medulla, cortex and hairy cortex, the hairy cortex is a thin and transparent layer of keratinocytes, overlapping each other, hair follicles are located in the dermis and subcutaneous tissue, composed of inner hair root sheath, outer hair root sheath and connective tissue sheath.

#### ***The growth cycle of the hair***

The cycle of hair growth is divided into three phases: the anagen phase, the degenerative phase

and the telogen phase (Park, Khan, & Rawnsley, 2018). The growth phase lasts about 3 years, the degenerative phase lasts about 3 weeks, and the telogen phase lasts about 3 months. During the growth phase, hair grows from the base of the hair follicle, the epithelium of the hair follicle proliferates and differentiates, extends to the dermis to form the hair matrix, inner root sheath, hair papilla and hair shaft, the fully developed hair follicle is in the growth phase of the hair cycle, after the growth phase stage, the hair enters the degenerative phase, the hair will stop growing, the hair follicle begins to atrophy, the base of the hair follicle in the telogen phase further atrophies, and the hair matrix in the hair follicle also disappears. Hair growth is a cyclical process, and changes in the hair growth cycle, such as shortening the anagen phase, premature regression of hair in the degenerative and telogen phases, etc., can lead to hair loss, which are also related to genetics, health status, hormone levels, drugs and other factors (Thom, 2016).

#### ***Signal regulation during the hair follicle growth cycle***

The formation and periodic changes of hair follicles are regulated by multiple cell signaling pathways, which constitute a complex network structure with each other, and synergy and antagonism control the growth and development of hair follicles, maintain the balance of hair follicle growth and development factors, and transmit information to the hair papilla and hair follicle epithelial tissue (Rishikaysh et al., 2014). Hair follicle morphogenesis in the embryonic period and the formation of hair follicle cycle after birth both receive the regulation of cell signals. Therefore, exploring the signaling pathways and key cytokines that control the hair follicle cycle is undoubtedly of great significance for solving the problem of hair loss. The Wnt/ $\beta$ -catenin pathway is thought to be the main pathway involved in hair regrowth and is the primary signal for follicle development and follicle regeneration (Choi, 2020). Androgen receptors (ARs) interact in an androgen-dependent manner with  $\beta$ -catenin, which significantly reduces the cytoplasmic/total  $\beta$ -catenin ratio in papillaeal cells, and their binding inhibits Wnt signaling pathway (Leirós, Attorresi, & Balañá, 2012). In addition, Wnt

signaling pathway not only plays an important role in the growth form of hair follicles, but also regulates the growth cycle of hair, Wnt/ $\beta$ -catenin signal expression is overactive, can induce hair growth in the growth cycle, which is conducive to hair growth. In addition, many growth factors play an important role in regulating the morphology, differentiation, and regeneration of hair follicles. These growth factors include hepatocyte growth factor, insulin-like growth factor, platelet-derived growth factor, vascular endothelial growth factor, and basic fibroblast growth factor (Gentile & Garcovich, 2019).

### **Androgenic alopecia (AGA)**

#### ***Information about AGA***

AGA is also called as Seborrheic alopecia, or alopecia areata. It is a common hair loss disorder that occurs during and after puberty. The disease is characterized by thinning of hair follicles and gradual loss of hair, with no scarring in the hair loss area, and is the most common type of male alopecia, but can also occur in women (Motofei et al., 2020). The prevalence of AGA varies significantly by race, with a higher incidence in Caucasians and a lower incidence in blacks and yellow Asians. In China, the prevalence of AGA among males is about 21.3%, while the prevalence of females is about 6% (T. L. Wang et al., 2010). The prevalence of AGA will keep increasing with ages. AGA can be classified as Male pattern and female pattern baldness, and a more professional and instructive classification of the onset state is BASP (Basic and Specific Classification). BASP is classified according to hairline shape, length and top hair density, which can be divided into 4 basic types and 2 special types (Gao et al., 2022). According to the shape of hairline, the basic forms of AGA can be classified as L, M, C and U. The two special classifications are F and V, which represent the density of hair in a particular area. Specially, F representing the forehead, according to the density of hair on the forehead, it is classified as mild, moderate or severe. and V representing the crown.

#### ***Mechanism of AGA***

There is a genetic predisposition to AGA. The investigation showed that 53.3%~63.9% of the patients with AGA had a family history of

inheritance, and the patrilineal inheritance was significantly higher than the maternal inheritance. Several susceptibility genes have been found to be associated with this disease, but no specific pathogenic gene has been found (Martinez-Jacobo, Villarreal-Villarreal, Ortiz-López, Ocampo-Candiani, & Rojas-Martínez, 2018). Androgen also plays an important role in the formation of this disease (Fu et al., 2021). DHT, which is converted from the main source of hormones in men, can make hair follicles miniaturized, the hair gradually becomes thinner during the growth period, the hair growth cycle is shortened, and the originally thick black hair gradually becomes thinner and shallower. Finally, hair will disappear from the skin due to hair follicle atrophy. Therefore, androgen leads to AGA, but the pathogenic role of androgen in female hair loss has not been fully clarified. In addition, poor mental state, eating habits and sleep schedule, and if there is an inflammation around the hair follicle, AGA could be induced or has a more serious symptom.

#### ***Treatment of AGA***

By contrast, to treat the most common alopecia that bothers a lot of people, there are various treatment options which is available for AGA. For examples, for men, the combination of oral finasteride and topical minoxidil has been established that it has effect to treat AGA. To prove this, scientists did the experiment to compare the efficiency, as well as the safety of topical solution of 0.25% finasteride admixed with 3% minoxidil and 3% minoxidil solution among men who had AGA (Gupta, Talukder, & Williams, 2022). The experiment used forty men aged between 18 and 60 years old. The result showed that the combine solution of finasteride and minoxidil can improve hair density, hair diameter and global photographic assessment much better than the solution which only had minoxidil. The improvements happened in more than 90% of the patients. Also, this combined solution caused very little effect on plasma dihydrotestosterone level, which had only about 5% reduction. In both groups, the systemic adverse events seemed were not present. As the result, the scientists had the conclusion about that for AGA, it was best to use the treatment with

topical solution of 0.25% finasteride admixed with 3% minoxidil, and this solution was well tolerated. For women with AGA Ludwig stage, I and II, it is said that minoxidil 5% is the best treatment, but there are no large studies showing the efficacy of this solution, the solution has considerable adverse effects as well (Bolduc & Shapiro, 2000).

Another saying is treatment should be decided due to the severity of the patient's hair loss, so patients should be diagnosed first to have the treatment. Only the medical history and physical examination can confirm the diagnosis of AGA. To know the progression of the hair loss, it is useful to take a look at the trichogram (Peereboom-Wynia, Beek, Mulder, & Stolz, 1993). Mild to moderate AGA among men can be treated by using oral finasteride or topical minoxidil. About 66% of male patients with oral finasteride at the dosage of 1 mg/day had a clinical improvement in about 2 years. For both frontal and vertex hair thinning, this drug is effective. Because the interruption of medication will cause the hair loss return to the pretreatment status, the medical treatment with finasteride of minoxidil should not be stopped. For mild to moderate AGA among women, they can be treated with oral antiandrogens (cyproterone acetate, spironolactone) or topical minoxidil, these two types of solution results good in many cases. For men and women who have a severe AGA problem, they can consider about hair systems and surgery.

A new treatment for AGA is platelet-rich plasma (PRP) (Gupta et al., 2019). It is said that treatment with PRP promotes hair growth, cell survival and proliferation. The procedure involves extracting school-rich plasma from a sample of the patient's blood, concentrating it into platelets using a centrifuge technique, adding calcium chloride to stimulate the release of growth factors, and injecting the plasma into the scalp (Paichitrojjana & Paichitrojjana, 2022). In the scalp, growth factors stimulate angiogenesis, cell survival, and cell proliferation.

### **Alopecia areata (AA)**

#### ***Information of AA***

AA is a form of autoimmune hair loss, and it is the most common cause of inflammatory hair loss, affecting an estimated 4.5 million people in the United States alone (Pratt, King, Messenger, Christiano, & Sundberg, 2017). The prevalence of AA worldwide is only 0.1-0.2%, while the lifetime risk of AA is 2%. AA is uncommon in children under three years of age, but most of its victims are young, with most patients younger than 30 (about 66%) and a small number older than 40 (about 20%). AA has many clinical forms, though the representative one is 1 or more well-defined round or oval patches of hair loss on the scalp (Strazzulla et al., 2018b). In some subgroups, about 50% to 80% of the population will spontaneous regression and regrow the patch, there still has the possibility of forming other patches. This will result to a multiple areas of hair loss and lead to a larger lesion, or even worse, eventually involves the whole scalp, which is called alopecia totalis, this is one form of AA (Lee et al., 2020). Other patterns of AA include the acute diffuse type, in which there is sudden hair loss all over the scalp, or the ophiasis-pattern, in which hair is lost on the posterior and lateral aspects of the scalp. Every part of a human body can develop AA, examples are eyelashes, eyebrows, beard, and pubic area. This kind of alopecia is also called alopecia universalis, as it can progress to the point of global hair loss. A large proportion of people with AA have changes in nails as well, which is about 7% to 66%.

#### ***Mechanism of AA***

The exact cause of AA is still unknown now. It is found that AA may be related to genetic, for the reason that about 10% to 25% patient of AA has a positive family history, and there is an interesting point, monozygotes who both have AA has the percentage of 42%, which is much higher than the percentage of dizygotes, which is approximately 10%. AA is considered to be an autoimmune disease (Simakou, Butcher, Reid, & Henriquez, 2019). When the body's immune system gets too strong, T cells think things that are already in the body are coming in from the outside, so they will attack those things. When T cells think the hair follicle is outside, they attack the hair follicle cells, causing the hair follicle to die, then AA occurs. A ground-breaking study in

2010 strengthen the autoimmune hypothesis for AA. By comparing 1054 patient cases and 3278 controls, 139 single-nucleotide polymorphisms related to the development of AA is found (Petukhova et al., 2010). Further research revealed that eight genes are involved in hair loss. Disorders in these eight genes cause T cells to attack hair follicles. Some of the “susceptibility loci” such as type 1 diabetes and rheumatoid arthritis are thought to play a role in other autoimmune processes.

### *Treatment of AA*

There are many available therapy options for AA, which contain topical, systemic, and injectable modalities (Strazzulla et al., 2018a). However, variable clinical outcomes were shown by these different treatment methods, and now we have no available treatments that include and sustain remission. A new treatment method is underway, which is using small molecules blocking specific pathways to treat. It is demonstrated that Janus Kinase (JAK) inhibitors can effectively reverse hair loss in patients with moderate to severe AA by repurposing Food and Drug Administration-approved small molecule JAK inhibitors as treatment for AA (E. H. C. Wang, Sallee, Tejada, & Christiano, 2018). Various JAK and signal transducer and activator of transcription (STAT) proteins form signaling pathways, which transmit extracellular cytokine signals to the nucleus and induce DNA transcriptions. Some researches published that tofacitinib, ruxolitinib, and baricitinib are drugs that has good effects on alopecia areata (Phan & Sebaratnam, 2019). However, unlike these oral formulations, efficiency atypical forms of tofacitinib and ruxolitinib reported in the researches is still unsatisfactory and requires some improvement. About some treatments that we can use today to treat AA, we have intralesional corticosteroids which remains the best choice. Another highly effective drug is systemic steroids. However, they are less desirable to both patients and physicians because of the side effect. Other treatments which are available are anthralin, minoxidil, topical immunotherapy and systemic immunosuppressants. Actually, a successful treatment of alopecia areata should pay attention to the psychological impact because the

morbidity of AA is mostly psychological (Marahatta, Agrawal, & Adhikari, 2020). Otherwise, platelet-rich plasma, fecal transplants, and cytokine-targeted therapy with ustekinumab and dupilumab have also been shown to regrow hair in patients with AA in individual case reports or small studies (Pourang & Mesinkovska, 2020).

Stem cells have been considered as new treatment for AA (Salhab, Khayat, & Alaaeddine, 2022). Cell origin, donor origin, product production, and recipient disease status are important factors related to the safety and efficacy of stem cell therapy (Gentile & Garcovich, 2019). At present, several studies have found that mesenchymal stem cells and stem cell derivatives have the effect of treating AA and promoting hair growth (Deng et al., 2021). Stem cells can interfere with the effect of androgens on hair follicles, regulate the hair follicle cycle, such as prolong the growth phase, delay the degenerative phase, promote the transformation of the telogen phase to the growth phase, etc. to promote hair growth, stem cells can also secrete a variety of cytokines and growth factors, such as insulin-like growth factor binding protein precursors, platelet-derived growth factors, alkaline fibroblast growth factor, keratinocytes growth factor, hepatocyte growth factor, vascular endothelial growth factor, etc., regulate the hair follicle cycle, promote vascular regeneration, anti-apoptosis, etc.

How to improve the ability of mesenchymal stem cells to promote hair follicle regeneration is also a matter of great concern. In the body, stem cells normally colonize tissues, so adult stem cells are often exposed to hypoxic environments. Studies have shown that in vitro culture of mesenchymal stem cells given low oxygen and then restore partial pressure of oxygen can promote the proliferation ability of mesenchymal stem cells and improve the stemness of cells, while more stem-dry mesenchymal stem cells can produce more growth factors, thereby better promoting hair growth (Kusuma, Peijnenburg, Patel, & Gerecht, 2014). Genetic modification of stem cells can alter the biological activity of cells and enhance specific functions (Gonçalves & Paiva,

2017). This approach is expected to be a new way to accurately solve specific clinical problems.

### **Other kinds of alopecia**

#### ***Side-effect alopecia***

Alopecia can be caused by medicines and supplements as well. The most common four are contraceptive, ibuprofen, beta-blocker and isotretinoin. Taking short acting contraceptives for a long time will maintain the estrogen in the body at a high level. If the drug is stopped suddenly, it will cause the imbalance of hormone level, which may induce or aggravate hair loss. Fortunately, Professor Shaster of the University of Melbourne, said contraceptives only cause hair loss in some people, and it is usually not serious. Therefore, after a period of conditioning, human body can return to normal. According to a New Zealand government report, long-term use of ibuprofen, an antipyretic analgesic, can cause alopecia. Another study from the United States found that 15 out of 21 patients taking ibuprofen reported thinning or hair loss. Professor Shaster warned that though ibuprofen is not known to cause hair loss, there is still a need for caution. Commonly used antihypertensive and antiarrhythmic drugs, metoprolol and propranolol have been shown to cause hair loss but are reversible. In addition, ACEI antihypertensive drugs such as captopril may also be associated with hair loss, but further research is needed to confirm. Isotretinoin acid capsules are commonly used to treat acne and are made of retinoids, which are derivatives of vitamin A. Excessive use of it can damage the hair follicles of the scalp, causing hair loss, curly hair and hair quality damage. Therefore, we should pay attention to the dosage, to prevent the ugly face disappear, but the hair was hurt.

In addition, a number of studies have confirmed that anticoagulants such as heparin, warfarin, and many antidepressants can cause hair loss. Medications for psoriasis, epilepsy and migraines can cause hair loss in about 3 to 10 percent of people. Professor Shaster pointed out that many drugs are inevitable side effects, in order to achieve the treatment effect, patients should promptly communicate with their doctors,

weigh the pros and cons before stopping or changing medications.

#### ***Primary cicatricial alopecia (PCA)***

PCA can be classified as four groups in the classification of the North American Hair Research Society (Kanti, Röwert-Huber, Vogt, & Blume-Peytavi, 2018). According to their prominent inflammatory infiltrate, there are PCAs with lymphocytic, neutrophilic, mixed or nonspecific cell inflammation pattern. The cause of PCA is often difficult to determine because it progresses slowly. Sometimes PCA can be difficult to diagnose, such as in the subacute, early or advanced stages of disease (Uchiyama, 2022). Anti-inflammatory treatment with topical corticosteroids class III to IV and / or with intracutaneous intralesional triamcinolone acetonide injections can be considered in most treatment of the PCA. The choice of systemic therapy depends on the type of predominant inflammatory infiltrate and includes antimicrobial, antibiotic or immunomodulating/immunosuppressive agents. Psychological support and camouflage techniques should be offered to the patients. There are very few patients with PCA, so there is no clear evidence of the effectiveness of any treatment for PCA.

### **Discussion**

For a long time, clinical treatment and research on alopecia have focused on the disease itself. In recent years, researchers have seen that more and more alopecia patients are accompanied by different degrees of psychological problems (Trüeb, 2013). Below, we will discuss the common psychological hair loss diseases and mental stress caused by hair loss in clinical practice, as well as clinical management strategies.

#### **Trichotillomania**

##### ***Clinical manifestations of trichotillomania***

Trichotillomania is a traumatic hair loss disorder caused by artificial traction, often caused by repeated pulling, twisting, or rubbing of the hair themselves (Grant & Chamberlain, 2016). The course of this disease is chronic and the process of occurrence is often hidden. In addition to hair pulling, actions such as twisting hair, curling hair

with fingers, and combing hair with a comb can also occur. Due to prolonged physical tension, the hair shaft can break and detach from the hair follicle duct. Due to the fact that patients often use their right hand to remove hair, the most common affected area is the top of the head, followed by the temporal, occipital, and frontal regions. The clinical manifestation is irregular shaped hair loss patches, which can present as complete or incomplete hair loss. The hair loss spots with complete hair loss have clear boundaries and strange shapes. Incomplete hair loss is more common, manifested as poorly defined hair loss patches with varying lengths of hair, some of which are convoluted and convoluted. Traumatic epidermal detachment and punctate bleeding can be seen on the scalp in the hair loss area.

#### ***Pathogenesis of trichotillomania***

At present, the etiology and pathogenesis of trichotillomania are not clear, and its classification is also controversial. Trichotillomania, along with obsessive-compulsive disorder, scratch disorder, and body deformation disorder, is classified as a psycho behavioural disorder. Research has shown that repetitive movements occur due to the disorder of nerve conduction channels involved in the generation and inhibition of exercise habits in patients located in the white matter of the brain (Dougherty et al., 2022). In addition, factors such as behavioural, neurobehavioral, sexual hormones, and various traumatic stress factors may be involved in inducing trichotillomania (Bohn, Thomsen, & Nissen, 2022).

#### ***Treatment of trichotillomania***

The depilatory behaviour of preschool children is mostly short-term and does not require special treatment. For pre-adolescent and adult patients, psychological treatment is mainly provided, including family therapy, behavioural therapy, and supportive conversation therapy (Henkel, Jaquez, & Diaz, 2019). Physicians should understand the causes of mental stress in children, educate them on the occurrence and development of the disease, and advise patients not to touch their hair with their hands as much as possible. Encourage patients to increase entertainment,

outings, or other activities appropriately to distract their attention. For older children and adults, behavioural therapy can be used, such as reinforcement training, punishment, habit reversal training, etc.

#### **Chemotherapy-induced alopecia**

Alopecia after chemotherapy has always been a major challenge for both doctors and patients, which has a negative impact on the psychological and physical image of patients (Chon, Champion, Geddes, & Rashid, 2012). Some patients refuse certain effective chemotherapy drugs due to concerns about hair loss, resulting in greater physical and mental damage to the patient. Chemotherapy induced alopecia refers to the loss of some or all of the normal growth areas of hair, including hair, eyebrows, armpits, etc. Normal hair undergoes a lifelong cycle characterized by growth, regression, and rest, followed by shedding. Chemotherapy drugs can attack rapidly dividing cells in the body, including dividing hair stromal cells, preventing them from completing normal cycles (Dunnill, Al-Tameemi, Collett, Haslam, & Georgopoulos, 2018). Chemotherapy induced alopecia usually occurs 3 weeks after chemotherapy and gradually worsens in the subsequent cycles. Chemotherapy induced alopecia can usually be completely restored. But new hair may experience changes in texture, colour, thickness, and other factors. Some chemotherapy drugs can also cause permanent alopecia, which means that hair does not regenerate or does not regenerate completely after 6 months.

#### ***Factors influencing chemotherapy-induced alopecia***

The risk of alopecia varies greatly among different chemotherapy drugs. Among commonly used chemotherapy drugs, alkylating agents, anti-tumour antibiotics, microtubule drugs, and topoisomerase inhibitors are most likely to cause complete alopecia (Rossi et al., 2017). Different chemotherapy drugs may also have effects beyond alopecia, such as changes in colour, texture, etc. Different administration methods and doses of the same chemotherapy drug can also cause varying degrees of alopecia. Research has shown that low-dose, oral

administration has a lower risk of complete alopecia. The high dose intermittent intravenous chemotherapy regimen has a higher likelihood of causing complete alopecia. The following factors in patients themselves can also exacerbate the risk of alopecia caused by chemotherapy, such as older age, liver dysfunction, and poor drug metabolism.

#### ***Treatment of chemotherapy-induced alopecia***

Due to changes in appearance, patients may develop a sense of inferiority complex, unwilling to express themselves, and unwilling to go out and work. The decrease in social interaction further exacerbates the psychological distress of patients, which can lead to anxiety and depression, thereby affecting their quality of life. Medical personnel should encourage patients to go out for activities, encourage patients to express their emotions in multiple ways, attach importance to educating patients' families, encourage emotional communication between family members and patients to enhance the relationship between patients and their relatives, and enhance patients' social support (Wikramanayake, Haberland, Akhundlu, Laboy Nieves, & Miteva, 2023).

#### **Stressful event cause alopecia**

Stress is a kind of bad mental stimulation, which can cause certain changes to the hair follicle, for example, may lead to the loss or decline of nutritional function around the hair follicle (Thom, 2016). In this case, hair follicles can gradually shrink or go into a resting phase, causing the appearance of hair loss. For the alopecia caused by pressure, we must actively alleviate pressure. People can also follow the doctor's advice to take some drugs to improve alopecia.

#### **Conclusion**

Alopecia is one of the common clinical conditions in modern society. Most patients with hair loss have obvious inferiority complex and depression, and are accompanied by reduced self-esteem, which seriously affects the quality of life of patients. Currently recognized as a therapeutic drug, minoxidil finasteride has a therapeutic effect, but it is often accompanied by certain side effects and recurrence after stopping

the drug. All in all, alopecia doesn't happen by chance. Sometimes it's caused by other conditions or medications. So, when the symptoms of alopecia, people should go to the hospital for a physical examination, see whether the body has health problems, and treat on time. In addition, for medical workers, while paying attention to the patient's hair loss, it is also necessary to pay attention to the psychological and spiritual problems accompanying the patient and give comprehensive treatment.

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