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Hair perms/straighteners and styling agents

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The hair shaft consists of outermost hair cuticle which forms layers of scales protecting the hair, hair cortex which accounts for 90% of hair's weight and contains amorphous sulfur protein matrix and keratin filaments, and medulla in the core. Among the bonds between adjoining keratin polypeptide chains, disulfide bonds formed by cystine are the strongest. Temporary hair waves are created using a brush or curlers by transiently breaking and reconnecting weaker bonds such as hydrogen bonds. Permanent waving is achieved by altering the disulfide bonds, using an alkaline reducing agent (thioglycolates or bisulfites, pH 8 - 9) to cleave some of the bonds and an oxidizing agent (most often hydrogen peroxide) to solidify newly formed bonds. Permanent waving of negroid hair requires an additional initial straightening step which uses a reducer (ammonium thioglycolate).

Hair straightening is achieved either mechanically through pressing, or chemically by using relaxers. Pressing provides temporary straightening using hot combs, flat irons, curling irons or marcel stove. Chemical relaxing is similar to permanent waving except that curly hair is permanently straightened using a comb during reducing phase. Heavy cream formulation, rather than a solution, is preferred for strongly alkaline relaxing agents (pH 12 - 14), which consists of NaOH, guanidine hydroxide, KOH or LiOH.

Hair fixing-styling agents are agents used to create temporary changes to hair to achieve changes in the volume and hair shaft style. Examples are hair gels, mousses, lotions, pomades, sprays and waxes. They are essentially oil-based preparations, and today microemulsions of oil, water and surfactant with a droplet size of 10-200 nm provide more sophisticated styling care. Incorporation of synthetic polymers and dimethicones improved quality and aesthetics of the products considerably. Hair gels containing polyvinyl pyrrolidone/vinyl acetate (PVP/VA) or vinylcaprolactan/PVP/dimethylaminoethylmethacrylate copolymer are aesthetically more pleasing. Hair sprays are essentially aerosols delivering soap-removable resins. Addition of film-modifying copolymers to soften the resin film reduced brittleness and flaking.

The most common allergen in hair styling products is fragrance which is included in 97% of products, followed by propylene glycol, cetylstearyl alcohol and sorbitan sesquioleate. Since styling products are leave-on products, sunblock ingredients and emollients (e.g., lanolin) are commonly incorporated, in contrast to shampoos and conditioners.

Hair perms or treatments 3 to 4 times during pregnancy seem safe.

■ CURRICULUM VITAE ■

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