Pathology

- The branch of medicine concerned with the study of disease in all its aspects (its nature, causes, development, and consequences)
Physiology

- The science of body functions – how body parts work
Pathophysiology

the physiology of abnormal states; *specifically*: the functional changes that accompany a particular syndrome or disease
Goals & Objectives

- Goals
  - What you want/need to retain
  - Learning Points

- Objectives
  - How you’re going to retain that knowledge
  - Lesson Plans
  - Exercises (assignments)

- Key Concepts
  - Each PowerPoint will have key concepts that a massage therapist needs to retain to be effective in treatment
Key Concepts

- Topic Areas
  - Physiology, Pathology, Hydrotherapy, Exercise, Nutrition
- Integration
- Homeostasis
- Systems of the Body
  - 11 systems
- Signs & Symptoms
- Stages of Healing
Structure and Function

- Structure and function of the body are closely related
- Structure of a part of the body allows performance of certain functions
  - Examples:
    - Bones of the skull provide protection for the brain
    - Thin air sacs of the lungs permit movement of oxygen
Levels of Structural Organization

1. Chemical Level
   - Atoms (C, H, O, N, P)
   - Molecule (DNA)

2. Cellular Level
   - Smooth muscle cell

3. Tissue Level
   - Smooth muscle tissue

4. Organ Level
   - Stomach
   - Epithelial tissue
   - Smooth muscle tissue layers
   - Serous membrane

5. System Level
   - Pharynx
   - Esophagus
   - Liver
   - Stomach
   - Pancreas
   - Gallbladder
   - Small intestine
   - Large intestine
   - Digestive system

6. Organismic Level
A system consists of related organs with a common function

Organ-system level

- Digestive system breaks down and absorbs food
  - It includes organs such as the mouth, small and large intestines, liver, gallbladder, and pancreas
- Eleven systems of the human body
  - Five are covered in the first year of the program
TABLE 1.1
Components and Functions of the Eleven Principal Systems of the Human Body

**Components:** Skin and structures associated with it, such as hair, nails, and sweat and oil glands.

**Functions:** Helps regulate body temperature; protects the body; eliminates some wastes; helps make vitamin D; detects sensations such as touch, pressure, pain, warmth, and cold.

1. INTEGUMENTARY SYSTEM (CHAPTER 5)
Components and Functions of the Eleven Principal Systems of the Human Body

**Components:** All the bones and joints of the body and their associated cartilages.

**Functions:** Supports and protects the body, provides a specific area for muscle attachment, assists with body movements, stores cells that produce blood cells, and stores minerals and lipids (fats).

2. **SKELETAL SYSTEM (CHAPTERS 6-9)**
### TABLE 1.1
Components and Functions of the Eleven Principal Systems of the Human Body

**Components:** Specifically refers to skeletal muscle tissue, which is muscle usually attached to bones (other muscle tissues include smooth and cardiac).

**Functions:** Participates in bringing about body movements, such as walking, maintains posture, and produces heat.

### 3. MUSCULAR SYSTEM (CHAPTERS 10-14)

![Skeletal muscle diagram]
TABLE 1.1
Components and Functions of the Eleven Principal Systems of the Human Body

**Components:** Blood, heart, and blood vessels.

**Functions:** Heart pumps blood through blood vessels; blood carries oxygen and nutrients to cells and carbon dioxide and wastes away from cells, and helps regulate acidity, temperature, and water content of body fluids; blood components help defend against disease and mend damaged blood vessels.

6. CARDIOVASCULAR SYSTEM (CHAPTERS 21-23)
Basic Life Processes

- Basic Life Processes
  - Distinguish living from non-living things
  - Six important life process
    - Metabolism
    - Responsiveness
    - Movement
    - Growth
    - Differentiation
    - Reproduction
Homeostasis

- A condition of **equilibrium** (balance) in the body’s internal environment
  - Dynamic condition
  - Narrow range is compatible with maintaining life
  - Example
    - Blood glucose levels range between 70 and 110 mg of glucose/dL of blood (4-7mmol/l in Canada)
    - Whole body contributes to maintain the internal environment within normal limits
Control of Homeostasis

- Homeostasis is constantly being disrupted
  - Physical insults
    - Intense heat or lack of oxygen
  - Changes in the internal environment
    - Drop in blood glucose due to lack of food
  - Physiological stress
    - Demands of work or school
  - Disruptions
    - Mild and temporary (balance is quickly restored)
    - Intense and prolonged (poisoning or severe infections)
Homeostatic Imbalances

- Normal equilibrium of body processes is disrupted
  - **Moderate imbalance**
    - Disorder or abnormality of structure and function
    - Disease specific for an illness with recognizable signs and symptoms
    - **Signs** are objective changes such as a fever or swelling
    - **Symptoms** are subjective changes such as headache
  - **Severe imbalance**
    - Death
Signs

- Any objective evidence indicative of disease, perceptible to the examiner, as compared to subjective sensations (symptoms) of the patient
- E.g.:
  - Bleeding,
  - Contusion
  - Seizures
  - Wheezing
  - Blood pressure
  - Fever
  - Weight loss
  - Crepitus
Symptoms

- Any manifestation of illness consciously experienced by a patient
- E.g.
  - Headache
  - Nausea
  - Disorientation
  - Pain
  - Fatigue
  - Tingling
A set of signs & symptoms that appear together with reasonable consistency.

E.g.
- Irritable Bowel Syndrome
- Chronic Fatigue Syndrome
Acute vs. Chronic

- Acute – denoting a disease or symptoms of abrupt onset or lasting a relatively short period of time; opposite of chronic

- Chronic – denoting a disease of slow progress and persisting over a long period of time; opposite of acute
Stages of Healing – Page 17

• Acute
  – Inflammatory Reaction

• Sub-Acute
  – Repair & Healing

• Chronic
  – Maturation & Remodeling
Treatment

- **Medical Treatment**
  - We will look at medical treatment applied to conditions that we cover including:
    - Medications
    - Rehabilitation
    - Lifestyle changes

- **Massage Treatment**
  - We will look at massage treatment, and modifications related to a client's condition.
Hydrotherapy

- The application of water in one of its forms for the purpose of enhancing homeostasis of the body. This may be as a preventative or treatment process.
Water

- As a solid
  ◦ Absorb heat from the body and to reduce circulation
  ◦ Reduce Pain

- As a liquid
  ◦ Cool the body
  ◦ Warm the body
  ◦ Provide easier movement of body parts

- As a gas
  ◦ Administer healing agents (respiratory)
  ◦ Affect the body systemically
Hydrotherapy – Treatment

- **Acute**
  - Follows trauma
  - Inflammatory Stage
  - Ice is most beneficial – slows down metabolism and decreases pain

- **Sub-Acute**
  - 3–7 days following injury, inflammation is decreasing
  - Contrast is of greatest benefit (3–5 min. of hot – 10–60 sec. of cold)

- **Chronic**
  - Long Standing 7–10 days
  - Heat Generally
Exercise

- Movement of the body is essential for life processes to keep the body in homeostasis
- The course will introduce beneficial exercise programs that will enhance quality of life for clients.
- E.g.;
  - Geriatric – Tai Chi
  - Joint Conditions – Aquatic Exercise
  - Mindfulness – for everyone!
Nutrition – Chapter 27

- Chemistry
- Metabolism
- Nutrients
- Disease/Disorder
Public Health

Health has been defined by the World Health Organization as a state of complete physical, mental and social well being and not merely the absence of disease or infirmity. (1947)

Determinants of Health
- Social State – religion, education, economic
- Psychosocial – work, depression, family
- Physical – environment, work demands
- Genetics – family history
- Early Childhood – mental and physical effects
Viruses

- Smallest of the infectious agents
- Require a living cell for survival and replication
- “an intracellular parasite composed of a strand of DNA or RNA and a protein coat”
  - E.g. – Polio, HIV, HPV, Hepatitis, Herpes, Influenza
Bacteria

- Single cell life forms that have no nucleus or ER
- Simple cells that require a host cell for replication and survival, may cause a host cell to produce toxins or overtake the original cells function, which may lead to death of the host – extracellular
- E.g. – Staphylococcus (pictured), Streptococcus, MRSA (Methicillin-Resistant Staphylococcus Aureus)
Mycology – Fungus
- Algae, protozoa and fungi – microorganisms, complex structures that tend to grow in a bunch
- E.g. – Yeast infections (Candida), Tinea Pedis (Athlete’s Foot), Blastomycosis
Parasites

- Metazoa and insecta
- An animal or plant that lives in or on a host
- E.g. – Helminthic Infections (worms), Scabies, Lice, Giardia (pictured)
Avenues of Transmission

- **Contact**
  - One of the most common forms of spreading communicable diseases
  - Direct contact – with intact or broken skin

- **Droplet Mechanism**
  - Coughing
  - Talking
  - Sneezing

Contact – Massage!

Droplet
Avenues of Transmission

- **Vehicle**
  - Enters the body through a substance
    - Food
    - Blood
    - Water
    - Serum

- **Vector**
  - Infectious agent enters the body through a bite
Prevention of Spread of Disease

- Using alcohol-based gel or form according to manufacturers’ directions (which means using the amount prescribed and rubbing until the skin is dry) is often faster and more convenient than washing with soap and water, and it is an effective antibacterial and antiviral mechanism, but it does not remove dirt and it is not effective against spore-forming bacteria.
- Alcohol-soaked towelettes are specifically not recommended because their alcohol concentration isn’t high enough to be effective.
Prevention of Spread of Disease

- **Antiseptic**
  - A germicide or, under special conditions, a bacteriostat: generally used on *living tissue*.
    - E.g. – Tea Tree Oil, Detol

- **Disinfectant**
  - Any agent that kills disease-causing microorganisms; generally used on *inanimate objects*.
    - E.g. – Lysol, Mr. Clean etc.

- **Sterilization**
  - The process of destroying or removing all living microorganisms.
    - E.g. – Boiling, Autoclave
Prevention of Spread of Disease

- Reception & Waiting Area
  - Disinfect doorknobs, light switch plates, telephones, coat racks, or hooks
- Washrooms
  - Disinfect sinks, toilets, floors, doorknobs, and usable surfaces often
- Laundry room
  - Hypoallergenic detergents/softeners, hot water (if bleach is used, rinse thoroughly), hot dryer (do not leave linens damp!)
  - Clean laundry separate from dirty, separate surface for folding etc.
- Lunch room or staff room – keep clean – keep smells to a minimum
- Treatment area
  - Disinfect massage plinth between clients (focus on face cradle)
  - Wash massage bottle between clients
  - Lubricants that are solid are room-temperature (coconut oil) – must be dispensed into individual containers and leftovers discarded
Prevention of Spread of Disease

- Hygiene
- Fingernails
- Hair
- Wash hands
- Clinic clothing (scrubs)
- Avoid allergic reactions (perfumes, colognes, harsh detergent smells)
- Lifestyle – exercise, diet, sleep, stress reduction
- Smoking (odor)
- Drugs and alcohol
- No massage when ill, or injured
- Client health – Client History!
Assignment for June

- Read Chapter 1 – Anatomy and Physiology for the Manual Therapies
- Read Chapter 1 – A Massage Therapist’s Guide to Pathology