Perm Waves and Hair Structure (2 hours)

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Lesson 1: Permanent Waving (1 hour)

- List implements of the permanent wave service
- Explain wrapping techniques
- Describe types of permanent wave solutions
- Identify types of roll ups and procedures

Lesson 2: Structure of Hair (1 hour)

Part A: Hair Composition

- List parts of the hair
- Define bonds
- Describe the hair follicle
- Define alopecia
- List hair classifications

Part B: Conditions of the Scalp and Skin

- List common daily terms used in a salon
- Name pigmentation abnormalities
- List inflammations of the skin
- Identify skin lesions
- Describe contagious disorders

Introduction: The following information reviews basic knowledge and skill in permanent wave services to include procedures, techniques and chemical solution types.

Permanent waving is a *two* step process involving a chemical change of the hair in order to form curls.

The hair is chemically treated in order to achieve the formation o f the shape of the rod used.

Perm wrapping is in essence a *wet* set on perm rods instead of rollers.
The size and shape of the rod determines the amount of curl in size as well as shape.
The wrapping method also determines the appearance of the curl.

Perm Rods and Wrapping Techniques

1925 Perm Model

Concave rods are the *most* common modern perm rod used today.

Concave means that the inside of the rod, the diameter, is *smaller* than the ends of the rod.

When performing a "regular" roll-up, the concave rod creates a smaller curl in the center of the hair strand and a larger curl on the ends of the hair strand. These rods come in different sizes in diameter.

Croquignole Wrap Method

The standard roll-up or wrapping method also known as the "regular" roll-up or *croquignole* method, is when the strand is wrapped over itself evenly. The strand is rolled from the ends to the scalp. Each rotation is directly over the previous. This makes the ends of the hair a smaller or "tighter" curl than at the scalp.**Straight rods are not *concave* but are evenly sized throughout the length of the rod.** They come in different sizes of diameter and two different lengths, long and short.

Soft bender rods are soft foam on the outside with an internal wire that makes the rod bendable. They are not concave and do not fasten, they simply bend and stay in the shape that you leave them against the head after winding the hair.

Loop or Circle rods – are very similar to soft bender rods in that they are bendable. They are not concave and they form a circle and fasten at the ends.

Wrapping – the hair on any rod can be wrapped in a spiral fashion or croquignole method.

The Spiral Wrap- is the technique of winding the hair at an angle on the rod causing the strand to look like the grip material on a tennis racket, with each wind touching the last and can slightly overlap, so there is no visible space between rotations.

The Piggyback Wrap is used when the hair is *long*. Two rods are used on the same hair strand.

With the first rod, you wind the hair strand beginning approximately halfway down the strand and wrap as a regular roll-up, being careful to hold the end of the hair strand out of the way while wrapping.

Once that rod is finished and secured to the head, begin at the end of the hair strand with a second rod and wind the hair as usual and securing it into position against the first rod.

The **term** piggyback originated in 1555-1565 as the word pickback.
The term evolved into the word pickaback by the year 1580-1590.
The term was transformed by mispronunciation to form the term piggyback, but has been accepted with the same meaning.

End Papers are absorbent papers used to control the *ends* of the hair strand when winding the hair on the rods.

End wraps should always extend *beyond* the hair ends so hair can not stick out and be misshaped during the curling process.

The hair within the end wrap should be combed smooth as possible to achieve the best and most beautiful curl.

End Wrap Techniques

There are several ways to use end wraps.

The Double Flat Wrap: is where you use *2* end wraps, one placed under the strand and one place on top, sandwiching the strand between the two papers.

The Single Flat Wrap: is where you use *1* end wrap placed on top of the hair strand.

The Bookend Wrap: is where you use one end paper *folded* in half.
You sandwich the hair strand inside and between the 2 sides of the folded wrap.

Hair Sectioning

The beginning of any permanent wave service is the *sectioning* of the hair.

This is the pre-planning stage and is a necessary process to get a beautiful end result.

Divide the hair into *panels* and decide the pattern and sizes of your rods.
Determine where you need more curl or less curl.

Each panel is then divided into subsections called *base* sections.

Each base section is where the rod rests and should be the length and *width* of that rod.

After winding, the perm rod will rest either on-base, *half*-off base or off base.
The science behind these positions are for the determination of fullness desired at the scalp.

Rod Placement

On-base placement is where the hair is held and wrapped at a 45º beyond perpendicular to it's base section.
This creates a curl pattern that begins closest to the scalp.

Half off-base placement is where the hair is held and wrapped at a 90º from the center of it's base section.

Off-base placement is where the hair is held and wrapped at a 45º angle below the center of the base section.
This creates a curl pattern that begins farthest away from the scalp.

The Chemistry and Types of Permanent Wave Formulations

Through chemical applications and mechanical procedures, straight hair can be made curly and curly hair can be made straight.

Alkaline Waves
Also known as cold waves, alkaline waves are processed at *room* temperature.
As the name indicates the pH of alkaline waves rage between 9.0 and 9.6.

Acid Waves
Glyderyl monothioglycolate is an acid with a low pH and is an ingredient in permanent waves.

To be an acid wave the pH is between 4,5 and 7.0 and require heat to process.
They generally cause less damage to hair but take longer to process.

Acid-Balanced Waves

These formulations have a pH between 7.8 and 8.2.
These perms process at room temperature.

Thio-Free Waves
Thio-Free Waves use a substitute for Ammonium Thioglycolate (ATG) as the primary reducing agent in the waving formula.

Commonly, the substitutes used are cysteamine or mercaptamine which while not technically being ATG are still thio compounds.

Thio-Free In high concentrations these can be as damaging as thio to the hair.

Thio-Free Waves have the benefits of processing at room temperature, and produce medium to fine curls.

The Thio-Free Wave is suited for use on normal to porous hair types, and can be gentler on the hair depending on the individual formula used.

Since the strength varies from manufacturer to manufacturer be sure to use caution in selecting and using a new formula.

Low-pH Waves
Low-pH waves use an alternative formula for their waving solutions.

Instead of Ammonium Thioglycolate, low-pH waves use *sulfates, sulfites and bisulfites* as their primary ingredients.

These formulations are very gentle since they work at a low pH, but while they have been in use for years, they are not very popular.

The trouble is that the permanent waves based on sulfites are very weak and do not provide firm curls. Because of this they are often marketed for use in body wave services.

The weak formulation of Low-pH waves make them suited for use with fine and damaged hair or in cases where a gentle wave is desired as opposed to firm curl.

Low-pH waves are endothermic waves and will need the heat of a hair dryer.

How does the hair curl?

The formation of disulfide bonds has a direct application in producing curls in hair by the permanent wave process.

Hair keratin consists of many protein alpha-helices.

Three alpha-helices are interwoven into a left-handed coil called a protofibril.

Eleven protofibrils are bonded and coiled together to make a microfibril.

Hundreds of these microfibrils are cemented into an irregular bundle called a macrofibril.

These in turn are mixed with dead and living cells to make a complete strand of hair.

Although it may seem incredible, in order for hair to grow 6 inches in one year, 9-1/2 turns of a -helix must be produced every second.

The alpha-helices are extensively cross-linked with disulfide bonds from cysteine.
These bonds enable keratin to have a somewhat elastic nature.

If the alpha -helices stretch unevenly past each other, the disulfide cross-links return them to the original position when the tension is released.

Disulfide Bonds
Disulfide bonds are formed by oxidation of the sulfhydryl groups on cysteine. Different protein chains or loops within a single chain are held together by the strong covalent disulfide bonds.
The alpha-helices in the hair strands are bonded by disulfide links.

Reducing Agent
In the permanent wave process, a basic reducing substance, usually ammonium thioglycolate, is first added to reduce and rupture some of the disulfide cross-links.

Temporary Wave
When the hair gets wet, water molecules intrude into the keratin strands.

The sheer numbers of water molecules are able to disrupt some of the hydrogen bonds which also help to keep the alpha-helices aligned.

The helices are able to slip past each other and will retain a new shape in the hair drying process as new hydrogen bonds are formed.

The hair strands are able for a short time to maintain the new curl in the hair.

The Perm

For a permanent wave, we will continue the discussion from the use of the reducing agent.

The hair is put on rollers or curlers.

Since the alpha-helices are no longer tightly cross-linked to each other, the alpha-helices can shift positions in relation to each other.

An oxidizing agent, usually a dilute solution of hydrogen peroxide, (also called the neutralizer) is added to reform the disulfide bonds in their new positions.

The permanent will hold these new disulfide bond positions until the hair grows out, since new hair growth is of course not treated.

When the chemical wave was developed, it was a breakthrough for many women who had long undergone repetitive and sometimes torturous treatments to get the curls they desired.

So therefore today, the list includes: Alkaline Waves, True Acid Waves, Acid-Balanced Waves, Exothermic Waves, Endothermic Waves, Ammonia-Free Waves, Thio-Free Waves, and Low-pH Waves.

Each formulation of permanent wave has its own reasoning and purpose for being, since there are so many different hair types.

It's important to understand permanent waving and the pros and cons of the different formulations in order to know what's best for a given individual's hair.

Let's look at the various Permanent Wave types, what makes them special, and for which hair type and condition they are best suited for

True Acid Waves - The first true acid waves were introduced in the early 1970s and use Glyceryl Monothioglycolate as the key ingredient.

Because they have a pH between 4.5 and 7.0 typically, they process much more slowly and usually require the application of heat from an outside source to process the hair.

The comparative mild formulation of an acid wave means it is much gentler on the hair, but also means that the processing will take longer and the resultant curl is often less firm than that achieved with alkaline perms.

Acid waves are ideal for use on extremely porous hair or hair that has been very damaged, while it is likely to be of little effect on coarser or more resistant hair types.

All acid waves have three components: a *waving solution*, an *activator*, and a *neutralizer*.

The activator contains the agent Glyceryl Monothioglycolate (GMTG) and should be considered carefully before deciding to use an Acid Wave since repeated exposure to GMTG is known to cause allergic sensitivity in both stylists and clients.

As stated, **Acid-Balanced Waves -** Because of the level of added effort and difficulty in processing a True Acid wave, the strength and pH of acid waves has been increased over the years to allow for easier, and simpler processing.

Most acid waves found in salons today have a pH of between 7.8 and 8.2 which isn't truly acidic. These are now called Acid-Balanced Waves.

In addition to speeding up the processing and allowing for the wave to process at room temperature, and without the need for use of a hair dryer to provide added heat.

Acid-balanced waves create *firmer* curl results than a true acid wave.

They are great for use with hair that is porous and possibly damaged because they are gentler than most alkaline waves.

Exothermic Waves
An exothermic wave is called exothermic because of the chemical reactions involved in the waving process.

An exothermic chemical reaction produces *heat*, and an Exothermic Wave uses exothermic chemical reactions to produce heat as a way to speed up the processing time of the permanent wave.

Exothermic waves have three components (like acid waves): waving solution, activator and neutralizer.

The waving solution contains thio just as in a cold wave and the activator contains an oxidizing agent (usually hydrogen peroxide).

Combining the two creates a rapid release of heat and an increase in the temperature of the solution.

The increased temperature increases the rate of the chemical reactions in the hair and shortens the required time to process the curl.

Exothermic waves are good for coarse, thick and/or resistant hair types, typically process faster than alkaline waves and create firm, strong curls.

However, like an alkaline perm, exothermic waves can damage delicate hair and often has a strong, unpleasant ammonia odor.

Endothermic Waves
An Endothermic Wave is opposite to the Exothermic wave.

Where the exothermic wave generates its own heat using a specific type of chemical reaction, the Endothermic Wave utilizes reactions that absorb the heat from its surroundings.

This means that they are only activated by an outside heat source – typically a conventional hooded hair dryer.
As is obvious, most True-Acid waves are endothermic, but not all endothermic waves are “true” acid waves.

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

One common substitute for ammonia is an alkanolamine, such as aminomethylpropanol and monoethanolamine.

These ammonia-free waves generally process the same as standard alkaline waves but since the substitutes for the ammonia don't evaporate as readily as ammonia, there is typically very little odor associated with their use.

Ammonia-free waves are generally suited to use on hair that is porous to normal in resistance level, processes at room temperature, and typically generates medium to fine curls.

While these waves may not smell as strongly as ammonia, they can still be every bit as alkaline and just as damaging.

Remember that ammonia-free doesn't mean damage-free.

Cold Waves in History

In 1938, Arnold F. Willatt invented the cold wave, the precursor to the modern perm.

It used no machines and no heat.

The entire process took 6–8 hours at room temperature. In the 1970s, acid perms were invented.

These use glycerol monothioglycolate instead and contain no ammonia.

Perms today use this method with sodium thioglycolate instead of ammonium thioglycolate.

This method takes only 15–30 minutes until the neutralizer is applied to bring down the pH and rebond the hair.

Norma Smallwood, Miss America 1926,

Lesson 2: Structure of Hair (1 hour)

Part A: Hair Composition

Learning Objectives:

- List parts of the hair
- Define bonds
- Describe the hair follicle
- Define alopecia
- List hair classifications

Introduction: The following information reviews basic structure and functions of hair to include parts of the hair, classifications of the hair and conditions of the hair.

Hair Structure

Hair is composed primarily of *proteins*. These proteins are of a hard fibrous type known as keratin. **Keratin protein is comprised of *polypeptide* chains.** The word, polypeptide, comes from the Greek word poly meaning many and peptos meaning digested or broken down. If we break down protein, we have individual amino acids. Many poly amino acids joined together form a polypeptide chain.

Two *amino* acids are joined together by a peptide bond, and the correct number of amino acids placed in their correct order will form a specific protein; Keratin or collagen.The alpha helix is the descriptive term given to the polypeptide chain that forms the keratin protein found in human hair.

Its structure is a coil. The amino acids link together to form the coil and there are approximately 3.6 amino acids per turn of the helix coil. The peptide bond is located between the carbon atom of one amino acid extending to bond with the nitrogen atom of the next amino acid.

HAIR

The A Helix Coil

In the organization of a single hair, three alpha helices are twisted together to form a protofibril.

This is actually the first fibril structure of the hair. Nine protofibrils are then bundled in a circle around two or more to form an eleven-stranded cable known as the microfibril. These microfibrils are embedded in an amphorous unorganized protein matrix of high sulfur content. Hundreds of such microfibrils are cemented into an irregular fibrous bundle called a macrofibril.

These macrofibrils are grouped together to form the cortex or the main body layers of the hair fiber.

Packed dead cells surround these structures and are known as the cuticular layers of the hair.

In the center of these structures lies the medulla, which is a part of the excretory system and houses any foreign debris, heavy metals, synthetics and medications that are thrown off by the body and eventually released through the medullary canal.

Bonding in Keratin Protein

When the hair is in its normal unstretched state, it is referred to as A of alpha keratin. The original configuration of the hair is held in place by the bonding found in the cortex layers of the hair.

The Hydrogen Bond

The hydrogen bond is located between the coils of the alpha helix and is responsible for the ability of the hair to be stretched and return back to its original shape.

The hydrogen bonds allow us to change the shape of the hair temporarily with the aid of water.

These bonds are electrolytically controlled and are the most readily broken down and the most readily reformed.
These bonds are responsible for approximately 35% of the strength of the hair and 50% of the hair's elasticity.

The Salt Bond

The salt bond is also an ionic bond formed by the electron transfer from the side chain of a basic amino group to the side chain of an acidic amino acid.
This is two positive and negative charges attracting one another.
The salt bond is responsible for approximately 35% of the strength of the hair and 50% of the hair's *elasticity*.

The Cystine Bond

The cystine bond also known as the disulfide bond, **sulfur bond**, or just **S bond** is formed by cross-links between cystine residues, amino acids, of the main polypeptide chains.

This bond is perpendicular to the axis of the hair and between the polypeptide chains.

Because of its position in the hair, it is responsible for the hair's toughness or abrasion resistance.

It actually holds the hair fibers together.

These cross-links are frequent in the hair fiber, with maximum of frequency of one cystine bond every four turns of the alpha helix.

This is what enables us to permanent wave the hair.

The Sugar Bond

The sugar bond is formed between the side chain of an amino acid having an OH group and an acidic amino group.

This bond is also formed perpendicular to the axis of the hair. Because of its position, it gives the hair toughness but little strength, about 5%. Some moisture is contributed to the hair as a by-product of this bonding.

Hair Facts

Hair is dead material when it leaves it's root, and we feel no pain when it is cut.

A person with blond hair has more hairs than red or dark haired people.

Hair **is strong** as a similar sized wire of iron.

It rips only after applying a force equivalent to 60kg, after it stretched itself for about 70%.

The hair grows an average rate of half of an inch per month. The growth rate does vary somewhat from person to person.

Healthy hair has an average lifetime of 2 to *6* years. After a rest period of three months the single hair falls out, and a new hair starts to grow.

Human beings have about one million and a half hairs on their entire body, with about four hundred and fifty thousand of them to be found above the neck.

These hairs include about **one hundred thousand hairs on the head** and about thirty thousand hairs taken up by mustaches, beards, or whiskers.

Hair grows at a faster rate in the *spring* and summer than in autumn and winter.

The *sebaceous* glands, next to the hair follicle, supply sebum. This mixture of triglycerides, waxes and squalene form a film on the surface of the skin and lubricate the hair, thus preserving its suppleness and sheen.

Being hormone dependent, the sebum can be produced in excessive quantities, making the hair greasy and heavy. On the other hand, if too little is secreted, the hair becomes damaged, dry and dull.

Melanin is responsible for the natural *color* of hair.

Produced deep in the root by the melanocytes, it is transmitted to the keratinocyte as the hair is formed.

Melanin is *1%* of the total composition of the hair and is in the form of two pigments: eumelanin, dark, and phaeomelanin, light.

Hair Follicle

The follicle is where a *hair* is formed. The follicle is an epidermal cavity within the dermis .

The Biological Formation of Hair

In the basal layer of the epithelial tissue cells multiply and create a bud-like structure.

Under this bud, connective cells clump together; these cells will be the origin of the dermal papilla and the connective tissue sheath.

The epithelial bud pushes down into the connective tissue.

On this epithelial column, two bulges appear: one will become the sebaceous gland, while the other will be the point at which the arrector muscle will be inserted.

This column meets the dermal papilla and attaches itself to it almost entirely surrounding it, itself being enclosed within the connective tissue sheath which has developed from the base of the papilla.

This union between the epithelial component and the dermal component marks the true birth of the hair follicle. It is at this stage that the construction of the hair really begins.

The papilla becomes the driving force of the follicle. Under its direction, the cells situated in the deeper part of the epithelial component, the matrix, multiply very rapidly.

Some form the external and internal epithelial sheaths of the follicle.

Others form the hair shaft. Unable to develop downwards, these cells will move upwards and the hair shaft will pierce the superficial layer of the epidermis, making the hair finally visible.

Throughout life, it is these same developmental processes which will continue to occur producing the growth cycle of hair.

Alopecia

Within every head of hair, each hair grows, falls out and then grows again. Despite differences in speed of growth, all hair follows this timeless cycle.

It is capable of reproducing itself many times over.

Sometimes this regeneration of hair stops and the condition of **hair loss** begins.

The loss of hair is called *alopecia* . Baldness is its most intense form.

While the deeper underlying causes of alopecia are still poorly understood, certain phenomena associated with it have been discovered.

Just before the hair falls out, hair follicle connective tissue sheath becoming rigid. The hardening of this sheath slows the development of the hair follicle.

The hair can not thrive and begins to become thin.

Cycle after cycle, the follicle becomes smaller and finally, only produces a down like hair.

As alopecia progresses, hairs are replaced less and less and the proportion of hair decreases, causing the progressive decreasing of hair density.

Age related thinning begins most profoundly at about the age of 50.

Hair Classifications

African hair, Asian hair, and Caucasian hair

It is true that Japanese hair is not the same as Indonesian hair and Swedish hair has no resemblance to African hair or Brazilian hair.

There are dynamic differences in comparing hair attributes of these 3 groups. These groups have their own unique qualities regarding hair density, speed of growth and hair follicle in the scalp.

For example, Asian hair holds the speed record for growth with 1.3 cm a month. On the other hand, it has lower density than any of the other ethnic groups.

The way its follicle is implanted causes the hair to grow straight, perpendicular to the scalp.

African hair, generally black hair, is the slowest growing of all, at less than 0.9 cm a month.
On the other hand it is slightly more dense than Asian hair and grows almost parallel to the scalp, twisting around itself as it grows.

As far as rate of growth is concerned, **Caucasian hair** comes between the other two at 1.2 cm a month, but it has the highest density of all. It grows at an oblique angle to the scalp and is slightly curved.

Water and the Hair

Wet hair is heavier than dry hair: this seems obvious and it is.
However, this simple observation illustrates an important characteristic of hair: it is permeable.

Despite the close fitting scales of its cuticle and the sebum which naturally coats it, a hair in good condition can absorb more than 30% of its own weight of water.

If the hair is damaged this absorption percentage can reach 45%. Its length can thus increase by 2% and its diameter by 15% to 20%. In cosmetics, this swelling is used to good effect to make large molecules penetrate into the body of the hair. This is the case for hair color.

Water can intensify the effects of sunlight on the hair. **Melanin degrades faster and hair color fades quicker if the hair is wet in the *sunlight*.** The keratin can become damaged making the hair more brittle.

Static Electricity

The contact of hair with certain synthetic garments and objects can produce *sparks.*

Your winter sweater can make your hair stand up on your head.

A balloon rubbed on a wall can produce enough static electricity that when hovered over the head, the hair will stand on end as it is attracted upward to the balloon.
These phenomena are associated with the hair's ability to become charged with static electricity.

Since keratin is a good insulator, it is mainly friction which gives hair an electric charge.
It increases when the hair cuticle is damaged.

The more *damaged* the hair cuticle, the more of the exchange of electric charges.
It decreases when the hair is damp.

Light Reflection

The reflection of light is what gives hair the appearance of sheen and shine.

Damaged hair can change the way that light is reflected from it's surface therefore making the hair appear dull.

The damage of the hair cuticle can be felt with the human hand and therefore the Cosmetologist can be sensitive to it's condition during the analysis process of the client's hair.

The rough outer scales of the hair shaft can be detected. **Damaged hair can develop *tangles* much easier due to these roughed up cuticle layers.**

Erosion and weathering of the hair occurs when the hair is repeatedly exposed to *environmental* elements. Hair *products* can soften the effects and protect the hair from these external attacks.

The use of hair products can maintain and even renew the *light* reflecting qualities contained in health hair.

Scalp and Hair

Hair is naturally lubricated by a thin layer of *sebum*, produced by the sebaceous glands.
This sebum is essential to provide the hair with protection, *flexibility* and shine.

But under the influence of hormonal factors, the production of sebum can become abnormally high.
The hair can become over saturated with sebum which in turn causes the hair to attract dirt.

Shampoo will not lather up in over *oily* hair and will require repeated shampoo applications in order to complete a thorough cleansing process.

Part B: Conditions of the Scalp and Skin

Learning Objectives:

- List common daily terms used in a salon
- Name pigmentation abnormalities
- List inflammations of the skin
- Identify skin lesions
- Describe contagious disorders

Introduction: The following information reviews basic terms and minor factors of the scalp and skin..

SALON SERVICES:

The following definitions are some of the most commonly used terms in salons when analyzing yourself or your client. From the hair color patch test to a simple shampoo/blow-dry service, these terms are reminders of condition awareness before ever serving a client or fellow professional.

SALON SERVICES: Daily terms:

Allergy	**Physical reaction by the skin due to exposure to a substance.**
Contagious	**Communicable**
Disease	The pathological interference of the normal function of the body or it's parts
Disorder	An abnormal condition that is usually not contagious
Infectious	The ability of a bacteria to enter the body
Inflammation	A skin disorder characterized by redness, pain, edema, and heat.
Occupational	Due to the activity of your job, possibly repetitive.
Parasitic	The type of any condition caused by animal or vegetable parasites.
Seasonal	Effects due to the exposure of changes in weather occurring throughout the year.

Bacteria and viruses can invade through an injury or *opening* of the skin.

The skin is made up of natural occurring barriers that protect us from undesirable environmental elements from entering our body

There can be skin and scalp conditions present that range from simple irritations to severe diseases of skin, scalp or other areas of the body. The Salon Professional must determine if she can give certain salon services to these clients. Products may worsen some conditions.

Common conditions of pigmentation abnormalities

The following conditions are generally not irritated or worsened by salon services.
However, always ask the client if he/she has any sensitivity to products or chemicals before performing salon services especially if you are in question about a condition.

SALON SERVICES: Pigmentation abnormalities

Albinism	**Congenital condition in which there is an absence of melanin pigment.**
Chloasma	**Patches of increased deposits of pigment in the skin are also known as liver spots.**
Leucoderma	Light patches on the skin due to congenital defective pigmentations.
Naevus	A birthmark also known as portwine or strawberry that can be small or large and that includes the malformation of skin due to pigmentation or dilated capillaries.
Lentigo	Small spots that can be yellow to brown in color.
Vitiligo	The type of condition of leucoderma that can affect skin or hair.

Skin Pigment Disorders

Skin color is determined by a *pigment*, melanin made by specialized cells in the skin, melanocytes. The amount and type of melanin determines a person's skin *color.*

***Melanin* gives color to the skin, hair, and iris of the eyes.** Levels of melanin depend on race and amount of sunlight exposure.

***Sun* exposure increases melanin production** - to protect the skin against harmful ultraviolet rays.

Vitiligo

***Vitiligo* is a disorder in which white patches of skin appear on different parts of the body.**

This happens because the cells that make pigment, in the skin are destroyed.

The cause is not known.

In the United States, 2 to 5 million people have the disorder. Most people with vitiligo develop it before the age of 40.

The disorder affects all races and both genders equally.

***White* patches on the skin are the main sign of vitiligo.**

These patches are more common in areas where the skin is **exposed to the sun**. The patches may be on the hands, feet, arms, face, **scalp,** and lips.

- **SALON SERVICES:** The following conditions can be irritated or made worse during a salon service. **Certain chemicals, products and even tap water can cause irritation to clients with eczema or psorasis.**

  Scalp and skin conditions can be minimal or they can be severe. The skin might be broken or blood could be present.

SALON SERVICES: Inflammations of the skin:

Eczema	Dry or moist lesions accompanied by itching and burning that usually has red-blisters and oozing.
Psoriasis	Lesions that are often round and are dry. Occurring in patches, they are covered with coarse, silvery scales. When irritated, they bleed.

Psoriasis

***Psoriasis* is a chronic skin condition characterized by inflamed, red, raised areas that often develop as silvery scales on the scalp, elbows, knees, and lower back.**

Psoriasis is estimated to affect between 5 million to 7 million people in the US.

The cause of psoriasis is unknown, however, it is thought to be caused by abnormally fast-growing and shedding skin cells.

The skin cells multiply quickly causing the skin to shed every three to four days. Though not contagious, the condition is hereditary. Psoriasis is often recurrent and occurs in varying severity.

Types of Psoriasis
Psoriasis has several forms and levels of *severity*.

- **discoid psoriasis**
  Also called **plaque psoriasis**, this type of psoriasis is the most common.
  It may include **patches of red, raised skin** on the trunk, arms, legs, knees, elbows, and **scalp**.
  Nails may also thicken, become pitted, and separate from the nail beds.

- **guttate psoriasis**
  This type may include many small patches of red, raised skin.

- **pustular psoriasis**
  It may include small pustules (pus-containing blisters) all over the body or just on the palms, soles, and other small areas.

SALON SERVICES: Contact Dermatitis

Contact *dermatitis* is a physiological reaction that occurs after skin comes in contact with certain substances.

The majority of these reactions are caused by irritants to the skin.

Contact dermatitis caused by an irritant occurs from direct contact with the irritant.

Adults are most commonly affected by allergic contact dermatitis, but it can affect persons of all ages.

Causes
The most common causes of allergic contact dermatitis include the following:

- soaps /shampoos/ cosmetic products
- detergents or bleaches not rinsed well from the shampoo bowel
- saturated towels left around the patron's neck during a permanent wave or other chemical service
- **cosmetics**
  Many types of cosmetics can cause *allergic* contact dermatitis. Permanent hair dyes that contain paraphenylenediamine are the most frequent causes. Other products that may cause problems include dyes used in clothing, perfumes, eye shadow, nail polish, lipstick, and some sunscreens

Reactions include:

- mild redness and swelling of the skin
- blistering of the skin
- itching
- scaling and temporary thickening of skin

SALON SERVICES: Skin lesions

Condition Awareness

The following conditions usually involve broken skin or bleeding.

These may occur on the scalp or any area of the skin. Do not come in contact with body fluids.

SALON SERVICES: Conditions of broken skin and body fluids

Bulla	**A blister containing body fluids.**
Crust	**Scab**
Excoriation	An abrasion caused by injury such as a scrape.
Fissure	**A crack in the skin that penetrates the dermal layer.**
Scale	**The accumulation of flakes of the epidermal layer.**
Ulcer	**Open lesions on the skin.**
Vesicle	A blister that contains body fluid within or just beneath the epidermis, an example is poison ivy.
Wheal	An itchy, swollen lesion that is temporary, for example: a mosquito bite.

SALON SERVICES: Public Health: Contagious disorders

Fungal infections of the skin are *contagious.*

Skin *fungi* live in the dead, top layer of skin cells in moist areas of the body, such as the scalp.

These fungal infections cause only a small amount of irritation.

Other types of fungal infections penetrate deeper and may cause itching, swelling, blistering, and scaling.

In some cases, fungal infections can cause reactions elsewhere on the body.

For example, a person may develop a rash on the scalp after touching an infected foot.

SALON SERVICES: Ringworm is contagious.

Condition Awareness

Tinea infections: Ringworm

"Ringworm" is a misleading term that refers to the circular appearance of the fungal lesion. There are no worms involved.

Different fungi, depending on their location on the body, cause ringworm.

Ringworm **is characterized by ring-shaped, red, scaly patches with clearing centers.**

Tinea is ringworm caused by *fungus*, a vegetable parasite, that includes symptoms of scaling of the skin.

It can effect the skin of the scalp, face or neck. Body ringworm (tinea corporis): This skin infection is characterized by a ring-like rash anywhere on the body or the face.
The effects of body ringworm may include:

- red, circular lesion with raised edges
- the middle of the lesion may become less red as the lesion grows
- itching of the affected area

Because the fungi can live indefinitely on the skin, recurrences of ringworm are likely.

Summary

We have reviewed various factors of the permanent wave, hair structure and scalp conditions. We can now more easily recognize professional standard implements used in the service application as well as specific wrapping techniques. We can now describe and define the structural composition of the hair and list various skin and scalp conditions.
Having knowledge of these elements is a must in the professional salon. Thank you for taking responsibility for your professional license and completing this continuing education course.

Credits, References, and Resources

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