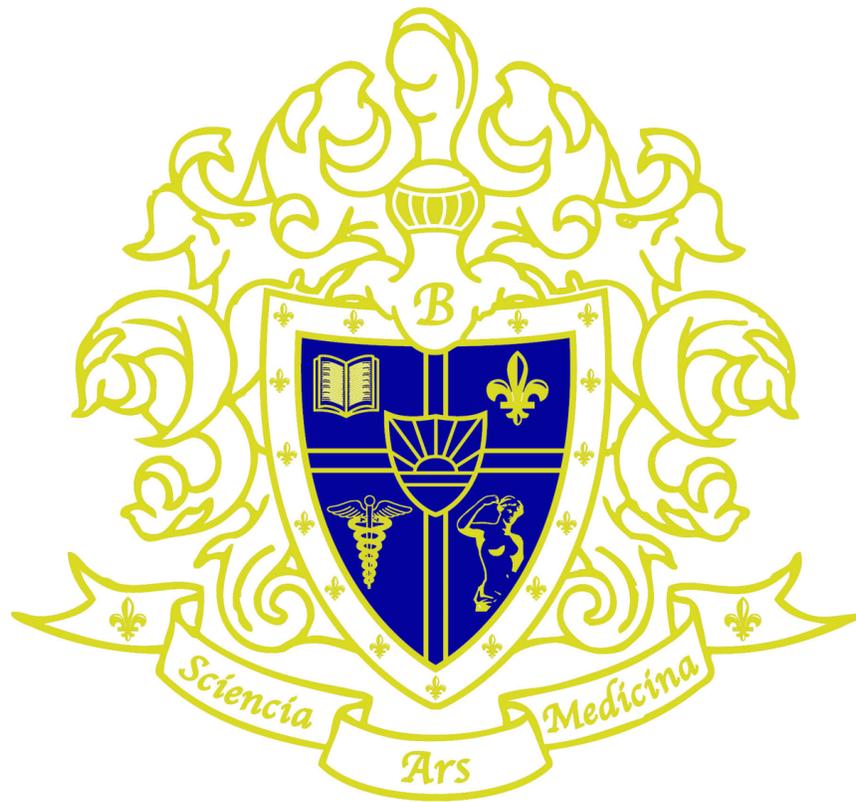


# Care for Damaged Hair



**Beeson Cosmetic Surgery**



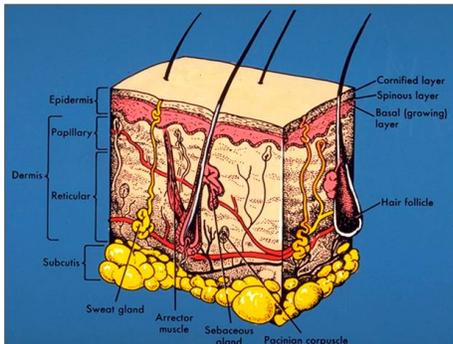
Hair loss and hair thinning can be the accumulative result of multiple factors—both internal and external (genetics, hormonal imbalances, emotional and physical stress, and environmental factors). Today, environmental assaults are taking on an increased importance.

In recent years, the hair cosmetic industry has developed a multitude of newer hair cosmetic therapies aimed at reducing oxidative damage, improving tensile strength, and stimulating hair growth. These specialized hair-grooming products have been formulated to not only

cleanse, but to also recondition, beautify, and strengthen our hair. Many are tailored for specific hair types—oily, dry, damaged, colored, or gray hair.

## **Physical Characteristics of Hair**

There are three primary geo-racial hair types—African, Asian, and Caucasian. Each has characteristic differences as to diameter, ellipticity, and curvature. Afro ethnic hair is invariably curly with an elliptic section. Asian hair is straight with a circular section. Caucasian hair can vary from straight to wavy with an oval cross section.



The hair shaft is the portion of the hair follicle that projects beyond the scalp surface. It consists primarily of an outer layer called the cuticle and an inner layer called the cortex. Some types of hairs also have a central core called a medulla. Hair gloss is dependent on the smooth layering of the cuticle. Hair strength depends on the integrity of the cortex.

The cuticle protects the hair from external environmental factors. It also controls chemical and water penetration into the hair shaft. Cuticle cells are made of chemicals called proteins, lipids, and polysaccharides. These cuticle cells are arranged in an overlapping, roof tile-like pattern with the open ends of the overlapping tiles directed away from the scalp towards the growing tip. The cells overlap such that only one-sixth of each surface is exposed. The cuticle is 6-8 layers thick and is closely attached to the inner cortex layer of the hair shaft.

The outermost layer of the cuticle (epicuticle) is hydrophobic and is the first layer of defense against water. The next layer in the cuticle is the A-layer. It is a layer that provides strength and rigidity to the cuticle and is high in cysteine content. The B-layer (exocuticle) and the inner endocuticle make up the rest of the cuticle. The endocuticle is a layer that absorbs water and swells. This results in changes in the physical properties of the hair shaft.

Below the cuticle is the cortex. The cortex is the major component of the hair shaft and is made up of multiple spindle cells. Cells of the cortex contain melanosomes that are responsible for the color of our hair. Dark hair may also contain an inner medulla layer. The function of the medulla layer is not known. It is only present in thick dark hair and is lost in aging gray hair.

## **Environmental injury**



## **Weathering of hair**

Damage to the cuticle results in structural changes to the hair shaft. Untreated hair has a pH of 4.5-5.5. This acidic pH helps keep the cuticle cells closely adherent to the cortex. Chronic exposure to the sun, excessive wetting, chlorine from swimming pools, air pollutants, and harsh chemical procedures are all contributing factors to hair damage. In addition, hot combs, blow-drying, and rough combing and brushing can all result in mechanical trauma to our hair.

As we spend more time in the sun, we experience more oxidative damage to our hair. Due to the lower amount of photo protective melanin, blonde hair is more susceptible to ultraviolet radiation damage. In addition, when we spend more time in the sun, we tend to perspire more, and as a result, tend to shower, shampoo and style more frequently. All this can result in more damage to the hair shaft. Chlorine and salt water deplete hair's natural oils which cause split ends. Many shampoos contained sulfates, which are essentially detergents that can over, wash and strip the hair. This can result in damage to the cuticle. Thus, weather damaged hair loses moisture more rapidly than normal hair and can look dull and dry. This can result in exposure to the cortex, which is more susceptible to damage, resulting in split ends what medically is called "trichoptilosis". Some researchers have pointed out that excessive weathering can be seen in patients with androgenic alopecia, which results in a lower threshold for damage, which is caused by changes in the base of the hair follicle. In addition, environmental dust, dirt, and sebum accumulation can all build up on the hair follicle. Copper from tap water in copper water pipes may become deposited on the hair shafts during washing and shampooing. This becomes a catalyst and results in free radicles being released, which cause the hair to become damaged. Hair weathering is not as prevalent in men as it is in women. This appears to be due the fact that men are constantly cutting their hair, which helps to remove the damaged portions of the hair shaft.

## **Care for damage hair**

### **Classification for hair care products**

Most hair care products work at the cuticle level of the exposed hair shaft. Others enter the cortex. Some hair cosmetic procedures such as coloring, straightening, and permanents can result in structural damage to the hair shaft.

Essentially hair cosmetic products can be divided into 2 classifications. First classification or category are those that work on the exocuticle - shampoos, conditioners, hair sprays, hair gels, mousses. The second classification would be those products work on the cortex and alter the structural integrity of the hair shaft. Products in this category would include hair-coloring products, bleaching agents, straightening agents and permitting agents.

### **Shampoos**

An important part to healthy hair is maintaining good scalp and hair hygiene. Historically, shampoos were formulated for cleaning the hair. However, today many shampoos also contain additives to provide ultraviolet protection, protect hair color, accentuate hair shine and volume. All shampoos contain certain basic ingredients—detergent, forming agents, conditioners, thickness, opacifiers, sequestering agents, pH adjusters, preservatives, and various additives.

Detergents in shampoo decrease surface tension of water, which allows the shampoo to be more effective in combining with and washing off grease and dirt. They can be very effective in cleaning the hair, but also can strip the hair of sebum, which results in the hair shaft being dry. For this reason, shampoos frequently incorporate conditioners into their product which coats to cuticle to improve hair luster. Examples of detergents are laurel/laureth sulfates and ammonium laurel/laureth sulfates.

When used with hard water, a detergent can interact with calcium and magnesium ions from the hard water and form a sticky residue on the hair shaft, which makes the hair appear dull and unmanageable. Sequestering agents are added to the shampoo to interact with these ions in hard water and eliminate the residue.

Alkaline detergents can damage hair and cause the hair shaft to swell. PH adjusters such as citric acid and lactic acid are often to shampoos to provide a more balanced pH. Other ingredients such as forming agents and thickeners and opacifiers are included in shampoo products simply to provide a more aesthetically appealing product and do not play a role in the cleaning affect.

## Conditioners

Hair conditioners may be incorporated into the shampoo or used as a separate product. In the latter case, it is applied after shampooing when the hair is slightly damp. Conditioners help to seal the cuticle, which helps to protect the cortex from environmental damage and makes the hair more manageable. There are a multitude of ingredients, which are used in conditioning agents including coconut oil, mineral oil, glycerin, propylene glycol, silicones and even natural products like bee honey and wheat germ oil. Conditioners are available as rinses (which are applied to hair for 2–5 minutes and then rinsed off), leave-on conditioners (which are applied to dry hair and remain until the next shampoo), leave-in conditioners (applied to hair prior to styling—typically used on hair damage by chemical processes), and deep conditioners (which are professionally applied at hair salon's).



The second classification of haircare products of those work on the cortex of the hair shaft and alter the structural integrity of the hair shaft and include hair coloring agents. Typically, these coloring agents can be divided into 5 categories—gradual hair dyes, temporary hair dyes, semi-permanent hair dyes, semi-permanent hair colors, and permanent hair dyes. Gradual hair dyes and temporary hair dyes unable to penetrate into the hair cortex. Semi-permanent hair dyes contain small molecules, which easily penetrated into the cortex of the hair but diffuse out easily, and subsequent hair washes. In permanent hair dyes the small dye molecules penetrate into the cortex and undergo an oxidation process to form large colored molecules, which remain in the hair shaft cortex and are not able to be washed out.

Gradual hair dye products are home-use products, which are applied daily on the hair until the desired color is reached. Temporary hair dyes typically lasts until the next hair wash. Semi-permanent hair dyes water-soluble dyes that are applied to shampooed hair and left on for 20 minutes and then rinsed off. The color gradually is reduced with each shampoo of the hair, but typically lasts for 8–10 shampoos. Semi-permanent hair colors typically contain a 2% concentration of hydrogen peroxide and contain no ammonia. They are gentler on the hair as compared to permanent hair dyes and last considerably longer than semi-permanent hair dyes. Permanent hair dyes are the most commonly used and the longest lasting of the hair-coloring agents.

## **15 Take Away Points for Keeping Your Hair Healthy**

- 1) Avoid hot water– High mineral content can interfere with hair care products forming film and residue that dulls hair and decreases manageability.
- 2) Good hair and scalp hygiene are important for better hair. Keeping hair follicles clean prevents blockage and inflammation, which can result in thinning hair later in life. Dandruff shampoos are great for cleaning the scalp, even if you don't have dandruff.
- 3) Avoid rough combing and brushing.
- 4) Consider using leave-in conditioners prior to styling or blow-drying–especially if hair has been damaged by chemical processes.
- 5) Hair gels can be helpful for people with thinning hair. When applied to damp hair, the hair can be styled to give lift from the scalp and the appearance of adequate volume.
- 6) Shampoos and conditioners, on occasion, can cause contact dermatitis and flare-up of childhood eczema.
- 7) Use "heat protective" products when using heat based styling treatments in order to minimize hair damage. These products contained polymers such as silicone, mineral oil, and petrolatum, which created a thin film on the hair shaft, protecting it from thermal damage.
- 8) Coconut oil has been shown to penetrate the hair shaft and reduce protein loss.
- 9) Exercise caution when using straighteners and other hair treatment processes that use the neutralizing agent hydrogen peroxide, as it can cause oxidation of melanin granules in the hair with resultant fading of hair color.
- 10) Frequent use of chemical treatments is a major cause of damage to the hair. Bleaching, hair dyeing, and perming can all damage or hair if these products are used incorrectly or too frequently.
- 11) Rinsing hair with cold water after cleansing and hydrating can help seal the cuticle and protect the hair.
- 12) Tight hairstyles worn while sleeping can contribute to hair loss (traction alopecia).
- 13) Consider using a sulfate free shampoo and one that contains proteins to help strengthen the hair.
- 14) Your hair is sensitive to ultraviolet damage from the sun. Consider using a sun-protection hat made of fabric and materials with UPF 50+ protective rating.

15) Saltwater and chlorine can penetrate the hair shaft. Consider using a regular conditioner or a leave-in conditioner and mix it with water in a spray bottle to mist hair throughout the day while you are at the beach or pool. It will add an additional barrier coating to your hair to help protect it from the sun and chemicals.

### **Nutrition is Important in Hair and Scalp Health:**



- 1) Eat at least 45 grams of protein daily. Meat, poultry, nuts are all excellent sources for protein.
- 2) Zinc—low levels of zinc can cause hair to shed. Zinc is important in many of the chemical reactions within our body. Walnuts, almonds, and cashews are excellent sources of zinc.
- 3) Omega-3 fatty acids are contained in cold-water fish, salmon, and sardines. Some studies have shown that omega-3 fatty acids help promote hair growth through the anagen activating pathways in the hair dermal papilla cells. They may also help to reduce inflammation associated with hair loss.
- 4) Vitamin D—low levels of vitamin D have been associated with androgenic alopecia and telogen effluvium.
- 5) Iron—low iron levels are commonly seen in females, frequently due to menstrual cycles. Iron supplements can be beneficial.
- 6) Vitamin C supplements are recommended to facilitate iron absorption in patients with low iron levels.

At the present time there is insufficient data to recommend zinc, riboflavin, folic acid vitamin D supplementation, vitamin D, or biotin supplements. Biotin supplements can lead to faulty laboratory results for certain cardiac enzyme testing and for testing for thyroid function. Too much vitamin A and too much selenium can actually contribute to hair loss. Topical retinoids used in the treatment of acne can, in some cases, elevate vitamin A levels and result in hair loss and thinning. In contrast, premature graying may be improved by supplementing deficient micronutrients iron, vitamin D, folate, vitamin B12, and selenium.

-“The Role of Vitamins and Minerals in Hair Loss: a Review”, Dermatologic Therapy (2019)



For those to prefer a more holistic approach to hair care, consider these recommended therapies:

**A) For dry hair and scalp**

Mix the herb gotu kola powder with coconut oil in a 1:5 ratio respectively and extract on low heat for 2–3 hours, then filter it through a cheesecloth. A daily 3–5 minutes scalp massage in the morning before showering or in the evening

**B) For sensitive scalp**

Mix neem powder with jojoba oil in a 1:5 ratio respectively and extract at room temperature over 48-72 hours and filter it through a cheesecloth. Apply via a 3–5 minute scalp massage daily or every other day

**C) For oily scalp**

Mix neem powder with grapeseed oil in a 1:5 ratio respectively and extract room temperature over 48–72 hours and filter it through a cheesecloth. Apply via a 3–5 minute scalp massage daily or every other day

*-Homeopathic Home Haircare at-Home Recipes from Healthy  
Hair Summit July 2020 by Raja Sivamani, MD*