



Western Technical College

10524143 PTA Biophysical Agents

Course Outcome Summary

Course Information

Description	Develops the knowledge and technical skills necessary to perform various biophysical agents likely to be used by a PTA.
Career Cluster	Health Science
Instructional Level	Associate Degree Courses
Total Credits	4
Total Hours	108

Pre/Corequisites

Prerequisite 10524139 PTA Patient Interventions

Textbooks

Biophysical Agents: Theory and Practice. 4th Edition. Copyright 2021. Behrens, Barbara J. Publisher: F. A. Davis Co. **ISBN-13**: 978-0-8036-7667-1. Required.

Success Abilities

1. Refine Professionalism: Participate Collaboratively
2. Refine Professionalism: Practice Effective Communication

Program Outcomes

1. Function under the supervision of a physical therapist in a safe, legal, professional, and ethical manner to ensure the safety of patients, self, and others throughout the clinical interaction
2. Demonstrate clear and collaborative communication with patients, families, and health care team

3. Exhibit behaviors and conduct that reflect respect and sensitivity according to physical therapy practice standards
4. Produce documentation to support the delivery of physical therapy services
5. Demonstrate critical thinking skills to implement and modify treatment within a plan of care under the direction and supervision of a physical therapist
6. Perform data collection essential for carrying out the plan of care under the direction and supervision of the physical therapist
7. Perform technically competent, evidence-based physical therapy interventions under the direction and supervision of the physical therapist
8. Educate patients, families, and other health providers
9. Integrate components of operational and fiscal practices of physical therapy service in a variety of settings

Course Competencies

1. Apply therapeutic ultrasound

Assessment Strategies

- 1.1. by responding to a case scenario (written, oral)
- 1.2. in a skill demonstration
- 1.3. by answering questions on one or more exams

Criteria

Your performance will be successful when:

- 1.1. you select correct equipment and supplies
- 1.2. you perform all critical steps in the right order
- 1.3. you position yourself and the patient correctly and apply correct body mechanics
- 1.4. you employ appropriate interventions
- 1.5. you follow safety procedures
- 1.6. you identify ultrasound
- 1.7. your explanation presents sound reasoning as you describe the process or activity
- 1.8. you explain the applications principles of therapeutic ultrasound
- 1.9. you demonstrate skilled application of therapeutic ultrasound
- 1.10. you assess integumentary integrity
- 1.11. you relate the principles of physics to ultrasound
- 1.12. you provide patient and caregiver education regarding therapeutic ultrasound
- 1.13. you conduct initial and post-treatment pain assessment
- 1.14. you choose intervention parameters for ultrasound in case scenarios

Learning Objectives

- 1.a. Describe physiologic response to thermal effects of ultrasound.
- 1.b. Describe physiologic response to non-thermal effects of ultrasound.
- 1.c. Explain the rationale for each parameter choice in ultrasound (frequency, duration, duty cycle, intensity).
- 1.d. Explain the physics of ultrasound, the indications, contraindications, precautions, considerations, and reasons for use in common language.
- 1.e. Assess the patient response to the intervention and notify the supervising physical therapist of pertinent information.
- 1.f. Adjust intervention using ultrasound within in the established plan of care by the physical therapist.
- 1.g. Recognize when the intervention should not be provided or when it should be discontinued based on changes in the patient status and notify the supervising physical therapist.
- 1.h. Document the application parameters of ultrasound correctly.

2. Examine therapeutic applications of electromagnetic modalities

Assessment Strategies

- 2.1. by developing an analysis (written, graphic, oral, or 3D model)

- 2.2. by answering questions on one or more exams

Criteria

Your performance will be successful when:

- 2.1. you differentiate between types of light therapy
- 2.2. you identify correct equipment and supplies
- 2.3. you define safety procedures
- 2.4. you describe application of electromagnetic modalities
- 2.5. you determine appropriate use of electromagnetic modalities
- 2.6. you relate the principles of physics to electromagnetic modalities
- 2.7. you apply concepts of light therapy and diathermy intervention to case scenarios

Learning Objectives

- 2.a. Explore two different types of diathermy based on wavelength.
- 2.b. Examine two different sub-types of shortwave diathermy related to type of field produced.
- 2.c. Explain the physics of, indications, parameters, considerations, and effect on patient tissue for electric field production (capacitance) in common language.
- 2.d. Explain the physics of, indications, parameters, considerations, and effect on patient tissue for magnetic field production (induction) in common language.
- 2.e. Explain the physics of, indications, parameters, considerations, and effect on patient and therapist for microwave diathermy in common language.
- 2.f. Define stimulated emissions.
- 2.g. Describe clinical applications of lasers.
- 2.h. Describe the physics of light therapy, indications, contraindications, considerations and reasons for use in common language.
- 2.i. Identify expected patient response to the intervention and notify the supervising physical therapist of pertinent information.
- 2.j. Recognize when the intervention should not be provided or when it should be discontinued based on changes in the patient status and notify the supervising physical therapist.
- 2.k. Document the application of diathermy and light therapy correctly.

3. Apply electrotherapeutic interventions

Assessment Strategies

- 3.1. by responding to a case scenario (written, oral)
- 3.2. in a skill demonstration
- 3.3. by answering questions on one or more exams

Criteria

Your performance will be successful when:

- 3.1. you identify electrotherapeutic interventions
- 3.2. you select correct equipment and supplies
- 3.3. you perform all critical steps in the right order
- 3.4. you position yourself and the patient correctly and apply correct body mechanics
- 3.5. you employ appropriate interventions
- 3.6. you follow safety procedures
- 3.7. your explanation presents sound reasoning as you describe the process or activity
- 3.8. you explain the applications principles of electrotherapeutic interventions
- 3.9. you demonstrate skilled application of electrotherapeutic interventions
- 3.10. you assess integumentary integrity
- 3.11. you relate the principles of physics to electrotherapeutic interventions
- 3.12. you provide patient and caregiver education regarding electrotherapeutic interventions
- 3.13. you conduct initial and post-treatment pain assessment

Learning Objectives

- 3.a. Describe basic principles of electricity.
- 3.b. Discuss components of electrical currents, waveforms, electrical circuits and current flow through biologic tissue.
- 3.c. Discuss physiologic responses to electrical current.
- 3.d. List the modalities that qualify as electrotherapeutic interventions.
- 3.e. Describe the pertinent physics of each electrotherapeutic intervention in common language.

- 3.f. Describe the indications, precautions, contraindications, considerations and reason for use for each electrotherapeutic intervention in common language.
- 3.g. Assess patient response to the intervention and notify the supervising physical therapist of pertinent information.
- 3.h. Adjust electrotherapeutic interventions within the established plan of care by the physical therapist.
- 3.i. Recognize when the intervention should not be provided or discontinued based on changes in patient status and notify the supervising physical therapist.
- 3.j. Document the application parameters of electrotherapeutic interventions correctly.
- 3.k. Demonstrate clinical decision making regarding dosage, current, location, number of treatment sessions and frequency of sessions in case scenarios.

4. Apply biofeedback interventions

Assessment Strategies

- 4.1. by responding to a case scenario (written, oral)
- 4.2. in a skill demonstration
- 4.3. by answering questions on one or more exams

Criteria

Your performance will be successful when:

- 4.1. you identify biofeedback interventions
- 4.2. you select correct equipment and supplies
- 4.3. you perform all critical steps in the right order
- 4.4. you position yourself and the patient correctly and apply correct body mechanics
- 4.5. you employ appropriate interventions
- 4.6. you follow safety procedures
- 4.7. your explanation presents sound reasoning as you describe the process or activity
- 4.8. you explain the applications principles of biofeedback interventions
- 4.9. you demonstrate skilled application of biofeedback interventions
- 4.10. you assess integumentary integrity
- 4.11. you relate the principles of physics to biofeedback interventions
- 4.12. you provide patient and caregiver education regarding biofeedback interventions
- 4.13. you conduct initial and post-treatment pain assessment
- 4.14. you choose intervention parameters for biofeedback in case scenarios

Learning Objectives

- 4.a. Examine biofeedback instrumentation.
- 4.b. Discuss motor unit recruitment, measuring electrical activity, and converting eletromyographical activity to meaningful information.
- 4.c. List clinical applications for biofeedback.
- 4.d. Describe the physics of biofeedback, indications, precautions, contraindications, considerations and reason for use in common language.
- 4.e. Assess patient response to the intervention and notify the supervising physical therapist of pertinent information.
- 4.f. Adjust biofeedback intervention within the established plan of care by the physical therapist.
- 4.g. Recognize when the intervention should not be provided or discontinued based on changes in the patient status and notify the supervising physical therapist.
- 4.h. Document the application parameters of biofeedback correctly.
- 4.i. Apply knowledge of biofeedback to case scenarios.

5. Apply compression interventions

Assessment Strategies

- 5.1. by responding to a case scenario (written, oral)
- 5.2. in a skill demonstration
- 5.3. by answering questions on one or more exams

Criteria

Your performance will be successful when:

- 5.1. you identify compression interventions
- 5.2. you select correct equipment and supplies

- 5.3. you perform all critical steps in the right order
- 5.4. you position yourself and the patient correctly and apply correct body mechanics
- 5.5. you employ appropriate interventions
- 5.6. you follow safety procedures
- 5.7. your explanation presents sound reasoning as you describe the process or activity
- 5.8. you explain the applications principles of compression interventions
- 5.9. you demonstrate skilled application of compression interventions
- 5.10. you assess integumentary integrity
- 5.11. you relate the principles of physics to compression
- 5.12. you provide patient and caregiver education regarding compression interventions
- 5.13. you conduct initial and post-treatment pain assessment
- 5.14. you choose intervention parameters for compression in case scenarios

Learning Objectives

- 5.a. Identify compression intervention options used in physical therapy practice.
- 5.b. Describe the purpose, structure and function of the lymphatic system.
- 5.c. Compare edema and lymphedema.
- 5.d. Examine safe inflammation pressures.
- 5.e. Explain the physics of compression interventions, indications, precautions, contraindications, considerations, and reasons for use in common language.
- 5.f. Assess patient response to the intervention and notify the supervising physical therapist of pertinent information.
- 5.g. Adjust compression interventions within the established plan of care by the physical therapist.
- 5.h. Educate patient regarding compression interventions.
- 5.i. Recognize when the intervention should not be provided or discontinued based on changes in the patient status and notify the supervising physical therapist.
- 5.j. Document appropriate data measures (pain, anthropometrics, blood pressure, integumentary integrity) and application parameters of the compression intervention.

6. Apply mechanical traction techniques

Assessment Strategies

- 6.1. by responding to a case scenario (written, oral)
- 6.2. in a skill demonstration
- 6.3. by answering questions on one or more exams

Criteria

Your performance will be successful when:

- 6.1. you identify the components of mechanical traction
- 6.2. you select correct equipment and supplies
- 6.3. you perform all critical steps in the right order
- 6.4. you position yourself and the patient correctly and apply correct body mechanics
- 6.5. you employ appropriate interventions
- 6.6. you follow safety procedures
- 6.7. your explanation presents sound reasoning as you describe the process or activity
- 6.8. you explain the applications principles of mechanical traction
- 6.9. you demonstrate skilled application of mechanical traction
- 6.10. you assess integumentary integrity
- 6.11. you relate the principles of physics to mechanical traction
- 6.12. you provide patient and caregiver education regarding traction techniques
- 6.13. you conduct initial and post-treatment pain assessment
- 6.14. you choose intervention parameters for mechanical traction in case scenarios

Learning Objectives

- 6.a. Describe physical effects of traction on spinal movement, bone, ligaments, disk, facet joints, muscles and nerves.
- 6.b. Explore the different types of mechanical traction techniques.
- 6.c. Compare intermittent and sustained traction.
- 6.d. Describe the physics of mechanical traction techniques, indications, precautions, contraindications, considerations and reason for use in common language.
- 6.e. Assess patient response to the intervention and notify the supervising physical therapist of pertinent

- information.
- 6.f. Adjust intervention using mechanical traction techniques within the established plan of care by the physical therapist.
- 6.g. Recognize when the intervention should not be provided or discontinued based on changes in the patient status and notify the supervising physical therapist.
- 6.h. Document the application parameters of mechanical traction techniques correctly.

7. Assess pain

Assessment Strategies

- 7.1. by responding to a case scenario (written, oral)
- 7.2. in a skill demonstration
- 7.3. by answering questions on one or more exams

Criteria

Your performance will be successful when:

- 7.1. you identify activities, positions, and postures that aggravate or relieve pain or altered sensations
- 7.2. you identify standardized questionnaires, graphs, behavioral scales, or visual analog scales for pain
- 7.3. you explain theories related to physiological effects of pain
- 7.4. you differentiate among nociceptive, referred, and pathophysiological pain
- 7.5. you administer pain assessment tools
- 7.6. data is recorded completely and accurately

Learning Objectives

- 7.a. Explain pain.
- 7.b. Explore pain assessment scales.
- 7.c. Discuss goals in managing pain.
- 7.d. Discuss neurophysiologic explanations of pain control.
- 7.e. Perform pain assessment including critical steps in the right order.
- 7.f. Utilize information from pain assessment appropriately in performing interventions using case scenarios.
- 7.g. Notify supervising physical therapist of pertinent results of pain assessment if necessary.

8. Apply manual therapy techniques.

Assessment Strategies

- 8.1. by responding to a case scenario (written, oral)
- 8.2. in a skill demonstration
- 8.3. by answering questions on one or more exams

Criteria

You will know you are successful when

- 8.1. you select correct equipment and supplies
- 8.2. you perform all critical steps in the right order
- 8.3. you position yourself and the patient correctly and apply correct body mechanics
- 8.4. you employ appropriate interventions
- 8.5. you follow safety procedures
- 8.6. you identify ultrasound
- 8.7. your explanation presents sound reasoning as you describe the process or activity
- 8.8. you explain the applications principles of manual therapy
- 8.9. you demonstrate skilled application of manual therapy
- 8.10. you assess integumentary integrity
- 8.11. you relate the principles of physics to manual therapy
- 8.12. you provide patient and caregiver education regarding manual therapy
- 8.13. you conduct initial and post-treatment pain assessment
- 8.14. you choose manual therapy techniques in case scenarios

Learning Objectives

- 8.a. Describe physiologic reflexive and mechanical effects of soft tissue mobilization.
- 8.b. List various soft tissue mobilization techniques.
- 8.c. Describe indications, precautions, contraindications, considerations, and reason for use of soft tissue mobilization in common language.
- 8.d. Describe indications, precautions, contraindications, considerations, and reason for use of manual

- traction to the cervical or lumbar spine in common language.
- 8.e. Examine various techniques to apply manual traction to the cervical and lumbar spine.
- 8.f. Assess patient response to the intervention and notify the supervising physical therapist of pertinent information.
- 8.g. Adjust the intervention within the established plan of care by the physical therapist.
- 8.h. Recognize when the intervention should not be provided or discontinued based on the changes in patient status and notify the supervising physical therapist.
- 8.i. Document the parameters of the manual therapy technique used correctly.

9. Apply iontophoresis.

Assessment Strategies

- 9.1. by responding to a case scenario (written, oral)
- 9.2. in a skill demonstration
- 9.3. by answering questions on one or more exams

Criteria

You will know you are successful when

- 9.1. you select correct equipment and supplies
- 9.2. you perform all critical steps in the right order
- 9.3. you position yourself and the patient correctly and apply correct body mechanics
- 9.4. you employ appropriate interventions
- 9.5. you follow safety procedures
- 9.6. you identify medications used with iontophoresis
- 9.7. your explanation presents sound reasoning as you describe the process or activity
- 9.8. you explain the application principles of iontophoresis
- 9.9. you demonstrate skilled application of iontophoresis
- 9.10. you assess integumentary integrity
- 9.11. you relate the principles of physics to ultrasound
- 9.12. you provide patient and caregiver education regarding therapeutic ultrasound
- 9.13. you conduct initial and post-treatment pain assessment
- 9.14. you choose intervention parameters for ultrasound in case scenarios
- 9.15. you choose intervention parameters with various medications for iontophoresis in case scenarios

Learning Objectives

- 9.a. Describe basic principles of D/C current.
- 9.b. Discuss physiologic responses to D/c current including safety considerations, time between sessions, and integumentary response.
- 9.c. List common medications used in iontophoresis.
- 9.d. Describe the indications, precautions, contraindications, considerations and reason for use for each medication option in common language.
- 9.e. Assess patient response to the intervention and notify the supervising physical therapist of pertinent information.
- 9.f. Adjust parameters for iontophoresis within the established plan of care by the physical therapist.
- 9.g. Recognize when the intervention should not be provided or discontinued based on changes in patient status and notify the supervising physical therapist.
- 9.h. Document the application parameters of iontophoresis correctly.
- 9.i. Demonstrate clinical decision making regarding dosage, location, polarity of leads unique to each medication used, the number of treatment sessions and frequency of sessions in case scenarios.