**Bacteria in Your Foot Soak**

**Recipe for bacterial infection**

Foot spa chlorination and chelating detergents is now recommended.

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**Foot spa chlorination and chelating detergents is now recommended**

**the salon’s whirlpool foot spas**

- A rod-shaped bacteria called *Mycobacterium fortuitum furunculosis* is now causing concern in California.
- In 2000, this bacteria caused infection in over 100 clients who received pedicures in the same salon. [http://www.youtube.com/watch?v=yHL8rfTw0](http://www.youtube.com/watch?v=yHL8rfTw0)
- The infection caused stubborn, ugly sores that lingered for months, required the use of strong antibiotics and in some cases caused scarring.

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**Microbiology**

- **Bacteria** are minute, One-celled microorganisms that have both plant and animal characteristics.
  - **Nonpathogenic:** harmless
  - **Pathogenic:** harmful
- **Viruses:** A parasitic submicroscopic particle that infects and resides in cells of biological organisms.
- **Parasites:** Organisms that grow, feed, and shelter on or in another organism (HOST).
- **Immunity:** the ability of the body to destroy and resist infection.
- **Prevention:** sanitation and disinfection.

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**TWO TYPES OF BACTERIA**

**Nonpathogenic**

- These are helpful or harmless.
- They have useful functions:
  - Decompose refuse
  - Improve soil fertility
  - Help metabolize food
  - Protect against microorganisms
  - Stimulate immune response
- **Saprophytes** are nonpathogenic bacteria that live on dead matter and do not produce disease.

**Pathogenic**

- These are harmful.
- Disease-producing
- When invading plant or animal tissue
- **Parasites** require living matter for their growth.

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**THREE GENERAL FORMS OF BACTERIA**

- **Cocci**
- **Bacilli**
- **Spirilla**
**Cocci**

- Are round-shaped
- Appear singly or in groups
- Rarely show active mobility or movement
- Transmitted via air, dust, or in substances in which they settle

**Staphylococci**
- Are pus-forming.
- Grow in bunches or clusters.
- Cause abscesses, pustules, and boils.

**Streptococci**
- Are pus-forming.
- Grow in chains.
- Cause infections such as strep throat and blood poisoning.

**Diplococci**
- Grow in pairs.
- Cause pneumonia.

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**Bacilli and Spirilla**

**Bacilli**
- Are short, rod-shaped bacteria.
- Are the most common type bacteria.
- Produce diseases such as:
  - Tetanus.
  - Haemophilus influenzae.
  - Typhoid fever.
  - Tuberculosis.
  - Diphtheria.

**Spirilla**
- Are spiral or corkscrew-shaped bacteria.
- Are subdivided into several groups:
  - Treponema pallida causes syphilis (STD).
  - Borrelia burgdorferi causes Lyme disease.

**Movements of bacteria**
- Cocci rarely show active movement.
- Bacilli and spirilla are both motile.
- Use slender, hair-like extensions for locomotion—flagella and cilia make a whip-like motion that moves the bacteria in liquid.

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**Growth and Reproduction**

- Bacteria generally consist of an outer cell wall and internal protoplasm.
- Bacteria manufacture their own food.
- Give off waste products.
- Grow and reproduce.

- Bacteria thrive in a warm, moist, dark, and dirty environment.
- Bacteria take about 20 to 30 minutes to reach full growth.

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**Two Phases in Life Cycle**

**Active or vegetative stage:**
- Growth and reproduce in favorable conditions.
- Daughter cells are formed by the mitosis division.

**Inactive or spore-forming stage:**
- Bacteria will form spherical spores and will not be harmed by disinfectant, heat, or cold.

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Ms. Ly
BACTERIAL INFECTIONS
- An infection occurs when body tissues are invaded by disease-causing or pathogenic bacteria.
- The presence of pus is a sign of infection.
- Pus is a fluid product of inflammation and contains white blood cells and the debris of dead cells, tissue elements, and bacteria.

LOCAL INFECTION
- A local infection is confined to a single area.
- Pimple
- Boil
- Infected cut
- Presence of pus is a sign of infection.
- Staphylococci are the most common pus-forming bacteria.

GENERAL INFECTION
- Pathogenic bacteria and their toxins are carried by the bloodstream to all parts of the body.
- Blood poisoning and syphilis are two well-known examples.

VIRUSES
- Are submicroscopic structures capable of infesting almost all plants, animals, and bacteria
- Can pass through the pores of a porcelain filter

VIRUSES
- Cause common colds and other respiratory and gastrointestinal infections, including:
  - Measles
  - Mumps
  - Chicken pox
  - Smallpox
  - Rabies
  - Yellow fever
  - Polio
  - Influenza flu
  - HIV (AIDS)
- Live by penetrating cells
- Are resistant to antibiotics
- Vaccination will help prevent; however, not available for all viruses

HEPATITIS
- Hepatitis is a disease marked by inflammation of the liver and caused by a bloodborne virus similar to HIV in transmission.
- This virus is present in all body fluids.
- Types of hepatitis include:
  - Hepatitis A.
  - Hepatitis B (HBV).
  - Hepatitis C (HCV).
HEPATITIS A

- Illness lasts about two to six weeks.
- Symptoms are similar to flu symptoms.
- Adults often have yellowing of skin or the eyes
- The disease is spread through
  - close contact.
  - poor sanitation and poor personal hygiene.
  - contaminated food, milk, water, and shellfish.
  - infected food handlers.
  - sexual contact.
- A vaccine is available.

HEPATITIS B (HBV)

- This illness may cause chronic liver damage and cirrhosis of the liver
- There may be flu-like symptoms or no symptoms at all.
- The disease is primarily transmitted through sexual contact or parenteral exposure (piercing mucous membranes or skin barrier) to blood or blood products.
- A vaccine is available.

HEPATITIS C (HCV)

- This illness can cause long-term hepatitis, cirrhosis, and/or liver cancer.
- Symptoms:
  - Fatigue
  - Stomach pain
- Also transferred through parenteral contact and sexual activity with infected partners
- No vaccine

HIV/AIDS

- HIV (Human Immunodeficiency Virus) is the virus that causes AIDS (Acquired Immune Deficiency Syndrome).
- AIDS breaks down the body’s immune system.
- One can be infected for 11 years without symptoms.
- HIV is passed through blood and body fluids

PARASITES

- An organism that lives in or on another organism (its host) and benefits by deriving nutrients at the host's expense.
- Contagious diseases caused by parasites are never treated in a cosmetology school or salon; refer the client to a physician.

PARASITES

- Parasites are vegetable or animal organisms that live in or on (and draw nourishment from) other living organisms.
- Parasites are responsible for contagious diseases.
- A parasite carried by a mosquito causes malaria.
- Insects carrying diseases from one person to another are known as disease vectors.
- Contagious diseases caused by parasites are never treated in a cosmetology school or salon; refer the client to a physician.
VEGETABLE PARASITES OR FUNGI
- Molds, mildews, and yeasts (fungi) can produce contagious skin diseases such as
  - ringworm.
  - tinea.
- Nail fungus can be contracted through implements that have not been disinfected properly or by moisture trapped under nail enhancements.
- Nail fungus is chronic and usually localized but can be spread to other nails, and from client to client.

HEAD LICE
- A skin disease caused by an infestation of head lice is called pediculosis capitis.
- Head lice are called pediculosis.

SCABIES
- Scabies is a contagious skin disease that is caused by the itch mite.
- The itch mite burrows under skin and causes scabies.

CONTAGIOUS OR COMMUNICABLE INFECTIONS
- Disease spread by one person to another
- Through direct or indirect contact such as
  - coughing
  - sneezing
  - unclean hands
  - unclean implements
  - open sores
  - common drinking cups or common towels, etc.
- Common contagious diseases preventing cosmetologists from working are
  - tuberculosis.
  - colds.
  - ringworm.
  - scabies.
  - head lice.
  - viral infections.

HOW PATHOGENS ENTER THE BODY?
BLOODBORNE PATHOGENS

HOW BODY FIGHTS INFECTION
Unbroken skin
Body secretions such as perspiration and digestive juices
White blood cells
Antitoxins

Method of Infection Control

Immunity: the body's ability to fight off or resist infections and disease, and to destroy bacteria that have entered the body.

1. Natural immunity: an inborn ability to resist certain diseases
   1. Naturally acquired immunity: The body acquires immunity after it has overcome a disease or through inoculation.
   1. Artificially acquired immunity: vaccination
Methods of Infection Control

- **contamination**
- **Decontamination** is the removal of pathogens and other substances from tools or surfaces by
  - **Sanitation**
  - **Disinfection**
    1. **Hospital-grade**: pseudomonacidal, bactericidal, fungicidal, and virucidal.
    2. **Cosmetology**: bactericidal, fungicidal, and virucidal.
  - **Sterilization**: High-pressure steam, dry heat autoclaves, some chemicals

**Only sanitation and disinfection are required in the salon.**

TYPES OF DISINFECTANTS

- **Quats**: Quaternary ammonium compounds
  - nontoxic, odorless, and fast-acting. 10-15 mins
- **Phenols**: soften and discolor certain rubber and plastic. A 5% solution is used most often for metal implements
- **Alcohols** - are not EPA-registered as disinfectants.
- **BLEACH** — sodium hypochlorite (household bleach)
  - Only sanitation and disinfection are required in the salon.

ALCOHOL not EPA-registered as disinfectants.

- Methyl alcohol is not used in salons.
- Ethyl alcohol \( \geq 70\% \) to be effective.
- Isopropyl alcohol \( \geq 99\% \) to be effective.
- They are not permitted for use with implements in states requiring hospital-grade disinfection.
- **Disadvantages**:
  1. They are extremely flammable.
  2. They evaporate quickly.
  3. They are slow-acting, less effective.
  4. They corrode tools and dull sharp edges.
  5. Vapors can cause headaches and nausea.

ULTRASONIC BATH

Ultrasound - High-frequency sound waves create powerful, cleansing bubbles in the liquid that clean tiny crevices impossible to reach with a brush.

Formalin (formaldehyde) is not safe for salon use.

Formalin may cause cancer.
Formalin is poisonous when inhaled and is extremely irritating to the eyes, nose, throat, and lungs can cause allergies.

DISINFECTANT SAFETY

- Wear gloves and safety glasses.
- **Add disinfectant to water; never add water to disinfectant**.
- Use tongs, gloves, or draining basket when removing implements from disinfectants.
- Keep them away from children.
- **Do not pour quats, phenols, etc. over your hands**.
- Carefully weigh and measure products.
- Never place anything in unmarked containers.
- Always follow manufacturer’s recommendations.

**If school and/or salon implements come into contact with blood or body fluids**, they must be cleaned and completely immersed in an **EPA-registered disinfectant that kills HIV-1 and HBV**, or in a **tuberculocidal disinfectant**.

**The National Interstate Council of State Cosmetology Boards (NICS) follows this standard for testing as well.**
### Federal Agencies

- Occupational Safety and Health Administration (OSHA) part of the U.S. Department of Labor
- Hazard Communication Standard (HCS) -> MSDS
- Environmental Protection Agency (EPA)
  - Hospital disinfectants
  - Tuberculocidal disinfectants

### Laws and Rules

- Laws are written by both federal and state legislatures that determine the scope of practice
- Rules and regulations are more specific than laws. Rules are written by the regulatory agency or the state board

### EPA - Environmental Protection Agency

Disinfectants must be approved by the EPA in your state:
- Product label must contain EPA registration number.
- Label lists organisms the product has been tested for.
- Label gives directions for use.
- Label lists safety precautions.
- Label lists active ingredients.

### AN EFFICACY LABEL

- The EPA-approved disinfectant label must have a registration number.
- The number ensures that the disinfectant has proven effective against certain organisms.
- The label will tell you exactly which organisms the disinfectant has been tested for, such as HIV-1.
- Hepatitis B virus.

### MSDS - Material Safety Data Sheets

Federal law requires manufacturers to provide you with important information such as
- directions for use.
- safety precautions.
- list of active ingredients.
- content.
- associated hazards.
- combustion levels.
- storage requirements.

### OSHA - Occupational Safety and Health Administration

- OSHA was created as part of the U.S. Department of Labor.
- OSHA enforces safety and health standards in the workplace.
- The Occupational Safety and Health Act of 1970 established the Hazard Communication Rule that requires manufacturers to assess hazards associated with their products.
- OSHA standards are important to cosmetology because of the nature of the chemicals used.

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