paragon CET • Sacramento, California

Effects of Hormones on Hair, Skin, and Nails

INTRODUCTION

The endocrine system is a network of glands and organs that produces and releases hormones throughout the body [1]. It is one of the body’s main communication systems, controlling and coordinating proper body functioning. Hormones are the chemical messengers of the endocrine system. They help maintain and control energy levels, reproduction, growth, development, metabolism, sexual function, and internal balance known as homeostasis [2]. Nerves send electrical messages and hormones send chemical messages to the body’s cells, tissues, and organs [3].

Hormones are produced and released by the eight predominant endocrine glands: the pituitary, pineal, thymus, thyroid, parathyroid, adrenal, pancreas, and gonads. These glands are not localized to one area, but rather are found throughout the body [4]. To understand this system is to understand the entire human body and its functions. Keeping this communication system in balance requires a vast amount of work. Many factors can affect the endocrine glands and the body’s hormonal balance. When the body reaches a state of imbalance, a variety of health problems can arise. Problems make their presence known internally, in the blood, heart, internal organs, and outside the body in the skin, hair, and nails.

THE ENDOCRINE SYSTEM

The pituitary gland, located in the brain, has been described as the most complex organ of the endocrine system [5]. It affects many body functions, including blood pressure, growth, contractions during childbirth, sex organ functions in both women and men, thyroid gland function, the conversion of food into energy (metabolism)” [5]. This gland also controls growth hormone, which is responsible for growth in children and development of bone and muscle. It also produces prolactin, which is responsible for breast milk production after childbirth [3].

The pineal gland, which is also located in the brain, is responsible for the production of melatonin, a hormone that influences daily physiologic cycles (e.g., the sleep-wake cycle) and affects reproductive development [4]. This gland plays a significant role in reproductive and sexual development and in skin color [5].

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Course Objective
The purpose of this course is to provide salon professionals with the knowledge necessary to provide the best services to their clients.

Learning Objectives
Upon completion of this course, you should be able to:

1. Describe the endocrine system and the role hormones play in health.
2. Discuss the role of hormones in skin, hair, and nail health throughout the lifespan.
3. Identify hormonal disorders that may impact the skin, hair and/or nails.

“Hormonal balance is vital to the body’s health and well-being.”
The thymus, in the upper chest area, assists the body in the production of a certain type of white blood cell (T cells) that is a major component of the immune system. These white blood cells help protect against infection [6]. By adolescence, this gland is already beginning to shrink.

The thyroid is located in the neck and is responsible for metabolism and for creating proteins [5]. This gland produces and releases hormones (thyroxine and triiodothyronine) dependent upon the presence of iodine. An imbalance of these hormones indicates a deficiency of iodine. Iodine deficiency can increase the potential for developing an enlargement of the thyroid gland, referred to as a goiter [7]. The parathyroid glands, which are attached to the thyroid, are responsible for secreting parathyroid hormone. Parathyroid hormone works to regulate blood calcium levels [7]. Regulation of this hormone is important to ensure that the nervous and muscular systems operate properly [5].

The adrenal glands are located on the kidneys. These glands are necessary for production of steroid or sex hormones, also known as androgens. The most well-known androgen is testosterone, but androgens are also necessary for the production of estrogen in women [7]. Men generally have greater quantities of testosterone than women. The adrenal gland is also responsible for production of epinephrine and norepinephrine, which cause the “fight or flight” response [5].

The pancreas is located along the back portion of the stomach. The importance of the pancreas lies in its duty to secrete enzyme-producing cells that are responsible for digesting carbohydrates, proteins, and fats [5]. Cells within the pancreas control the production of glucagon and insulin; dysfunction of these cells leads to diabetes [5]. Glucagon is released when sugar levels in the blood have become low. In turn, insulin is released when there are high levels of sugar in the blood.

The gonads are the sexual organs of men and women—the testes and ovaries, respectively. These are the primary reproductive organs, and they determine the sexual characteristics in men and women [5]. In men, the testes produce testosterone and sperm for reproduction. The testes are also responsible for [8]:

- The growth and development of the male reproductive structures
- Increased skeletal and muscular growth
- Enlargement of the larynx accompanied by voice changes
- Growth and distribution of body hair
- Increased male sexual drive

In women, the ovaries produce estrogen, progesterone, and small amounts of testosterone. When puberty begins, estrogen promotes:

- The development of the breasts
- Distribution of fat evidenced in the hips, legs, and breasts
- Maturation of female reproductive organs

The role of progesterone in this process is to cause the lining of the uterus to thicken in anticipation of pregnancy. Estrogen and progesterone play a dominant role in female health and the menstrual cycle, and maintaining balance of these hormones is vital [8].

**EFFECTS OF HORMONES THROUGHOUT LIFE**

Hormone levels naturally vary throughout life, and major developmental events, such as puberty, pregnancy, menopause, and old age, will affect the hormone balance. According to Dr. Debra Jaliman, “fluctuating levels of hormones can have an impact on the skin, hair and nails that can be physically and emotionally challenging” [9].

**ACNE**

Acne is defined as “plugged pores (blackheads and whiteheads), pimples, and even deeper lumps (cysts or nodules) that occur on the face, neck, chest, back, shoulders, and upper arms” [10]. It can occur at any age but is most prevalent during adolescence. Hormones play a major role in the changes that occur during adolescence, and acne is one of the many results. The onset of acne is usually attributed to increased production of androgens (e.g., testosterone) that promote oil production in the sebaceous glands of the skin [9]. Other hormones, including steroids, testosterone, and estrogen, are known to trigger acne as well. When there is too much oil production, the pores become clogged with oil, dirt, bacteria, and dead skin cells, causing acne blemishes. Oil glands are most active during the teenage years, but people can have trouble with acne at any stage of life [11]. It can be triggered by many things, including menstruation, pregnancy, stress, diabetes, and polycystic ovary syndrome (PCOS) [9].
To treat acne, doctors typically prescribe a variety of creams or oral medications. There is still debate regarding whether oral contraceptives (birth control pills) are effective as an acne treatment [11]. However, good hygiene is the first step in treating acne. It is important to wash the face with a mild cleanser morning and night; anything more than this will just cause further irritation. Removing makeup every night is a necessary step, as is adding moisture back to the skin after cleansing. When these steps are not enough to rid the skin of acne, topical treatments containing alpha hydroxy acids (such as glycolic and lactic acid) may be effective. These acids range in strength, which is noted as a percentage on products. For example, 20% or 30% glycolic acid treatments may be used to manage acne [12]. Salicylic acid, sulfur, and benzoyl peroxide may also be applied to the skin in order to kill bacteria, lessen the amount of oil on the skin, and remove dead skin cells [11].

**ORAL CONTRACEPTIVES**

**Positive Hormonal Effects**

Oral contraceptives, or birth control pills, are prescribed to prevent pregnancy. However, they can also have positive and negative effects on the skin, hair, and nails. As discussed, oral contraceptives may be prescribed to clear up acne, although it is unclear if this is an effective technique [11]. As with any medication, sometimes it is necessary to try a few oral contraceptives until the most useful one is found. A combination of oral contraceptives and topical treatments may be necessary to gain the most from treatment [13]. The most effective birth control medications used to treat acne are those with low androgenic activity, or a low amount of androgen, as these hormones seem to cause the most trouble with acne [12].

Low-androgen birth control options include [14]:

- Norgestimate (Ortho-Cyclen and Ortho Tri-Cyclen)
- Norethindrone (Micronor and Ovcon 35)
- Desogestrel (Desogen and Ortho-Cept)

Acne can be triggered and aggravated by hormonal imbalance, and oral contraception is used to regain that balance. Oral contraceptives also influence the amount of sebum on the skin, an oil the body creates to lubricate the hair and skin. A buildup of sebum and dead skin cells in hair follicles causes acne blemishes [13]. After a few months of oral contraceptive use, one study found that sebum production was decreased by as much as 40% [12].

**Negative Hormonal Effects**

Oral contraceptives change the balance of hormones in the body, which is effective in preventing pregnancy and acne but can also have a negative effect on the hair and skin. Hair loss is one possible side effect of oral contraceptives, although few people know this can be a trigger of hair loss [14]. This risk applies to all women, but extra caution should be used for those who are more sensitive or have a family history of hormone-related hair loss. Hair loss can occur while taking the medication and for up to several weeks or months after stopping [15]. To lessen the risk of hair loss, the American Hair Loss Association (AHLA) recommends women should only use only low-androgen index birth control [15].

Fungal infections on the skin and the nails are another possible side effect of oral contraceptive use. The most common cause of these infections is an overgrowth of the fungus *Candida albicans*. *C. albicans* is a common fungus that causes cutaneous candidiasis, onychomycosis (fungal infection of the nail area), and many other fungal infections [16]. Oral contraceptives have been proven to increase the risk of cutaneous (skin) candidiasis, mainly in warm, moist, creased areas such as the armpits and groin [16]. This type of fungus can also lead to infection around the nails, on the feet, and around the mouth.

One study in the *Annals of Oncology* examined the risk of developing skin cancer due to hormone use in the form of oral contraceptives and hormone replacement therapy. Researchers found that women taking estrogen, either from oral contraceptives or postmenopausal hormone replacement, were at greater risk for developing skin cancer [36]. However, other studies have refuted this claim and say there is no connection [37]. More research is necessary before we know for sure if there is a link.

**PREGNANCY**

Pregnancy can greatly affect the condition of the skin, hair, and nails. The body's hormonal balance is altered to suit the needs of the growing fetus. Changes in the skin, hair, and nails can range from mild to dramatic. Some women may be more affected than others, depending on many factors.

Pregnancy is a time when women may want to pamper themselves with a day at the salon. However, pregnancy triggers many changes, and it is crucial for salon professionals to be aware of the changes. In the salon environment, extra caution should be taken with all services performed on a pregnant woman.
Skin Changes

Some women experience acne during pregnancy due to the increase in hormones, while others notice that their acne clears up [17]. If a woman was prone to acne during her menstrual cycle, then she may be prone to it during pregnancy, but this is not always the case [17]. The oil and sweat glands increase production during pregnancy, which can exacerbate problems with acne [18].

Hyperpigmentation, or darkening of the skin, is a common feature of pregnancy. This condition affects areas of the body that already have a great deal of pigment, such as the nipples and the areola, the armpits, and the genital area [18]. Women of all skin colors can experience hyperpigmentation of the skin during pregnancy, possibly triggered by estrogen [18].

Hyperpigmentation of facial skin during pregnancy is referred to as melasma or the “mask of pregnancy” [17]. This skin darkening appears as brownish, uneven marks on the forehead, temples, and middle of the face and may also appear around the eyes or over the nose [17]. Sunlight exposure can increase the darkening of the skin, so sunscreen should be applied daily and tanning should be avoided [17]. Although melasma can develop in any women, it is more likely to affect women with darker skin tone, including those of Latin/Hispanic, North African, African American, Asian, Indian, Middle Eastern, and Mediterranean descent. Women with a blood relative who had melasma are also at an increased risk [19]. Melasma usually goes away after the baby is born, but it may also linger [20].

Expectant mothers may come into the salon seeking advice on how to treat this condition. However, a physician should always be consulted first. There are a variety of treatments available to manage melasma, including tretinoin, kojic acid, and azelaic acid. Chemical peels and topical steroid treatments have been used, but their safety during pregnancy is unclear and the melasma is likely to return [21]. Again, the most important treatment is prevention with the regular use of sunscreen.

Stretch marks are highly common and occur in 90% of pregnant women [18]. These pink, red, or purple indented streaks on the skin of the abdomen, breasts, upper arms, buttocks, and thighs appear due to stretching of the skin [22]. Stretch marks should be treated as soon as possible; otherwise, they can progress to a point that it becomes difficult to erase them [23]. Treatment generally consists of moisturizing 3 to 4 times daily with a product containing cocoa or shea butter. It is best to massage the moisturizer deep into the affected area [23]. Other possibly beneficial treatments include glycolic acid, wheat germ oil, vitamin C, retinoids, and peptide-containing products [23]. Other skin issues that may develop during pregnancy include [18]:

- Varicose veins
- Spider veins
- Pruritic urticarial papules and plaques of pregnancy (PUPPP), a type of rash that usually appears late in the third trimester of a first pregnancy

Hair and Nail Changes

The hair and nails are also impacted by the hormonal changes of pregnancy. Hair on the scalp becomes thicker during pregnancy, but after delivery it becomes thinner. The thinning can likely be attributed to the change in hormone levels after childbirth. The hair that falls out is hair that would have been lost in the last few months if there had been no pregnancy; it is just the body getting “back to normal” [24].

There may be excess hair growth on the face and chest area during pregnancy caused by the hormonal transitions. This should also go away soon after delivery [24]. Hair removal treatments such as tweezing or waxing can be utilized while pregnant, but all treatments should be approved by a physician.

Hair coloring is a challenge, as chemicals are involved, and it is not clear how they affect the fetus. Many women avoid coloring their hair during the first trimester as a safety precaution. Hair texture is also different during pregnancy due to increased hormones, so hair dyes may turn out different than usual [26]. Any substance that is applied to the skin (or scalp) will be absorbed into the body. Therefore, caution should always be used when performing any service to pregnant women, and if in doubt, the service should not be performed.

Many women experience changes in their nails while pregnant. Some women experience stronger, healthier nails, while others experience dry, brittle nails [24]. The abundance of hormones stimulates growth, but some unwanted characteristics may appear, too. Nails may develop grooves or ridges or may separate from the nail bed [25]. Nails may also split at the tip, forming V-shaped nicks [18]. These ridges and irregularities are caused by an irregular production of keratin [18].

HORMONES AND NORMAL AGING

Hormonal balance is affected by aging in many ways and can be seen in the body’s external appearance. As a person ages, many body functions slow down, including hormone production and secretion. Estrogen and testosterone both decrease as age advances, leading to many skin, hair, and nail issues.
Skin and Age
Skin problems associated with aging, such as dry skin, sagging, age spots, and wrinkles, occur in both men and women due to decreased hormone levels. Estrogen has an effect on collagen production and skin thickness, so as this hormone decreases with age and after menopause, dry, loose skin results [27]. Skin becomes thinner and loses fat as we age and tends to appear less plump and smooth [27]. Less blood is supplied to the skin, resulting in a dull appearance. Changes in circulation and skin thickness also increase the risk for spider veins and broken blood vessels. Topical estrogen treatments have been found to be helpful in improving skin’s texture and appearance in some cases, but there are risks [28]. Other treatments to help improve the condition of aging skin are [29]:

- Tretinoin
- Vitamin C
- Alpha hydroxy acids
- Chemical peels
- Dermabrasion
- Laser resurfacing

Minor issues with aging skin can be addressed by a licensed esthetician or cosmetologist, but any major concerns should be directed to a medical professional. Education, awareness, and caution should always be utilized.

Hair and Age
As men and women age, hair tends to lose its luster, turn gray, thin in certain spots, and grow more in other places. Of course, there is always the exception to the rule, but most will experience at least one of these hair issues. Gray hair is probably the most noticeable sign of aging. Hair usually begins to turn gray around age 30 or 40, but this varies by individual and by race/ethnicity [30]. Hair loses its usual color as a result of the hair follicle producing less melanin, or pigment [30]. The onset of gray hair is related to genetics and occurs earlier for white individuals and later for persons of Asian or African descent [30].

In addition to turning gray, hair may also thin or fall out. There are a variety of reasons hair thins and falls out: malnutrition, hormonal imbalance, menopause, stress, serious illness, or simply the aging process. The most common cause of hair loss in advancing age is androgenetic alopecia, a gradual thinning of the hair that affects both men and women [31]. A licensed cosmetologist is capable of performing a color treatment on a client with gray hair, as long as no serious issues are present. The cosmetologist can rule out issues by asking questions and by examining the area they will be treating with color.

Nails and Age
Nails may become dry, brittle, or discolored as a person ages due to decreased hormone production, although the degree of change varies from person to person. Nails may grow slower, become brittle, or change in appearance (becoming yellowed and opaque) [30]. Toenails tend to become harder and thicker, with an increased predisposition toward ingrown toenails [30]. Nail technicians must be fully aware of changes to the nail that result from normal aging and those that indicate possible disease or infection. Licensed salon professionals should work only on healthy nails and skin with no visible signs of disease or infection [32].

Menopause
Men and women are both affected by skin, hair, and nail changes as their age progresses. However, women may experience more abrupt changes due to menopause. Menopause, or the ceasing of menstruation, causes a dramatic drop in the production and secretion of reproductive hormones. This stops a woman’s ability to have children, but it also leads to several other external health issues. As discussed, estrogen plays a dominant role in women’s skin, hair, and nail health, and when estrogen drops, women often experience undesirable changes in their skin, hair, and nails [33]. Skin tone, color, elasticity, and dryness are all affected by lower estrogen levels. The skin is most obviously affected by menopause, but the hair and nails undergo changes that may be noticed as well. Hair may begin to thin, and nails may become brittle.

Hormone Replacement Therapy
To treat the symptoms of menopause, including changes in appearance, some women have turned to hormone replacement therapy. Hormone replacement therapy usually involves the administration of estrogen and possibly progesterone, another female hormone, through many forms, including a pill, patch, vaginal ring, or cream [35]. There are conflicting attitudes regarding hormone replacement therapy. Some believe it can help ease the variety of troubles women face with menopause, but there is an increased risk of some types of cancer, stroke, and blood clots. A doctor’s advice should be followed carefully [34].

Human Growth Hormone Therapy
To help alleviate some of the skin, hair, and nail symptoms of aging and hormonal decline, some have chosen treatment with synthetic human growth hormone (hGH) [5]. HGH is secreted by the pituitary gland to promote growth in childhood and to help maintain vitality throughout life [38]. HGH is available in many forms, including injections, sprays, patches, creams, pills, and powders [39].
HORMONAL DISORDERS

Keeping hormonal balance is the main priority of the endocrine system. When hormone production is out of sync, an imbalance can occur, leading to many health problems. From the smallest cells to the largest organs, every part of the body (and its functions) can be negatively affected by hormonal imbalance. This imbalance is associated with diabetes, cardiovascular disease, growth disorders, hormone abuse, menopause, osteoporosis, PCOS, reproductive disorders, thyroid dysfunction, and aging. Subsequently, this imbalance can cause various problems in the skin, hair, and nails.

DIABETES

One of the major hormonal disorders is diabetes. The pancreas produces insulin, the hormone that carries sugar from the bloodstream into the cells to be used for fuel and to rid the body of waste [43]. If there is not enough insulin, blood sugar levels regularly get too high, resulting in diabetes [43]. Diabetes is monitored and treated on a continuous basis; persons living with diabetes must watch their blood sugar levels regularly, modify their diets and alcohol consumption, and exercise regularly.

Bacterial and Fungal Infections

People with diabetes are more prone to bacterial and fungal infections of the skin and nails because their immune systems are compromised. When blood sugar levels are high, as in diabetes, bacteria are able to grow more readily and infections develop more easily [44]. One of the most common indicators of diabetes is an open wound or cut that will not heal [44]. According to the American Diabetic Association, up to 33% of people with diabetes will have a skin disorder caused by diabetes at some point in their lives [45]. Living with diabetes means living with a compromised immune system. Many skin disorders can occur as a result, including [45]:

- **Styes**
- **Boils and carbuncles**
- **Folliculitis**
- **Diabetic dermopathy (scaly patches)**
- **Diabetic vascular disease (affects the skin on the legs)**
- **Allergic reactions**
- **Diabetic blisters resulting from nerve damage**
- **Digital sclerosis (thick, waxy skin on the back of the hands)**
- **Acanthosis nigricans (dark, discolored patches in skin folds, particularly among persons of color)**

Infections related to diabetes include styes, boils, folliculitis, carbuncles, and nail infections [45]. Luckily, most of these ailments can be prevented or treated by control of blood sugar levels and/or medications.

Persons with diabetes are more susceptible to styes, a type of infection that appears as a red bump on the base of the eyelash or underneath an eyelid. The infection is caused by bacteria that is found on the skin, called Staphylococcus aureus or “staph,” entering the oil gland of the eyelid and growing [46]. A person without diabetes is better able to fight off this infection than those with diabetes. The most common signs and symptoms of a sty are pain, redness, swelling, and the characteristic red bump with a yellowish center [46]. A sty is generally treated with a warm compress for 10 minutes, 4 or 5 times a day [46].

Another bacterial infection that occurs more frequently among diabetics is skin abscess, or boils. A boil is a deep bacterial infection in a hair follicle or oil gland that results in “a collection of pus that forms in the skin” [47]. The best way to prevent boils is to practice good hygiene; the body should be cleaned regularly and thoroughly to remove excess bacteria. Health professionals may prescribe antibiotics to treat boils if the infection is severe, but draining is the most common treatment [47]. After a boil ruptures, the area should be cleansed 2 to 3 times daily until it heals.

A carbuncle is a grouping of several boils that extend deep into the tissue and are filled with pus [49]. Like many other skin infections, it is caused by a staph infection. It can spread to many parts of the body and is also contagious to other people.

Diabetics are also at risk for folliculitis, a bacterial infection of the hair follicle. Folliculitis can occur when instead of growing out of the follicle, the hair grows beneath the surface of the skin, causing irritation and infection as bacteria and pus build up [5]. Folliculitis is a common complication of hair removal, particularly thick or curly hair [5]. It can be the result of shaving or waxing with old or unclean implements or of soaking in unsanitized tubs. Salon professionals should take the utmost care in cleanliness, but extra care should be taken with clients who have diabetes. Treatment for folliculitis includes antibacterial washes, antibiotic creams, and possibly oral medications [48].
Infections can also occur around the nail or toenail in those with diabetes, and many of these infections are fungal. Fungus thrives in a warm, moist environment, so the feet and toes are at the greatest risk, as they are enclosed for most of the day.

In people with diabetes, the most common cause of fungal infection is *C. albicans*. This fungus creates “rashes of moist, red areas surrounded by tiny blisters and scales” and usually occurs under the breasts, around the nails, between fingers and toes, in the corners of the mouth, under the foreskin (in uncircumcised men), and in the armpits and groin [45]. If present on toenails, discoloration and nail loss are common.

Well-known fungal infections include athlete’s foot, jock itch, vaginal yeast infections, and ringworm; each of these infections is contagious, and steps must be taken to prevent spread of the fungal spores [45].

Itching is a common problem for those living with diabetes. The skin is more sensitive and prone to irritation from many internal, external, and environmental factors. The cause of itchy irritated skin could be poor circulation, dry skin, or a yeast infection. The best way to treat itchy, irritated skin is to use mild cleansers and apply a soothing cream or spray to the affected area after bathing [45]. Excessive bathing should be avoided, if possible.

**STERIOD ABUSE**

Hormones are sometimes used as medications to treat a variety of health conditions. For example, the steroid cortisol is used to treat many types of skin rashes, and estrogen replacement is used to treat symptoms of menopause. However, hormone use can also turn into abuse, a problem that occurs frequently in the athletic community. Athletes may turn to synthetic anabolic steroids in their journey to be “the best.” This type of manufactured steroid is similar to testosterone and may be taken orally or injected. Anabolic steroids increase muscle mass and improve athletic performance; they are a quick and easy way to become bigger and stronger [50].

However, while the benefits of steroids may seem appealing to athletes, there are many negative repercussions that should not be overlooked. Steroid abuse can cause problems with the heart, leading to cardiovascular disease, and can disrupt chemicals in the brain that affect mood and behavior. Evidence has also shown that steroids cause male-pattern baldness, body acne, decreased fertility, and blood-filled liver cysts that can rupture; in women, masculinization may occur, with deepened voice, increased facial hair, and changes in clitoral and breast size [50]. A 2011 study conducted by the Centers for Disease Control and Prevention found that 3.6% of high school students admitted using illegal anabolic steroids; use was highest among freshmen (4.2%) [50].

**THYROID DYSFUNCTION**

An imbalance of thyroid hormone can be detrimental to one’s health and appearance. Overproduction of thyroid hormone causes hyperthyroidism; conversely, an insufficient production of thyroid hormone leads to hypothyroidism [51]. Problems with the thyroid can lead to thyroid nodules, goiter (i.e., enlarged thyroid gland), and cancer [52]. Hyperthyroidism is characterized by [53]:

- Difficulty concentrating
- Fatigue
- Frequent bowel movements
- Goiter
- Heat intolerance
- Increased appetite
- Increased sweating
- Irregular menstrual periods
- Nervousness
- Restlessness
- Weight loss
- Hair loss
- Itching
- Clammy skin
- Blushing or flushing

The body is more vulnerable to fungal infection when dealing with hypothyroidism partly due to weak cardiac contractions. The heart does not contract as strongly as it would in a healthy individual; it cannot sufficiently pump blood (and oxygen) to the lower body. The result is reduced warmth in the feet and hands. This low oxygen state in the toes facilitates fungal overgrowth, particularly *C. albicans*, in nails and between toes [51]. As with diabetes, hyperthyroidism weakens the immune system and allows fungus to grow and thrive where it usually would not. This type of nail infection is referred to as onychomycosis and is found much more frequently in those with hyperthyroidism than with healthy individuals [55].

Hypothyroidism occurs more frequently than hyperthyroidism and exhibits the following symptoms [54]:

- Fatigue
- Weakness
- Lethargy
- Weight gain
- Depression
- Memory problems
- Constipation
- Dry skin
Hormonal balance is vital to the body’s health and well-being. The production and secretion of hormones is not visible to the outside world, but the effects of these hormones are clearly present in the appearance of the skin, hair, and nails. Hormones are constantly pumping through our bodies every day as part of complex system with many components. If one is out of balance, the others are likely affected. The outside appearance will often reflect this imbalance.

When safe and appropriate, salon treatments for skin, hair, or nails can be greatly beneficial to the client. However, it is imperative that hormonal disorders and their effects be understood.

**POLYCYSTIC OVARY SYNDROME**

PCOS is the most common hormonal disorder among women of reproductive age in the United States [57]. PCOS is characterized by enlarged ovaries containing many small cysts [56]. The symptoms of PCOS are mainly caused by an overproduction of androgens (male sex hormones) in the female body. Androgens are responsible for stopping ovulation and causing irregular periods, which can result in infertility. In addition, women with PCOS often have acne, thinning hair on the scalp, and increased body hair on the back, chest, abdomen, and face [58]. Many women will seek to remove unwanted hair with cream depilatories or laser hair removal. Laser hair removal involves damaging an individual hair follicle with laser and heat, thereby preventing hair growth, but it can be costly [59].

Women diagnosed with PCOS are usually diagnosed with diabetes as well. PCOS and diabetes share a common thread: insulin resistance, or difficulty processing insulin [62]. If this problem persists, skin and weight changes associated with diabetes will begin to appear. Skin tags and signs of acanthosis nigricans (i.e., dark, velvety skin patches under the arm, on the neck, or in the groin and genital area) are common [60].

A professional in the salon and spa environment deals with the issues of acne, unwanted hair loss or growth, and skin imperfections on a daily basis. For this reason, it is imperative that hormonal disorders and their effects be understood.

**ANDROGENETIC ALOPECIA**

Androgenetic alopecia, a type of hair loss, affects both men and women. It is said to be caused by many factors, including an imbalance of the hormone androgen, genetic predisposition, heart disease, diabetes, high blood pressure, and PCOS [61]. Androgens are primarily produced in the adrenal glands, fat cells, the testes (in men), and the ovaries (in women). It is the hormone responsible for regulating hair growth and sex drive in both men and women [61]. When this hormone is not produced at proper levels, it creates many issues for the hair and skin.

In men, androgenetic alopecia is usually called male pattern baldness, and the hairline gradually recedes and forms an “M” shape [63]. Frequently, the hair loss continues and becomes finer, shorter, and thinner, creating a U-shaped pattern of hair around the sides of the head [63]. Some men experience continual hair loss until they reach a state of total baldness [61]. Male hair loss can begin as early as the teenage years, but female hair loss tends to occur later in life [64].

Although it is primarily common to men, women are also affected by androgenetic hair loss. For women, overproduction of androgen is typically the cause. Female androgenetic hair loss occurs after menopause or as a symptom of a health problem (e.g., PCOS, diabetes). The hair loss pattern differs from male hair loss. Women experience more of a loss over the entire head, rather than in a specific pattern [61]. The loss tends to be centralized to the crown of the head [64].

**CONCLUSION**

Symptoms should subside with proper medical treatment, but medication must be taken for the rest of the person’s life. As with hyperthyroidism, hypothyroidism also makes it easier to develop nail fungus.

The salon professional should question every client about any health issues they may have. They should also do a little detective work of their own—looking at clients’ skin, hair, scalp, and nails to check for any obvious issues. It may be difficult to ask the client about possible health problems when witnessing skin, hair, or nail issues, but it is necessary.

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A professional in the salon and spa environment deals with the issues of acne, unwanted hair loss or growth, and skin imperfections on a daily basis. For this reason, it is imperative that hormonal disorders and their effects be understood.

**ANDROGENETIC ALOPECIA**

Androgenetic alopecia, a type of hair loss, affects both men and women. It is said to be caused by many factors, including an imbalance of the hormone androgen, genetic predisposition, heart disease, diabetes, high blood pressure, and PCOS [61]. Androgens are primarily produced in the adrenal glands, fat cells, the testes (in men), and the ovaries (in women). It is the hormone responsible for regulating hair growth and sex drive in both men and women [61]. When this hormone is not produced at proper levels, it creates many issues for the hair and skin.

In men, androgenetic alopecia is usually called male pattern baldness, and the hairline gradually recedes and forms an “M” shape [63]. Frequently, the hair loss continues and becomes finer, shorter, and thinner, creating a U-shaped pattern of hair around the sides of the head [63]. Some men experience continual hair loss until they reach a state of total baldness [61]. Male hair loss can begin as early as the teenage years, but female hair loss tends to occur later in life [64].

Although it is primarily common to men, women are also affected by androgenetic hair loss. For women, overproduction of androgen is typically the cause. Female androgenetic hair loss occurs after menopause or as a symptom of a health problem (e.g., PCOS, diabetes). The hair loss pattern differs from male hair loss. Women experience more of a loss over the entire head, rather than in a specific pattern [61]. The loss tends to be centralized to the crown of the head [64].

**CONCLUSION**

Hormonal balance is vital to the body’s health and well-being. The production and secretion of hormones is not visible to the outside world, but the effects of these hormones are clearly present in the appearance of the skin, hair, and nails. Hormones are constantly pumping through our bodies every day as part of complex system with many components. If one is out of balance, the others are likely affected. The outside appearance will often reflect this imbalance.

When safe and appropriate, salon treatments for skin, hair, or nails can be greatly beneficial to the client. However, it is the duty of the salon professional to be cautious and refuse service if necessary. If a service endangers the client or the salon professional, it cannot be performed. Being in the salon industry, professionals will definitely come in contact with clients who may have a hormonal disorder or who are experiencing the normal hormonal fluctuations that occur throughout life. Cosmetologists, estheticians, and nail technicians must understand how hormones play a role in their profession and how hormones affect the skin, hair, and nail health of their clients.
Works Cited


