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# CHEMICAL TEXTURE SERVICES

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# LEARNING OBJECTIVES

After completing this chapter, you will be able to:

## LO 1

Explain the four chemical reactions that take place during permanent waving.

## LO 2

Explain the difference between an alkaline wave and a true acid wave.

## LO 3

Explain the purpose of neutralization in permanent waving.

## LO 4

Demonstrate safe and effective perm techniques.

## LO 5

Describe how thio relaxers straighten the hair.

## LO 6

Describe how hydroxide relaxers straighten the hair.

## LO 7

Demonstrate safe and effective hydroxide relaxing techniques.

## LO 8

Describe curl re-forming and how it restructures the hair.

## OUTLINE

WHY STUDY CHEMICAL TEXTURE SERVICES? 598

UNDERSTAND HOW CHEMICAL SERVICES AFFECT THE STRUCTURE OF HAIR 598

DEMONSTRATE THE PROPER TECHNIQUE FOR PERMANENT WAVING 601

DEMONSTRATE THE PROPER TECHNIQUE FOR CHEMICAL HAIR RELAXERS 617

DEMONSTRATE THE PROPER TECHNIQUE FOR CURL RE-FORMING (SOFT CURL PERMANENTS) 627

PERFORM PROCEDURES 629

**C**hemical hair texture services give you the ability to permanently change the hair's natural wave and curl pattern thereby offering clients a variety of styling options that would not otherwise be possible. Texture services can be used to curl straight hair, straighten overly curly hair, or soften tightly coiled hair (figure 20-1).

why study

## CHEMICAL TEXTURE SERVICES?

**Cosmetologists should study and have a thorough understanding of chemical texture services because:**

- > Chemical texture services allow stylists the opportunity to offer clients options to change the texture of their hair and explore the fashionable world of hairstyling.
- > Knowing how to perform these services accurately, safely, and professionally will help build a trusting and loyal clientele.
- > Knowledge builds confidence, to offer chemical texture services to all clients.
- > Chemical services are among the most lucrative and repetitive services in the salon, and many retail products are specific to hair's texture and condition.
- > Without a thorough understanding of chemistry, cosmetologists could damage hair, cause hair loss, and harm their clients and themselves.

**Chemical texture services** are hair services that cause a chemical change within the hair's natural wave and curl pattern. They include:

- **Permanent waving.** Adding wave or curl to the hair.
- **Relaxing.** Removing curl or waves; leaving the hair smooth and straight.
- **Curl re-forming (soft curl permanents).** Loosening overly curly hair; changing tightly curly or coiled hair into loose curls or waves.

The world of hairstyling is ever changing. Clients will always want to smooth their curly and wavy hair or give their straight hair more body and curl; therefore, mastering the techniques in this chapter will allow you to greatly expand your potential as a cosmetologist.

figure 20-1

Permanent waving is a unique chemical texture service.



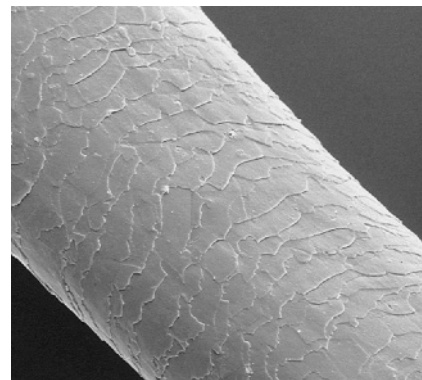
## Understand How Chemical Services Affect the Structure of Hair

Because all chemical texture procedures involve chemically and physically changing the structure of the hair, this chapter begins by reviewing the

structure and purpose of each layer of the hair—characteristics of hair that were first discussed in Chapter 11, Properties of the Hair and Scalp.

- **Cuticle.** Tough exterior layer of the hair. It surrounds the inner layers and protects the hair from damage. Although the cuticle is not directly involved in the texture or movement of the hair, texture chemicals must penetrate through the cuticle to their target in the cortex in order to be effective (figures 20-2 and 20-3).
- **Cortex.** Middle layer of the hair, located directly beneath the cuticle layer. The cortex is responsible for the incredible strength and elasticity of human hair. Breaking the side bonds of the cortex makes it possible to change the natural wave pattern of the hair.
- **Medulla.** Innermost layer of the hair, often called the *pith* or *core* of the hair. The medulla does not play a role in chemical texture services and may be missing in fine hair.

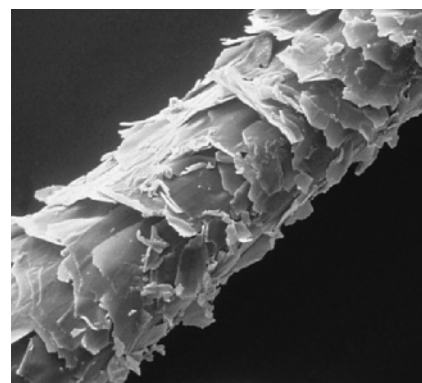
For more detailed information on the hair's structure, review Chapter 11, Properties of the Hair and Scalp,



**figure 20-2**  
A healthy cuticle is compact and lies tight against the hair strand. It protects the hair from damage and makes it appear smooth and shiny.

## Importance of pH in Texture Services

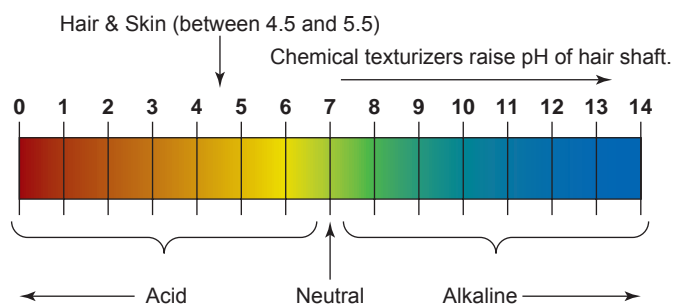
In Chapter 12, Basics of Chemistry, you learned that pH is an abbreviation for potential hydrogen. The symbol *pH* represents the quantity of hydrogen ions. The pH scale measures the acidity and alkalinity of a substance by measuring the quantity of hydrogen ions it contains. The pH scale has a range from 0 to 14. A pH of 7 is neutral, a pH below 7 is acidic, and a pH above 7 is alkaline. The natural pH of hair is between 4.5 and 5.5. Chemical solutions raise the pH of the hair to an alkaline state (figure 20-4). This action opens the cuticle layer of the hair and allows the solution to reach the cortex layer, where restructuring occurs. Coarse, resistant hair with a strong, compact cuticle layer requires a highly alkaline chemical solution. Porous, damaged, or chemically treated hair requires a less alkaline solution.



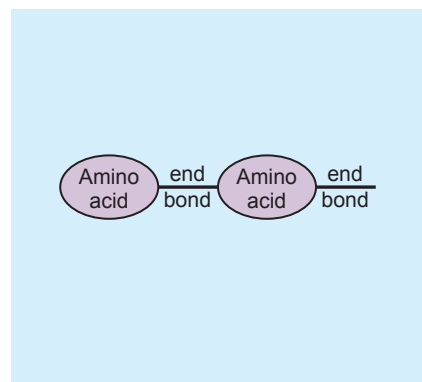
**figure 20-3**  
A damaged cuticle is chipped and does not lie tight against the hair shaft. It cannot adequately protect the hair against damage, so the hair becomes rough, dull, and prone to split ends and breakage.

## Basic Building Blocks of Hair

To understand how a chemical solution changes the structure of hair, it is important to understand the basic building blocks of hair (figures 20-5 through 20-8).



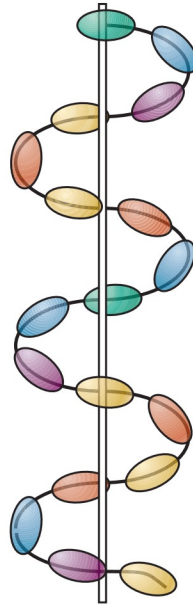
**figure 20-4**  
The importance of pH in texture services



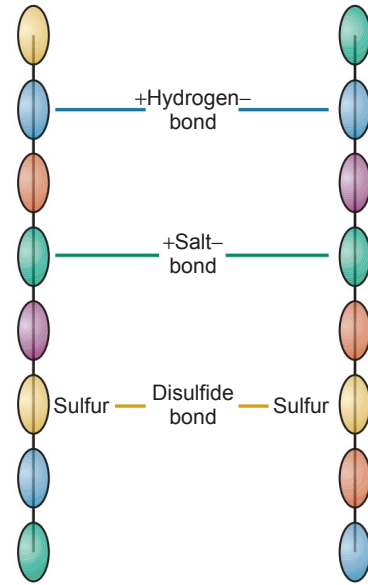
**figure 20-5**  
Peptide bonds (end bonds) link amino acids together in long chains.



**figure 20-6**  
Polypeptide chains are formed when amino acids link together.



**figure 20-7**  
Keratin proteins are long, coiled peptide chains.



**figure 20-8**  
Side bonds cross-link polypeptide chains together.

- **Amino acids** are compounds made up of carbon, oxygen, hydrogen, nitrogen, and sulfur.
- **Peptide bonds**, also known as *end bonds*, are chemical bonds that join amino acids together, end-to-end in long chains, to form a polypeptide chain.
- **Polypeptide chains** (pahl-ee-PEP-tyd CHAYNS) are long chains of amino acids joined together by peptide bonds.
- **Keratin proteins** are long, coiled polypeptide chains.
- **Side bonds** are disulfide, salt, and hydrogen bonds that cross-link polypeptide chains together.



**figure 20-9**  
A correct permanent wave service only alters the side bonds.

### **Keratin Proteins**

Keratin proteins are made of long chains of amino acids linked together end-to-end like beads. The amino acid chains are linked together by peptide bonds (end bonds). These chains of amino acids linked by peptide bonds are called polypeptides. Keratin proteins are made of long, coiled, polypeptide chains, which in turn are comprised of amino acids.

### **Side Bonds**

The cortex is made up of millions of polypeptide chains cross-linked by three types of side bonds: disulfide, salt, and hydrogen. Side bonds are responsible for the elasticity and strength of the hair. Altering these three types of side bonds makes wet setting, thermal styling, permanent waving, curl re-forming, and chemical hair relaxing possible (**figure 20-9**).

### **Disulfide Bonds**

**Disulfide bonds** are strong chemical side bonds formed when the sulfur atoms in two adjacent protein chains are joined together. Although there

are far fewer disulfide bonds than hydrogen or salt bonds, they are the strongest of the three side bonds, accounting for about one-third of the hair's overall strength. Disulfide bonds are not affected by water; however, boiling water can break and alter their appearance. Although the amount of heat used in conventional thermal styling does not break disulfide bonds, caution must be used when using thermal tools with extreme heat because the high heat can cause irreversible damage to the hair.

Altering the chemical and physical changes in disulfide bonds makes permanent waving, curl re-forming, and chemical hair relaxing possible.

### **Salt Bonds**

Salt bonds are relatively weak physical side bonds that are the result of an attraction between negative and positive electrical charges (ionic bonds); they are easily broken by changes in pH, and they re-form when the pH returns to normal levels. Hydrogen bonds can be broken by water, whereas salt bonds are broken by changes in pH levels. Even though salt bonds are far weaker than disulfide bonds, the hair has so many salt bonds that they account for about one-third of the hair's total strength.

### **Hydrogen Bonds**

**Hydrogen bonds** are weak physical side bonds that are also the result of an attraction between opposite electrical charges; they are easily broken by water (wet setting) or heat (thermal styling), and they re-form as the hair dries or cools. Although individual hydrogen bonds are very weak, there are so many of them that they, too, account for about one-third of the hair's total strength.

*After reading the next few sections, you will be able to:*

- LO 1** Explain the four chemical reactions that take place during permanent waving.
- LO 2** Explain the difference between an alkaline wave and a true acid wave.
- LO 3** Explain the purpose of neutralization in permanent waving.
- LO 4** Demonstrate safe and effective perm techniques.

# Demonstrate the Proper Technique for Permanent Waving

**Permanent waving** is a two-step process whereby the hair undergoes a physical change caused by wrapping the hair on perm rods; the hair then undergoes a chemical change caused by the application of permanent



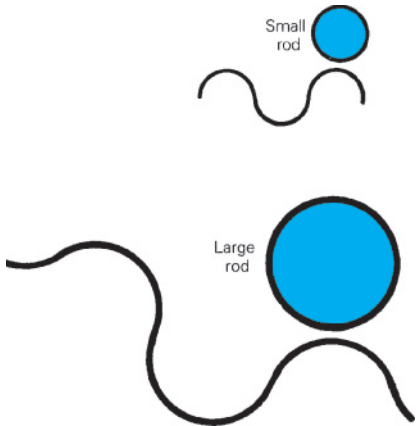
**figure 20-10**  
Elasticity test

waving solution and neutralizer. Because chemical changes are involved, you should always perform an elasticity test before perming the hair (**figure 20-10**).

When performing a permanent waving service, the size of the rod determines the size of the curl. The shape and type of curl are determined by the shape and type of rod and the wrapping method used (**figure 20-11**). Selecting the correct perm rod and wrapping method is crucial to creating a successful permanent wave. Perm rods come in a wide variety of sizes and shapes that can be combined with different wrapping methods to provide an exciting range of hairstyling options.

## The Chemistry of Permanent Waving

Alkaline permanent waving solutions soften and swell the hair, and they open the cuticle, permitting the solution to penetrate into the cortex. **Figure 20-12** illustrates hair saturated with alkaline permanent waving solution (pH 9.4) for 5 minutes. Note the swelling of the cuticle layer. In **figure 20-13**, hair from the same sample has been saturated with acid-balanced permanent waving solution (pH 7.5) for 5 minutes. Note that there is far less swelling of the cuticle layer.



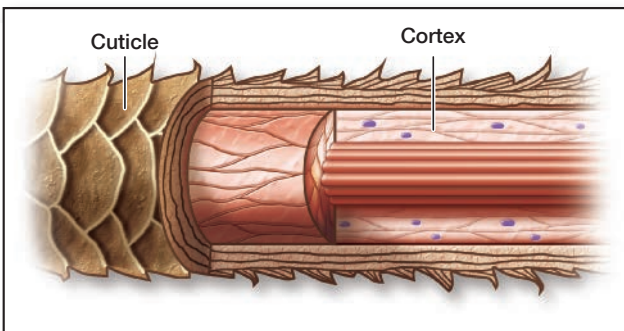
**figure 20-11**  
The diameter of the rod determines the size of the curl.

## Reduction Reaction

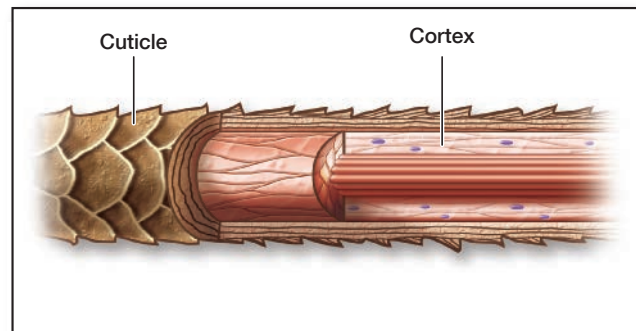
Once in the cortex, the waving solution breaks the disulfide bonds through a chemical reaction called reduction. A reduction reaction involves either the addition of hydrogen or the removal of oxygen. The reduction reaction in permanent waving is due to the addition of hydrogen.

The chemical process of permanent waving involves the following reactions:

- A disulfide bond joins the sulfur atoms in two adjacent polypeptide chains.
- Permanent wave solution breaks a disulfide bond by adding a hydrogen atom to each of its sulfur atoms.
- The sulfur atoms attach to the hydrogen atom from the permanent waving solution, breaking their attachment to each other.



**figure 20-12**  
Hair that has been saturated with alkaline waving solution (9.4 pH) for five minutes



**figure 20-13**  
Hair that has been saturated with acid-balanced waving solution (7.5 pH) for five minutes

- Once the disulfide bond is broken, the polypeptide chains can form into their new curled shape. Reduction breaks disulfide bonds (figure 20-14) and oxidation reforms them.

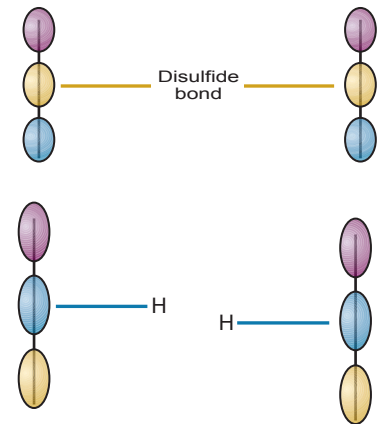
All permanent wave solutions contain a reducing agent. The reducing agent, commonly referred to as *thio*, is used in permanent waving solutions. It contains a *thiol* (THY-ohl), which is a particular group of compounds, along with carboxylic acid.

**Thioglycolic acid** (thy-oh-GLY-kuh-lik), a colorless liquid with a strong, unpleasant odor, is the most common reducing agent in permanent wave solutions. The strength of the permanent waving solution is determined primarily by the concentration of thio. Stronger perms have a higher concentration of thio, which means that more disulfide bonds are broken compared to weaker perms.

Because acids do not swell the hair nor penetrate into the cortex, it is necessary for manufacturers to add an alkalizing agent. The addition of ammonia to thioglycolic acid produces a new chemical named **ammonium thioglycolate (ATG)** (uh-MOH-nee-um thy-oh-GLY-kuh-layt), which is alkaline and is the active ingredient or reducing agent in alkaline permanents.

The degree of alkalinity (pH) is a second factor in the overall strength of the waving solution. Coarse hair with a strong, resistant cuticle layer needs the additional swelling and penetration that is provided by a stronger and more highly alkaline waving solution.

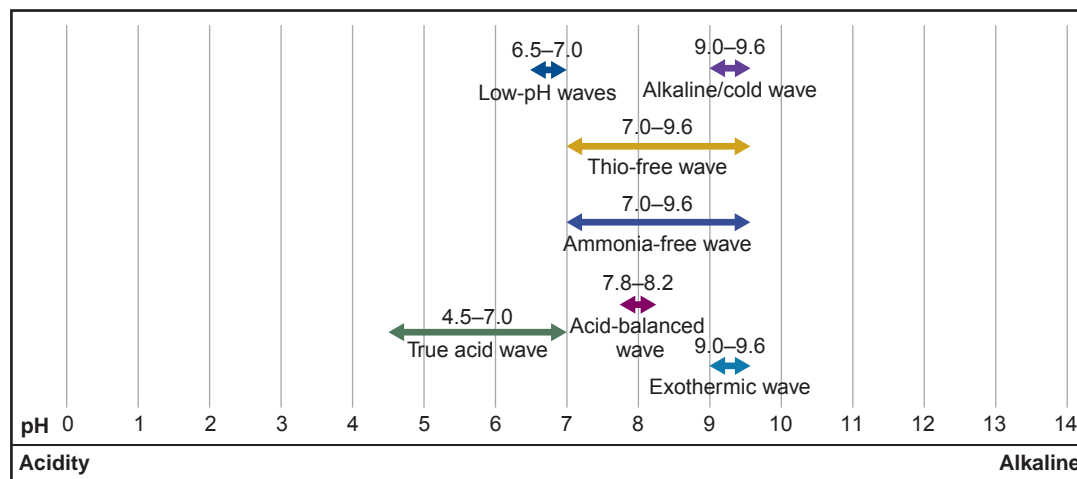
By contrast, porous hair, or hair with a damaged cuticle layer, is easily penetrated and could be damaged by a highly alkaline permanent waving solution. The alkalinity of the perm solution should correspond to the resistance, strength, and porosity of the cuticle layer.



**figure 20-14**  
A reduction reaction breaks disulfide bonds during the permanent waving process.

## Types of Permanent Waves

A variety of permanent waves are available in salons today (figure 20-15). Brief descriptions of the most commonly used perms follow.



**figure 20-15**  
Depending on the type and formulation, perm solutions can vary from being slightly acidic to highly alkaline.



## ACTIVITY

Using pH testing strips, test various liquids, including acid waves, acid-balanced waves, lemon juice, and more. Track and evaluate the results for acidity and alkalinity and share with your classmates. Discuss which liquids have a higher or lower pH value?

### Alkaline Waves or Cold Waves

**Alkaline waves**, also known as *cold waves*, were developed in 1941. They have a pH between 9.0 and 9.6. Ammonium thioglycolate (ATG) is the reducing agent, and it processes at room temperature without the addition of heat.

### Acid Waves

**Glyceryl monothioglycolate (GMTG)** (GLIS-ur-il mon-oh-thy-oh-GLY-koh-layt) is the main active ingredient in true acid and acid-balanced waving lotions. It has a low pH and is the primary reducing agent in most acid waves. Most acid waves also contain ATG, just like a cold wave. Although the low pH of acid waves may seem ideal, repeated exposure to GMTG is known to cause allergic sensitivity in both hairstylists and clients.

### True Acid Waves

All acid waves have three separate components: permanent waving solution, activator, and neutralizer. The activator tube contains GMTG, which must be added to the permanent waving solution before applying to the hair. The first true acid waves were introduced in the early 1970s. **True acid waves** have a pH between 4.5 and 7.0 and require heat to process; they process more slowly than alkaline waves, and they do not usually produce as firm a curl as alkaline waves. GMTG, which has a low pH, is the active ingredient.

Since acidic solutions contract the hair, you may be wondering how a true acid wave, with a pH below 7.0, can cause the hair to swell. Although a pH of 7.0 is neutral on the pH scale, a pH of 5.0 is neutral for hair. The pH of any substance is always a balance of both acidity and alkalinity. Even the strongest acid also contains some alkalinity. (To review the pH scale, see Chapter 12, Basics of Chemistry.) Acidity increases when alkalinity decreases, and alkalinity increases when acidity decreases (figure 20-16).

Because every step in the pH scale represents a tenfold change in pH, a pH of 7.0 is 100 times more alkaline than the pH of hair (5.0). Even pure water with a pH of 7.0 can damage the hair and cause it to swell.

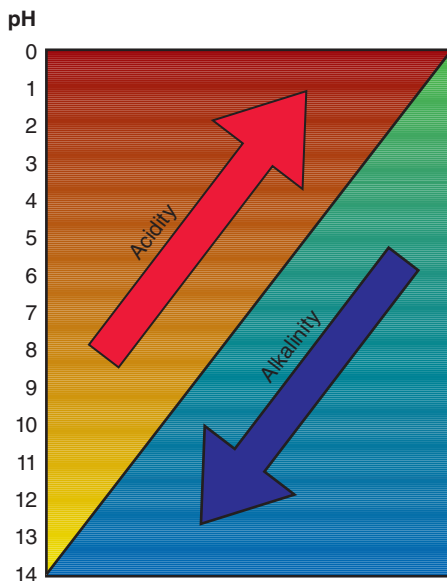
### Acid-Balanced Waves

In order to permit processing at room temperature and produce a firmer curl, the strength and pH of acid waves have increased steadily over the years. Most of the acid waves found in today's salons have a pH between 7.8 and 8.2. Modern acid waves are actually **acid-balanced waves**, which are permanent waves that have a 7.0 or neutral pH; because of their higher pH, they process at room temperature, do not require the added heat of a hair dryer, process more quickly, and produce firmer curls than true acid waves.

### Exothermic Waves

An exothermic chemical reaction produces heat. **Exothermic waves** (Eks-oh-THUR-mik WAYVZ) create an exothermic chemical reaction that heats up the waving solution and speeds up the processing.

All exothermic waves have three components: permanent waving solution, activator, and neutralizer. The permanent waving solution



**figure 20-16**  
Acidity increases as alkalinity decreases, and alkalinity increases as acidity decreases.

contains thio, just as in a cold wave. The activator contains an oxidizing agent (usually hydrogen peroxide) that must be added to the permanent waving solution immediately before use. Mixing an oxidizer with the permanent waving solution causes a rapid release of heat and an increase in the temperature of the solution. The increased temperature increases the rate of the chemical reaction, which shortens the processing time.

### **Endothermic Waves**

An endothermic chemical reaction is one that absorbs heat from its surroundings. **Endothermic waves** (en-duh-THUR-mik wayvz) are activated by an outside heat source, usually a conventional hood-type hair dryer.

Endothermic waves will not process properly at room temperature. Most true acid waves are endothermic and require the added heat of a hair dryer.

### **Ammonia-Free Waves**

**Ammonia-free waves** are perms that use an ingredient that does not evaporate as readily as ammonia, so there is very little odor associated with their use.

Aminomethylpropanol (uh-MEE-noh-meth-yl-pro-pan-all), or AMP, and monoethanolamine (mahn-oh-ETH-an-all-am-een), or MEA, are examples of alkanolamines that are used in permanent waving solutions as a substitute for ammonia. Even though these solutions may not smell as strong as ammonia, they can still be every bit as alkaline and just as damaging. Remember: Ammonia-free does not necessarily mean damage-free.

### **Thio-Free Waves**

**Thio-free waves** (THY-oh FREE WAYVZ) use an ingredient other than ATG, such as cysteamine (SIS-tee-uh-meen) or mercaptamine (mer-KAPT-uh-meen), as the primary reducing agent. Even though these thio substitutes are not technically ATG, they are still thio compounds.


Although thio-free wave products are often marketed as damage-free, this is not necessarily true. At a high concentration, the reducing agents in thio-free waves can be just as damaging as thio.


### **Low-pH Waves**

The use of sulfates, sulfites, and bisulfites presents an alternative to ATG known as **low-pH waves**. Sulfites work at a low pH. They have been used in perms for years, but they have never been very popular. Permanents based on sulfites are very weak and do not provide a firm curl, especially on strong or resistant hair. Sulfite permanents are usually marketed as body waves or alternative waves.

## **Selecting the Right Type of Perm**

It is extremely important to select the right type of perm for each client. Each client's hair has a distinct texture and condition, so individual needs must always be addressed. After a thorough consultation, you should be able to determine which type of permanent is best suited to your client's

 **CAUTION**  
Accidentally mixing the contents of the activator tube with the neutralizer instead of the permanent waving solution will cause a violent chemical reaction that can cause injury, especially to the eyes. So always use caution!

 **CAUTION**  
The ingredients, strength, and pH of permanent wave solutions differ among manufacturers and can vary considerably, even within the same category. Always check the manufacturer's instructions and the product's Material Safety Data Sheet (MSDS) for accurate, detailed information.

hair type, condition, and desired results. **Table 20-1** lists the most common types of permanent waves along with recommended hair type for each. These are only general guidelines. Perms for use on color-treated hair are not necessarily safe for damaged or bleached hair. Also, hair that has been treated with a semipermanent color, which coats the hair, is not as porous as hair treated with permanent color and may actually appear more resistant.

### **Permanent Wave Processing**

The strength of any permanent wave is based on the concentration of its reducing agent. In turn, the amount of processing is determined by the strength of the permanent wave solution. If a mild permanent wave solution is used on coarse hair, there may not be enough hydrogen ions to break the necessary number of disulfide bonds, no matter how long the permanent processes. In other words, the perm solution chosen would be incorrect. But the same mild solution may be exactly right for fine hair with fewer disulfide bonds. On the other hand, a strong solution, which releases many hydrogen atoms, may be perfect for coarse hair but too harsh and damaging for fine hair. The amount of processing should be determined by the strength of the solution, not necessarily the perm's processing time.

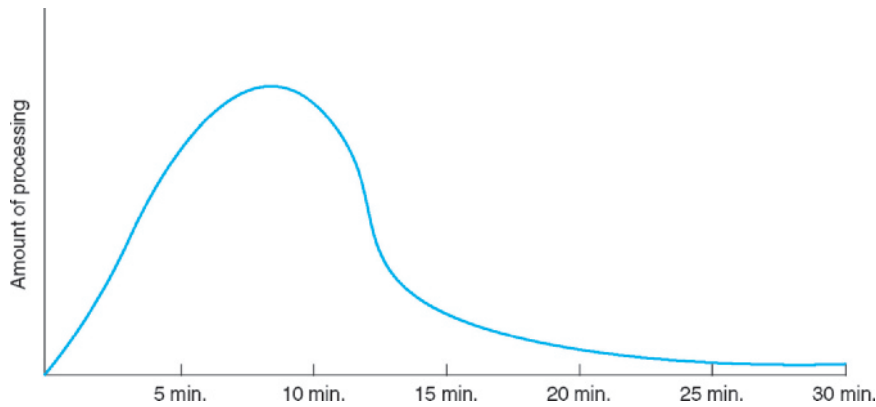
In permanent waving, most of the processing takes place as soon as the solution penetrates the hair, within the first 5 to 10 minutes. The additional processing time allows the polypeptide chains to shift into their new configuration.

If you find that your client's hair has been overprocessed, it probably happened within the first 5 to 10 minutes of the service, and a weaker

table 20-1

## PERMANENT WAVE CATEGORIES

Perm Type	Active Ingredient	Process	Recommended Hair Type
alkaline/cold wave pH: 9.0 to 9.6	ammonium thioglycolate (ATG)	room temperature	coarse, thick, or resistant
exothermic wave pH: 9.0 to 9.6	ammonium thioglycolate (ATG)	exothermic	coarse, thick, or resistant
true acid wave pH: 4.5 to 7.0	glyceryl monothioglycolate (GMTG)	endothermic	extremely porous or very damaged hair
acid-balanced wave pH: 7.8 to 8.2	glyceryl monothioglycolate (GMTG)	room temperature	porous or damaged hair
ammonia-free wave pH: 7.0 to 9.6	monoethanolamine (MEA)/ aminomethylpropanol (AMP)	room temperature	porous to normal
thio-free wave pH: 7.0 to 9.6	mercaptamine/cysteamine	room temperature	porous to normal
low-pH waves pH: 6.5 to 7.0	ammonium sulfite/ammonium bisulfite	endothermic	normal, fine, or damaged



**figure 20-17**  
Average processing times

permanent waving solution should have been used. If the hair is not sufficiently processed after 10 minutes, it may require a reapplication of waving solution. Resistant hair requires a stronger solution, a higher pH, and a more thorough saturation.

It must be noted that saturation of the hair is essential to ensure proper processing for a permanent wave service regardless of the strength of the solution. Resistant hair may not become completely saturated with just one application of waving solution due to the density of the hair's structure. Therefore, reapply the solution slowly and repeatedly until the hair looks wet and stays wet!

### **Overprocessed Hair**

A thorough saturation with a stronger (more alkaline) solution will break more disulfide bonds and process the hair more, but processing the hair more does not necessarily translate into more curl. A properly processed permanent wave should break and rebuild approximately 50 percent of the hair's disulfide bonds (figure 20-17).

If too many disulfide bonds are broken, the hair may not hold the desired curl. Weak hair equals a weak curl. Overprocessed hair usually has a weak curl pattern or may appear to be absolutely straight. Since the hair at the scalp is usually stronger than the hair at the ends, overprocessed hair is usually curlier at the scalp and straighter at the ends (figure 20-18). If the hair is overprocessed, further processing will make it straighter and cause further damage, including breakage.

### **Underprocessed Hair**

Underprocessed hair is the exact opposite of overprocessed hair. If too few disulfide bonds are broken, the hair will not be sufficiently softened and will not hold the desired curl.

Underprocessed hair usually has a very weak curl, but it may also be straight. Since the hair at the scalp is usually stronger than at the ends, underprocessed hair is usually straighter at the scalp and curlier at the ends (figure 20-19). If the hair is underprocessed, further processing will make it curlier.



**figure 20-18**  
Overprocessed hair



**figure 20-19**  
Underprocessed hair

### **Permanent Waving (Thio) Neutralization**

In permanent waving, **thio neutralization** (THY-oh NEW-truhl-eyez-ay-shun) stops the action of the waving solution and rebuilds the hair into its new curly form. Neutralization performs two important functions:

- Any waving solution that remains in the hair is deactivated (neutralized).
- Disulfide bonds that were broken by the waving solution are rebuilt.

The neutralizers used in permanent waving are oxidizers. In fact, the word *neutralizer* is not accurate because the chemical reaction involved is actually oxidation. The most common neutralizer is hydrogen peroxide. Concentrations vary between 5 volume (1.5 percent) and 10 volume (3 percent).

**Thio Neutralization: Stage One** The first function of permanent waving (thio) neutralization is the deactivation, or neutralization, of any waving lotion that remains in the hair after processing and rinsing. The chemical reaction involved is called oxidation. Given that water's (H<sub>2</sub>O) pH is between 6 and 7, rinsing begins the neutralizing process. Proper rinsing and blotting are important!

Prior to applying the neutralizer, properly rinsing the hair after the permanent has processed removes any remaining perm solution. Oxidative reactions can also lighten hair color, especially at an alkaline pH. To avoid scalp irritation and unwanted lightening of hair color, always rinse perm solution from the hair for at least 5 minutes, and then blot the hair with towels to remove as much moisture as possible. Excess water left in the hair reduces the effectiveness of the neutralizer.

A successful perm requires knowledge, time, and patience:

- Always rinse the hair with warm water, never hot water.
- Always use a gentle stream of water, never a strong blast of water.
- Never apply pressure to the rods while rinsing out the solution.
- Always begin rinsing at the area where you first applied the perm solution; with the most fragile areas typically at the temple and hairline.
- Always check the nape area to ensure that you are thoroughly rinsing the bottom rods.
- Always rinse for the time recommended by the manufacturer.
- Always smell the hair after the recommended time has elapsed; if it still smells like perming solution, continuing rinsing until the odor is gone.
- Always gently blot the hair with a dry towel; never firmly or aggressively blot the hair as it could disrupt the curl-blocking pattern and alter the final wave or curl.
- Always check for excess moisture, especially at the nape of the neck where water tends to accumulate (pull of gravity), prior to neutralizing the hair.
- Always adjust any rods that have become loose or have drifted out of alignment prior to applying the neutralizer.

Some manufacturers recommend the application of a pre-neutralizing conditioner after rinsing and blotting, just before application of the neutralizer. An acidic liquid protein conditioner can be applied to the hair and dried under a warm hair dryer (hair is uncovered, always follow manufacturer's instructions) for 5 minutes or more prior to neutralization. This added step is especially beneficial for very damaged hair because it strengthens the hair prior to neutralization. Always follow the manufacturer's directions and the procedures approved by your instructor.

**Thio Neutralization: Stage Two** As discussed previously, permanent waving solution breaks disulfide bonds by adding hydrogen. Thio neutralization rebuilds the disulfide bonds by removing the hydrogen that was added by the permanent waving solution (figure 20-20a). The hydrogen atoms are strongly attracted to the oxygen in the neutralizer and release their bond with the sulfur atoms and join with the oxygen (figure 20-20b). Each oxygen atom joins with two hydrogen atoms to rebuild one disulfide bond, forming a water molecule. The water is removed in the final rinse. Side bonds are then re-formed into their new shape as different pairs (figure 20-21).

## Permanent Waving Procedures

### Preliminary Test Curls

Preliminary test curls help you determine how your client's hair will react to a perm. It is advisable to do preliminary test curls to assess what the final curl pattern will look like. This is especially important if the hair appears damaged, dehydrated, color treated, or if there is any uncertainty about the results.

Preliminary test curls provide the following information and answer the following questions:

- Correct processing time for the best curl development.
- Results you can expect from the type of perm solution selected.
- Curl results for the rod size and wrapping technique you are planning to use.
- How much color will be removed from the process if the client has color-treated hair.
- Will the integrity of the hair be compromised?
- Did the hair break? Is it dry? frizzy?
- Is the client satisfied with the shape and hold of the curl?

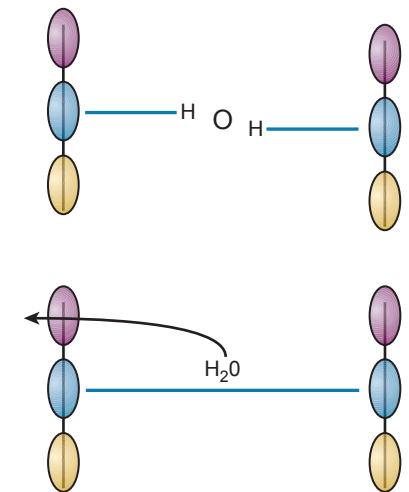
### **P** 20-1 Preliminary Test Curl for a Permanent Wave See page 629

## Types of Rods

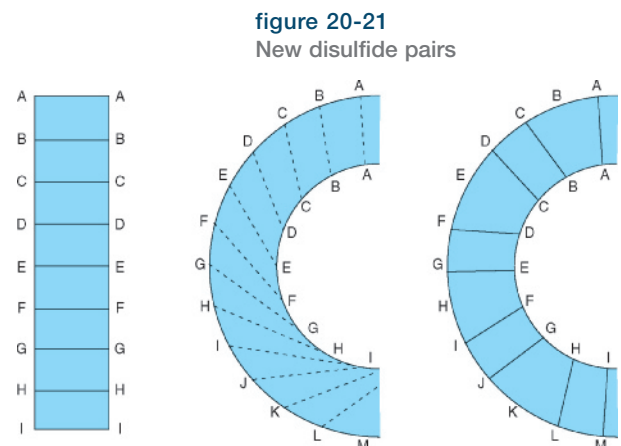
**Concave rods** (khan-KAYV RAHDZ) are the most common type of perm rod; they have a smaller diameter

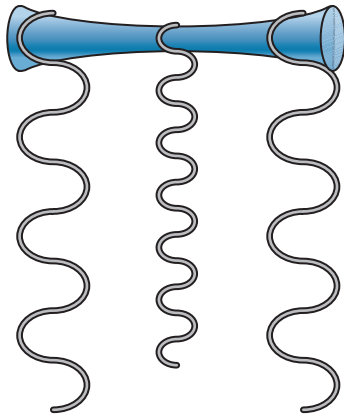


**figure 20-20a**  
Thio neutralization rebuilds the disulfide bonds by removing the hydrogen that was added by the permanent waving solution.

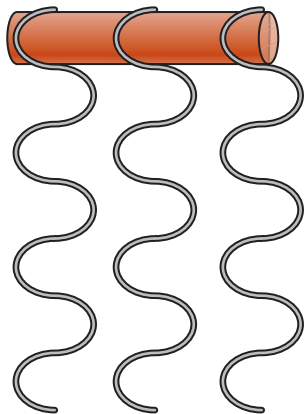


**figure 20-20b**  
Oxidation reaction of thio neutralizers





**figure 20-22**  
Concave rods create curl that is tightest in the center.



**figure 20-23**  
Straight rods create curl that is tightest on the ends and looser towards the scalp.

in the center that increases to a larger diameter on the ends. Concave rods produce a tighter curl in the center, and a looser curl on either side of the strand (**figure 20-22**).

**Straight rods** are equal in diameter along their entire length or curling area. This produces a uniform curl along the entire width of the strand (**figure 20-23**).

Both concave and straight rods come in different lengths to accommodate different sections on the head. Short rods, for instance, can be used for wrapping small and awkward sections where long rods would not fit.

**Soft bender rods** are usually about 12 inches (30.5 centimeters) long with a uniform diameter along the entire length of the rod. These soft foam rods have a flexible wire inside that permits them to be bent into almost any shape (**figure 20-24**).

The **loop rod**, also known as *circle rod*, is usually about 12 inches (30.5 centimeters) long with a uniform diameter along the entire length of the rod. After the hair is wrapped, the rod is secured by fastening the ends together to form a loop (**figure 20-25**).

Today, many perms are performed with large rollers, rag rollers, or other tools in order to achieve large, loose curls and waves. Larger tools are also used for root perms, in which only the base of the hair is permed to create volume and lift without curl.

## End Papers

**End papers**, also known as *end wraps*, are thin, absorbent papers used to control the ends of the hair when wrapping and winding hair on the perm rods. End papers should extend beyond the ends of the hair to keep them smooth and straight and to prevent fishhooks (hair that is bent up at the ends). The most common end-paper techniques are the double flat wrap, single flat wrap, and bookend wrap.

- The **double flat wrap** is a perm wrap in which one end paper is placed under and another is placed over the strand of hair being wrapped.



**figure 20-24**  
Loop rods atop soft bender rods



**figure 20-25**  
Loop rods



**figure 20-26**  
Double flat wrap



**figure 20-27**  
Single flat wrap



**figure 20-28**  
Bookend wrap

Both papers extend past the hair ends. This wrap provides the most control over the hair ends and also helps keep them evenly distributed over the entire length of the rod (**figure 20-26**).

- The **single flat wrap** is similar to the double flat wrap but uses only one end paper, placed over the top of the strand of hair (**figure 20-27**).
- The **bookend wrap** uses one end paper folded in half over the hair ends like an envelope. The bookend wrap eliminates excess paper and can be used with short rods or with very short lengths of hair. When using this wrap method, be careful to distribute the hair evenly over the entire length of the rod. Avoid bunching the hair in the fold of the paper—hair should be in the center—to produce an even curl (**figure 20-28**).

## Sectioning for a Perm

All perm wraps begin by sectioning the hair into panels. The size, shape, and direction of these panels vary based on the wrapping pattern and the type and size of the rod being used. **Base sections** are subsections of panels into which the hair is divided for perm wrapping; one rod is normally placed on each base section (**figure 20-29**). The size of each base section is usually the length and width of the rod being used.

## Base Placement

**Base placement** refers to the position of the rod in relation to its base section; base placement is determined by the angle at which the hair is wrapped. Rods can be wrapped on base, half off base, or off base.

For **on-base placement**, the hair is wrapped 45-degrees beyond perpendicular to its base section, and the rod is positioned on its base (**figure 20-30**). Although on-base placement may result in greater volume at the scalp area, any increase in volume will be lost as soon as the hair begins to grow out. Caution should be used with on-base placement because the additional stress and tension can mark or break the hair.



**figure 20-29**  
All perm wraps section the hair into panels. These panels are then divided into base sections.

**✓ HERE'S A TIP**  
Keeping the hair evenly damp with water throughout wrapping helps the end papers cling to the hair.

**⚠ CAUTION**  
Using a base section that is wider than the perm rod can create an uneven curl pattern and undue tension on the hair.





**figure 20-30**  
On-base placement



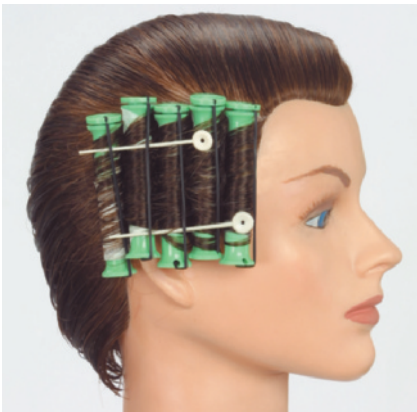
**figure 20-31**  
Half off-base placement



**figure 20-32**  
Off-base placement

In **half off-base placement**, the hair is wrapped at an angle of 90 degrees or perpendicular to its base section, and the rod is positioned half off its base section (**figure 20-31**). Half off-base placement minimizes stress and tension on the hair.

**Off-base placement** refers to wrapping the hair at 45 degrees below the center of the base section, so that the rod is positioned completely off its base (**figure 20-32**). Off-base placement creates the least amount of volume and results in a curl pattern that begins farthest away from the scalp.



**figure 20-33a**  
Vertical base direction

## Base Direction

**Base direction** refers to the angle at which the rod is positioned on the head: horizontally, vertically, or diagonally (**figures 20-33a** and **20-33b**); base direction also refers to the directional pattern in which the hair is wrapped. Although directional wraps can be wrapped backward, forward, or to one side, it is important to remember that wrapping with the natural direction of hair growth causes the least amount of stress to the hair. Wrapping against the natural growth pattern can produce a band mark or breakage at the base of the curl.



**figure 20-33b**  
Horizontal base direction

## Wrapping Techniques

There are two basic techniques of wrapping the hair around the perm rod: the croquignole and spiral technique.

A **croquignole perm wrap** (KROH-ken-ohl) is wrapped from the ends to the scalp in overlapping concentric layers (**figure 20-34**). Because the hair is wrapped perpendicular to the length of the rod, each new layer of hair is wrapped on top of the previous layer, increasing the size (diameter) of the curl with each new overlapping layer. This produces a tighter curl at the ends, and a larger curl at the scalp. Longer, thicker hair increases this effect.

In a **spiral perm wrap** the hair is wrapped at an angle other than perpendicular to the length of the rod (**figure 20-35**), which causes the hair to spiral along the length of the rod, like the stripes on a candy cane.

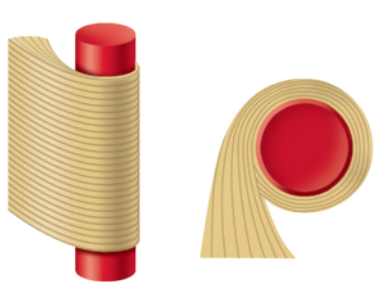


figure 20-34  
Croquignole perm wrap

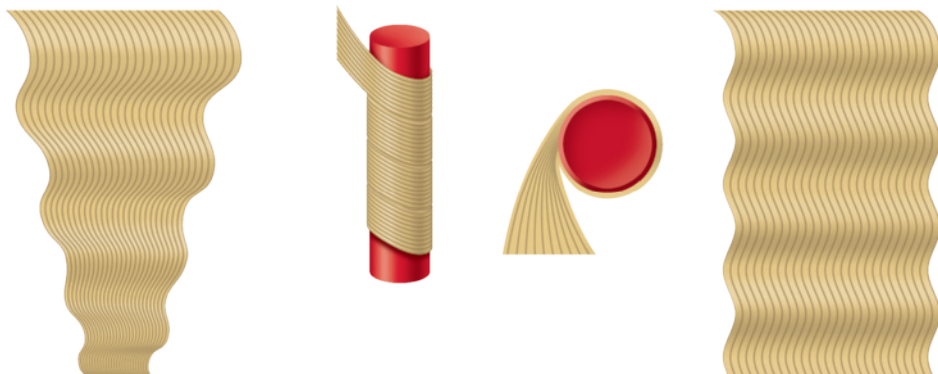


figure 20-35  
Spiral perm wrap

A spiral perm wrap may partially overlap the preceding layers. As long as the angle remains constant, any overlap will be uniform along the length of the rod and the strand of hair (figure 20-36). This wrapping technique causes the size (diameter) of the curl to remain constant along the entire length of the strand and produces a uniform curl from the scalp to the ends.

## Wrapping Patterns

When doing a permanent waving service, hair is “wrapped” around a hard roller or rod to create curls and waves on straight hair. Wrapping patterns and different types of rods are combined to create a wide variety of specialized perm wraps, thus providing an unlimited array of styling options. For extra-long hair, you may need to use a **double-rod wrap**, also known as *piggyback wrap*, in which the hair is wrapped on one rod from the scalp to midway down the hair shaft (figure 20-37), and another rod is used to wrap the remaining hair strand in the same direction. This allows for better penetration of the processing solution and for a tighter curl near the scalp than that provided by a conventional croquignole wrap.



figure 20-36  
Spiral wrap on bender rods



figure 20-37  
Piggyback wrap



figure 20-38  
Basic perm wrapping pattern

The **basic permanent wrap**, also known as *straight set wrap*, is a wrapping pattern in which all the rods within a panel move in the same direction and are positioned on equal-sized bases; all the base sections are horizontal and are the same length and width as the perm rod. The **base control** is the position of the tool in relation to its base section, determined by the angle at which the hair is wrapped (figure 20-38).

**P 20-2** Permanent Wave and Processing Using a Basic Permanent Wrap See page 631

In the **curvature permanent wrap**, partings and bases radiate throughout the panels to follow the curvature of the head. This wrapping pattern uses pie-shaped base sections in the curvature areas (figure 20-39).

**P 20-3** Permanent Wave and Processing Using a Curvature Permanent Wrap See page 635

The **bricklay permanent wrap** is similar to the actual technique of bricklaying; base sections are offset from each other row by row, to prevent noticeable splits and to blend the flow of the hair. Different bricklay patterns use different starting points (front hairline, occipital area, and crown), and these starting points affect the directional flow of the hair. The bricklay permanent wrap can be used with various combinations of sectioning, base control, base direction, wrapping techniques, and perm rods (figure 20-40).

**P 20-4** Permanent Wave and Processing Using a Bricklay Permanent Wrap See page 638

The **weave technique** uses zigzag partings to divide base areas. It can be used throughout the entire perm wrap or only in selected areas. This technique is very effective for blending between perm rods with opposite base directions. It can also be used to create a smooth transition from the rolled areas into the unrolled areas of a partial perm. The weave technique can be used with a variety of base directions, wrapping patterns, and perm rods (figure 20-41).

**P 20-5** Permanent Wave and Processing Using a Weave Technique See page 640

The double-rod wrap technique (piggyback wrap), discussed earlier, is a wrap technique whereby extra-long hair is wrapped on one rod from the scalp to midway down the hair shaft. Another rod is then used to wrap the remaining hair strand in the same direction. The upper half of the strand is wrapped around one rod, and then the lower half of the same strand is wrapped around a second rod in an alternate direction and stacked (piggybacked) on top of the first.

**P 20-6** Permanent Wave and Processing Using a Weave Double-Rod or Piggyback Technique See page 642

The double-rod wrap technique doubles the number of rods used. Using more rods increases the amount of curl in the finished perm, making this technique especially effective on long hair. Rods of various diameters may be used to create different effects. The double-rod wrap technique can also be used with a variety of base directions, wrapping patterns, and perm rods.



figure 20-39  
Curvature perm wrapping pattern



figure 20-40  
Bricklay perm wrapping pattern



**figure 20-41**  
Weave technique



**figure 20-42**  
Spiral perm wrap

In a spiral perm wrap, the hair is wrapped at an angle other than perpendicular to the length of the rod. This wrapping technique produces a uniform curl from the scalp to the ends. Longer, thicker hair will benefit most from this effect (**figure 20-42**).

### **P** 20-7 Permanent Wave and Processing Using a Spiral Wrap Technique *See page 644*

The spiral wrapping technique can be used with a variety of base sections, base directions, and wrapping patterns. Base sections may be either horizontal or vertical length of the hair and do not affect the finished curl. Conventional rods, bendable soft foam rods, and loop rods can all be used for this technique, depending on the length of the rod and the hair.

#### **Partial Perms**

If your client wants a perm but does not wish the entire head of hair to be curled, a partial perm may be the answer. Partial perms also allow you to give a perm when some of the hair is too short to roll on rods (**figure 20-43**).

Partial perms can be used for:

- Male and female clients who have long hair on the top and crown but very short hair with tapered sides and nape.
- Clients who only need volume and lift in certain areas.
- Clients who desire a hairstyle with curls along the perimeter but a smooth, sleek crown.

Partial perms rely on the same techniques and wrapping patterns as those used with other perms, but there are additional considerations:

- In order to make a smooth transition from the rolled section to the unrolled section, use a larger rod for the last rod next to an unrolled section.
- Applying waving solution to unrolled hair may straighten it or make it difficult to style. To protect the unrolled hair, apply a protective barrier cream to the unrolled section before applying the waving lotion.



**figure 20-43**  
Partial perm wrap

## Perms for Men

Many male clients are looking for the added texture, fullness, style, and low maintenance that only a perm can provide (figure 20-44). Perms help thin hair look fuller, make straight or coarse hair more manageable, and help control stubborn cowlicks. Although men's and women's hairstyles may be different, the techniques for permanent waving are essentially the same.

## Safety Precautions for Permanent Waving

- Always protect your client's clothing. Have the client change into a gown, or use a waterproof chemical cape, and double drape with towels to absorb accidental spills.
- Do not give a permanent to any client who has experienced an allergic reaction to a previous permanent.
- Always examine the scalp before the perm service. Do not proceed if there are any skin abrasions or signs of scalp disease.
- Do not perm hair that is excessively damaged or shows signs of breakage.
- Do not attempt to perm hair that has been previously treated with hydroxide relaxers.
- If there is a possibility that metallic haircolor has been previously used on the hair, perform a test for metallic salts.
- Always apply protective barrier cream around the client's hairline and ears prior to applying permanent waving solution.
- Do not dilute or add anything to the waving lotion or neutralizer unless specified in the manufacturer's directions.
- Keep waving lotion out of the client's eyes. In case of accidental exposure, rinse thoroughly with cool water.
- Always follow the manufacturer's directions.
- Wear gloves when applying solutions.
- Immediately replace cotton or towels that have become wet with solution.
- Do not save any opened, unused waving solution or neutralizer. When not used promptly, these chemicals may change in strength and effectiveness.
- Hair that has been permanently waved should be shampooed and conditioned with products formulated for chemically treated hair.

**figure 20-44**

Many male clients are looking for the added texture, fullness, style, and low maintenance that only a perm can provide.



## Metallic Salts

Some home haircoloring products contain metallic salts that are not compatible with permanent waving. Metallic salts leave a coating on the hair that may cause uneven curls, severe discoloration, or hair breakage.

Metallic salts are more commonly found in men's haircolors that are sold for home use. Haircolor restorers and progressive haircolors that darken the hair gradually with repeated applications are the most likely to contain metallic salts. If you suspect that metallic salts may be present on the hair, perform the following test.

In a glass or plastic bowl, mix 1 ounce (29.57 milliliters) of 20-volume peroxide with 20 drops of 28-percent ammonia. Immerse at least 20 strands of hair in the solution for 30 minutes. If metallic salts are not present, the hair will lighten slightly and you may proceed with the service. If metallic salts are present, the hair will lighten rapidly. The solution may get hot and give off an unpleasant odor, indicating that you should not proceed with the service.

*After reading the next few sections, you will be able to:*

- LO5 Describe how thio relaxers straighten the hair.
- LO6 Describe how hydroxide relaxers straighten the hair.
- LO7 Demonstrate safe and effective hydroxide relaxing techniques.

## Demonstrate the Proper Technique for Chemical Hair Relaxers

**Chemical hair relaxing** is a process that rearranges the structure of curly hair into a straighter or smoother form. Whereas permanent waving curls straight hair, chemical hair relaxing straightens curly hair (figure 20-45).

Other than their objectives being quite different, the permanent wave and relaxer services are very similar. In fact, the chemistry of relaxers and permanent wave is exactly the same. Both services change the shape of the hair by breaking disulfide bonds.

The most common types of chemical hair relaxers are ammonium thio, guanidine hydroxide, and sodium hydroxide. It should be noted that thio and guanidine are usually classified as no-lye relaxers and sodium hydroxide is considered to be a lye-based relaxer.

### Curly Hair

There are varying degrees and types of curly hair. Some curly hair types are extremely curly, where the hair grows in long twisted spirals, or coils. Cross-sections are highly elliptical and vary in shape and thickness along their lengths. Compared to straight or wavy hair, which tends to possess a



figure 20-45  
Relaxed hair



## CAUTION

Relaxers are extremely alkaline and can literally melt or dissolve hair if used incorrectly. The sodium hydroxide in most relaxers is the same ingredient used in depilatories (products used for temporary hair removal); however, the strength is different.

fairly regular and uniform diameter along a single strand, extremely curly hair is irregular, exhibiting varying diameters along a single strand.

The thinnest and weakest sections of the hair strands are located at the twists. These sections are also bent at an extremely sharp angle and will be stretched the most during relaxing. A chain is only as strong as its weakest link, and hair is only as strong as its weakest section. Hair breaks at its weakest point. Extremely curly hair usually breaks at the twists because of the inherent weakness in that section and because of the extra physical force that is required to straighten it.

## Thio Relaxers

**Thio relaxers** (THY-oh ree-LAX-UHRS) use the same ATG that is used in permanent waving but at a higher concentration and a higher pH (above 10). Thio relaxers are also thicker, with a higher **viscosity** (vis-KAHS-ut-ee)—the measurement of the thickness or thinness of a liquid that affects how the fluid flows—making them more suitable for application as a relaxer.

Thio relaxers break disulfide bonds and soften hair, just as in permanents. After enough bonds are broken, the hair is straightened into its new shape, and the relaxer is rinsed from the hair. Blotting comes next, followed by a neutralizer. The chemical reactions of thio relaxers are identical to those in permanent waving.

### **Thio Neutralization**

The neutralizer used with thio relaxers is an oxidizing agent, usually hydrogen peroxide, just as in permanents. The oxidation reaction caused by the neutralizer rebuilds the disulfide bonds that were broken by the thio relaxer.

### **Thio Relaxer Application**

The application steps for thio relaxers are the same as those for hydroxide relaxers, although the neutralization procedure is different. Relaxer may be applied with bowl and brush or the back of a hard rubber comb. Although all thio relaxers follow the same procedures, different application methods are used for virgin relaxers and retouch relaxers.

Follow the same preparation steps as virgin hydroxide relaxers (see page 619) with the possible exception of a light shampoo before a thio relaxer. Do not forget to perform an analysis of the client's hair and scalp. Test the hair for elasticity and porosity on several areas of the head. If the hair has poor elasticity, do not perform a relaxer service.

**P 20-8** Applying Thio Relaxer to Virgin Hair *See page 647*

**P 20-9** Thio Relaxer Retouch *See page 650*

## Japanese Thermal Straighteners

Japanese thermal straightening, sometimes called thermal reconditioning or TR, combines use of a thio relaxer with flat ironing. When first introduced, they were called thermal ionic reconstructors. Each

manufacturer has slightly different procedures. Generally, after the hair is shampooed and conditioned, the straightener is applied to sections, distributed evenly, and processed until the desired degree of curl or frizz reduction is reached. Then the hair is rinsed thoroughly for about 10 minutes, conditioned, and blown dry until it is completely dry. Next, each section is flat ironed; several passes of the flat iron are required for each section. (The added heat and mechanical pressing helps to make these formulas more effective than standard thio relaxers.) The hair is then neutralized and blown dry.

The service can take several hours and is not always appropriate for extremely curly hair or some color-treated hair. Thermal reconditioning is considered a specialty, and many manufacturers require certification in their particular procedure.

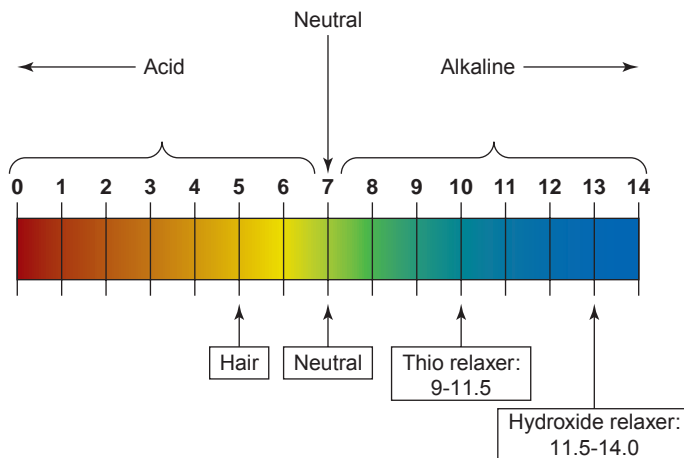
## Hydroxide Relaxers

The hydroxide ion is the active ingredient in all **hydroxide relaxers**, which are very strong alkalis with a pH over 13. Sodium hydroxide, potassium hydroxide, lithium hydroxide, and guanidine hydroxide are all types of hydroxide relaxers, which can swell the hair up to twice its normal diameter.

Hydroxide relaxers are not compatible with thio relaxers, permanent waving, or soft curl perms due to the difference in chemistry.

Hydroxide relaxers have such a high pH that the alkalinity alone can break the disulfide bonds. The average pH of the hair is about 5, and many hydroxide relaxers have a pH over 13. Since each step in the pH scale represents a tenfold change in concentration, a pH of 13 is 100 million (100,000,000) times more alkaline than a pH of 5 (**figure 20-46**).

Hydroxide relaxers break disulfide bonds differently than in the reduction reaction of thio relaxers. A disulfide bond consists of two bonded sulfur atoms. In **lanthionization** (lan-thee-oh-ny-ZAY-shun), the process by which hydroxide relaxers permanently straighten hair, the relaxers remove a sulfur atom from a disulfide bond and convert it into a lanthionine bond. Lanthionine bonds contain only one sulfur atom. The disulfide bonds that are broken by hydroxide relaxers are broken



**figure 20-46**  
pH of thio and hydroxide relaxers



## CAUTION

Application of a thio relaxer or thio permanent on hair that has been treated with a hydroxide relaxer will not properly relax or curl the hair and may cause extreme damage, dehydrate the hair, and/or cause hair loss or breakage. Hair that has been treated with hydroxide relaxers is not compatible with thio relaxers or soft curl permanents.

permanently and can never be re-formed. That is why hair that has been treated with a hydroxide relaxer is unfit for permanent waving and will not hold a curl.

### **Types of Hydroxide Relaxers**

**Metal hydroxide relaxers** are ionic compounds formed by a metal—sodium (Na), potassium (K), or lithium (Li)—which is combined with oxygen (O) and hydrogen (H). Metal hydroxide relaxers include sodium hydroxide (NaOH), potassium hydroxide (KOH), and lithium hydroxide (LiOH).

Although calcium hydroxide (CaOH) is sometimes added to hydroxide relaxers, it is not used by itself to relax hair.

All metal hydroxide relaxers contain only one component and are used exactly as they are packaged in the container; no mixing is necessary. The hydroxide ion is the active ingredient in all hydroxide relaxers. There is no significant difference in the performance of these metal hydroxide relaxers.

### **Lye-Based Relaxers**

Sodium hydroxide (NaOH) relaxers are commonly called lye relaxers. Sodium hydroxide is the oldest, and one of the most common, types of chemical hair relaxer. At one time it was the most popular of hair relaxers, however no-lye relaxers have gained considerable popularity as well. Sodium hydroxide is also known as lye or caustic soda and can cause hair loss and skin burns if used incorrectly.

### **No-Lye Relaxers**

Lithium hydroxide (LiOH) and potassium hydroxide (KOH) relaxers are often advertised and sold as “no mix—no lye” relaxers. Although technically they are not lye, their chemistry is identical, and there is very little difference in their performance.

Guanidine (GWAN-ih-deen) hydroxide relaxers are also advertised and sold as no-lye relaxers. Although technically they too are not lye, the hydroxide ion is still the active ingredient. Guanidine hydroxide relaxers contain two components that must be mixed immediately prior to use. These relaxers straighten hair completely, with less scalp irritation than other hydroxide relaxers. Most guanidine hydroxide relaxers are recommended for sensitive scalps, and they are sold over-the-counter for home use. Although they reduce scalp irritation, they do not reduce hair damage if used incorrectly. They swell the hair slightly more than other hydroxide relaxers, and tend to be more drying on the hair, especially after repeated applications.

### **Low-pH Relaxers**

Sulfites and bisulfites are sometimes used as low-pH hair relaxers. The most commonly used are ammonium sulfite and ammonium bisulfite. Sulfites are marketed as mild alternative relaxers and are compatible with thio relaxers but not compatible with hydroxide relaxers. They do not completely straighten extremely curly hair. Low-pH relaxers are intended for use on color-treated, damaged, or fine hair. See [table 20-2](#) for a summary of the types and uses of relaxers.



## SELECTING THE CORRECT RELAXER

Active Ingredient	pH	Marketed as	Advantages	Disadvantages
sodium hydroxide	12.5–13.5	lye relaxer	very effective for extremely curly hair	may cause scalp irritation and damage the hair
lithium hydroxide and potassium hydroxide	12.5–13.5	no-mix, no-lye relaxer	very effective for extremely curly hair	may cause scalp irritation and damage the hair
guanidine hydroxide	13–13.5	no-lye relaxer	causes less skin irritation than other hydroxide relaxers	with repeated use may dehydrate the hair
ammonium thioglycolate	9.6–10	thio relaxer, no-lye relaxer	compatible with soft curl permanents	strong, unpleasant ammonia smell; with repeated use may dehydrate hair
ammonium sulfite/ ammonium bisulfite	6.5–8.5	low-pH relaxer, no-lye relaxer	less damaging to hair	does not sufficiently relax extremely curly hair

## Base and No-Base Relaxers

Hydroxide relaxers are usually sold in base and no-base formulas. **Base cream**, also known as *protective base cream*, is an oily cream used to protect the skin and scalp during hair relaxing. **Base relaxers** require the application of a protective base cream to the entire scalp prior to the application of the relaxer.

**No-base relaxers** do not require the application of a protective base cream. They contain a protective base cream that is designed to melt at body temperature. As the relaxer is applied, body heat causes the protective base cream to melt and settle out onto the scalp in a thin, oily, protective



### CAUTION

Make sure that the client has not had haircoloring containing metallic salts, such as gradual or progressive haircolors, before applying either thio or hydroxide relaxers to the hair. Extreme damage or breakage can occur.

When combining a relaxing service with a permanent or demipermanent hair coloring service, it is always preferable to relax the hair first, and color it two weeks later. Some manufacturers present their demipermanent products as “no lift”—however, all demipermanent haircolor uses low volumes of peroxide or other alkalinizing agents, such as MEA, as well as oxidizing agents that gently lighten the hair.

Never use bleaches or high-lift color products on relaxed hair. These combinations have resulted in many lawsuits, immediate and permanent hair loss, scalp burns, and severe damage.

You can use a semipermanent product on the same day as hair relaxing service because these colors contain no ammonia or peroxide. Relax the hair first, check the hair's condition, and then

apply the semipermanent color, following the manufacturer's guidelines and your instructor's directions.

When in doubt, test the hair's strength, and then do a strand test for the color. Accomplished colorists say they use demipermanent and even permanent color products on the same day as relaxing the hair. Permanent color should never be used on the same day as a hair relaxer service! Some manufacturers claim their coloring products allow this; however, same-day chemical services are advanced techniques that depend on the hair's condition, the experience of the stylist, and the specific products used.

Please note that same-day chemical services most always compromise the hair's integrity, whether you are combining hydroxide-based chemicals and haircolor or thio-based chemicals and color. For instance, same-day coloring and Japanese thermal straightening, done incorrectly, can result in extreme and immediate hair breakage.



### HERE'S A TIP

Do not worry if the protective base cream touches the hair shaft when performing a relaxer re-touch service, it will help prevent overprocessing of previously relaxed hair.

coating. No-base relaxers are an improvement only on the protection that is provided to the skin by the oils in all hydroxide relaxers. For added protection, protective base cream should always be applied to the entire scalp, hairline, and around the ears, even with no-base relaxers.

## Relaxer Strengths

Most chemical hair relaxers are available in three strengths: mild, regular, and super. The difference in strength of hydroxide relaxers parallels the concentration of hydroxide.

- Mild-strength relaxers are formulated for fine, color-treated, or damaged hair. This strength is also used for texturizing hair (leaving some curl and wave in the hair).
- Regular-strength relaxers are intended for normal hair texture with a medium natural curl. This is the most commonly used strength and often produces a smooth, straight hair.
- Super-strength relaxers should be used for maximum straightening on very coarse, extremely curly, and resistant hair. Only select clients should use this strength.

When in doubt, always strand test prior to the actual application. Strand testing will help you choose the proper strength and timing, thereby avoiding damage, breakage, or hair loss.

### **Periodic Strand Testing (during the actual relaxer application)**

Periodic strand testing during processing will help inform you when the hair is sufficiently relaxed. After the relaxer is applied, smooth and gently press the strand to the scalp and remove product using the back of the comb, the applicator brush, or your finger. Be gentle! If the strand remains smooth, with no visible curl pattern, it is sufficiently relaxed. If the curl returns, continue processing. Processing time will vary according to the manufacturer's recommendations, relaxer strength, hair type, condition, and the desired results (figures 20-47 and 20-48). Follow the manufacturer's timing guide and your instructor's guidance.



figure 20-47  
Sufficiently relaxed strand

### **Hydroxide Neutralization**

Unlike thio neutralization, **hydroxide neutralization** is an acid-alkali neutralization that neutralizes (deactivates) the alkaline residues left in the hair by a hydroxide relaxer and lowers the pH of the hair and scalp; hydroxide relaxer neutralization does not involve oxidation or rebuilding disulfide bonds. The pH of hydroxide relaxers is so high that the hair remains at an extremely high pH, even after thorough rinsing. Although rinsing is important, rinsing alone does not neutralize (deactivate) the relaxer, nor does it restore the normal acidic pH of the hair and scalp.

As described in Chapter 12, Basics of Chemistry, acids neutralize alkalis. Therefore, the application of an acid-balanced shampoo or a normalizing lotion neutralizes any remaining hydroxide ions to lower the pH of the hair and scalp. Some neutralizing shampoos intended for use after hydroxide relaxers have a built-in pH indicator that changes color to show when the pH of the hair has returned to normal.



figure 20-48  
Insufficiently relaxed strand

## Hydroxide Relaxer

Although the same procedure is used for all hydroxide relaxers, application methods vary according to virgin and retouch application:

- A virgin relaxer application should be used for hair that has not had a chemical relaxer service. Since the scalp area and the porous ends will usually process more quickly than the middle of the strand, the application for a virgin relaxer starts  $\frac{1}{4}$  inch (0.6 centimeters) to  $\frac{1}{2}$  inch (1.25 centimeters) away from the scalp and includes the entire strand up to the porous ends. To avoid overprocessing and scalp irritation, do not apply relaxer to the hair closest to the scalp or to the ends until the last few minutes of processing.

### **P 20-10** Applying Hydroxide Relaxer to Virgin Hair *See page 653*

- A retouch relaxer application should be used for hair that has previously received a chemical relaxer service. The application for a retouch relaxer starts  $\frac{1}{4}$  inch to  $\frac{1}{2}$  inch (0.6 to 1.25 centimeters) away from the scalp and includes only the new growth. To avoid overprocessing and scalp irritation, do not apply relaxer to the hair closest to the scalp until the last few minutes of processing. The relaxer should never be applied to hair that is already relaxed.

### **P 20-11** Hydroxide Relaxer Retouch *See page 656*

- A texturizing service uses a hydroxide relaxer to reduce the curl pattern by degrees using a mild strength relaxer. The procedure for texturizing is similar to that for relaxing virgin hair and the same precautions apply, only the product is gently combed through using a large-tooth comb. This allows you to observe the curl pattern as it relaxes the curl and creates a natural curly style. Texturizing makes combing and styling tightly-coiled hair easier.
- Most relaxers today recommend the application of a base cream to protect the entire scalp, irrespective of a virgin application or retouch. For a retouch, most manufacturers recommend applying a protective cream or oil to previously relaxed hair to treat the hair while relaxing it and to prevent overlapping. Contemporary hair relaxing often includes the application of a normalizing conditioning lotion after thoroughly rinsing the relaxer out of the hair and prior to using the neutralizing shampoo. **Normalizing lotions** are conditioners with an acidic pH that restore the hair pH before the final neutralizing shampoo.
- All relaxers must include a neutralizing shampoo that must be used after rinsing the relaxer out of the hair. It is an acidic shampoo designed to restore the natural pH of hair and scalp. Some produce a color signal that turns pink if any relaxer residue remains in the hair and turns white when all the relaxer is rinsed out of the hair, so rinse thoroughly!

After a thorough consultation, you should be able to determine which type of relaxer is best suited to your client's hair type, condition, and

desired results. **Table 20-2** lists the most common types of relaxers along with selected advantages and disadvantages for each.

## Safety Precautions for Chemical Hair Relaxing Service

- Perform a thorough hair analysis and client consultation prior to the service.
- Examine the scalp for abrasions. Do not proceed with the service if redness, swelling, or skin lesions are present.
- Examine the hair for signs of breakage, damage, and extreme dryness. Do not proceed with service if these conditions are present.
- Do not apply a hydroxide relaxer on hair that has been previously treated with a thio relaxer, soft curl perm, or permanent wave.
- Do not apply a thio relaxer or soft curl perm on hair that has been previously treated with a hydroxide relaxer.
- Do not chemically relax hair that has been treated with a metallic dye.
- Do not chemically relax hair that is two shades lighter than natural hair color with permanent color.
- Do not relax hair that has been highlighted or decolorized with bleach.
- Do not relax hair that is color-treated with developer that is 30 to 40 percent.
- Do not shampoo the client prior to the application of a hydroxide relaxer.
- The client's hair and scalp must be completely dry prior to the application of a hydroxide relaxer.
- Apply a protective base cream to avoid scalp irritation.
- Wear gloves during the relaxer application.
- If any solution accidentally gets into the client's eye, flush the eye immediately with cool water and refer the client to a doctor.
- Do not allow chemical relaxers to accidentally come into contact with the client's ears, scalp, or skin.
- Conduct periodic strand tests during the service to monitor the hair's progression.
- Avoid scratching the scalp with your comb or fingernails.
- Do not overlap relaxer onto previously relaxed hair during retouch application.
- Always use proper relaxer strength for hair type as recommended by the manufacturer to avoid hair breakage.
- Do not process hair longer than indicated by the strand test and the manufacturer's recommended timing.
- Thoroughly rinse the relaxer from the hair using warm water. Failure to rinse properly can cause skin irritation and possible hair loss, breakage, and damage.

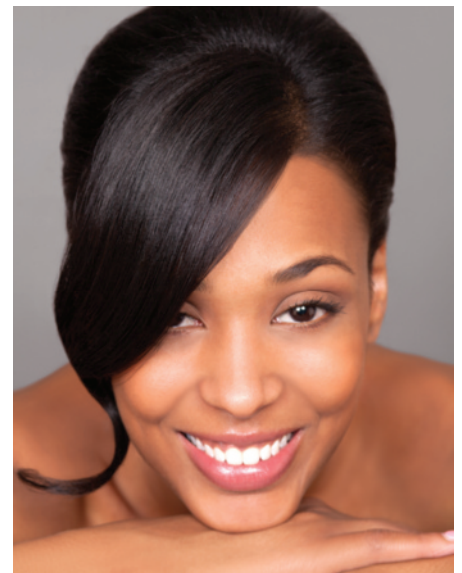
- Use a neutralizing shampoo to guarantee that the hair and scalp have been restored to their normal pH.
- Always apply a conditioner and comb through using wide-tooth comb after a relaxer service. This will eliminate excessive stretching and remove tangles.
- Use caution when styling relaxed hair with hot tools as relaxed hair may become dehydrated and break.
- Keep accurate and detailed client records of the services performed and the results achieved.
- Have the client sign a release statement indicating that he or she understands the possible risks related to the service.
- You are expected to have a thorough understanding of hair relaxing application, chemical compositions, and precautionary and after-care procedures before performing a relaxer service.

## Keratin-Based Straightening Treatments

Keratin-based straightening treatments (also called Brazilian keratin treatments) are available to salon professionals and are widely used. Keratin-based straightening treatments contain silicone polymers and formalin or similar ingredients, which release formaldehyde gas when heated to high temperatures. Some keratin-based straightening treatments marketed as “formaldehyde free” have been found to contain formalin; some other formulas simply use different aldehydes. Do not confuse these treatments with simple “keratin conditioning treatments.” Keratin alone will not straighten hair.

Keratin straightening treatments work by fixing the keratin in place in a semipermanent manner; they do not break bonds. Once the treatment is applied, the hair is blown dry, and a flat iron set at 450 degrees Fahrenheit (232.222 Celsius) is used on narrow sections, one by one, to polymerize a coating on the hair. Each section is flat ironed several times, and the procedure takes about two hours or more for longer or very dense hair. Formalin is reactive to proteins and creates a chemical link or bridge with them when heated so as to release formaldehyde.

Depending on the size of the salon, the type of ventilation system in place, and the number of technicians simultaneously performing the service, the formaldehyde released during the process has the potential to exceed the maximum concentration allowed by OSHA (Occupational Safety and Health Administration) of 0.75 parts per million (ppm) over an eight-hour period. Local source capture ventilation is recommended, particularly because the flat ironing takes place so close to both the client’s and stylist’s face and because the stylist may be exposed to the formaldehyde for long periods of time. Because the coating breaks down over time, the client can be exposed to released vapors even when the treatment itself is complete. This is why it is usually recommended that the client wait at least 72 hours after the treatment before taking a shower. Within this time period, the steam and heat from the shower can accelerate release of the vapors.



Generally, keratin straightening treatments eliminate up to 95 percent of frizz and curl and last three to five months. They are not usually appropriate for extremely curly, tightly coiled hair. Although this is an advanced treatment, no certification is actually required; nevertheless, most manufacturers do offer specialized training in both the service and the all-important after care. It is vital to follow the manufacturer's directions and inform clients about at-home maintenance care.

It is essential to conduct a detailed consultation before performing a keratin straightening service, so the client will understand what to expect from the service based upon condition of hair, chemical history, and degree of curl.

You will need to discuss the following:

- The client's recent hair history, including all chemical treatments that may still be on the hair and the products used.
- Home-care maintenance during the three-day (72-hour) period after the service is performed, as described below:
  - Usually the hair cannot be shampooed for three days (72 hours) after the service.
  - With most systems, the client should avoid getting any moisture into hair for 72 hours. If the hair gets damp, blowdry immediately and go over lightly with a flat iron on low-heat setting.
  - The client should wear his or her hair down, and should not use pins, clips, ponytail holders, or sunglasses to hold the hair back. The hair must remain in a straight position for 72 hours to maintain its new straightness.
- Determine the length and density of the client's hair before quoting a price.

### ***Pre-Conditioning before a Keratin Straightening Treatment***

Pre-conditioning is meant to equalize the porosity of the hair, taking it to a healthier level. For hair that is extremely overprocessed, damaged, or very curly, shampoo and deep condition prior to beginning the service.

### ***Permanent Color/Highlights and Keratin Straightening Treatments***

Clients may have a permanent haircolor or highlighting service before the keratin straightening treatments is applied. For those clients, be sure to use a regular/mild shampoo during the haircolor service. Follow the manufacturer's directions regarding the use of a clarifying shampoo before the treatment product is applied.

Do not use a clarifying product on a client that has 70 percent or more highlights.

### ***Toners or Demi-Gloss and Keratin Straightening Treatments***

If the client wishes to have a demi-gloss treatment, it should be done at least three to five days after the keratin treatment to prevent color loss and to avoid wetting the newly straightened hair. However, since keratin straightening treatments do coat the hair, a strand test may show that the product you've chosen will not cover the existing cuticle coating to the desired degree.

After reading the next few sections, you will be able to:

**LO8** Describe curl re-forming and how it restructures the hair.

# Demonstrate the Proper Technique for Curl Re-Forming (Soft Curl Permanents)

Curl re-forming does not straighten the hair; it simply makes the existing curl larger and looser. A **soft curl permanent** is a thio-based chemical service that re-formats curly and wavy hair into looser and larger curls and waves. Reformation occurs by wrapping the hair on rods. A soft curl permanent is akin to permanent waving. Often, this type of chemical service is referred to as “a curl” or “curly perm.” Soft curl permanents use ATG (ammonium thioglycolate) and oxidation neutralizers just as thio permanent waves do.

**P 20-12** Curl Re-Forming (Soft Curl Perm) *See page 659*

## Safety Precautions for Hair Relaxing and Curl Re-Forming

- Perform a thorough hair analysis and client consultation prior to the service. Hair should be in relatively good condition.
- Examine the scalp for abrasions. Do not proceed with the service if redness, swelling, or skin lesions are present.
- Keep accurate and detailed client records of the services performed and the results achieved.
- Have the client sign a release statement indicating that he or she understands the possible risks related to the service.
- Do not apply a hydroxide relaxer on hair that has been previously treated with a thio relaxer.
- Do not apply a thio relaxer or soft curl perm on hair that has been previously treated with a hydroxide relaxer.
- Do not chemically relax hair that has been treated with a metallic dye.
- Do not relax overly damaged hair. Suggest instead a series of reconstruction treatments.
- Do not shampoo the clients hair to the application of a hydroxide relaxer.
- The client’s hair and scalp must be completely dry and free from perspiration prior to the application of a hydroxide relaxer.





- Apply a protective base cream to avoid scalp irritation.
- Wear gloves during the relaxer application.
- If any solution accidentally gets into the client's eye, flush the eye immediately with cool water, and refer the client to a doctor.
- Do not allow chemical relaxers to accidentally come into contact with the client's ears, scalp, or skin.
- Perform periodic strand tests during the service to monitor the pace of curl removal.
- Avoid scratching the scalp with your comb or fingernails.
- When performing a hair relaxer service, be sure not to overlap onto previously relaxed hair. Apply to new growth only.
- Thoroughly rinse the chemical relaxer from the hair. Failure to rinse properly can cause excessive skin irritation and possible hair breakage.
- Follow manufacturer's instructions closely when applying a chemical relaxer.
- Use a neutralizing shampoo to guarantee that the hair and scalp have been restored to their normal pH.

Performing texture services involves understanding the chemical process and the precautions. When applied responsibly, your services will be in great demand.



# PRELIMINARY TEST CURL FOR A PERMANENT WAVE

## IMPLEMENTS & MATERIALS

You will need all of the following implements, materials, and supplies:

- |  |  |  |   |
|--|--|--|---|
| <input type="checkbox"/> Applicator bottles                              | <input type="checkbox"/> Cotton coil or rope | <input type="checkbox"/> Perm solution                           | <input type="checkbox"/> Protective barrier cream |
| <input type="checkbox"/> Chemical cape                                   | <input type="checkbox"/> Disposable gloves   | <input type="checkbox"/> Plastic clips for sectioning            | <input type="checkbox"/> Roller picks             |
| <input type="checkbox"/> Clarifying and acid-balanced shampoo (optional) | <input type="checkbox"/> End papers          | <input type="checkbox"/> Plastic tail comb                       | <input type="checkbox"/> Spray bottle             |
| <input type="checkbox"/> Conditioner (optional)                          | <input type="checkbox"/> Neutralizer         | <input type="checkbox"/> Pre-neutralizing conditioner (optional) | <input type="checkbox"/> Styling comb             |
|  | <input type="checkbox"/> Neutralizing bib    |  | <input type="checkbox"/> Timer                    |
|  | <input type="checkbox"/> Perm rods           |  | <input type="checkbox"/> Towels                   |

## PREPARATION

Perform:

**P 15-1** Pre-Service Procedure See page 325

## PROCEDURE

- 1 Drape the client for shampoo.
- 2 Gently shampoo and towel dry hair. Avoid irritating the client's scalp. Re-drape the client for a chemical service.



- 3 Wrap one rod in each different area of the head (top, side, and nape).

- 4 Wrap a coil of cotton around each rod.



5 Apply perm solution to the wrapped curls. Do not allow perm solution to come into contact with unwrapped hair.

6 Set a timer, and process according to the manufacturer's directions.

7 Check each test curl frequently for proper curl development. Unfasten the rod and unwind the curl about one to two turns of the rod. Do not allow the hair to become loose or completely unwound. Gently move the rod toward the scalp to encourage the hair to fall loosely into the wave pattern.



8 Curl development is complete when a firm S is formed that reflects the size of the rod used. Different hair textures will have slightly different S formations. The wave pattern for fine, thin hair may be weak, with little definition. The wave pattern for coarse, thick hair is usually stronger and better defined.

9 When the desired curl has been formed, rinse thoroughly with warm water for at least 5 minutes, blot thoroughly, apply neutralizer, and process according to the manufacturer's directions. Gently dry the hair and evaluate the results. Do not proceed with the permanent if the test curls are extremely damaged or overprocessed. If the test curl results are satisfactory, proceed with the perm, but do not re-perm these preliminary test curls. Rinse and process the test rods, but wait to remove them with the rest of the rods after the perm is completed.

## POST-SERVICE

Complete:

P 15-2 Post-Service Procedure *See page 343*

# PERMANENT WAVE AND PROCESSING USING A BASIC PERMANENT WRAP

## IMPLEMENTS & MATERIALS

You will need all of the following implements, materials, and supplies:

- |  |  |  |   |
|--|--|--|---|
| <input type="checkbox"/> Applicator bottles                              | <input type="checkbox"/> Cotton coil or rope | <input type="checkbox"/> Perm solution                           | <input type="checkbox"/> Protective barrier cream |
| <input type="checkbox"/> Chemical cape                                   | <input type="checkbox"/> Disposable gloves   | <input type="checkbox"/> Plastic clips for sectioning            | <input type="checkbox"/> Roller picks             |
| <input type="checkbox"/> Clarifying and acid-balanced shampoo (optional) | <input type="checkbox"/> End papers          | <input type="checkbox"/> Plastic tail comb                       | <input type="checkbox"/> Spray bottle             |
| <input type="checkbox"/> Conditioner (optional)                          | <input type="checkbox"/> Neutralizer         | <input type="checkbox"/> Pre-neutralizing conditioner (optional) | <input type="checkbox"/> Styling comb             |
|  | <input type="checkbox"/> Neutralizing bib    |  | <input type="checkbox"/> Timer                    |
|  | <input type="checkbox"/> Perm rods           |  | <input type="checkbox"/> Towels                   |

## PREPARATION

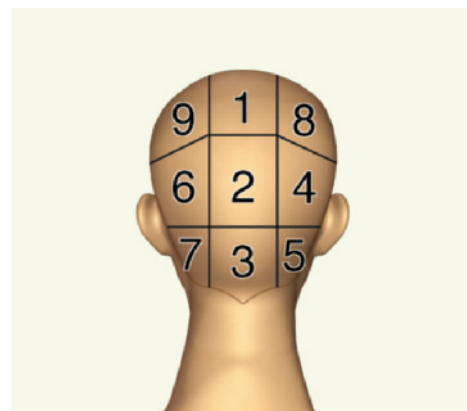
Perform:

**P 15-1** Pre-Service Procedure *See page 340*

## PROCEDURE

1 After completing the pre-service procedure, seat the client. If the manufacturer's directions indicate that a shampoo is necessary before the service, then drape the client for a shampoo and gently shampoo and towel dry hair. Avoid irritating the client's scalp.

2 Re-drape the client for a chemical service.



3 Divide the hair into nine panels. Use the length of the rod to measure the width of the panels. Remember to keep the hair evenly damp as you wrap.



4 a. Begin wrapping at the front hairline or crown. Make a horizontal parting the same size as the rod. Using two end papers, roll the hair down to the scalp in the direction of hair growth, and position the rod half off-base.



4 b. The band should be smooth, not twisted, and should be fastened straight across the top of the rod. Excessive tension may cause band marks or hair breakage.



4 c. Continue wrapping the remainder of the first panel using the same technique. Option: Insert roller picks to stabilize the rods and eliminate any tension caused by the band.



5 Continue wrapping the remaining eight panels in numerical order, holding the hair at a 90-degree angle.



⑥ Apply protective barrier cream to the hairline and the ears. Apply a coil of cotton around the entire hairline and offer the client a towel to blot any drips. Put on gloves.



⑦ Slowly and carefully apply the perm solution to each rod. Ask the client to lean forward while you apply solution to the back area; ask the client to lean back as you apply solution to the front and sides. Avoid splashing and dripping. Continue to apply the solution slowly until each rod is completely saturated. Apply solution to the most resistant area first.



⑧ If a plastic cap is used, punch a few holes in the cap and cover all the hair completely. Do not allow the plastic cap to touch the client's skin.

⑨ Check cotton and towels. If they are saturated with solution, replace them.

⑩ Process according to the manufacturer's directions. Processing time varies according to the strength of the solution, hair type and condition, and desired results. As a general rule, processing usually takes less than 20 minutes at room temperature.

⑧ If a plastic cap is used, punch a few holes in the cap and cover all the hair completely. Do not allow the plastic cap to touch the client's skin.



⑪ Check frequently for curl development. Unwind the rod and check the S pattern formation described in the preliminary test curl procedure. Check a different rod each time!



12 When processing is complete, rinse the hair thoroughly for at least 5 minutes. Then towel-blot each rod to remove excess moisture. Option: Some manufacturers recommend the application of a pre-neutralizing conditioner after rinsing and blotting and before applying the neutralizer. Always follow the manufacturer's directions and the procedures approved by your instructor.



13 Apply the neutralizer slowly and carefully to the hair on each rod. Ask the client to lean forward while you apply solution to the back area, and then to lean back as you apply solution to the front and sides. Avoid splashing and dripping. Continue to apply the neutralizer until each rod is completely saturated.

14 Set a timer for the amount of time specified by the manufacturer.

15 Rinse thoroughly. Option: Shampoo and condition. Always follow the manufacturer's directions and the procedures approved by your instructor.



16 Style the hair as desired.

## POST-SERVICE

Complete:

**P** 15-2 Post-Service Procedure *See page 343*

# PERMANENT WAVE AND PROCESSING USING A CURVATURE PERMANENT WRAP



## IMPLEMENTS & MATERIALS

You will need all of the following implements, materials, and supplies:

- |  |  |  |   |
|--|--|--|---|
| <input type="checkbox"/> Applicator bottles                              | <input type="checkbox"/> Cotton coil or rope | <input type="checkbox"/> Perm solution                           | <input type="checkbox"/> Protective barrier cream |
| <input type="checkbox"/> Chemical cape                                   | <input type="checkbox"/> Disposable gloves   | <input type="checkbox"/> Plastic clips for sectioning            | <input type="checkbox"/> Roller picks             |
| <input type="checkbox"/> Clarifying and acid-balanced shampoo (optional) | <input type="checkbox"/> End papers          | <input type="checkbox"/> Plastic tail comb                       | <input type="checkbox"/> Spray bottle             |
| <input type="checkbox"/> Conditioner (optional)                          | <input type="checkbox"/> Neutralizer         | <input type="checkbox"/> Pre-neutralizing conditioner (optional) | <input type="checkbox"/> Styling comb             |
|  | <input type="checkbox"/> Neutralizing bib    |  | <input type="checkbox"/> Timer                    |
|  | <input type="checkbox"/> Perm rods           |  | <input type="checkbox"/> Towels                   |

## PREPARATION

## PROCEDURE

Perform:

**P 15-1** Pre-Service Procedure *See page 340*



**1** After completing the pre-service procedure, seat the client. If the manufacturer's directions indicate that a shampoo is necessary before the service, then drape the client for a shampoo and gently shampoo and towel dry hair. Avoid irritating the client's scalp.

**2** Re-drape the client for a chemical service.





3 Begin sectioning at the front hairline on one side of the part. Comb the hair in the direction of growth. Alternate from side to side as you section out all the curvature panels over the entire head. Sectioning the panels in advance creates a road map that provides direction and gives continuity to the wrapping pattern.



4 Section out individual panels to match the length of the rod.



5 Begin wrapping the first panel at the front hairline on one side of the part. Comb out a base section the same width as the diameter of the rod. The base direction should point away from the face. Hold the hair at a 90-degree angle to the head. Using two end papers, roll the hair down to the scalp and position the rod half off-base.



6 The remaining base sections in the panel should be wider on the outside of the panel (the side farthest away from the face). Continue wrapping the rest of the rods in the panel, alternating rod diameters.



8 When you reach the last rod at the hairline, comb the hair flat at the base and change the base direction. Direct the rod up and toward the base, keeping the base area flat.

7 Insert picks to stabilize the rods and eliminate any tension caused by the band.



9 Continue by wrapping panel two, which is the front panel on the other side of the part. Repeat the same procedure as on the first panel.



10 Continue with the third panel, which is the panel behind and next to the first panel. Repeat the same procedure until you reach the last two rods at the hairline. Comb the hair flat at the base, and change the base direction. Direct the last two rods up and toward the base, keeping the base area flat.

11 Continue with the fourth panel, on the opposite side of the head, behind and next to the second panel. Repeat the same procedure you used with the third panel. Maintain consistent dampness as you work by re-misting the hair with water if necessary.

12 Follow the same procedure with the fifth panel. The base direction should remain consistent with the pattern already established. The base direction in the back flows around and contours to the perimeter hairline area.



13 All panels should fit the curvature of the head and should blend into the surrounding panels.



14 Process and style the hair.

## POST-SERVICE

Complete:

**P** 15-2 Post-Service Procedure See page 343



Photography by Tom Carson.

# PERMANENT WAVE AND PROCESSING USING A BRICKLAY PERMANENT WRAP

## IMPLEMENTS & MATERIALS

You will need all of the following implements, materials, and supplies:

- Applicator bottles
- Chemical cape
- Clarifying and acid-balanced shampoo (optional)
- Conditioner (optional)
- Cotton coil or rope
- Disposable gloves
- End papers
- Neutralizer
- Neutralizing bib
- Perm rods
- Perm solution
- Plastic clips for sectioning
- Plastic tail comb
- Pre-neutralizing conditioner (optional)
- Protective barrier cream
- Roller picks
- Spray bottle
- Styling comb
- Timer
- Towels

## PREPARATION

Perform:

**P 15-1** Pre-Service Procedure *See page 340*

## PROCEDURE



**1** After completing the pre-service procedure, seat the client. If the manufacturer's directions indicate that a shampoo is necessary before the service, then drape the client for a shampoo and gently shampoo and towel dry hair. Avoid irritating the client's scalp.

- 2** Re-drape the client for a chemical service.
- 3** Begin sectioning at the front hairline on one side of the part. Comb the hair in the direction of growth, and then section out individual panels to match the length of the rod.



4 Begin by parting out a base section parallel to the front hairline that is the length and width of the rod being used. The base direction is back, away from the face. Hold the hair at a 90-degree angle to the head. Using two end papers, roll the hair down to the scalp and position the rod half off-base.



5 In the second row directly behind the first rod, part out two base sections for two rods offset from the center of the first rod. Hold the hair at a 90-degree angle to the head. Using two end papers, roll the hair down to the scalp and position the rods half off-base.

6 Insert picks to stabilize rods and eliminate any tension caused by the band.



7 On the third row, part out a base section at the point where the two rods meet in the previous row. Complete the third row in this manner. This same pattern is used throughout the entire wrap.

8 Continue to part out rows that radiate around the curve of the head through the crown area. Maintain even dampness as you work. Extend rows around and down to the side hairline, parting out base sections at the center of the point where the two rods meet in the previous row.

9 Stop the curving rows after you have finished wrapping the crown area. Part out horizontal sections throughout the back of the head, and continue with the bricklay pattern. You may need to change the length of the rods from row to row to maintain the pattern.



10 Process and style the hair.

## POST-SERVICE

Complete:

**P** 15-2 Post-Service  
Procedure See page 343

# PERMANENT WAVE AND PROCESSING USING A WEAVE TECHNIQUE

## IMPLEMENTS & MATERIALS

You will need all of the following implements, materials, and supplies:

- |  |  |  |  |
|--|--|--|--|
| <input type="checkbox"/> Applicator bottles                              | <input type="checkbox"/> Disposable gloves | <input type="checkbox"/> Plastic clips for sectioning            | <input type="checkbox"/> Roller picks  |
| <input type="checkbox"/> Clarifying and acid-balanced shampoo (optional) | <input type="checkbox"/> End papers        | <input type="checkbox"/> Plastic tail comb                       | <input type="checkbox"/> Chemical cape |
| <input type="checkbox"/> Conditioner (optional)                          | <input type="checkbox"/> Neutralizer       | <input type="checkbox"/> Pre-neutralizing conditioner (optional) | <input type="checkbox"/> Spray bottle  |
| <input type="checkbox"/> Cotton coil or rope                             | <input type="checkbox"/> Neutralizing bib  | <input type="checkbox"/> Protective barrier cream                | <input type="checkbox"/> Styling comb  |
|  | <input type="checkbox"/> Perm rods         |  | <input type="checkbox"/> Timer         |
|  | <input type="checkbox"/> Perm solution     |  | <input type="checkbox"/> Towels        |

## PREPARATION

Perform:

**P 15-1 Pre-Service Procedure** See page 340

## PROCEDURE

- 1 After completing the pre-service procedure, seat the client. If the manufacturer's directions indicate that a shampoo is necessary before the service, then drape the client for a shampoo and gently shampoo and towel dry hair. Avoid irritating the client's scalp.
- 2 Re-drape the client for a chemical service.
- 3 Begin sectioning at the front hairline on one side of the part. Comb the hair in the direction of growth, and then section out individual panels to match the length of the rod.



- 4 Part out one base section the same size as two rods. Comb the entire base section at a 90-degree angle to the head, and use a tail comb to make a zigzag parting along the length of the base section.



⑤ a. Using two end papers, roll half of the strand down to the scalp. Maintain even dampness as you work, re-misting the hair with water if necessary.



⑤ b. Comb the remaining half of the base section at a 90-degree angle; use two end papers, and roll the strand down to the scalp.

⑥ Secure the rods and insert picks to stabilize them and to eliminate any tension caused by the band.



⑧ Process and style the hair.

⑦ Continue with the same procedure in any sections where the effect is desired.

## POST-SERVICE

Complete:

**P** 15-2 Post-Service Procedure *See page 343*



# PERMANENT WAVE AND PROCESSING USING A WEAVE DOUBLE-ROD OR PIGGYBACK TECHNIQUE

## IMPLEMENTS & MATERIALS

You will need all of the following implements, materials, and supplies:

- Applicator bottles
- Chemical cape
- Clarifying and acid-balanced shampoo (optional)
- Conditioner (optional)
- Cotton coil or rope
- Disposable gloves
- End papers
- Neutralizer
- Neutralizing bib
- Perm rods
- Perm solution
- Plastic clips for sectioning
- Plastic tail comb
- Pre-neutralizing conditioner (optional)
- Protective barrier cream
- Roller picks
- Spray bottle
- Styling comb
- Timer
- Towels

## PREPARATION

Perform:

**P 15-1** Pre-Service Procedure *See page 340*

## PROCEDURE



**1** After completing the pre-service procedure, seat the client. If the manufacturer's directions indicate that a shampoo is necessary before the service, then drape the client for a shampoo and gently shampoo and towel dry hair. Avoid irritating the client's scalp.

**2** Re-drape the client for a chemical service.

**3** Begin sectioning at the front hairline on one side of the part. Comb the hair in the direction of growth, and then section out individual panels to match the length of the rod.



**4 a.** Begin by placing the base rod in the middle of the strand.



**4 b.** Wrap the end of the strand one revolution around the rod while holding it to one side.



**5** Roll the rod up to the base area, letting the loose ends follow as you roll.

**6** Insert picks to stabilize the rods and to eliminate any tension caused by the band.



**7 a.** Place two end papers on the ends of the strand, position the rod, and roll from the ends toward the base.



**7 b.** Secure the end rod on top of the base rod.



**8** Maintain consistent dampness as you work, re-wetting the hair with water if necessary. Continue with the same procedure in any sections where the effect is desired.

**9** Process and style the hair.

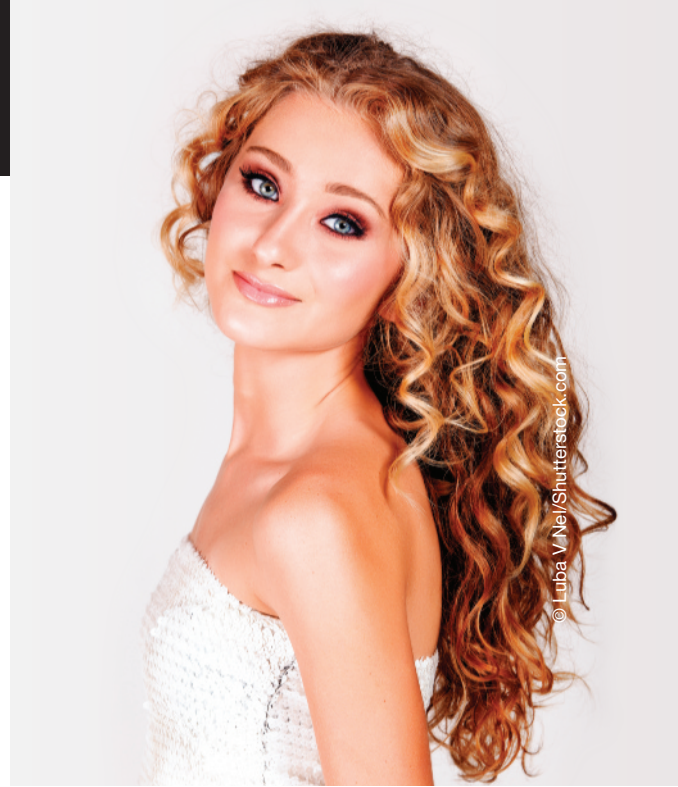
## POST-SERVICE

Complete:

**P 15-2** Post-Service Procedure *See page 343*



# PERMANENT WAVE AND PROCESSING USING A SPIRAL WRAP TECHNIQUE



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## IMPLEMENTS & MATERIALS

You will need all of the following implements, materials, and supplies:

- Applicator bottles
- Chemical cape
- Clarifying and acid-balanced shampoo (optional)
- Conditioner (optional)
- Cotton coil or rope
- Disposable gloves
- End papers
- Neutralizer
- Neutralizing bib
- Perm rods
- Perm solution
- Plastic clips for sectioning
- Plastic tail comb
- Pre-neutralizing conditioner (optional)
- Protective barrier cream
- Roller picks
- Spray bottle
- Styling comb
- Timer
- Towels

## PREPARATION

Perform:

**P 15-1** Pre-Service Procedure *See page 340*

## PROCEDURE



**1** After completing the pre-service procedure, seat the client. If the manufacturer's directions indicate that a shampoo is necessary before the service, then drape the client for a shampoo and gently shampoo and towel dry hair. Avoid irritating the client's scalp.

**2** Re-drape the client for a chemical service.

**3** Begin sectioning at the front hairline on one side of the part. Comb the hair in the direction of growth, and then section out individual panels to match the length of the rod.



4 Part the hair into four panels, from the center of the front hairline to the center of the nape, and from ear to ear. Section out a fifth panel from ear to ear in the nape area.

5 Section out the first row along the hairline in the nape area. Comb the remainder of the hair up, and secure it out of the way.



6 Part out the first base section on one side of the first row. Hold the hair at a 90-degree angle to the head. Using one or two end papers, begin wrapping at one end of the rod. Starting the wrap from the right or left side of the rod will orient the curl in that direction.



7 Roll the first two full turns at a 90-degree angle to the rod to secure the ends of the hair, and then start spiraling the hair on the rod by changing the angle to an angle other than 90 degrees.



8 Continue to spiral the hair toward the other end of the rod. Roll the hair down to the scalp, position the rod half off-base, and secure it by fastening the ends of the rod together.



9 Continue wrapping with the same technique, in the same direction, until the first row is completed.

10 Section out the second row above and parallel to the first row. Comb the remainder of the hair up, and secure it to keep it out of the way.



11 Begin wrapping at the opposite side from the side where the first row began, and move in the direction opposite the direction established in the first row.



12 Follow the same procedure to wrap the second row, but begin wrapping each rod at the opposite end established in the first row. Maintain consistent dampness as you work, misting the hair with water if necessary. Continue wrapping with the same technique, in the same direction, until the second row is completed.



**13 a.** Section out the third row above and parallel to the second row. Follow the same wrapping procedure, alternating the rows from left to right as you move up the head. This will alternate the orientation of the curl throughout the head.



**13 b.** Complete wrapping.

**14** Process and style the hair.

## POST-SERVICE

Complete:

**P 15-2** Post-Service Procedure *See page 343*

# APPLYING THIO RELAXER TO VIRGIN HAIR



## IMPLEMENTS & MATERIALS

You will need all of the following implements, materials, and supplies:

- |  |  |   |   |
|--|--|---|---|
| <input type="checkbox"/> Acid-balanced shampoo         | <input type="checkbox"/> Chemical cape         | <input type="checkbox"/> Pre-neutralizing conditioner | <input type="checkbox"/> Thio neutralizer |
| <input type="checkbox"/> Applicator brush or tail comb | <input type="checkbox"/> Disposable gloves     | <input type="checkbox"/> Protective base cream        | <input type="checkbox"/> Thio relaxer     |
| <input type="checkbox"/> Conditioner                   | <input type="checkbox"/> Hard rubber comb      | <input type="checkbox"/> Spray bottle                 | <input type="checkbox"/> Timer            |
|  | <input type="checkbox"/> Plastic or glass bowl | <input type="checkbox"/> Styling comb                 | <input type="checkbox"/> Towels           |
|  | <input type="checkbox"/> Plastic clips         |   |   |

## PREPARATION

Perform:

**P 15-1** Pre-Service Procedure See page 340

## PROCEDURE

**1** Perform an analysis of the hair and scalp. Perform tests for porosity and elasticity.



**2** Drape the client for a chemical service. *The hair and scalp must be completely dry prior to the application of a thio relaxer.*



**3** Part the hair into four sections, from the center of the front hairline to the center of the nape, and from ear to ear. Clip the sections up to keep them out of the way.



4 Apply protective base cream to the hairline and ears. Option: Take ¼ inch to ½ inch (0.6 to 1.25 centimeters) horizontal partings, and apply a protective base cream to the entire scalp. Always follow the manufacturer's directions and the procedures approved by your instructor.



5 Wear gloves on both hands. Begin application in the most resistant area, usually at the back of the head. Make ¼ inch to ½ inch (0.6 to 1.25 centimeters) horizontal subsections, and apply the relaxer to the top of the strand first, and then to the underside. Apply the relaxer with an applicator brush, with the back of the comb, or with your fingers. Apply relaxer ¼ inch to ½ inch (0.6 to 1.25 centimeters) away from the scalp, and up to the porous ends. To avoid scalp irritation, do not allow the relaxer to touch the scalp until the last few minutes of processing.



6 Continue applying the relaxer, working your way down the section toward the hairline.



7 Continue the same application procedure with the remaining sections. Finish the most resistant sections first.



8 After the relaxer has been applied to all sections, use the back of the comb or your hands to smooth each section. Never comb the relaxer through the hair.

9 Process according to the manufacturer's directions. Perform periodic strand tests. Processing usually takes less than 20 minutes at room temperature. Always follow the manufacturer's processing directions.



10 During the last few minutes of processing, work the relaxer down to the scalp and through the ends of the hair, using additional relaxer as needed. Carefully smooth all sections using an applicator brush, your fingers, or the back of the comb.



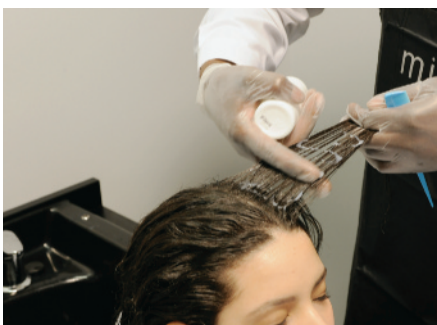
11 Rinse thoroughly with warm water to remove all traces of the relaxer.



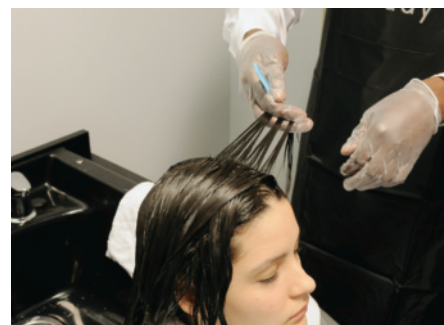
12 Shampoo at least three times with an acid-balanced shampoo. It is essential that all traces of the relaxer be removed from the hair. Optional: Apply the pre-neutralizing conditioner, and comb it through to the ends of the hair. Leave it on for approximately 5 minutes and then rinse. Always follow the manufacturer's directions and the procedures approved by your instructor.



13 Blot excess water from the hair.



14 Apply this neutralizer in ¼- to ½ inch (0.6 to 1.25 centimeters) sections throughout the hair and smooth with your hands or the back of the comb.



15 Process the neutralizer according to the manufacturer's directions.



16 Rinse thoroughly. Shampoo, condition, and style.

## POST-SERVICE

Complete:

**P** 15-2 Post-Service Procedure *See page 343*

# THIO RELAXER RETOUCH



Photography by Tom Pearson.

## IMPLEMENTS & MATERIALS

You will need all of the following implements, materials, and supplies:

- |  |  |   |   |
|--|--|---|---|
| <input type="checkbox"/> Acid-balanced shampoo         | <input type="checkbox"/> Conditioner           | <input type="checkbox"/> Pre-neutralizing conditioner | <input type="checkbox"/> Thio neutralizer |
| <input type="checkbox"/> Applicator brush or tail comb | <input type="checkbox"/> Disposable gloves     | <input type="checkbox"/> Protective base cream        | <input type="checkbox"/> Thio relaxer     |
| <input type="checkbox"/> Chemical cape                 | <input type="checkbox"/> Hard rubber comb      | <input type="checkbox"/> Spray bottle                 | <input type="checkbox"/> Timer            |
|  | <input type="checkbox"/> Plastic clips         | <input type="checkbox"/> Styling comb                 | <input type="checkbox"/> Towels           |
|  | <input type="checkbox"/> Plastic or glass bowl |   |   |

## PREPARATION

Perform:

**P 15-1** Pre-Service Procedure See page 340

## PROCEDURE

- 1 Perform an analysis of the hair and scalp. Perform tests for porosity and elasticity.
- 2 Drape the client for a chemical service. To avoid scalp irritation, do not shampoo the hair prior to a thio relaxer. *The hair and scalp must be completely dry prior to the application of a thio relaxer retouch.*



- 3 Divide the hair into four sections, from the center of the front hairline to the center of the nape, and from ear to ear. Clip sections up to keep them out of the way.



④ Wear gloves on both hands. Apply a protective base cream to the hairline and ears, unless you are using a no-base relaxing product. Option: Take  $\frac{1}{4}$  inch to  $\frac{1}{2}$  inch (0.6 to 1.25 centimeters) horizontal partings, and apply protective base cream to the entire scalp.



⑤ Begin application of the relaxer in the most resistant area, usually at the back of the head or under the occipital bone. Make  $\frac{1}{4}$  inch to  $\frac{1}{2}$  inch (0.6 to 1.25 centimeters) horizontal subsections, and apply the relaxer to the top of the strand. Apply the relaxer as close to the scalp as possible, but do not touch the scalp with the product. Only allow the relaxer to touch the scalp itself during the last few minutes of processing. To avoid overprocessing or breakage, do not overlap the relaxer onto the previously relaxed hair.



⑥ Continue applying the relaxer, using the same procedure and working your way down the section toward the hairline.



⑦ Continue the same application procedure with the remaining sections, finishing the most resistant sections first.



⑧ After the relaxer has been applied to all sections, use the back of the comb, the applicator brush, or your hands to smooth each section.

⑨ Process according to the manufacturer's directions. Perform periodic strand tests. Processing usually takes less than 20 minutes at room temperature. Always follow the manufacturer's processing directions.



⑩ During the last few minutes of processing, gently work the relaxer down to the scalp.



#### CAUTION

Never intentionally overlap previously relaxed hair as this will result in damage and possible hair breakage!

⑪ Rinse thoroughly with warm water to remove all traces of the relaxer.



12 Shampoo at least three times with an acid-balanced shampoo (neutralizer). It is essential that all traces of the relaxer be removed from the hair. If the relaxer product recommends using a pre-neutralizing conditioner, comb it throughout the hair as per the recommendations of the manufacturer. Rinse again and neutralize with acid shampoo. Always follow the manufacturer's directions and the procedures approved by your instructor.

13 Blot excess water from hair.



14 Apply this neutralizer in ¼- to ½ inch (0.6 to 1.25 centimeters) sections throughout the hair and smooth with your hands or the back of the comb.

15 Process the neutralizer according to the manufacturer's directions.

16 Rinse thoroughly. Shampoo, condition, and style.

## POST-SERVICE

Complete:

P 15-2 Post-Service Procedure *See page 343*

# APPLYING HYDROXIDE RELAXER TO VIRGIN HAIR



## IMPLEMENTS & MATERIALS

You will need all of the following implements, materials, and supplies:

- |  |   |  |  |
|--|---|--|--|
| <input type="checkbox"/> Chemical cape     | <input type="checkbox"/> Neutralizing acid-balanced shampoo | <input type="checkbox"/> Protective base cream         | <input type="checkbox"/> Timer                       |
| <input type="checkbox"/> Conditioner       | <input type="checkbox"/> Plastic clips                      | <input type="checkbox"/> Styling comb                  | <input type="checkbox"/> Towels                      |
| <input type="checkbox"/> Disposable gloves | <input type="checkbox"/> Plastic or glass bowl              | <input type="checkbox"/> Tail comb or applicator brush | <input type="checkbox"/> Wide-tooth hard rubber comb |
| <input type="checkbox"/> Hydroxide relaxer |   |  |  |

## PREPARATION

Perform:

**P 15-1** Pre-Service Procedure See page 340

## PROCEDURE

**1** Perform an analysis of the hair and scalp by visually assessing the hair for breakage, sores on the scalp, or any visual signs of irritation. Feel the hair and perform an elasticity test. If hair fails the test for porosity and elasticity, do not perform the relaxer service.



**2** Drape the client for a chemical service.



**3** To avoid scalp irritation, do not shampoo the hair. *The hair and scalp must be completely dry prior to the application of a hydroxide relaxer.*

4 Part the hair into four sections, from the center of the front hairline to the center of the nape, and from ear to ear. Clip the sections up if necessary to keep hair out of the way.



4 a. Apply protective base cream to the hairline and ears.



4 b. Optional: Take ¼ inch to ½ inch (0.6 to 1.25 centimeters) horizontal partings, and apply a protective base cream to the entire scalp. Always follow the manufacturer's directions and the procedures approved by your instructor. Set timer as indicated by the manufacturer and initial strand test.



5 a. Put gloves on both hands. Begin the relaxer application in the most resistant area, usually at the back of the head or nape area. Make ¼ inch to ½ inch (0.6 to 1.25 centimeters) horizontal subsections, and apply the relaxer to the top of the strand first. Do not apply to the scalp.



5 b. Apply relaxer to the underside of the first section using an applicator brush or the back of a tail comb. Apply relaxer ¼ inch to ½ inch (0.6 to 1.25 centimeters) away from the scalp, and up to the porous ends. To avoid scalp irritation, do not allow the relaxer to come near the scalp until the last few minutes of processing.

6 Continue applying relaxer to other sections, working your way down the section toward the hairline. Continue the same application procedure with the remaining sections.



7 After the relaxer has been applied to all sections, use the back of the comb or your hands to smooth each section. Never comb the relaxer through the hair as this may break the hair.



8 Process according to the manufacturer's directions and what your initial strand test indicated regarding timing. Perform periodic strand tests.



9 During the last few minutes of processing, work the relaxer down to the scalp and through the ends of the hair, using additional relaxer as needed. Carefully smooth all sections, using an applicator brush, your fingers, or back of the tail comb.

10 Rinse thoroughly with warm water to remove all traces of the relaxer.

11 If the relaxer comes with a normalizing lotion or conditioner, comb it throughout the hair. Leave it on as indicated by the manufacturer. Rinse thoroughly. Always follow the manufacturer's directions and the procedures approved by your instructor.

12 Shampoo at least three times with an acid-balanced neutralizing shampoo. If you are using a neutralizing shampoo with a color indicator, usually the color will change from pink to white indicating that all traces of the relaxer are removed, and the natural pH of the hair and scalp has been restored.



13 Rinse thoroughly, condition, and style as desired.

## POST-SERVICE

Complete:

P 15-2 Post-Service Procedure *See page 343*

# HYDROXIDE RELAXER RETOUCH



## IMPLEMENTS & MATERIALS

You will need all of the following implements, materials, and supplies:

- |  |  |  |  |
|--|--|--|--|
| <input type="checkbox"/> Acid-balanced shampoo | <input type="checkbox"/> Disposable gloves     | <input type="checkbox"/> Plastic clips         | <input type="checkbox"/> Tail comb or applicator brush |
| <input type="checkbox"/> Chemical cape         | <input type="checkbox"/> Hard rubber comb      | <input type="checkbox"/> Plastic or glass bowl | <input type="checkbox"/> Timer                         |
| <input type="checkbox"/> Conditioner           | <input type="checkbox"/> Hydroxide neutralizer | <input type="checkbox"/> Protective base cream | <input type="checkbox"/> Towels                        |
|  | <input type="checkbox"/> Hydroxide relaxer     | <input type="checkbox"/> Spray bottle          |  |

## PREPARATION

Perform:

**P 15-1** Pre-Service  
Procedure See page 340

## PROCEDURE

- 1 Perform an analysis of the hair and scalp. Perform tests for porosity and elasticity.
- 2 Drape the client for a chemical service.
- 3 To avoid scalp irritation, do not shampoo the hair. *The hair and scalp must be completely dry prior to the application of a hydroxide relaxer retouch.*
- 4 Divide the hair into four sections, from the center of the front hairline to the center of the nape, and from ear to ear. Clip sections up to keep hair out of the way if necessary.



- 4 a. Apply a protective base cream to the hairline and ears. Put gloves on both hands.



- 4 b. Optional: Take  $\frac{1}{4}$  inch to  $\frac{1}{2}$  inch (0.6 to 1.25 centimeters) horizontal partings and apply protective base cream throughout the entire scalp. Set timer as indicated by the manufacturer for retouch.



- 5 Begin application of the relaxer in the most resistant area, usually at the back of the head or nape area. Make  $\frac{1}{4}$  inch to  $\frac{1}{2}$  inch (0.6 to 1.25 centimeters) horizontal subsections, and apply the relaxer to the top of the strand. Apply the relaxer as close to the scalp as possible, but do not touch the scalp with the relaxer. Only allow the relaxer to near the scalp during the last few minutes of processing. To avoid overprocessing or breakage, do not overlap the relaxer onto the previously relaxed hair.

- 6 Continue applying the relaxer, using the same procedure and working your way down the section toward the hairline.



- 7 Continue the same application procedure with the remaining sections.



- 8 After the relaxer has been applied to all sections, use the back of the comb, the applicator brush, or your hands to smooth each section.

- 9 Process according to the manufacturer's directions. Perform periodic strand tests. Always follow the manufacturer's processing directions.

- 10 During the last few minutes of processing, gently work the relaxer down to the scalp.



11 Do not relax mid-shaft or ends during the retouch service, as this will cause overprocessing. Option: Oil may be applied to previously relaxed ends to protect from overprocessing caused by overlapping.

12 Rinse thoroughly with warm water to remove all traces of the relaxer. If the relaxer comes with a normalizing lotion or conditioner, comb it through the hair. Leave it on as indicated by the manufacturer and rinse thoroughly. Always follow the manufacturer's directions and the procedures approved by your instructor.

13 Shampoo at least three times with an acid-balanced neutralizing shampoo. If you are using an acid-balanced neutralizing shampoo with a color indicator, usually the color change will go from pink to white indicating all traces of the relaxer have been removed and the natural pH of the hair and scalp has been restored.

13 a. Apply conditioner as per manufacturer's recommendations. Rinse.



14 Style the hair as desired.

## POST-SERVICE

Complete:

P 15-2 Post-Service Procedure *See page 343*

# CURL RE-FORMING (SOFT CURL PERM)



## IMPLEMENTS & MATERIALS

You will need all of the following implements, materials, and supplies:

- |  |  |   |  |
|--|--|---|--|
| <input type="checkbox"/> Applicator bottle | <input type="checkbox"/> Gentle clarifying shampoo | <input type="checkbox"/> Plastic processing cap | <input type="checkbox"/> Thio wrap lotion          |
| <input type="checkbox"/> Applicator brush  | <input type="checkbox"/> Large-tooth comb          | <input type="checkbox"/> Protective base cream  | <input type="checkbox"/> Thio neutralizer solution |
| <input type="checkbox"/> Conditioner       | <input type="checkbox"/> Plastic or glass bowl     | <input type="checkbox"/> Tail comb              |  |
| <input type="checkbox"/> Disposable gloves |  | <input type="checkbox"/> Thio cream relaxer     |  |

## PREPARATION

**Perform:**

**P 15-1 Pre-Service Procedure** See page 340



### CAUTION

Hair that has been treated with hydroxide relaxers cannot be treated with soft curl permanents. The chemicals are not compatible!

## PROCEDURE

- 1 Perform an analysis of the hair and scalp. Perform tests for porosity and elasticity. Remember, this procedure requires that the hair and scalp be completely dry. Most manufacturer's directions indicate that a shampoo may be necessary before a soft curl service, if so, drape the client for a shampoo and gently shampoo with a mild shampoo and towel-dry hair. Avoid irritating the client's scalp.
- 2 Re-drape the client for a chemical service.
- 3 Based on the manufacturer's recommendation for preliminary strand test, conduct strand test to determine proper timing and curl pattern prior to full-head application. Make note of the timing for the Thio cream relaxer, strength used, and rod size.





4 Divide the hair into four sections. Clip the sections up to keep them out of the way and for better application of product. Apply a protective base cream to the hairline and ears.



5 Wearing gloves on both hands, begin application of Thio cream relaxer to the most resistant area, usually at the back of the head and nape area. Using an applicator brush or tail comb, apply cream ¼ inch (0.6 to 1.25 centimeters) away from the scalp and topside and underside of the strand. Do not apply to cream to the ends of hair during this step. To avoid possible scalp irritation, do not allow cream to touch the scalp until the last few minutes of processing.



6 Repeat application in remaining sections. Apply Thio cream to the hairline and ends last, since hair is the most fragile in this region.



7 Review application of all four quadrants. If necessary, apply more cream until all hair strands are covered. Apply cream to hairline and ends of hair during this step.



8 After the Thio cream has been applied to all sections, using an applicator brush, the back of the comb, or your hands, begin to smooth each section, starting at the first section where Thio cream was applied. Never comb the cream through the hair.

9 Process according to the manufacturer’s directions, and strand test results for timing. Perform periodic strand tests until time has elapsed.

10 During the final remaining minutes of processing, apply the Thio cream to the scalp and through the ends of the hair, using additional cream as needed. Carefully smooth all sections using an applicator brush, your fingers, or the back of the comb.



11 Rinse thoroughly with warm water to remove all traces of the Thio cream.



12 After rinsing the hair, towel blot and part it into nine panels. Use the length of the rod to measure the width of the panels. *Review Chapter 20, Understand Permanent Waving, for how to properly wrap hair.*



13 a. Wearing gloves, apply thio wrap lotion to each section and roll hair on the appropriate-sized perm rods. Begin wrapping at the most resistant area, usually the nape.

13 b. Make a horizontal parting the same size as the rod. Hold the hair at a 90-degree angle to the head. Using two end papers, roll the hair down to the scalp.

13 c. Continue wrapping the remaining eight panels in numerical order using the same technique.

**CAUTION**  
 Maintain even dampness as you work.

Position the rod half off-base.  
 Option: Insert roller picks to stabilize the rods and eliminate any tension caused by the band.



14 Place cotton strip around the hairline and neck to protect client.

15 If the manufacturer or your instructor suggests using a plastic processing cap, cover all the hair completely. Do not allow the plastic cap to touch the client's skin.

16 Process according to manufacturer's directions. Processing time will vary according to the strength of the product, hair type and condition, desired results, and strand test results. Check for proper curl development in 5 minute intervals.



17 When processing is complete, rinse the hair thoroughly for at least 3 minutes. Gently towel blot each rod to remove excess moisture. Do not rub.

18 Re-drape client with fresh cotton strip around hairline and neck.



19 Measure approximately six to eight ounces of the Thio neutralizer in an applicator bottle, using more or less as needed. Slowly and carefully apply to each rod. Avoid splashing and dripping. Make sure each rod is completely saturated. Set a timer and neutralize according to the manufacturer's directions.

20 The average time to complete the neutralization process is 10 minutes without the use of a hair dryer.

21 After neutralizing is complete, thoroughly rinse hair with water for about 2 minutes with rods still in the hair. Do not remove rods during rinsing.

22 Gently blot to remove excess water.

23 Remove the rods from the hair, and rinse thoroughly for about 2 minutes.

**CAUTION**  
 Hair must not be shampooed for at least 48 hours; otherwise curls will be compromised!

24 Towel dry and apply hydrating conditioner. Using a large-tooth comb, distribute the conditioner throughout the hair.

---



25 Rinse, towel dry, and style as desired.

## POST-SERVICE

Complete:

**P** 15-2 Post-Service Procedure *See page 343*

## REVIEW QUESTIONS

- 1 What are the four chemical reactions that take place during permanent waving?
- 2 What is the difference between an alkaline wave and a true acid wave?
- 3 Why do permanent waves need to be neutralized?
- 4 How do thio relaxers straighten the hair?
- 5 How do hydroxide relaxers straighten the hair?
- 6 What is curl re-forming and how does it restructure the hair?

## STUDY TOOLS

- **Reinforce what you just learned:** Complete the activities and exercises in your Theory or Practical Workbook, or your Study Guide.
- **Expand your knowledge:** Search for websites about the topics in this chapter and make a list of additional resources.
- **Study and prepare for your quiz:** Take the chapter test in your Exam Review or your Milady U: Online Licensing Prep.
- **Re-Test your knowledge:** Take the Chapter 20 Quizzes!
- **Learn even more:** Look up in a dictionary or search the internet for the definitions for any additional terms you want to learn about.

## CHAPTER GLOSSARY

<b>acid-balanced waves</b>	p. 604	Permanent waves that have a 7.0 or neutral pH; because of their higher pH, they process at room temperature, do not require the added heat of a hair dryer, process more quickly, and produce firmer curls than true acid waves.
<b>alkaline waves</b>	p. 604	Also known as <i>cold waves</i> ; they have a pH between 9.0 and 9.6, use ammonium thioglycolate (ATG) as the reducing agent, and process at room temperature without the addition of heat.
<b>amino acids</b>	p. 600	Compounds made up of carbon, oxygen, hydrogen, nitrogen, and sulfur.
<b>ammonia-free waves</b>	p. 605	Perms that use an ingredient that does not evaporate as readily as ammonia, so there is very little odor associated with their use.
<b>ammonium thioglycolate (ATG)</b> uh-MOH-nee-um thy-oh-GLY-kuh-layt	p. 603	Active ingredient or reducing agent in alkaline permanents.
<b>base control</b>	p. 614	Position of the tool in relation to its base section, determined by the angle at which the hair is wrapped.
<b>base cream</b>	p. 621	Also known as <i>protective base cream</i> ; oily cream used to protect the skin and scalp during hair relaxing.
<b>base direction</b>	p. 612	Angle at which the rod is positioned on the head (horizontally, vertically, or diagonally); also, the directional pattern in which the hair is wrapped.

<b>base placement</b>	p. 611	Refers to the position of the rod in relation to its base section; base placement is determined by the angle at which the hair is wrapped.
<b>base relaxers</b>	p. 621	Relaxers that require the application of protective base cream to the entire scalp prior to the application of the relaxer.
<b>base sections</b>	p. 611	Subsections of panels into which hair is divided for perm wrapping; one rod is normally placed on each base section.
<b>basic permanent wrap</b>	p. 614	Also known as <i>straight set wrap</i> ; perm wrapping pattern in which all the rods within a panel move in the same direction and are positioned on equal-sized bases; all the base sections are horizontal and are the same length and width as the perm rod.
<b>bookend wrap</b>	p. 611	Perm wrap in which one end paper is folded in half over the hair ends like an envelope.
<b>bricklay permanent wrap</b>	p. 614	Perm wrap similar to actual technique of bricklaying; base sections are offset from each other row by row to prevent noticeable splits and to blend the flow of the hair.
<b>chemical hair relaxing</b>	p. 617	A process or service that rearranges the structure of curly hair into a straighter or smoother form.
<b>chemical texture services</b>	p. 598	Hair services that cause a chemical change that alters the natural wave pattern of the hair.
<b>concave rods</b> khan-KAYV RAHDZ	p. 609	Perm rods that have a smaller diameter in the center that increases to a larger diameter on the ends.
<b>croquignole perm wrap</b> KROH-ken-yohl	p. 612	Perm in which the hair strands are wrapped from the ends to the scalp in overlapping concentric layers.
<b>curvature permanent wrap</b>	p. 614	Perm wrap in which partings and bases radiate throughout the panels to follow the curvature of the head.
<b>disulfide bonds</b>	p. 600	Strong chemical side bonds formed when the sulfur atoms in two adjacent protein chains are joined together.
<b>double flat wrap</b>	p. 610	Perm wrap in which one end paper is placed under and another is placed over the strand of hair being wrapped.
<b>double-rod wrap</b>	p. 613	Also known as <i>piggyback wrap</i> ; a wrap technique whereby extra-long hair is wrapped on one rod from the scalp to midway down the hair shaft, and another rod is used to wrap the remaining hair strand in the same direction.
<b>end papers</b>	p. 610	Also known as <i>end wraps</i> ; absorbent papers used to control the ends of the hair when wrapping and winding hair on perm rods.
<b>endothermic waves</b> en-duh-THUR-mik wayvz	p. 605	Perm activated by an outside heat source, usually a conventional hood-type hair dryer.
<b>exothermic waves</b> Eks-oh-THUR-mik WAYVZ	p. 604	Create an exothermic chemical reaction that heats up the waving solution and speeds up processing.
<b>glyceryl monothioglycolate (GMTG)</b> GLIS-ur-il mon-oh-thy-oh-GLY-koh-layt	p. 604	Main active ingredient in true acid and acid-balanced waving lotions.

<b>half off-base placement</b>	p. 612	Base control in which the hair is wrapped at an angle of 90 degrees or perpendicular to its base section, and the rod is positioned half off its base section.
<b>hydrogen bonds</b>	p. 601	Weak physical side bonds that are also the result of an attraction between opposite electrical charges; they are easily broken by water (wet setting) or heat (thermal styling), and they re-form as the hair dries or cools.
<b>hydroxide neutralization</b>	p. 622	An acid-alkali neutralization reaction that neutralizes (deactivates) the alkaline residues left in the hair by a hydroxide relaxer and lowers the pH of the hair and scalp; hydroxide relaxer neutralization does not involve oxidation or rebuild disulfide bonds.
<b>hydroxide relaxers</b>	p. 619	Very strong alkalis with a pH over 13; the hydroxide ion is the active ingredient in all hydroxide relaxers.
<b>keratin proteins</b>	p. 600	Long, coiled polypeptide chains.
<b>lanthionization</b> lan-thee-oh-ny-ZAY-shun	p. 619	Process by which hydroxide relaxers permanently straighten hair; they remove a sulfur atom from a disulfide bond and convert it into a lanthionine bond.
<b>loop rod</b>	p. 610	Also known as <i>circle rod</i> ; tool that is usually about 12 inches long with a uniform diameter along the entire length of the rod.
<b>low-pH waves</b>	p. 605	Perms that use sulfates, sulfites, and bisulfites as an alternative to ammonium thioglycolate.
<b>metal hydroxide relaxers</b>	p. 620	Ionic compounds formed by a metal (sodium, potassium, or lithium) which is combined with oxygen and hydrogen.
<b>no-base relaxers</b>	p. 621	Relaxers that do not require application of a protective base cream.
<b>normalizing lotions</b>	p. 623	Conditioners with an acidic pH that restore the hair's natural pH before the final neutralizing shampoo.
<b>off-base placement</b>	p. 612	Base control in which the hair is wrapped at 45 degrees below the center of the base section, so the rod is positioned completely off its base.
<b>on-base placement</b>	p. 611	Base control in which the hair is wrapped at a 45-degree angle beyond perpendicular to its base section, and the rod is positioned on its base.
<b>peptide bonds</b>	p. 600	Also known as <i>end bonds</i> ; chemical bonds that join amino acids together, end-to-end in long chains, to form polypeptide chains.
<b>permanent waving</b>	p. 601	A two-step process whereby the hair undergoes a physical change caused by wrapping the hair on perm rods; the hair then undergoes a chemical change caused by the application of permanent waving solution and neutralizer.
<b>polypeptide chains</b> pahl-ee-PEP-tyd CHAYNS	p. 600	Long chains of amino acids joined together by peptide bonds.
<b>side bonds</b>	p. 600	Disulfide, salt, and hydrogen bonds that cross-link polypeptide chains together.
<b>single flat wrap</b>	p. 611	Perm wrap that is similar to double flat wrap but uses only one end paper, placed over the top of the strand of hair being wrapped.
<b>soft bender rods</b>	p. 610	Tool about 12 inches long with a uniform diameter along the entire length.

<b>soft curl permanent</b>	p. 627	A thio based chemical service that reformats curly and wavy hair into looser and larger curls and waves.
<b>spiral perm wrap</b>	p. 612	Hair is wrapped at an angle other than perpendicular to the length of the rod, which causes the hair to spiral along the length of the rod, similar to the stripes on a candy cane.
<b>straight rods</b>	p. 610	Perm rods that are equal in diameter along their entire length or curling area.
<b>thioglycolic acid</b>	p. 603	The most common reducing agent in permanent wave solutions.
<b>thio neutralization</b> THY-oh NEW-truhl-eyez-ay-shun	p. 608	Stops the action of a permanent wave solution and rebuilds the hair in its new curly form.
<b>thio relaxers</b> THY-oh ree-LAX-UHRS	p. 618	Use the same ammonium thioglycolate (ATG) that is used in permanent waving, but at a higher concentration and a higher pH (above 10).
<b>thio-free waves</b> THY-oh FREE WAYVZ	p. 605	Perm that uses an ingredient other than ATG as the primary reducing agent, such as cysteamine or mercaptamine.
<b>true acid waves</b>	p. 604	Have a pH between 4.5 and 7.0 and require heat to process; they process more slowly than alkaline waves, and they do not usually produce as firm a curl as alkaline waves.
<b>viscosity</b> vis-KAHS-ut-ee	p. 618	The measurement of the thickness or thinness of a liquid that affects how the fluid flows.
<b>weave technique</b>	p. 614	Wrapping technique that uses zigzag partings to divide base areas.