

A Review of Hair Care Products for Black Individuals

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Practice Points

- The structure and characteristics of hair in black individuals can make it vulnerable to damage.
- Moisture and protein deficiency are common causes of hair breakage and may be addressed with the appropriate use of cleansers, conditioners, and moisturizers.
- Chemical relaxers may exacerbate hair damage in black individuals and may be prevented by utilizing protective pretreatment and posttreatment care.

Physicians should be prepared to provide professional guidance to black individuals with both chemically treated and natural (ie, nonchemically treated) hair. Patients may seek advice from physicians if they decide to discontinue use of chemical relaxers or if they have sustained damage such as chemical burns, breakage, or hair loss from the misuse of various hair care products. Properly advising this patient population requires a basic understanding of hair morphology in black individuals as well as the unique characteristics of this hair type and the products used to address its needs. Although some products may promote healing properties, misusing or overusing them may cause adverse effects. This article will provide clinicians with a basic understanding of chemically treated and natural hair in black individuals. We also discuss hair care products that are ideal for this patient population and the potential adverse effects based on their chemical formulations.

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Dermatologists often encounter black patients who have sustained hair damage such as chemical burns, breakage, or hair loss from misusing various hair care products. Properly advising this patient population requires a basic understanding of hair morphology as well as the unique characteristics of this hair type and the products used to address its needs. This article reviews the basic understanding of chemically treated and natural hair in black individuals. Ideal hair care products for this patient population and the potential adverse effects based on their chemical formulations also are discussed.

Hair Structure

The cysteine-rich keratin that contributes to the physical and chemical stability of hair is composed of strong disulfide bonds that occur between keratin filaments.¹ These bonds contribute to the coarse nature of hair in black individuals. These bonds can only be broken by chemical processes (eg, chemical relaxers), which have permanent and irreversible effects.

There are 2 main hair categories in black individuals: chemically treated and natural. In black individuals, hair that has not been altered with permanent chemical treatments is considered natural.^{2,3} Of the patients with natural hair, some have never used chemical treatments, and some previously used chemical treatments but transitioned to a nonchemically treated hairstyle (commonly referred to as “going natural”). When properly managed, natural hair can be structurally stronger than chemically treated hair because the chemical processes weaken the bonds of natural hair.

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Hair Fragility

Structurally, hair is more fragile in black individuals than in individuals with other skin types due to various distinguishing characteristics, such as elliptical-shaped hair shafts, hair shafts of varying diameters, curved follicular bulbs, paired grouping of hair follicles, dry hair and scalp, and decreased water content in hair fibers.^{2,7} Also contributing to hair fragility in black individuals is cross-sectional asymmetry, which creates points of weakness and decreases the tensile strength of the hair shaft.^{4,5,7} In black patients, the hair shaft mechanically curls as it emerges from an ovoid-shaped follicle within the scalp. As it grows, the direction, shape, and diameter of the hair shaft varies along its length.^{2,3,5} Changes in shaft diameter are a natural characteristic of hair fibers in black individuals and remain unaltered, even after chemical treatments (eg, chemical relaxers) have been applied. Applying chemical relaxers to areas of the hair shaft that are more narrow in diameter increases its fragility and the possibility of breakage.² Certain hairstyling practices (eg, braids, twists, weaves) also can lead to breakage and hair loss.⁶ Although these particular hairstyles are intended to be worn long-term and often do not require daily grooming, they place constant tension on the hair shaft, which may cause damage or traction alopecia.

The risk for hair breakage is particularly increased in black individuals who are transitioning from chemically treated to natural hair. In these patients the hair shaft is at the highest risk for breakage at the point marking the transition from chemically processed to nonchemically processed.^{2,3} This risk may be minimized by reducing mechanical stress on the hair shaft as well as by using hair care products with certain protective properties (Table). If used appropriately, these hair care products can help enhance the manageability, structure, and cosmetic appearance of hair in black individuals while reducing combing resistance and tangling.^{2,3,7-11}

Hair Breakage From Moisture Deficiency

Hair breakage is a common concern in this patient population and can occur because of fragility secondary to natural hair morphology, stress from styling tools, or protein or moisture loss.^{2,3,8-12} Moisture deficiency can cause stress at weak spots along the hair shaft, leading to breakage even at low levels of tension.¹³ Hair moisturizers are available in cream, oil, lotion, and pomade formulations and can be used to address daily styling and moisture needs. Moisturizers and conditioners always contain water for hydration, but they may also contain additives (eg, proteins, cationic surfactants and polymers, humectants, silicones, oils^{2,3,7-12}) that can attract and

maintain moisture while protecting hair against styling insults.²

The 2 main types of conditioners that can reduce breakage related to moisture loss from damaged cuticles and/or mechanical force are rinse-out and leave-in conditioners.^{2,14} Rinse-out conditioners help restore moisture immediately following shampooing and can benefit black individuals with moisture deficiency. Leave-in conditioners and moisturizers can help amplify hydration prior to styling and between washes.²

Humectants have hygroscopic qualities that can also reduce breakage related to dryness.^{2,15} The primary humectant used in hair care products for black individuals is glycerin or glycerol, a trihydric alcohol derived from fats and oils. Other common humectants include sorbitol, sodium pyrrolidone carboxylic acid, panthenol, and sodium lactate.^{2,16,17}

Hair Breakage From Protein Deficiency

Protein deficiency is a common problem in chemically relaxed hair that may clinically present as hair breakage in black individuals.² One study showed that chemical relaxers are associated with amino acid changes consistent with fragile damaged hair.^{5,16} Chemical relaxers strip the hair of proteins in the process of destroying the chemical bonds required to loosen curls. The addition of proteins to conditioners and moisturizers, usually in the form of hydrolysates, helps to reduce breakage and condition hair.^{17,18} Proteins work at the outer cuticle by binding and filling in the damaged areas; they also soften hair, increase its tensile strength, and improve the overall look and feel of hair.^{17,19} Common proteins found in conditioners include hydrolyzed collagen; elastin; keratin; and soy, wheat, almond, and oat proteins, as well as simple amino acids and quaternized protein hydrolysates.^{2,16-18} These ingredients can reduce cuticle damage by providing protection prior to application of chemical relaxers.^{2,19} Products with high protein concentrations (eg, reconstructing conditioners) also encourage moisture retention in natural or transitioning hair² and can be used to address more severe breakage or damaged cuticles.^{2,20}

Silicones Reduce Friction and Mechanical Breakage

Silicones are included in many conditioners and moisturizers to reduce combing stress by forming hydrophobic films that lubricate the hair and reduce friction between strands.^{2,8-10,17,21} They also promote shine by smoothing damaged cuticles, allowing them to lie flat, which reflects light.¹⁸ Silicone-containing conditioners are useful in chemically relaxed hair because they reduce frizz as well as provide protection

Hair Care Products With Protective Properties

Additive	Potential Benefits for Hair	Common Identifiers
Cationic surfactants/ cationic polymers	Smooths cuticle, detangles, improves manageability, softens	Polyquaterniums, cellulose derivatives
Emollients	Softens, lubricates, increases sheen, acts as a scalp barrier for chemical relaxers, seals in moisture	Fats, lanolin, waxes, ceramides, petrolatum, cetyl alcohol
Essential oils	Seals in moisture, hydrates/seals (polar oils)	Coconut oil, rosemary oil, thyme oil
Humectants	Hydrates	Glycerin, glycerol, sodium PCA
Protein	Smooths cuticle, strengthens hair structure, improves body, provides prophylaxis for chemical relaxers, reduces breakage	Collagen, keratin, elastin, hydrolyzed protein
Silicone	Protects against heat, detangles, seals in moisture, increases shine	Ingredients with common suffixes (eg, -cone, -conol, -col, -xane); PPG or PEG in name

Abbreviations: PCA, pyrrolidone carboxylic acid; PPG, polypropylene glycol; PEG, polyethylene glycol.

against breakage and heat damage caused by styling tools.^{8-10,19,21} Black women with natural hairstyles can reduce the damage that frequently occurs from detangling by using silicone-containing conditioners and moisturizers; however, frequent use of silicones may leave behind a residue that can only be fully removed with shampoos containing harsh detergents. Because these harsh detergents are not ideal for dry hair types, silicones have been omitted from or reduced in some formulations. A group of lighter-weight silicones that still can provide the benefits of manageability and heat resistance but can be easily removed include lauryl methicone copolyol and dimethicone copolyols.²

Gentle Cleansing

In black individuals, both natural and chemically treated hair flourish in high-moisture conditions.^{1,2,4} A weekly cleanse with a shampoo that eliminates product residue without stripping the hair of its natural oils helps maintain moisture by allowing proteins to bind water within the hair shaft. Shampoos with gentler detergents (eg, sulfate-free shampoos) can prevent hair from becoming dry and brittle because they do not contain harsh detergents such as sodium lauryl sulfate and ammonium lauryl sulfate.^{2,14} Because the number of sulfates in a shampoo corresponds with its relative cleansing strength,

sulfate-free shampoos can prevent excessive sebum removal. Certain sulfates (eg, sodium myreth sulfate) are not as harsh and can be used with lesser effects on hair and scalp moisture.²

Moisturizing shampoos, also known as conditioning shampoos, generally are marketed to those with dry or damaged hair and can be synonymous with sulfate-free shampoos. Conditioning shampoos tend to contain anionic and amphoteric surfactants such as isethionates, polyglycerol derivatives, and beta-ines.^{9,11,14,17} A moisturizing shampoo is intended to simultaneously cleanse and condition in one step; however, black individuals may benefit from using an additional conditioner because their hair is naturally drier than other ethnicities.^{2,14,22}

Effective components of moisturizing shampoos and conditioners include cationic surfactants and polymers.^{7,9-11,14,18,22} Unlike shampoo surfactants, which repel dirt and oil from hair, cationic surfactants adhere to and normalize the hair surface, protect damaged areas, soften hair, and facilitate detangling.^{2,5,9,11,13,14,17} Cationic polymers are even more effective than cationic surfactants at improving hair texture while providing hair with reduced friction between strands, increased manageability, body, texture, and firmness.^{9,14,21} These polymers bind to the hair shaft and seal the cuticle, which improves damage and split ends.²¹ On product labels, cationic

polymers are identified as polyquaterniums, polysaccharides, chitins, and cellulose derivatives such as hydroxyethyl cellulose.^{17,18,21,23} For patients with natural hair, cationic polymers are especially helpful in reinforcing curl patterns and detangling.^{2,14,18,21}

Although many black individuals believe that dry hair is caused by frequent shampooing, it actually may be from inappropriate use of hair care products and regimens that are not ideal for their hair type.^{2,3,12} Silicone-heavy moisturizers and conditioners as well as sulfate-rich shampoos can cause dry hair and/or scalp. Inadequate cleansing of the hair and scalp also can leave a buildup of styling aids that may exacerbate problems such as seborrheic dermatitis and brittle hair.^{8,10,14} Furthermore, application of chemical relaxers by untrained individuals may cause brittle and damaged hair.

Chemical Relaxers

In 2006, it was reported that an estimated 70% to 80% of black women used chemical relaxers,²⁴ or perms as they are called in lay language, to straighten their hair for lifestyle preferences, increased styling options, and improved manageability. Chemical relaxers straighten hair by swelling the hair shaft, which opens the cuticle and permits alkaline agents to penetrate the cortical layer. The alkaline agents break and re-form sulfide bonds in the protein structure of curly hair, leaving hair permanently straightened.^{1,2,4,7,10,13} The hydroxyl ions disrupt ordered bonding of keratin and salt bridges, while other ionic bonds are broken up easily by the increased alkalinity.^{1,2,4,6,11} The new bonds that form are weaker than the original bonds because of the overall loss of sulfur. The 2 most commonly used types of relaxers are lye and no lye.

Lye Relaxers—The active ingredient in lye relaxers is either sodium hydroxide or potassium hydroxide.^{1,2,4,6,10,13} They have an extremely alkaline pH (13 or 14) and require professional application due to their alkalinity.^{2,4,13} Lye relaxers are believed to cause less damage to hair, allowing hair to retain some of its natural strength and elasticity; however, lye relaxers are corrosive to the scalp and can quickly cause irritation or burns.² They always require application of a petrolatum base to provide a protective barrier to the scalp and any hair that has previously been treated with chemical relaxers.²

The 2 subcategories of lye relaxers are base and no-base formulations.^{2,4,6} Base formulations have high percentages of sodium hydroxide, which allows them to produce fast results, but they also can irritate the scalp if a protective base is not used.^{5,6,10,14} No-base lye relaxers contain more oils and were intended to be used without requiring a scalp protective layer;

however, scalp barriers are recommended prior to the application of any type of relaxer.^{5,6}

No-Lye Relaxers—No-lye relaxers typically substitute sodium hydroxide and potassium hydroxide with guanidine hydroxide or lithium hydroxide,^{2,4,6,16} which acts as the chemical straightening component in these products. There are 2 types of no-lye relaxers: mix and no-mix formulations.^{2,4,6,10,16} Mix formulations require the combination of a cream containing calcium hydroxide and a guanidine carbonate solution to produce the active ingredient guanidine hydroxide, which is applied to the hair in the same manner as lye relaxers.^{4-6,10} No-mix formulations usually contain lithium hydroxide instead of guanidine hydroxide.^{2,4,6,10} No-lye relaxers are less irritating to the scalp but tend to leave behind mineral deposits that can cause dry and brittle hair.^{2,3,6} These deposits can be removed with a chelating shampoo.

Chemical Relaxers, Inflammation, and Breakage—Chemical relaxers have been associated with adverse effects including scalp inflammation, hair breakage, and alopecia.^{2,13,16,25} A small study of 39 African women found a relationship between contact scalp irritation from chemical relaxers and inflammation leading to scarring alopecias such as central centrifugal cicatricial alopecia,²⁶ a lymphocytic primary alopecia that progresses in a centrifugal pattern leaving behind scarring with follicular dropout.²⁵ However, a separate study investigating changes in sebum cytokines in response to chemical relaxers failed to demonstrate specific inflammatory marker changes to relaxer components.²⁷ Although chemical relaxers have not been implicated as a causative factor in scarring alopecias, their misuse has been considered a pathogenic or exacerbating risk factor.^{16,25} Therefore, physicians should demonstrate extra vigilance when patients utilize potentially damaging hair care products such as chemical relaxers.

Chemical relaxers increase the fragility of the hair shaft^{1-4,25} and should not be applied to hair that is already compromised or has previously been treated with a chemical relaxer.^{2,13} A protective regimen should be administered several days prior to application of a chemical relaxer, which can include a protein reconstructer, deep conditioner, and minimal styling.² The risk for hair breakage also can be minimized by advising patients to maximize the time between each relaxer application and to refrain from reapplication more frequently than every 8 to 10 weeks.^{2,25,28}

Chemical Burns—Chemical relaxers can cause chemical burns, frequently from application by untrained users.^{2,13} Burns often occur when a chemical relaxer is applied to the scalp for a longer period of time than directed or when the product is applied without first protecting the scalp with a petrolatum

barrier.^{2,16} It is important to note that burns can occur even if a protective barrier has been applied to the scalp. Long-term effects can include scalp irritation, scarring, and possible hair loss; therefore, chemical relaxers should not be left on for longer than indicated by the product manufacturer, should not be applied closer than 1 cm of the scalp surface, and should not be applied in conjunction with other chemical straightening or coloring agents.^{20,25}

Conclusion

The ethnic hair care market is already a large multibillion-dollar industry inspired by growing trends such as natural hair. It is important for physicians to be able to advise black patients when clinical questions or problems arise regarding hair care and hygiene. Incorrect use or selection of hair care products can lead to harmful outcomes that may present as fragile hair, hair breakage, or even hair loss. By understanding the nature of hair structure in black patients and the implications of using certain chemicals and products, clinicians can provide patients with the information that will encourage the growth and maintenance of chemically relaxed or natural hair.

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