

# PTAT-1402: CLINICAL PATHOPHYSIOLOGY & PHARMACOLOGY

## Cuyahoga Community College

**Viewing: PTAT-1402 : Clinical Pathophysiology & Pharmacology**

**Board of Trustees:**

November 2024

**Academic Term:**

Fall 2025

**Subject Code**

PTAT - Physical Therapist Assist

**Course Number:**

1402

**Title:**

Clinical Pathophysiology & Pharmacology

**Catalog Description:**

Introduction to pathophysiology and pharmacological management encountered in the practice of physical therapy that affect such systems as the musculoskeletal, endocrine, immune, integumentary, vascular, and neurological systems. Discuss the health, disease, and process of inflammation and repair of tissue and mechanisms of pain.

**Credit Hour(s):**

3

**Lecture Hour(s):**

3

## Requisites

**Prerequisite and Corequisite**

PTAT-1300 Functional Anatomy, and PTAT-1312 Fundamentals of Physical Therapy, and BIO-2341 Anatomy and Physiology II.

## Outcomes

**Course Outcome(s):**

A. Discuss the concepts of health, disability, and pathology, and the behavioral, social and environmental factors contributing to disease and dysfunction.

**Essential Learning Outcome Mapping:**

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

**Objective(s):**

1. Discuss the concepts of health, disease, illness and disability.
  2. Discuss the role of physical therapy in health promotion and disease prevention.
  3. Classify disease as to etiology, duration and organ or system affected.
  4. Discuss the plan of care as developed by the physical therapist to achieve desired outcomes in the treatment of these various pathologies.
  5. Identify the need for patient related instruction to achieve the desired outcomes as identified in the plan of care.
  6. Recognize the impact that differences in cultural, ethnic, racial and socioeconomic factors have on patient interaction and response to disease, injury and treatment.
  7. Identify the body's defenses against disease.
  8. Reinforce Occupational Safety and Health Administration (OSHA) standard precautions and blood borne pathogens.
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**Course Outcome(s):**

B. Apply contraindications, precautions and special indications for physical therapy intervention for patients with diabetes mellitus and other endocrine disorders.

**Objective(s):**

1. Describe endocrine function and identify manifestations of endocrine dysfunction.
2. Identify etiology, signs and symptoms of diabetes mellitus.
3. Discuss the role of physical therapy in the management of diabetes mellitus and diabetic neuropathy.
4. Identify physical therapy interventions and precautions for the patient with pituitary, thyroid, parathyroid and adrenal diseases.
5. Describe the signs and symptoms of Addison's disease and Cushing's syndrome and the implications for physical therapy intervention.

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**Course Outcome(s):**

C. Discuss and compare physical therapy interactions and interventions for the patient with blood disorders or diseases of the venous, arterial and lymphatic system.

**Objective(s):**

1. Discuss cause, manifestation and treatment of peripheral vascular disease.
2. Distinguish between arterial and venous disorders.
3. Identify the signs and symptoms of hematologic disorders.
4. Identify the various classifications of lymphedema and the complications resulting from lymphedema.
5. Apply contraindications, precautions and special indications for physical therapy intervention for patients with anemia, leukemia and sickle cell anemia.
6. Compare and contrast Hodgkin's and Non Hodgkin's lymphoma.
7. Discuss the considerations and physical therapy interventions for the patient with lymphoma and myeloma.
8. Discuss the organization and categories of peripheral vascular disease as inflammatory, arterial occlusive, venous or vasomotor.
9. Discuss the signs and symptoms of the various peripheral vascular diseases and the role of physical therapy with these patients.
10. Compare and contrast arterial, venous and diabetic ulcers including common anatomical locations, appearance, exudate and treatment.

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**Course Outcome(s):**

D. Apply knowledge of the contraindications, precautions and special considerations for physical therapy intervention for patients with renal and digestive system diseases.

**Objective(s):**

1. Discuss the role of physical therapy when working with clients with renal and hepatic disorders.
2. Discuss the role of physical therapy when working with clients with gastrointestinal disorders.
3. Identify the signs and symptoms of urinary tract infection and discuss how this may impact the patient's ability to participate in physical therapy.
4. Describe the neurological involvement with chronic renal and liver failure and the physical therapy treatment challenges with this patient population.
5. Discuss the treatment considerations for the patient receiving dialysis including infection control and precautions regarding shunt location.
6. Identify some common causes of neurogenic bladder and the physiological and psychological ramifications of this diagnosis.
7. Identify the parameters for a diagnosis of incontinence and the physical therapy interventions for the patient with this diagnosis.
8. Identify the clinical manifestations of diseases of the gastrointestinal system and the terminology utilized to describe those manifestations.
9. Discuss the adaptation of physical therapy interventions for patients with Crohn's disease, ulcerative colitis and irritable bowel syndrome.

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**Course Outcome(s):**

E. Describe the etiology and presentation of central and peripheral nervous system diseases and conditions and discuss specific physical therapy interventions.

**Objective(s):**

1. Identify the clinical manifestations of pathology to the central and peripheral nervous systems to include but not limited to the following: encephalitis and meningitis, brain tumors, degenerative diseases, neuropathy, headache and vestibular disorders.
2. Identify the etiology, clinical manifestations, routine tests and treatment for infectious disorders of the central nervous system (CNS).
3. Discuss the considerations and adaptations regarding physical therapy intervention with patients with infections of the (CNS).
4. Describe common central nervous system tumors as primary or secondary and glioma or nonglioma and common treatment interventions.
5. Discuss adaptations and precautions for physical therapy intervention for the patient with CNS tumor.
6. Identify the genetic basis as well as clinical manifestations of Huntington's disease and the physical therapy treatment involved in the care of this patient.
7. Compare and contrast the etiology, clinical manifestations, prognosis and physical therapy interventions for various neuropathies such as Bell's palsy, Guillain-Barre, post polio syndrome and myasthenia gravis.
8. Describe the signs and symptoms of migraine headache, most common triggers for migraine headache and treatment.
9. Identify the two types of cluster headache, the signs and symptoms, precipitating factors and treatment.
10. Define the terminology utilized to describe the clinical manifestations of disorders to the vestibular system.
11. Describe the signs and symptoms of benign paroxysmal positional vertigo (BPPV) and tests and maneuvers utilized to diagnose and treat this disorder.
12. Describe the vertigo related to Meniere's disease the typical use of medication, diet, balance activities and physical therapy used to manage this disorder.

**Course Outcome(s):**

F. Apply knowledge of common diseases and disorders of the eye with the implications of vision loss and low vision for physical therapy intervention.

**Objective(s):**

1. Identify some of the signs and symptoms of disorders of the eye such as cataract, glaucoma and macular degeneration.
2. Apply knowledge of eye disorders and limitations to the adaptation of the physical environment and patient interaction during physical therapy intervention.

**Course Outcome(s):**

G. Apply contraindications, precautions and special indications for physical therapy interventions for patients with metabolic or multiple system disorders.

**Objective(s):**

1. Describe the role of the balance of acids and bases as essential for functioning of the cell and organs.
2. Identify some of the muscular and neurological symptoms that can be associated with metabolic and electrolyte imbalances.
3. Identify some of the signs and symptoms of electrolyte and fluid imbalance.
4. Compare and contrast metabolic and respiratory acidosis and alkalosis.
5. Describe the clinical manifestations and harmful side effects of inappropriate use or long term use of nonsteroidal anti-inflammatory drugs, corticosteroids and anabolic steroids.

**Course Outcome(s):**

H. Describe the clinical manifestations, treatment, and physical therapy intervention for disorders and diseases of the integumentary system utilizing proper terminology.

**Objective(s):**

1. Identify and utilize the proper terminology for skin disorders during communication and documentation.
2. Document skin lesions including characteristics, exudate, pattern of arrangement, location and distribution.
3. Compare and contrast the signs and symptoms of common skin disorders including treatment and physical therapy involvement.
4. Discuss the etiology and development of herpes zoster and the neuralgia and post herpetic nerve pain associated with this disorder.
5. Discuss the etiology and pathophysiology of psoriasis and the role of physical therapy in treatment.
6. Discuss skin cancer and identify categories of tumors as benign, pre-cancerous and cancerous.
7. Discuss malignant melanoma in terms of classification, risk factors, treatment and outcomes.

8. Describe patient and family instruction relative to skin care and protection and prevention of skin cancer.
9. Identify the characteristics of skin lesions that the patient should observe and report to the physician.

**Course Outcome(s):**

I. Describe how physical therapy interventions can be utilized to reduce inflammation, pain and facilitate wound healing.

**Objective(s):**

1. Describe the role of physical therapy interventions in pain control.
2. Describe the physiological mechanisms of injury and the inflammatory response.
3. Describe the phases of wound repair and possible complications to wound healing.
4. Discuss the theories of pain transmission and modulation including the gate control theory of pain.
5. Compare types of healing and factors that affect healing.

**Course Outcome(s):**

J. Relate physical therapy intervention to the healing process for bone, tendons, ligaments and muscle.

**Objective(s):**

1. Discuss the possible early and late complications of fracture injury and treatment and the role of physical therapy in the prevention of these complications.
2. Discuss the various types of internal and external skeletal fixation used in fracture treatment and the implications on physical therapy intervention.
3. Identify the etiology and discuss the physical therapy management of specific fractures in adults.
4. Discuss metabolic bone diseases such as osteomalacia, osteoporosis and Paget's disease and the role of physical therapy in each.
5. Describe the etiology and general features of rheumatoid arthritis, ankylosing spondylitis, psoriatic arthritis, gouty arthritis and osteoarthritis.
6. Discuss principles of physical therapy interventions in the treatment of the various types of arthritis.

**Course Outcome(s):**

K. Describe the physiological mechanism of the immune response and apply knowledge of immunopathology and hypersensitivity reactions to physical therapy interventions.

**Objective(s):**

1. Identify the components and function of the immune system and discuss the immune response. Identify factors that impact immunity.
2. Discuss the pathophysiology of immunodeficiency and autoimmune disease.
3. Describe the physical therapy interventions and patient instructions for systemic lupus erythematosus, fibromyalgia and chronic fatigue syndrome.
4. Identify the types of hypersensitivity reactions and the characteristics and interventions for each.
5. Describe the characteristics of anaphylactic shock and the immediate need for appropriate response and treatment.
6. Discuss the importance of the use of infection control and standard precautions to the interaction with the immunocompromised patient.
7. Identify the characteristics of the stages in AIDS and relate to CD4 cell counts.

**Course Outcome(s):**

L. Describe the classification, staging and medical treatment for neoplasias and the implications for physical therapy intervention.

**Objective(s):**

1. Discuss the classification, staging and grading of neoplasms. Identify the clinical manifestations of metastasis.
2. Identify some of the physiological effects of cancer and the role of physical therapy in the treatment of patients with cancer.
3. Discuss the classifications of musculoskeletal tumors and the clinical manifestations, treatment and physical therapy role in each.

**Course Outcome(s):**

M. Discuss the concepts of pharmacology and the practical applications affecting the delivery of physical therapy interventions.

**Essential Learning Outcome Mapping:**

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

**Objective(s):**

1. Explain essential pharmacological terms and definitions.
  2. Describe drug administration routes based on patient-specific factors.
  3. Relate factors which influence the absorption and action of drugs in the body.
  4. Analyze the impact of pharmacological and non-pharmacological agents on various physiological systems.
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**Methods of Evaluation:**

1. Quizzes and examinations
2. Web discussion board and assignments
3. Demonstration of professional behaviors

**Course Content Outline:**

1. Concepts of health, illness and disease
  - a. Behavioral, social and environmental factors
  - b. Health promotion and disease prevention
  - c. Classification models
  - d. Mental and behavioral issues
  - e. Ethical and legal obligations for abuse
  - f. OSHA standard precautions and blood borne pathogens.
2. Cellular and tissue injury and repair
  - a. The inflammatory response
  - b. Phases of wound healing
  - c. Healing process for bone, ligaments, tendons and muscle
  - d. Complications of wound healing
  - e. Physical therapy role in inflammation and wound healing
  - f. Pain control theories
3. Fractures and diseases of bone
  - a. Normal musculoskeletal tissue and reactions.
  - b. General features of fractures and fracture healing
  - c. Management and physical therapy (PT) intervention for the patient with fracture
  - d. Metabolic bone disorders
  - e. Degenerative joint diseases and PT interventions
4. Immunopathology
  - a. Physiological mechanisms of immune response
  - b. Hypersensitivity reactions and disorders
  - c. Immunodeficiency and autoimmune diseases
  - d. Transplantation
  - e. Interventions
5. Neoplasms
  - a. Causes and classifications
  - b. Staging and grading of neoplasms
  - c. Implications for treatment
  - d. Soft tissue and bone neoplasms
  - e. Metastasis
6. Endocrine system diseases and disorders
  - a. Role of pituitary and pituitary diseases
  - b. Thyroid and parathyroid diseases
  - c. Adrenal diseases
  - d. Diabetes mellitus

- e. Diabetic neuropathy
- f. Interventions for diabetes and other endocrine disorders
- 7. Peripheral vascular disorders
  - a. Arterial diseases
  - b. Venous diseases
  - c. Lymphatic disorders
  - d. Treatment and role of physical therapist assistant (PTA) in circulatory conditions
- 8. Blood disorders
  - a. Anemia and other disorders of red blood cells
  - b. Leukemia
  - c. Sickle cell anemia
  - d. Medical interventions and precautions for patient interaction
  - e. Physical therapy interventions
  - f. Lymphoma and myeloma
- 9. Diseases of the digestive and urinary systems
  - a. Inflammatory bowel disease, Crohn's disease, ulcerative colitis
  - b. Irritable bowel syndrome
  - c. Liver cirrhosis/cancer
  - d. Cancer of the gastrointestinal (GI) tract and accessory organs
  - e. Diseases of the kidney and bladder
  - f. Acute and chronic renal failure and dialysis
  - g. Precautions and special considerations for intervention
  - h. Incontinence
- 10. Pathology of the central and peripheral nervous system
  - a. Neoplasms of the CNS
  - b. Prion diseases, Creutzfeldt-Jacob disease
  - c. Epilepsy
  - d. Guillain barre, Huntington's and myasthenia gravis
  - e. Neuropathies
  - f. Headache
  - g. Vestibular disorders, BPPV
  - h. Infectious disorders of CNS
- 11. Disorders of the eye
  - a. Retinal detachment
  - b. Cataracts
  - c. Glaucoma
  - d. Macular degeneration
  - e. Optimal PT intervention for eye disorders
- 12. Metabolic and multiple system disorders
  - a. Balance of acids and bases
  - b. Mineral deficiencies
- 13. Integumentary system
  - a. Dermatitis
  - b. Psoriasis
  - c. Cellulitis
  - d. Herpes zoster
  - e. Skin cancer
  - f. Terminology and documentation
- 14. Pharmacology
  - a. Pharmacokinetics, pharmacokinetics, polypharmacy
  - b. Oral, intravenous, intramuscular, topical, and inhalation drug administration pathways
  - c. Patient specific considerations: age, comorbidities, mobility status
  - d. Monitoring and managing side effects and drug interactions during therapy sessions
  - e. Adapting physical therapy interventions based on pharmacological considerations

## Resources

Marshall, Charlene. *Goodman and Fuller's Pathology for the Physical Therapist Assistant*. 3rd ed. Elsevier, 2024.

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Lescher, Penelope J. *Pathology for the Physical Therapist Assistant*. F.A. Davis Co., 2011.

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Damjanov, Ivan. *Pathology for the Health Professions*. 6th ed. Elsevier Saunders, 2021.

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Moini, Jahangir. *Introduction to Pathology for the Physical Therapist Assistant*. 2nd ed. Jones & Bartlett Learning, 2021.

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Best, Janie T., et al. *Pathophysiology, Physical Assessment, and Pharmacology: Advanced integrative Clinical Concepts*. F.A Davis Co., 2021.

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Ciccone, Charles D. *Pharmacology in Rehabilitation*. 5th ed. F.A. Davis Co., 2022.

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### **Resources Other**

Online videos

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