CHAPTER 2

Medical, Hormonal, and Nutritional Causes

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Numbered citations in parentheses refer to the list in Chapter 10: References.

Why Am I Losing Hair? Causes Other Than Female Pattern Hair Loss

Female pattern hair loss is common, but **we do not assume that it explains every woman's thinning or shedding**. Hormonal changes, nutritional deficiencies, medications, autoimmune disorders, and hairstyling habits can also contribute to its development. The following sections describe these causes and what we look for during the evaluation.

Telogen Effluvium and What Causes It In Women

Telogen effluvium is a common cause of diffuse hair shedding in women. It results from a **larger-than-normal number of scalp hairs shifting from the growing (anagen) phase into the resting (telogen) phase, followed by shedding**. Hair loss typically presents itself as diffuse shedding, which means it is not patchy, and many patients first notice it when showering, brushing their hair, or seeing increased hair on clothing and bedding.

Telogen effluvium is usually triggered by **physical or emotional stress on the body**. Common causes include childbirth, major surgery, significant illness or high fevers, a severe infection, rapid weight loss, restrictive dieting, nutritional deficiencies, thyroid disease, significant emotional stress, and certain medications. The shedding often does not begin until approximately 2-3 months after the triggering event, which is why many patients do not immediately connect the hair loss with the original cause. In most cases, once the underlying trigger has resolved, the excessive shedding gradually improves, and the normal hair-growth cycle resumes. However, recovery may take several months. [9]

What Causes Postpartum Hair Loss and When Will It Stop?

Hair shedding after childbirth usually begins 2-4 months after delivery. During pregnancy, higher estrogen levels can keep more scalp hairs in the growth phase. After delivery, falling estrogen levels allow more hairs to enter the resting phase and shed several months later. You may notice more hair in the shower drain, on pillows, or on your brush, with temporary thinning around the front and temples. The shedding usually improves as the hair cycle returns to normal. [9] If density does not return as expected, we look for other causes, since postpartum shedding can also uncover underlying female pattern hair loss. [10]

Hair Thinning During Menopause

Hair thinning and hair loss during menopause and the years surrounding it are very commonly seen in our practice. Declining levels of estrogen and progesterone can alter the normal hair-growth cycle and may also unmask underlying female pattern hair loss at the same time. [11, 12]

Estrogen helps support the active growth phase of the hair cycle, called the anagen phase. As estrogen levels fall, the anagen phase may shorten, and **a greater percentage of scalp hairs may enter the resting and shedding phases of the hair cycle**. This change in the hormonal environment can also increase the relative influence of androgens on genetically susceptible hair follicles, even when a woman's testosterone level is within the normal laboratory range. [11, 12]

Menopause can make previously subtle female pattern hair loss more noticeable. We do not dismiss thinning as normal aging. We determine whether hormonal shedding, female pattern hair loss, another medical condition, or a combination is responsible before recommending treatment. [11, 12]

The typical appearance is gradual thinning over the central scalp and crown, often accompanied by progressive widening of the part line. The frontal hairline is usually preserved, although some women also develop thinning in the frontal region and temples. [6, 12] Hormonal changes can also trigger telogen effluvium, causing a more sudden increase in shedding. It is therefore not unusual for a woman to have both progressive thinning and increased shedding at the same time. [11, 13] We routinely examine the scalp with a **dermoscope, a noninvasive device that magnifies and illuminates the scalp and hair follicles**. Variation in hair-shaft diameter, together with follicular miniaturization, is a common finding in female pattern hair loss. [6, 14] We also look for iron deficiency, thyroid disease, nutritional deficiencies, significant weight loss, medication effects, and ongoing physical or emotional stress. Acne, increased facial or body hair, or rapidly progressive thinning may warrant a hormonal evaluation. In women who are still menstruating, we ask about irregular periods as well. [6, 12]

We also frequently use HairMetrix, an **AI-assisted digital hair-analysis system**, to quantify hair density and hair-shaft characteristics. This **provides an objective baseline and allows us to document whether treatment is actually stabilizing or improving the hair loss over time**.

Hormone replacement therapy should not be prescribed solely as a treatment for hair loss. The decision to use menopausal hormone therapy should be based on the woman's overall symptoms, medical history, and individual risks and benefits, in consultation with the appropriate physician. [15, 16] If another cause of hair loss is identified, treatment should also be directed at that condition.

Can Nutritional Deficiencies Cause Hair Loss?

We occasionally see female patients in our practice who present with hair loss due to prolonged or significant nutritional deficiencies. Such deficiencies can result in **both increased shedding and progressive thinning of scalp hair**. [17]

Iron Deficiency

Iron deficiency is one of the most important nutritional abnormalities to consider in women with hair loss. It may result from heavy menstrual bleeding, pregnancy, restrictive diets, gastrointestinal blood loss, or impaired iron absorption due to conditions such as malabsorption syndromes. [18, 19]

Iron stores can become depleted **even when a woman has a normal hemoglobin level and is not yet anemic**. For this reason, serum ferritin is often included in the laboratory evaluation of women with otherwise unexplained diffuse hair loss. Several studies have found lower ferritin levels in women with nonscarring hair loss,

although the relationship between ferritin levels and hair loss remains somewhat controversial and there is no universally accepted ferritin level required for optimal hair growth. [17, 20] We recommend iron supplements when testing confirms a deficiency. We also need to determine why the iron stores are low and treat the underlying cause. Hair loss alone is not a reason to take iron. [18, 19]

Vitamin D Deficiency

We see women who have both vitamin D deficiency and female pattern hair loss. **Studies have found lower vitamin D levels in several forms of nonscarring alopecia**, but this does not establish that deficiency caused the hair loss or that supplements will restore hair. We treat a confirmed deficiency while also evaluating other causes of thinning. [17, 21]

Zinc Deficiency

Zinc deficiency may also **cause generalized diffuse hair loss and increased shedding**. Other manifestations of significant zinc deficiency can include dermatitis, impaired wound healing, and alterations in taste. Zinc deficiency is more likely to occur in patients with severe dietary restriction, malabsorption disorders, chronic illness, or certain medications. Although some studies have reported lower serum zinc levels in patients with androgenetic alopecia, the evidence does not support routine zinc supplementation in patients whose zinc levels are normal. [17, 22]

Does Biotin Really Help Hair Loss?

Many women who come to our practice are already taking biotin because they have read online that it helps hair growth. True biotin deficiency is uncommon, and **there is little evidence that high-dose biotin improves hair growth in otherwise healthy women**. [23, 24, 25]

Biotin is vitamin B7, a cofactor in normal cellular metabolism. While severe deficiency can cause hair loss, true deficiency is quite rare. Severe deficiency is usually seen with malnutrition, malabsorption, prolonged inadequate nutrition, excessive raw egg-white intake, certain medications, or rare inherited metabolic disorders. The hair loss pattern is typically diffuse and may be accompanied by dermatitis around the mouth, nose, and eyes. More severe deficiency, particularly with inherited disorders of biotin metabolism, may also produce neurological symptoms such as numbness or tingling, weakness, problems with coordination, or seizures. [23, 24, 25]

We explain that treating a true biotin deficiency is different from taking extra biotin when nutrition is adequate. Studies of biotin alone for hair growth are few, and controlled evidence does not support routine supplementation for women without deficiency. Extra biotin **has not been shown to reverse the miniaturization of female pattern hair loss**. [24, 25]

Many commercial hair supplements contain doses hundreds of times higher than normal daily requirements, but **higher doses have not been shown to produce better hair growth in patients who are not deficient**. [24, 25] High-dose biotin can also interfere with certain laboratory tests, including some thyroid, reproductive hormone, and cardiac assays, potentially producing misleading results. Patients should therefore always tell their physician if they are taking biotin before undergoing blood testing. [26, 27]

Can Thyroid Disease Lead To Hair Loss?

We typically ask about thyroid disease and symptoms that might suggest a thyroid disorder. Both an underactive thyroid (hypothyroidism) and an overactive thyroid (hyperthyroidism) can cause diffuse hair shedding, because **thyroid hormones help regulate the normal hair-growth cycle**. [28, 29]

In hypothyroidism, the hair often becomes dry, coarse, brittle, and thinner. Some patients also notice their outer eyebrows begin to thin. Thyroid dysfunction can **push more hairs into a resting or shedding phase**, often called telogen effluvium, which helps explain why the loss is more diffuse and not patchy in appearance. Other systemic symptoms of reduced thyroid function include fatigue, unexplained weight gain, cold intolerance, changes in bowel habits like constipation, and skin changes including skin that is dry, rough, cool, and pale in appearance. [28, 29, 30]

In hyperthyroidism, the hair may become finer and softer with diffuse thinning and shedding. Other systemic symptoms include sweating, heat intolerance, unexplained weight loss, heart palpitations, and diarrhea. The skin also tends to feel warm, moist, and smooth with occasional flushing and increased perspiration. [28, 29, 30]

Blood tests are essential to establish a diagnosis of thyroid dysfunction. TSH, T4, and other studies are often used to determine the type and extent of a thyroid disorder. However, it is important to remember that **abnormal thyroid lab results do not necessarily explain all of a woman's hair loss**. Thyroid disease can coexist with other disorders that cause hair loss, including FPHL, iron deficiency, and telogen effluvium, among others. When thyroid dysfunction is corrected, hair shedding often improves. However, hair recovery is delayed because **it takes months for hair follicles to**

reenter the normal growth cycle. [28, 31] Autoimmune thyroid disease is also seen more frequently in patients with alopecia areata. [32]

Can Polycystic Ovary Syndrome (PCOS) Cause Hair Loss in Women?

Polycystic Ovary Syndrome (PCOS) is a relatively common hormonal and metabolic disorder affecting women during their reproductive years that can be associated with hair loss. Many women with PCOS have elevated levels of androgens. Androgens include testosterone and dihydrotestosterone (DHT) and are often called "male hormones," although women normally produce them as well, usually at much lower levels. When androgen activity is increased, **it can progressively shorten the growth phase of genetically susceptible scalp hair follicles**. Over time, these follicles produce hairs that become finer in caliber and shorter in length—a process known as hair follicle miniaturization. [12, 33, 34]

The typical pattern of hair loss is decreased density over the central and frontal scalp, often producing a progressively widening part line. Unlike the pattern commonly seen in men, the frontal hairline is usually preserved. In some women, thinning becomes most noticeable toward the front of the central scalp, producing the characteristic triangular or "Christmas tree" pattern when viewed from above. [4, 5]

Women with hair loss should be evaluated more carefully for PCOS **when there are other symptoms such as irregular or missed menstrual periods, increased facial or body hair, persistent acne, or difficulties becoming pregnant**. These findings may suggest that higher androgen levels are contributing to hair loss. If the hair loss develops very rapidly or is associated with a sudden increase in facial hair, deepening of the voice, or other unusual changes, further

evaluation is important because this is not typical of most women with PCOS and may indicate another hormonal problem involving the ovaries or adrenal glands. [33, 35]

Not every woman with PCOS develops hair loss, and not every woman with female pattern hair loss (FPHL) has PCOS. Blood testosterone levels alone do not explain scalp hair loss. Female pattern hair loss can occur even when circulating androgen levels are within the normal range, suggesting that genetic susceptibility and the sensitivity of individual hair follicles to androgens are also important. [12, 33, 34] Current international PCOS guidelines likewise recognize that female pattern hair loss by itself is only a relatively weak predictor of biochemical hyperandrogenism. [33]

What Medications Can Cause Hair Loss in Women?

Medication-related hair loss is commonly overlooked as a cause of hair loss. Many women take prescription medications, over-the-counter products, or supplements, **but the connection with shedding may not be obvious**. Hair loss may begin weeks or months after a medication is started, stopped, or changed in dose. We review these changes carefully during the appointment. [36]

The most common form of medication-related hair loss is telogen effluvium, which causes diffuse shedding. A medication change can cause more growing hairs to enter the resting phase earlier than usual. The shedding **typically becomes noticeable about 2-3 months later**. [36]

Many different medications have been associated with hair loss, although some are much more likely to cause it than others. Medications that have been reported in association with telogen effluvium include certain retinoids, blood thinners, beta blockers and

other blood pressure medications, antiseizure medications, antidepressants and other psychiatric medications, thyroid medications, hormonal medications, and some cholesterol-lowering medications. [36, 37] More recently, hair loss has also been reported with GLP-1 weight-loss medications, particularly semaglutide and tirzepatide, although rapid weight loss and reduced nutritional intake may also contribute to the shedding. [9, 17, 38, 39]

Examples of medications that may be associated with hair loss include the following. Taking a medication on this list does not necessarily mean it is causing your hair loss, and the likelihood varies considerably among individual drugs.

- **Oral acne and psoriasis medications**: Isotretinoin (often known as Accutane) and acitretin (Soriatane) can cause diffuse shedding. The dose and duration of treatment may influence the risk.
- **Blood thinners**: Warfarin (Coumadin or Jantoven), heparin, and related medications have been associated with increased shedding. Hair loss has also been reported with newer blood thinners, although the evidence that they directly cause telogen effluvium is less certain.
- **Antiseizure and mood-stabilizing medications**: Valproic acid and divalproex sodium (Depakote) are recognized examples. Hair loss has also been reported with lithium, although the evidence is less consistent. Lithium can affect thyroid function, which may itself contribute to hair loss.
- **Antidepressants**: Hair loss has occasionally been reported with selective serotonin reuptake inhibitors, including sertraline (Zoloft), fluoxetine (Prozac), and escitalopram (Lexapro). However, this is an uncommon potential adverse effect.

- **Certain blood pressure medications**: Examples reported in association with hair loss include metoprolol (Lopressor or Toprol-XL), propranolol (Inderal), captopril, and enalapril (Vasotec). These associations are uncommon and supported mainly by individual case reports.
- **Thyroid replacement medication**: Levothyroxine (Synthroid) can occasionally be associated with temporary hair loss during the first few months of treatment. It is also important to consider the underlying thyroid disorder and whether the thyroid hormone levels are being adequately controlled.
- **Certain oral antifungal medications**: Fluconazole (Diflucan) and voriconazole (Vfend) have been associated with shedding, particularly with prolonged treatment. This does not mean that a single dose of fluconazole carries the same risk as an extended course.
- **Weight-loss medications**: Hair loss has been reported with semaglutide (Wegovy) and tirzepatide (Zepbound). Weight reduction and changes in nutritional intake may contribute, so the shedding should not automatically be attributed to a direct effect of the medication on the hair follicle.
- **Chemotherapy**: Chemotherapy deserves separate discussion because many chemotherapy drugs cause anagen effluvium, which affects actively growing hairs and can produce substantial hair loss within days to weeks of treatment. This differs from the delayed shedding typically seen with medication-related telogen effluvium. [36]

We ask patients to bring a list of their prescription medications, over-the-counter products, and supplements, including when each was started, stopped, or changed in dose. Do not stop or adjust a prescribed medication without first speaking with the prescribing physician.