

Rehabilitation and Modalities Curriculum



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This curriculum and accompanying supplies will help students learn the basic principles of rehabilitation and modalities for acute injuries. Students will also be introduced to various careers within the field of rehabilitation.

Curriculum Structure

The *Rehabilitation and Modalities Sim Kit* curriculum is composed of the following lessons. Approximate lesson times are included.

Lesson	Title	Approximate Time
One	Understanding Rehabilitation Modalities	60-75 minutes
Two	Safety Procedures for Modalities	60-75 minutes
Three	Five Phases of Rehabilitation	60-75 minutes
Four	Creating First Aid Treatment Plans for Acute Injuries	60-75 minutes
Five	Career Exploration: The Role of Various Rehabilitation Professionals	60-75 minutes
Six	Assessment and Application: Acute Injury Scenarios	320-510 minutes
	Total	10-15 hours

Lesson Structure

Each lesson begins with a Lesson Overview, Lesson Objectives, and a Lesson at a Glance table which lists the lesson activities, materials required, suggested preparation steps, and approximate class time.

Lesson Sections

The actual lesson follows the overview, which will contain some of the sections described below.

FOCUS

Every lesson begins with a FOCUS activity intended to capture participants' attention. This may be in the form of a small or large class discussion, a game, a review of previous lesson information, or a demonstration. During this activity, participants are introduced to the topic of the lesson.

LEARN

The LEARN activity in each lesson varies in its presentation mode. It may be a slide presentation, group activity, or demonstration.

REVIEW

The majority of lessons end with a REVIEW activity intended to briefly review the lesson's key messages or main points.

Lesson One – Understanding Rehabilitation Modalities

Lesson Overview

In this lesson, participants will be introduced to various modalities used in the treatment and rehabilitation of injuries.

Lesson Objectives

After completing this lesson, participants will be able to:

- Understand what a modality is and the general purposes of modalities
- List the basic types of modalities

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• <i>Stop Icing Your Running Injuries?! Video</i> found at https://www.youtube.com/watch?v=qviy2d6_2Kc	1. Prepare <i>Stop Icing Your Running Injuries?! Video</i> for viewing 2. Review discussion facilitation questions	20-25 minutes
LEARN	• <i>Understanding Rehabilitation Modalities</i> slide presentation • <i>Understanding Rehabilitation Modalities Note Pages</i> • <i>Understanding Rehabilitation Modalities Note Pages – Answer Key</i>	1. Prepare <i>Understanding Rehabilitation Modalities</i> slide presentation for viewing 2. Print/photocopy <i>Understanding Rehabilitation Modalities Note Pages</i> (one per participant)	30-35 minutes
REVIEW	• <i>Understanding Modalities Crossword</i> • <i>Understanding Modalities Crossword – Answer Key</i> • <i>Therapeutic Modalities Flashcards</i>	1. Print/photocopy <i>Understanding Modalities Crossword</i> (one per participant)	10-15 minutes

Lesson One – Understanding Rehabilitation Modalities

FOCUS: To Ice or Not to Ice

20-25 minutes

Purpose:

Participants will be actively engaged in a discussion about the use of ice following an acute injury.

Materials:

- *Stop Icing Your Running Injuries?! Video:*
https://www.youtube.com/watch?v=qviy2d6_2Kc

Facilitation Steps:

1. Watch *Stop Icing Your Running Injuries?! from 2:05 until 16:10.*
2. Start a discussion with the class about their experience with icing injuries and what they thought of the video. Questions that may help facilitate the discussion:
 - What did you think about the video?
 - Does what Dr. Starrett said make sense to you?
 - Has anyone ever told you not to put ice on an acute injury before?
 - Why is Dr. Starrett against using ice on injuries?
 - What does he suggest doing to treat injuries instead of ice?
 - What else should you avoid doing immediately after an injury?

Lesson One – Understanding Rehabilitation Modalities

LEARN: Purpose of Modalities

35-40 minutes

Purpose:

Participants will view the slide presentation, be introduced to various modalities, and will understand the purpose of using these modalities.

Materials:

- *Introduction to Rehabilitation and Modalities* slide presentation
- *Understanding Rehabilitation Modalities* Note Pages
- *Understanding Rehabilitation Modalities* Note Pages – Answer Key

Facilitation Steps:

1. Share the following information with the participants as you show the slide presentation. Give students the note pages to complete as they follow along.

Slide 1: Introduction Slide

Slide 2: Therapeutic Modalities

Therapeutic modalities are various heating, cooling, mechanical, and electrical methods used on the human body to treat injuries.

They are used to create an optimal environment for injury healing by reducing pain, discomfort, inflammation, and/or muscle spasms associated with injuries.

Slide 3: Choosing which type of modality to use is dependent on several factors, including:

- The type of injury, the severity of the injury, and the body part injured
- The indication and contraindication for the specific modality
 - Indication: defined as the condition that could benefit from a specific modality
 - Contraindication: defined as the condition that would be adversely affected by a particular modality

* Indication and contraindication for each modality will be covered in the next lesson on safety procedures

- Physician prescription: some physicians will ask for a specific modality to be used for their patients
- The athlete's willingness to accept treatment. On occasion an athlete may refuse a specific treatment despite the AT's recommendation that it will help their condition. This is common with ice baths, or athletes with prior bad experiences with a modality.

Slide 4: The general purpose of modalities is to treat an injury. Depending on the modality chosen, there may be:

- Altered blood flow to the area
 - Vasoconstriction occurs with the application of cold and is the narrowing of blood vessels
 - Vasodilation occurs with the application of heat and is the widening of blood vessels
- Decrease pain
- Decrease muscle spasms
- Decrease swelling
- Alter metabolism

Slide 5: The types of modalities that we'll talk about today include:

- Thermal
- Mechanical
- Electrical
- Acoustic
- Light

*keep in mind that many modalities will fall into more than one of these categories.

Slide 6: Thermal modalities are treatments that transfer heat into or out of the body. These modalities include any heat or cold applications. Some examples of thermal modalities include heat and cold packs, ultrasound, hydrotherapy, and paraffin wax.

Slide 7: Thermal energy is transmitted into tissues through one of four methods:

- Conduction
- Convection
- Conversion
- Radiation

Slide 8: Conduction occurs when heat is transferred through a warmer object to a cooler object through direct contact. The heat exchange ratio during conduction depends on the temperature and the exposure time of the modality.

Skin temperatures during conduction are influenced by many aspects, including the type of heat or cold medium being applied, the conductivity of tissues being treated, the quantity of blood flow to the area being treated, and the speed at which the heat is being dissipated.

Slide 9: Convection occurs when heat is transferred through the movement of fluids or gases. This occurs in modalities such as hydrotherapy and fluidotherapy. Skin temperature during convection is influenced by the temperature of the water or gases, the speed of movement of the water or gases, and the conductivity of the part.

Slide 10: Conversion occurs when heat is transferred from another energy form. This can occur when mechanical energy is changed to heat, such as with ultrasound, or with chemical agents, such as icy hot or biofreeze. These create energy through counterirritation of sensory nerve endings.

Slide 11: Radiation occurs when energy is transferred in the form of infrared waves without physical contact. This occurs in modalities such as shortwave and microwave diathermy, infrared heating, ultraviolet therapy, or a low level laser.

Slide 12: Cryotherapy is a commonly used type of thermal modality. It is an umbrella term used to describe multiple types of cold applications.

It is one of the most commonly used modalities due to its effectiveness, convenience, low cost, and low rates of complications.

Slide 13: What types of cryotherapy can you think of? (Allow time for students to answer.)

Each type will be followed by a picture on the slide.

Slide 14: Thermotherapy is another type of thermal modality. It is the therapeutic heating of tissues.

Thermotherapy should only be used when the inflammation stage has subsided after an acute injury, approximately 24-48 hours after the injury.

Slide 15: What types of thermotherapy treatments can you think of? Allow time for students to answer.

Each type will be followed by a picture on the slide.

Slide 16: Hydrotherapy is the use of water at varying temperatures. It can be used for both exercise and treatment.

Hydrotherapy fits into both cryotherapy and thermotherapy when used for treatment and is therefore a thermal modality. However, it is also considered a mechanical modality when used for wound treatment and exercise rehabilitation. It can be used in many different forms, including:

- Aquatic therapy (rehab)
- Hot bath, cold bath, contrast baths
- Hydromassage

Slide 17: Mechanical modalities are the various treatments used to stretch, compress, or manipulate soft tissues or joint surfaces. These modalities include traction, external compression, massage, and dry needling.

Slide 18: Manual therapy is a type of mechanical therapy. It is any therapy that uses skilled, hands-on techniques rather than a machine for treatment.

Some examples of manual therapy include:

- Massage
- Cupping
- IASTM (instrument assisted soft tissue mobilization)
- Manual traction
- Joint mobilization
- Stretching

Slide 20: Electrical modalities use electrical impulses to produce muscle contractions by stimulating motor nerves. Examples of electrical modalities include: neuromuscular electrical stimulation (NMES), transcutaneous electrical nerve stimulation (TENS), and iontophoresis.

Slide 21: Electrical stimulation modalities use electrical currents to cause contractions or spasms. The type of electrical stim (ES) chosen will depend on the goal of treatment (i.e. pain management or muscle re-education).

Different setups include:

- Interferential (pain control)
- Pre-modulated (pain control)
- Neuromuscular (NMES, muscle stimulation)

Slide 22: Acoustic modalities are modalities that transfer energy in the form of sound waves. These sound waves can produce either thermal or non-thermal effects on the cells.

Sound waves are used to provide treatment to the dense tissue at a deeper level without excessive heating of the superficial layers.

Ultrasound and phonophoresis are both acoustic modalities.

Slide 23: Ultrasound is the most commonly used acoustic modality. An ultrasonic wave is created by a vibrating synthetic crystal housed in a metal shield called a transducer. Ultrasound can produce thermal, mechanical, or chemical effects.

Ultrasound is used to manage soft-tissue conditions, such as tendinitis, bursitis, and muscle spasms when used with thermal effects. Non-thermal effects are typically used with wound healing applications.

Slide 24: The final type of modality is light modalities. These modalities are light therapy involving the use of lasers, light-emitting diodes, and other light sources applied to injured tissues.

Different types of light work in slightly different ways. In general, all light modalities act on chromophores, which then produce additional Adenosine Triphosphate (ATP), which is used in the tissue repair process.

Slide 25: LASER stands for light amplification for the stimulated emission of radiation. Pain is typically treated with a low-power or cold laser that produces little to no thermal effects. It can, however, have a significant effect on tissue and has been shown to be effective in fracture healing.

Light at the wavelength used in LASER therapy is readily absorbed by enzymes, hemoglobin, fibroblasts, and neurologic tissues.

Name: _____ Class: _____

Understanding Rehabilitation Modalities Note Pages

1. What are therapeutic modalities?
2. Define the following:
Indication:

Contraindication:
3. What are five general purposes of modalities?
4. What are common types of modalities available for rehabilitation?
5. What is cryotherapy? Give three examples.
6. What is thermotherapy? Give three examples.

7. What is hydrotherapy? Give three examples.

8. What is manual therapy? Give three examples.

9. Complete the chart.

Modality	Definition	Examples
Thermal		
Mechanical		
Electrical		
Acoustic		
Light		

Understanding Rehabilitation Modalities Note Pages – Answer Key

1. What are therapeutic modalities?

Various heating, cooling, mechanical, and electrical methods of treatment used on the human body to create an optimum environment for injury healing by reducing pain, discomfort, inflammation, and/or muscle spasms.

2. Define the following:

Indication: condition could benefit from a specific modality

Contraindication: condition that could be adversely affected by a particular modality

3. What are five general purposes of modalities?

a) Alter blood flow

b) Decrease pain

c) Decrease muscle spasm

d) Decrease swelling

e) Alter metabolism

4. What are common types of modalities available for rehabilitation?

Thermal, Mechanical, Electrical, Acoustic, Light

5. What is cryotherapy? Give three examples.

An umbrella term to describe multiple types of cold applications.

Examples include ice packs, cold tub, ice massage, whole body cryotherapy, and vapor-coolant spray (fluorimethane).

6. What is thermotherapy? Give three examples.

Umbrella term for the therapeutic heating of tissues

Examples include moist hot pack/dry hot pack, warm/hot whirlpool, paraffin bath, fluidotherapy, (dry heat air circulated through cellulose particles), and ultrasound.

7. What is hydrotherapy? Give three examples.

The use of water, both internally and externally and at varying temperatures, for health purposes.

Examples include whirlpool or aquatic therapy, contrast bath, and hydromassage.

8. What is manual therapy? Give three examples.

Utilizing skilled, hands-on techniques rather than a machine for treatment. Examples include massage, cupping, Graston, manual traction, joint mobilization, and stretching.

9. Complete the chart.

Modality	Definition	Example
Thermal	Treatments that transfer heat into or out of the body, includes both heat and cold application.	Heat and cold packs Ultrasound Hydrotherapy Paraffin wax
Mechanical	Treatments that are used to stretch, compress, or manipulate soft tissue and/or joint surfaces.	Traction External compression Massage Dry needling
Electrical	The use of electrical impulses to produce muscle contractions by stimulating the motor nerves.	Neuromuscular Electrical Stimulation (NMES) Transcutaneous Electrical Nerve Stimulation (TENS) Iontophoresis
Acoustic	Modalities that transfer energy in the form of sound waves to elicit either thermal or non-thermal effects.	Sound waves are absorbed through dense tissue to transfer energy in the deep structures of the muscle without excessive heating of the superficial layers.
Light	Light therapy involves the application of lasers, light-emitting diodes (LEDs) and other light sources to injured tissues.	Light Amplification for the Stimulated Emission of Radiation (LASER)

Lesson One – Understanding Rehabilitation Modalities

REVIEW: Definitions of Modalities

15-20 minutes

Purpose:

Participants will complete a crossword puzzle to review definitions presented during the slide presentation.

Materials:

- *Understanding Modalities Crossword*
- *Understanding Modalities Crossword – Answer Key*
- Therapeutic Modalities Flashcards

Facilitation Steps:

1. Provide each participant with a copy of the *Understanding Modalities Crossword*.
2. Instruct participants to complete the puzzle using the clues at the bottom of the page. If time does not allow this, have participants complete the puzzle independently and turn it in the next class period.
3. Flashcard Activity

Explain to participants that there are eight different therapeutic modalities in the card deck and two cards per modality.

Pair version:

1. Pair participants up and give one pack of cards to each pair.
2. Have participants lay the cards out on a surface with the safety procedures list and the definition facing up.
3. Participants should take turns choosing two cards that they believe match and flip them over. They need to identify the modality before they flip the cards. If the same term is on the back of both cards and the modality was correctly identified, the student wins that round and keeps the cards. If they do not guess right, the cards get turned back over.

4. The game continues until all cards are collected. The participant with the most cards wins.

Whole class version:

1. The instructor reads the card title “modality” and either “safety procedures” or “definition.” Alternatively, the card could be displayed using a document projector.
2. A participant is called upon to give the correct answer to the card.
3. If the correct answer is given, the participant is given the card. If incorrect, the card goes to the bottom of the deck.
4. Each participant gets a chance to answer, and then the rotation is started again.
5. The game is complete when all cards are given out to participants. The participant with the most cards wins.

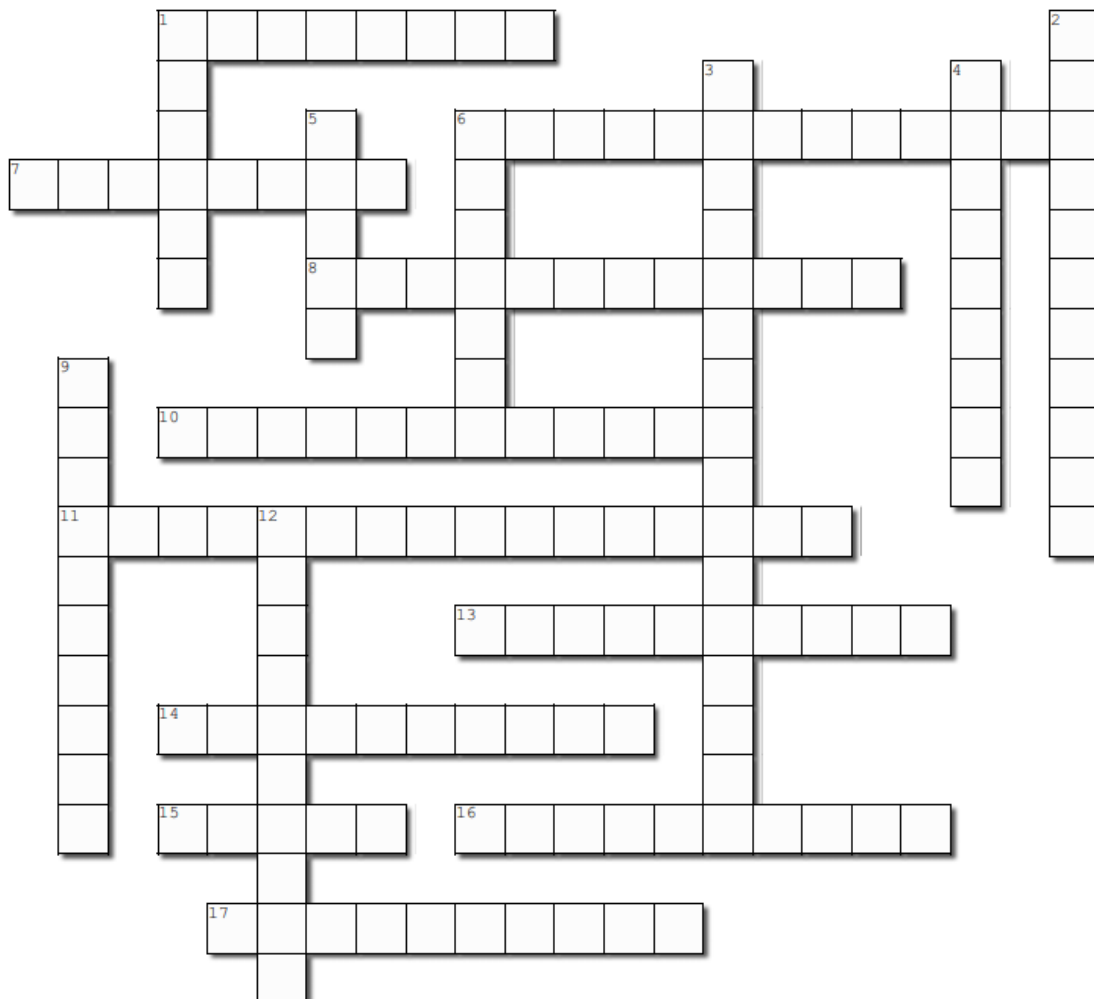
Individual practice:

Participants may be given the card deck to quiz themselves on the safety procedures and definitions.

Name: _____ Class: _____

Understanding Modalities

Complete the crossword puzzle using the clues below



Across

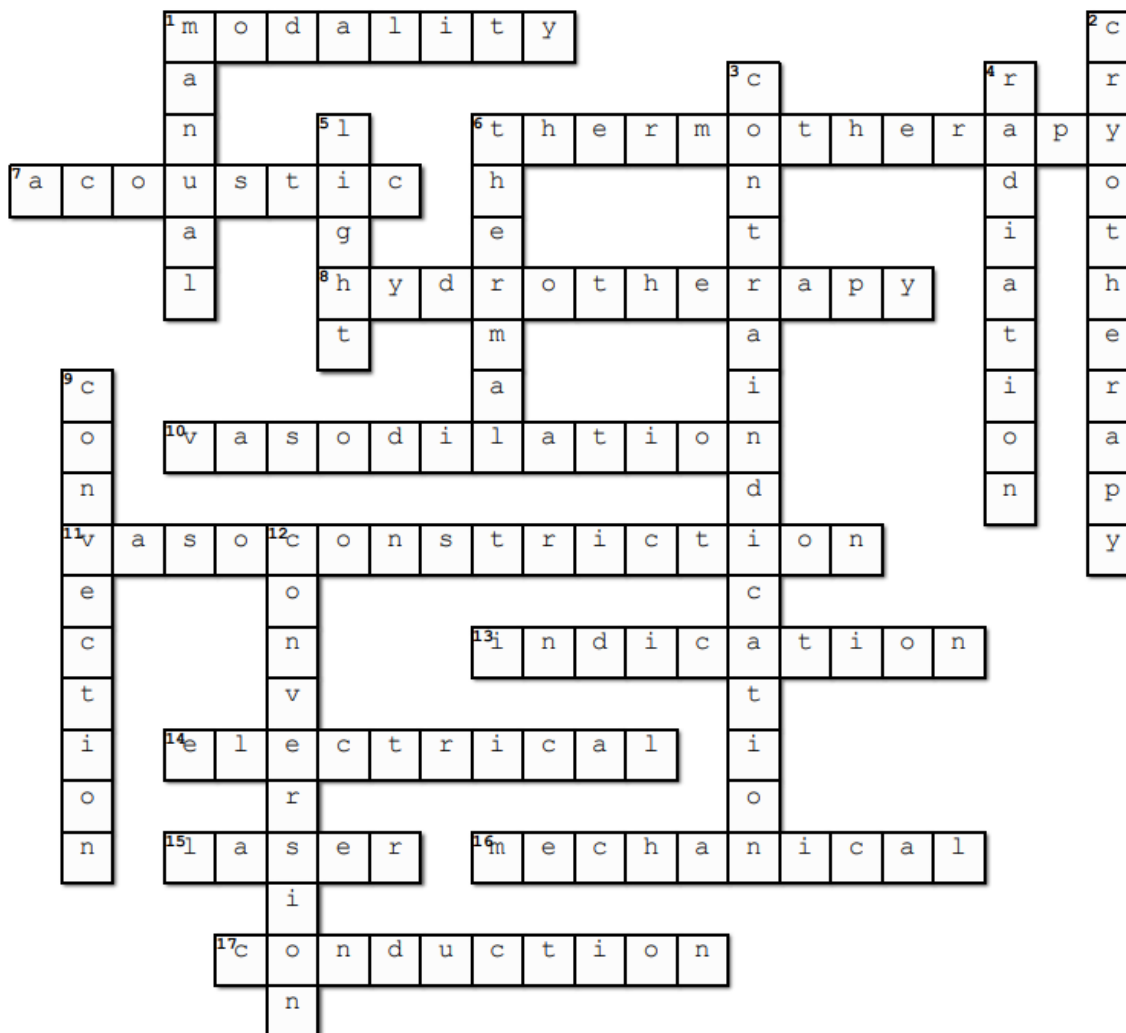
1. treatment used to create optimum environment for healing
6. heat modalities
7. transfer energy in the form of sound waves
8. uses water for treatment or rehab
10. widening of blood vessels
11. narrowing of blood vessels
13. reason to use a modality
14. stimulates motor neurons to produce muscle contractions
15. light amplification for the stimulated emission of radiation
16. treatments that manipulate soft tissue
17. heat transfer from warmer object to cooler object

Down

1. hands-on techniques
2. cold modalities
3. reason not to use a modality
4. transfer of energy in the form of infrared waves
5. therapy that effects chromophores
6. treatments that transfer heat or cold
9. transfer of heat through movement of fluid
12. transfer of heat from another energy form

Understanding Modalities

Complete the crossword puzzle using the clues below



Created using the Crossword Maker on TheTeachersCorner.net

Across

1. treatment used to create optimum environment for healing (**modality**)
6. heat modalities (**thermotherapy**)
7. transfer energy in the form of sound waves (**acoustic**)
8. uses water for treatment or rehab (**hydrotherapy**)
10. widening of blood vessels (**vasodilation**)
11. narrowing of blood vessels (**vasoconstriction**)
13. reason to use a modality (**indication**)
14. stimulates motor neurons to produce muscle contractions (**electrical**)
15. light amplification for the stimulated emission of radiation (**laser**)
16. treatments that manipulate soft tissue (**mechanical**)
17. heat transfer from warmer object to cooler object (**conduction**)

Down

1. hands-on techniques (**manual**)
2. cold modalities (**cryotherapy**)
3. reason not to use a modality (**contraindication**)
4. transfer of energy in the form of infrared waves (**radiation**)
5. therapy that effects chromophores (**light**)
6. treatments that transfer heat or cold (**thermal**)
9. transfer of heat through movement of fluid (**convection**)
12. transfer of heat from another energy form (**conversion**)

Sources

Amheim, D. D., and Prentice, W. E. (2013). *Principles of Athletic Training* (15th ed.). New York, NY: McGraw-Hill.

Miller, D., Smith, N., Bailey, M., Czarnota, G., Hynynen, K., Makin, I., and American Institute of Ultrasound in Medicine Bioeffects Committee. (2012). Overview of therapeutic ultrasound applications and safety consideration. *Journal of Ultrasound Medicine*, 31(4), 623-634.

The Run Experience. (2020, April 11). *Stop icing your running injuries?! [Video]*. YouTube. Retrieved from: https://www.youtube.com/watch?v=qviy2d6_2Kc

Lesson Two – Safety Procedures for Modalities

Lesson Overview

During this lesson, participants will learn about the safety precautions and guidelines associated with the use of therapeutic modalities.

Lesson Objectives

After completing this lesson, participants will be able to:

- Understand the clinical indications for the use of cryotherapy and experience each stage of cryotherapy
- Understand the general guidelines and safety procedures for each modality
- Demonstrate cause and effect of improper treatment prep when using modalities

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• 5-6 buckets (or more as needed, depending on time available and number of participants) • Ice and water for each bucket • Watch or stopwatch (one per group) • <i>Stages of Cryotherapy</i> • <i>Stages of Cryotherapy</i> slide presentation	1. Obtain 5-6 empty buckets 2. Fill buckets with ice and water 3. Print/photocopy <i>Stages of Cryotherapy</i> (one per participant) 4. Prepare <i>Stages of Cryotherapy</i> slide presentation for viewing	15-20 minutes
LEARN	• <i>Safety Procedures for Therapeutic</i> slide presentation • <i>Safety Procedures Note Pages</i> • <i>Safety Procedures Note Pages – Answer Key</i>	1. Prepare <i>Safety Procedures for Therapeutic Modalities</i> slide presentation for viewing 2. Print/photocopy <i>Safety Procedures Note Pages</i> (one per participant)	20-25 minutes
REVIEW	• <i>Improper Treatment Prep</i> • <i>Improper Treatment Prep</i> instructor resource	1. Print/photocopy <i>Improper Treatment Prep</i> (one per participant)	25-30 minutes

Lesson Two – Safety Procedures for Modalities

FOCUS: Stages of Cryotherapy

15-20 minutes

Purpose:

Participants will learn about and experience the four stages of cryotherapy.

Materials:

- 5-6 buckets (or more as needed, depending on time available and number of participants)
- Ice and water for each bucket
- Watch or stopwatch (one per group)
- *Stages of Cryotherapy*
- *Stages of Cryotherapy* slide presentation

Facilitation Steps:

1. Fill the buckets with ice and water before class begins.
2. Share the following information with participants as you show the Stages of Cryotherapy slide presentation. Give participants the note page to complete as they follow along.

Slide 1: Introduction Slide

Slide 2: Physiological Response

The application of cold to the body as a therapeutic treatment will cause decreased tissue temperature and reduced blood flow due to vasoconstriction of the blood vessels in the area.

It will also result in decreased muscle spasms by slowing metabolism in the area.

Cold decreases pain perception by decreasing free nerve ending excitability and the excitability of peripheral nerves. Pain reduction is caused by the raising of the nerve's threshold.

Slide 3: Indications/Contraindications

Who remembers what indications are from the last lesson?

What are contraindications?

It is vital to understand the indications and contraindications for each type of modality being

used (cryotherapy indications/contraindications are listed on slide).

Slide 4: Clinical Reasoning

Clinical reasoning is crucial when determining which modality to use for a given injury. A clinician must be able to identify the injury and determine an effective treatment protocol.

Injuries commonly treated with cryotherapy include acute soft tissue injuries and chronic inflammatory conditions.

Slide 5: Cryotherapy Protocol

A protocol is a set of guidelines designed to help a therapist make sound decisions consistent with the clinical expertise and evidence-based evidence.

The protocol for cryotherapy treatments is dependent on the type of modalities being used (i.e. ice bag, cold whirlpool, ice bucket). The dosage (length of treatment) will vary depending on the location being treated and the type of treatment used, but the treatment should not exceed 20 minutes.

Slide 6: Typical Reactions to Cryotherapy Treatment

The athlete will be uncomfortable and may not want to do the treatment. They will experience cold, burning, aching, and then numbness. If the water is constantly moving during cold whirlpool or ice bucket treatments, they may never fully achieve complete numbness.

Slide 7: Stage 1

During the first stage, the athlete will experience a cold sensation. This stage may last from 0-3 minutes.

Slide 8: Stage 2

During this stage, the athlete will begin to feel a burning sensation. This stage is the most uncomfortable stage of treatment. This stage may last from 2-5 minutes.

Slide 9: Stage 3

This stage occurs when the athlete feels an uncomfortable, aching feeling and is sometimes combined with stage 2. This stage may last from 5-10 minutes.

Slide 10: Stage 4

The final stage of treatment occurs when the treatment area becomes numb. This phase can occur from 10-20 minutes.

Slide 11: End of presentation

3. Give participants the *Stages of Cryotherapy* worksheet.
4. Have participants get into groups of 3-4.
5. Have one volunteer from each group place a foot in an ice bucket and describe their experience of the four stages of cryotherapy. Each participant should record the time for each stage and what the volunteer felt at each stage.
6. If time allows, additional group members could repeat the experience.
7. Participants can keep the worksheet to use as a study guide.



Stages of Cryotherapy

Stage 1: Cold

At what time did you enter this stage?

What sensations did you feel during this stage?

Stage 2: Burning

At what time did you enter this stage?

What sensations did you feel during this stage?

Stage 3: Achiness

At what time did you enter this stage?

What sensations did you feel during this stage?

Stage 4: Numbness

At what time did you enter this stage?

What sensations did you feel during this stage?

Lesson Two – Safety Procedures for Modalities

LEARN: Safety Procedures in Modalities

20 - 25 minutes

Purpose:

Participants will watch the slide presentation and learn about safety procedures when using therapeutic modalities.

Materials:

- *Safety Procedures* slide presentation
- *Safety Procedures Note Pages*
- *Safety Procedures Note Pages – Answer Key*

Facilitation Steps:

1. Share the following information with the participants as you show the Safety Procedures slide show:

Slide 1: Introduction Slide

Slide 2: Selecting and Using Modalities

There is a wide range of modalities to choose from when treating a patient. Misuse or overuse of modalities can aggravate a condition, delaying rather than facilitating the athlete's return to play.

To properly select a modality, the physiological effects, indications, contraindications, and precautions need to be understood.

Slide 3: Choosing a Modality

When choosing a modality, it is important to ask yourself:

Is the modality safe for this type of injury?

Will the modality contribute significantly to the rehab and recovery process?

Does the patient have any other conditions that would make it unsafe to use?

Are you adequately trained to use the modality?

Slide 4: General Guidelines

When using therapeutic modalities, some general guidelines for all modalities are necessary to ensure the patient's safety. It is important to ensure that all modalities are plugged into ground fault circuit interrupter outlets. These outlets shut off when an

abnormal current is detected, ensuring the patient and therapist will not be injured.

The modality machines (i.e., ultrasound, e-stim, hydrocollator) should be inspected and calibrated annually. The facility should maintain documentation of all inspections in case of an issue.

Before beginning any treatment, the procedure should always be explained to the patient. This will help reduce any anxiety or stress related to the treatment and make them aware of symptoms they should look for that may be harming them and causing further injury.

Always follow physician or physical therapists' orders when using modalities.

Slide 5: Guidelines for the use of cryotherapy

As we discussed in the previous lesson, cryotherapy encompasses a wide range of modalities that use cold to treat injuries. Cryotherapy should only be applied according to certain guidelines (listed on slide).

Raynaud's Phenomenon is a condition that causes vasospasm of digital arteries lasting for hours, which could lead to tissue death. The early signs are attacks of intermittent skin blanching or cyanosis of the fingers or toes, skin pallor followed by redness, and finally, a return to typical color. Pain is uncommon, but numbness, tingling, or burning may occur during and shortly after an attack.

Slide 6: Guidelines for the Use of Thermotherapy

In general, superficial heating of the skin is a safe therapeutic medium. These general guidelines should be followed when using a thermotherapy modality (listed on slide).

Slide 7: General Guidelines for Electrical Modalities

Electrical modalities require specific training on each device used for treatment. The following are only general guidelines for the use of electrical modalities (listed on slide).

Cleaning the area will ensure proper adhesion of electrode pads.

Never use electrical modalities on a patient with a pacemaker without prior physician approval, as the electrical current may interfere with the pacemaker.

Avoid high-fluid areas of the body as the electrical current may be intensified by high fluid concentrations, causing burns.

Avoid the use of electrical modalities over the carotid artery as this could change blood pressure and cause the patient to faint.

Never use electrical modalities on the trunk/torso of a pregnant patient. They can be used on the extremities with approval from a physician.

Slide 8: Guidelines for Acoustic Modalities

Ultrasound is an electrical modality but, due to its additional sound properties, has additional guidelines that must be followed during its use.

Prolonged contact in one area and use over areas of high fluid can result in burns to the patient.

Treatment areas should be less than 3-4 inches in diameter to ensure that the concentration of ultrasound needed for effective treatment is obtained.

Slide 9: Guidelines for Mechanical Modalities

Like electrical and acoustic modalities, mechanical modalities require specialized training for each device. The following general guidelines should be adhered to when using mechanical modalities (listed on slide).

Slide 10: Guidelines for Light Modalities

It is essential to know the specific guidelines for each light modality before use. The general guidelines for light therapies are (listed on slide).

Name: _____ Class: _____

Safety Procedures for Therapeutic Modalities Note Pages

True or False Misuse or overuse of modalities can improve a condition rather than delay an athlete's return to play.

What four things need to be understood to select a proper modality?

What four questions should you ask yourself when choosing a modality?

Name three general guidelines to follow when using therapeutic modalities that ensure the safety of the patient.

Guidelines for the use of cryotherapy – True or False

- | | | |
|---|---|---|
| T | F | Never apply any form of cold on open wounds without a protective covering. |
| T | F | You may apply any form of cold to anesthetized skin. |
| T | F | Except for vapo-coolant sprays, do not apply cryotherapy to patients with decreased circulation, diabetes, or cardiac conditions. |
| T | F | Monitor the patient for signs of cold allergy or Raynaud's phenomenon. |
| T | F | To avoid further injury to the tissues, always monitor the time for which cryotherapy is Applied. |
| T | F | Monitor patient when the application is over artificial nerves. |

Guidelines for the use of thermotherapy – True or False

- | | | |
|---|---|---|
| T | F | Never apply to an area of decreased sensation. |
| T | F | Never apply directly after an injury. |
| T | F | Selectively apply to eyes or genitalia. |
| T | F | Never apply over the abdomen of a pregnant patient. |
| T | F | It is allowable to apply over an open wound or infection. |
| T | F | Do not apply to a patient with a history of diabetes. |
| T | F | Always monitor the time the treatment is applied and ensure the use of appropriate padding or towels to reduce the risk of hypothermia. |

General guidelines for electrical modalities- True or False

- | | | |
|---|---|--|
| T | F | Always cleanse the area to be treated before with soap and water and dry thoroughly. |
| T | F | Ensure the treatment channels are turned on before removing electrodes. |
| T | F | Never use on an open wound. |
| T | F | Permissible for use on a patient with a pacemaker without approval from a physician. |
| T | F | Avoid low-fluid areas of the body. |
| T | F | Avoid using over the carotid arteries. |
| T | F | Never use on the abdomen of a pregnant patient. |
| T | F | Increase treatment if patient experiences pain. |

Guidelines for ultrasound - True or False

- | | | |
|---|---|---|
| T | F | Ultrasound is an electrical modality. |
| T | F | Prolonged contact in one area and use over areas of low fluid can result in burns to the Patient. |
| T | F | Treatment areas should be less than 3-4 inches in diameter. |

Guidelines for mechanical modalities – True or False

- | | | |
|---|---|--|
| T | F | Follow manufacturer's instructions for the use of all equipment. |
| T | F | Frequent circulation checks of extremities are important when applying traction. |
| T | F | Stop the treatment if the procedure decreases the patient's pain. |

Guidelines for light modalities – True or False

- | | | |
|---|---|--|
| T | F | Do not aim light near the mouth. |
| T | F | Protective footwear should be worn. |
| T | F | Do not use over an area of primary carcinoma or secondary metastasis. |
| T | F | Never do treatment directly over developing fetus. |
| T | F | Be aware that pulsed visible light may trigger seizures in a patient with hives. |

Safety Procedures for Therapeutic Modalities

Note Pages – Answer Key

True or **False** Misuse or overuse of modalities can improve a condition rather than delay an athlete's return to play.

What four things need to be understood to select a proper modality?

1. **the physiological effects**
2. **indications**
3. **contraindications**
4. **precautions**

What four questions should you ask yourself when choosing a modality?

Is the modality safe for this type of injury?

Will the modality contribute significantly to the rehab and recovery process?

Does the patient have any other conditions that would make the modality unsafe to use?

Are you adequately trained to use the modality?

Name three general guidelines to follow when using therapeutic modalities that ensure the safety of the patient.

Answers will vary but may include:

- **It is important to ensure that all modalities are plugged into ground fault circuit interrupter outlets.**
- **The modality machines (i.e. ultrasound, e-stim, hydrocollator) should be inspected and calibrated annually. The facility should maintain documentation of all inspections in case of an issue.**
- **Before beginning any treatment, the procedure should always be explained to the patient. This will help to reduce any anxiety or stress related to the treatment and make them aware of symptoms they should look for that may be harming them and causing further injury.**
- **Always follow physician or physical therapists orders when using modalities.**

Guidelines for the use of cryotherapy – True or False

- | | | |
|----------|----------|---|
| T | F | Never apply any form of cold on open wounds without a protective covering. |
| T | F | You may apply any form of cold to anesthetized skin. |
| T | F | Except for vapo-coolant sprays, do not apply cryotherapy to patients with decreased circulation, diabetes, or cardiac conditions. |
| T | F | Monitor the patient for signs of cold allergy or Raynaud's phenomenon. |
| T | F | To avoid further injury to the tissues, always monitor the time for which cryotherapy is applied. |
| T | F | Monitor patient when the application is over artificial nerves. |

Guidelines for the use of thermotherapy – True or False

- I** F Never apply to an area of decreased sensation.
- I** F Never apply directly after an injury.
- T **F** Selectively apply to eyes or genitala.
- I** F Never apply over the abdomen of a pregnant patient.
- T **F** It is allowable to apply over an open wound or infection.
- I** F Do not apply to a patient with a history of diabetes.
- T **F** Always monitor the time the treatment is applied and ensure the use of appropriate padding or towels to reduce the risk of hypothermia.

General guidelines for electrical modalities- True or False

- I** F Always cleanse the area to be treated before with soap and water and dry thoroughly.
- T **F** Ensure the treatment channels are turned on before removing electrodes.
- I** F Never use on an open wound.
- T **F** Permissible for use on a patient with a pacemaker without approval from a physician.
- T **F** Avoid low-fluid areas of the body.
- I** F Avoid using over the carotid arteries.
- I** F Never use on the abdomen of a pregnant patient.
- T **F** Increase treatment if patient experiences pain.

Guidelines for ultrasound - True or False

- I** F Ultrasound is an electrical modality.
- T **F** Prolonged contact in one area and use over areas of low fluid can result in burns to the patient.
- I** F Treatment areas should be less than 3-4 inches in diameter.

Guidelines for mechanical modalities – True or False

- I** F Follow manufacturer's instructions for the use of all equipment.
- I** F Frequent circulation checks of extremities are important when applying traction.
- T **F** Stop the treatment if the procedure decreases the patient's pain.

Guidelines for light modalities – True or False

- T **F** Do not aim light near the mouth.
- T **F** Protective footwear should be worn.
- I** F Do not use over an area of primary carcinoma or secondary metastasis.
- I** F Never do treatment directly over developing fetus.
- T **F** Be aware that pulsed visible light may trigger seizures in a patient with hives.

Lesson Two – Safety Procedures for Modalities

REVIEW: Improper Treatment Prep

25-30 minutes

Purpose:

Participants will complete a worksheet to understand the cause and effect of improper preparation and the use of modalities.

Materials:

- *Improper Treatment Prep*
- *Improper Treatment Prep* instructor resource

Facilitation Steps

1. Give each participant the *Improper Treatment Prep*.
2. Have students work individually to fill in the empty boxes.
3. As a class, call on volunteers to share their thoughts on the prompts. Suggested answers and additional activities are listed on the *Improper Treatment Prep* instructor resource. Participants should keep worksheets to study from.

Name: _____ Class: _____

IMPROPER TREATMENT PREP

Cause and Effect

Directions: Read the cause and fill in the effect that might occur as a result.

Cause	Effect
The practitioner did not read directions for the equipment that will be used.	
The practitioner did not tell the patient what to expect.	
The practitioner did not clean the surface that will be used for treatment with antiseptic or soap.	
The practitioner did not have the patient use proper body mechanics while performing an exercise.	
The practitioner did not follow the appropriate protocol or parameters prescribed by the physician.	
The practitioner did not properly drape the patient.	
The practitioner did not ensure that the equipment was plugged into a GFI before using.	

IMPROPER TREATMENT PREP

Instructor Resource Cause and Effect

Cause	Effect
The practitioner did not read directions for the equipment that will be used.	<u>Equipment caused further injury to the patient.</u>
The practitioner did not tell the patient what to expect.	<u>Patient feels increased anxiety and/or stress.</u> <u>Patient does not know when the treatment is harming them – further injury may occur.</u>
The practitioner did not clean the surface that will be used for treatment with antiseptic or soap.	<u>Patient contracts a skin disease or infection.</u>
The practitioner did not have the patient use proper body mechanics while performing an exercise.	<u>Further injury to the patient.</u>
The practitioner did not follow the appropriate protocol or parameters prescribed by the physician.	<u>Injury to the practitioner and/or patient.</u>
The practitioner did not properly drape the patient.	<u>Treatment was not effective because it was not in the best location.</u> <u>Patient experiences increased stress and/or anxiety from exposure of an unnecessary body part.</u>
The practitioner did not ensure that the equipment was plugged into a GFI before using.	<u>Further injury to the patient and/or practitioner.</u>

Sources

- Cotler, H. B., Chow, R. T., Hamblin, M. R., & Carroll, J. (2015). The use of low level laser therapy (LLLT) for musculoskeletal pain. *MOJ orthopedics & rheumatology*, 2(5), 00068.
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Lesson Three – Five Phases of Rehabilitation

Lesson Overview

In this lesson, participants will be introduced to the rehabilitation process and be able to describe the 5 phases of rehabilitation.

Lesson Objectives

After completing this lesson, participants will be able to:

- Understand the clinical indications and demonstrate the ability to apply moist heat pack treatments safely
- Understand and be able to describe the phases of rehabilitation
- Create a rehab program based on the phases of rehabilitation

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• <i>Thermotherapy Lab</i> slide presentation • Hydrocollator • Hydrocollator pads • Hydrocollator pad covers • Towels • Tongs to remove pads from hydrocollator	1. Prepare <i>Thermotherapy Lab</i> slide presentation for viewing 2. Gather necessary supplies for hydrocollator lab	15-20 minutes
LEARN	• <i>Sport Injury Rehabilitation</i> slide presentation • <i>Sport Injury Rehabilitation Note Pages</i> • <i>Sport Injury Rehabilitation Note Pages – Answer Key</i>	1. Prepare <i>Sport Injury Rehabilitation</i> slide presentation for viewing 2. Print/photocopy <i>Sport Injury Rehabilitation Note Pages</i>	35-40 minutes
REVIEW	• <i>Phases of Rehab Quiz</i> • <i>Phases of Rehab Quiz – Answer Key</i>	1. Print/photocopy <i>Phases of Rehab Quiz</i> (one per participant)	10-15 minutes

Lesson Three – Five Phases of Rehabilitation

FOCUS: Thermotherapy Modality Lab

15-20 minutes

Purpose:

To help the participants understand the purpose of using thermotherapy modalities and practice using moist heat packs.

Materials:

- *Thermotherapy Lab* slide presentation
- Hydrocollator
- Hydrocollator pads
- Hydrocollator pad covers
- Towels
- Tongs to remove pads from hydrocollator

Facilitation Steps:

1. Gather materials for hydrocollator demonstration.
2. Share the following information with the participants as you show the slide presentation:

Slide 1: Introduction Slide

Who remembers what thermotherapy stands for? (Call on a volunteer to answer.)

Slide 2: Thermotherapy modalities cause the opposite physical response as we saw in cryotherapy in the last lesson. Remember, cryotherapy causes vasoconstriction, whereas thermotherapy causes vasodilation. It has the following physiological responses: (listed on slide)

Slide 3: Thermotherapy is indicated for use in sub-acute injuries, where the acute inflammatory phase has been completed and there are no signs of heat, swelling, or inflammation due to an acute injury. It is typically used to treat tendonitis, strains, and spasms.

Thermotherapy is contraindicated immediately after an injury. It is also contraindicated in areas of lost sensation and decreased arterial circulation. It should never be applied directly over the eyes, genitals, or abdomen of a pregnant woman. It should also never be used when malignancy is present. It is also advised to carefully monitor heat

when applied to elderly patients or infants who cannot report their reactions.

Slide 4: Thermotherapy protocols are dependent upon the type of modality being used.

Moist hot packs: treatment typically lasts 15-20 minutes.

Ultrasound: the intensity and time of treatment will be set according to the injury site and stage of healing.

Hot whirlpool: treatment time is typically 20 minutes.

Slide 5: Explain that they will practice administering moist heat to their classmates.

A hydrocollator pack is a cotton pad filled with silicate gel that is kept in 170-degree water. These packs come in different sizes and shapes for different body areas.

When using these packs, the clinician should be careful to avoid burning themselves and the patient with the hot water. The packs need to be removed from the water with the use of tongs and placed in the covers carefully to avoid dripping hot water on the clinician. The pack can then be placed on the patient, with additional towels as needed, for 15-20 minutes.

The patient should never lie on the hydrocollator packs as the pressure from their body weight can cause burns.

3. Have the participants get into groups of 3-4 (or more as needed), with one participant volunteering to get the hydrocollator pack and one participant volunteering to receive the treatment.
4. Supervise participants while they take turns getting hydrocollator packs to avoid burns.
5. Have participants return the hot packs to the hydrocollator after they have experienced the heat for a few minutes.

Lesson Three – Five Phases of Rehabilitation

LEARN: Sports Injury Rehabilitation

35-40 minutes

Purpose:

Participants will receive a thorough introduction to sports injury rehabilitation and the phases of rehab as it pertains to return to sport.

Materials:

- *Sports Injury Rehabilitation* slide presentation
- *Sports Injury Rehabilitation Note Pages*
- *Sports Injury Rehabilitation Note Pages – Answer Key*

Facilitation Steps:

1. Share the following information with participants as you show the *Sports Injury Rehabilitation* slide presentation:

Slide 1: Introduction Slide

Slide 2: Rehabilitation is defined as a treatment designed to facilitate the process of recovery from injury, illness, or disease to as normal a condition as possible. This is often done with the help of a specialized medical professional.

Slide 3: General Guidelines

The sports injury rehab process is unique to each injury. It is influenced by the severity of the injury, the stage of tissue healing, the type of treatment chosen (conservative vs. surgery), and the specific demands of the athlete's sport.

Slide 4: Principles of Rehab

ATC IS IT is an acronym to help you remember the principles of rehab (listed on the slide).

Slide 5: Avoid aggravation of the injury. The athlete should be progressed based on the healing process. An athletic trainer must implement the proper exercise at the right time, know their athlete, and know how hard they will work.

Slide 6: Timing. Begin rehab as soon as possible once they have had time to heal. The sooner the athlete completes rehab, the sooner they can return to play.

Slide 7: Compliance. The patient must be willing to do what they need to do to get better. Inform the patient of the expected goals and progression.

If program is carried out consistently, with progression and proper recovery, they will get back to play better and sooner.

Slide 8: Individualization. Rehab must be individualized for each athlete, and it is helpful to know the athlete's response to injury and rehab.

Slide 9: Specific sequencing. Sequence the progression based on how the athlete is healing.

Slide 10: Intensity. Challenge the athlete and the injured area without overdoing it.

Knowing how much stress an exercise puts on an injury/person and when to back off is crucial.

Slide 11: Total patient. Focus on the whole body, not just the injured area. It is important to make sure the athlete remains strong and does not become deconditioned.

Slide 12: Common mistakes made during rehab programs include only treating the signs and symptoms of the injury. Rehab programs should treat the cause of the injury, not just signs and symptoms present.

Another mistake is not addressing the contra-lateral side. Rehab programs should include exercises for both sides, not just the limb involved.

Rehab programs should also address and correct techniques and postural defects that may be present (listed on slide).

Slide 13: Goals of rehab programs should be realistic and reachable and should focus on the following components: (listed on slide).

Slide 14: Five phases of rehabilitation are:

- Rest
- ROM
- Strength
- Function
- Return to Play

These phases often overlap, and the focus must be on the athlete's progression and their individual needs.

Slide 15: Phase 1 is the medical management of the injury with the focus placed on pain relief, swelling reduction, and protected mobilization.

Slide 16: Phase 1 symptoms include redness, heat, swelling, pain, inflammation, and loss of function.

Short-term goals of this phase include decreasing pain, decreasing swelling, and increasing ROM. Maintaining the strength of the unaffected side and cardiovascular conditioning should also be goals of this phase of rehab.

Slide 17: Modalities and exercises used in phase 1 focus on immobilization, strengthening the unaffected limb, muscle stim, and Rest, Ice, Compression, and Elevation (RICE), as well as cross-training for cardiovascular maintenance.

Slide 18: Phase 2 focuses on ROM and non-weight-bearing exercises.

Slide 19: Injury to a joint will always result in some degree of loss of ROM. Regaining the lost ROM is vital to moving through the rehab process as quickly as possible.

Slide 20: Phase 3 focuses on improving flexibility and restoring strength. Strengthening starts with isometric exercises, followed by progressive resistance exercises, then isokinetic exercises, and finally, plyometrics.

Slide 21: Functional progression is a series of basic sport-specific movement patterns that gradually increase in difficulty and intensity according to the difficulty of the sport and the athlete's tolerance.

The end goal of functional progression is an athlete's timely and safe return to competition.

Slide 22: The SAID principle is at the heart of functional progressions. It stands for Specific Adaptation to Imposed Demands. The effects of the rehab or conditioning program are specific to the type of stress applied to the particular systems of the body being exercised.

"You develop that which you train" is an easy way to remember the SAID principle.

Slide 23: Restoring muscle strength is critical to getting the athlete back to their pre-injury condition.

A rehab strength program should consist of four major components: isometric, progressive resistance exercises, isokinetic, and plyometrics.

Slide 24: Isometric exercise is mostly used in the beginning stages of rehab. They can be used to increase static strength and decrease atrophy.

Useful cases where moving the joint through full range of motion (ROM) may be contraindicated.

Slide 25: Progressive resistance exercise (PRE) is the most common type of rehabilitative exercise and is a type of dynamic resistance training in which a constant external load is applied by contracting muscle by some mechanical means and incrementally increased. This can be done using weights, tubing, and weight machines.

PRE uses isotonic contractions to gain strength.

Slide 26: The overload principle suggests the system involved must be progressively and gradually challenged or placed under additional stress.

Overload can be implemented by gradually increasing:

- Resistance
- Reps
- Intensity
- Length of Task

Slide 27: Isokinetic exercises are commonly used in the later phases of rehabilitation when the muscle length changes at a constant speed. It requires expensive machines to provide consistent resistance through a full range of motion.

Slide 28: Plyometric exercise is most often used in later rehabilitation stages to regain the muscle's quick stretch contraction. Plyometrics are also helpful in developing dynamic strength.

Slide 29: During phase 4, rehab goals are to retain sport-specific movement patterns and improve coordination and agility.

Slide 30: Functional testing occurs during this stage to assess the athlete's ability to perform. Results should be compared to pre-injury/baseline or to the uninjured side. These functional assessments should be used to determine if the athlete is ready for return to play.

Slide 31: During phase 5, the athlete returns to their sport.

Slide 32: In order to return to sport, the athlete must have full ROM and strength. They must also be both physically and psychologically ready. The athlete should start with practices and limited activity before returning to full training and competition.

Name: _____ Class: _____

Sports Injury Rehabilitation Note Pages

What is rehabilitation?

The rehab process is unique to each individual injury and is influenced by what four things?

- 1.
- 2.
- 3.
- 4.

Fill in what “ATC IS IT” stands for, along with notes on each:

ATC IS IT	Notes

Common Mistakes in Rehabilitation Programs

- Only _____ and _____ are treated
- Not addressing the _____ side
- Postural defects, anatomical mal-alignment, and biomechanical imbalances are _____

What are Rehabilitation Goals?

- Joint stability and structural integrity
- Decrease _____, _____ and _____
- _____ and flexibility
- Muscular strength and endurance
- _____
- Muscular power
- Agility, coordination, and sport-specific skills
- Improve _____
- Maintain cardiovascular endurance
- Prevent _____

Phases of Rehabilitation

Phase Number	Description	Notes
1		
2		
3		

4		
5		

Four Major Components to Restoring Muscle Strength, Endurance, and Power

Match the term on the left to the definition on the right.

- A. Isometric _____ Training in which a constant external load is applied by contracting muscle by some mechanical means and incrementally increase.
- B. Progressive Resistance Exercise _____ Quick stretch of the muscle followed by a contraction, used to improve power.
- C. Isokinetic _____ Muscle contractions that do not change the length of the muscle.
- D. Plyometric _____ Muscle length changes at a constant speed used to measure strength during rehab.

Sports Injury Rehabilitation Note Pages – Answer Key

What is rehabilitation?

A treatment or treatments designed to facilitate the process of recovery from injury, illness, or disease to as normal a condition as possible, often with the help of a specialized medical professional.

The rehab process is unique to each individual injury and is influenced by what four things?

- 1. Severity of the injury**
- 2. Stage of tissue healing**
- 3. Type of treatment (i.e., conservative vs. surgery)**
- 4. Sport-specific demands**

Fill in what “ATC IS IT” stands for, along with notes on each:

ATC IS IT	Notes
Avoid aggravation	Rehabilitation progression should be progressive and not worsen the injury. Progress at right speed by knowing healing progress. Know the right exercises at the right time. Know the athlete and how hard you can push them.
Timing	Begin rehab ASAP, but not too quickly. Must get the necessary rest first. The sooner they can complete rehab, the sooner they can return to play.
Compliance	A patient must do what they need to do to get better. Inform patient about the program and expected goals/progression. If the program is carried out consistently, with progression and proper recovery, they will get back to play better and sooner.
Individualization	Each person needs their own program. May have a template for an injury but should be adjusted for every person. Must know patients’ response to injury and rehab.
Specific Sequencing	Sequence the progression based on how the patient is healing.
Intensity	You must challenge the patient and the injured area but also not aggravate the injury further. Knowing how much stress an exercise puts on an injury/person and when to back off.
Total Patient	Focus on the whole body, not just the injured area. Make sure to keep EVERYTHING strong.

Common Mistakes in Rehabilitation Programs

- Only **signs** and **symptoms** are treated
- Not addressing the **contralateral** side
- Postural defects, anatomical mal-alignment, and biomechanical imbalances are **neglected**

What are Rehabilitation Goals?

- Joint stability and structural integrity
- Decrease **pain, inflammation, and swelling**
- **ROM** and flexibility
- Muscular strength and endurance
- **Speed**
- Muscular power
- Agility, coordination, and sport-specific skills
- Improve **technique, posture, and mechanics**
- Maintain cardiovascular endurance
- Prevent **re-injury**

Phases of Rehabilitation

Phase Number	Description	Notes
1	Rest	Short term goals: Decrease pain Decrease swelling Increase ROM Maintain Strength of unaffected musculature Maintain cardiovascular conditioning
2	ROM	Focus: restoring range of motion, non-weight bearing exercises
3	Strength	SAID Principle: Specific Adaptation to Imposed Demands – Effects of conditioning program are specific to the type of stress applied and to the particular systems of the body being exercised – You develop that which you train
4	Function	Functional testing notes: Use functional progression drills to assess the athlete's ability to perform – Timed agility runs, vertical jump • Compare to baseline or pre-injury test • Compare to the uninjured side

		• Used to determine if the athlete is ready for RTP (Return to Play)
5	Return to Play	Return to sport considerations: • Full ROM and strength • Physically and psychologically ready • Start with practice and limited activity

Four Major Components to Restoring Muscle Strength, Endurance, and Power

Match the term on the left to the definition on the right.

- A. **Isometric** **B** Training in which a constant external load is applied by contracting muscle by some mechanical means and incrementally increased.
- B. **Progressive Resistance Exercise** **D** Quick stretch of the muscle followed by a contraction used to improve power.
- C. **Isokinetic** **A** Muscle contractions that do not change the length of the muscle.
- D. **Plyometric** **C** Muscle length changes at a constant speed used to measure strength during rehab.

Lesson Three – Five Phases of Rehabilitation

REVIEW: Phase of Rehab Quiz

10-15 minutes

Purpose:

Participants will complete a quiz to assess their mastery of recent material.

Materials:

- *Phases of Rehab Quiz*
- *Phases of Rehab Quiz – Answer Key*

Facilitation Steps:

1. Hand out the *Phases of Rehab Quiz* to participants. Give them a couple of minutes to complete it.
2. Have participants self-check or peer check their answers as you share them from the *Phases of Rehab Quiz – Answer Key*.

Name: _____ Class: _____

Phases of Rehab Quiz

Answer the following questions:

1. Which of the following terms/phrases is defined as a “series of sport-specific, basic movement patterns graduated according to the difficulty of the skill and athlete’s tolerance”?
 - A. Functional progression
 - B. SAID
 - C. Biofeedback
 - D. Overload Principle
 - E. None of the above
2. The statement, “you develop that which you train,” is a restatement of which rehab principle? _____
3. Proprioceptive exercises:
 - A. Target specific muscle groups
 - B. Help patient develop better body awareness
 - C. Improve overall stability
 - D. Improve posture and gait
 - E. None of the above
4. True or False
 - T or F An athlete is ready to return to competition when physically and psychologically prepared.
 - T or F Heat can be applied during the acute phase of an injury to increase ROM.
5. What are the five phases of rehabilitation:
 - A. _____
 - B. _____
 - C. _____
 - D. _____
 - E. _____

Phases of Rehab Quiz – Answer Key

Answer the following questions:

1. Which of the following terms/phrases is defined as a “series of sport-specific, basic movement patterns graduated according to the difficulty of the skill and athlete’s tolerance?”
A. Functional progression
B. SAID
C. Biofeedback
D. Overload Principle
E. None of the above
2. The statement “you develop that which you train” is a restatement of which rehab principle?
SAID principle
3. Proprioceptive exercises:
A. Target specific muscle groups
B. Help patient develop better body awareness
C. Improve overall stability
D. Improve posture and gait
E. None of the above
4. True or False
T or F An athlete is ready to return to competition when physically and psychologically ready.
T or **F** Heat can be applied during the acute phase of an injury to increase ROM.
5. What are the five phases of rehab:
A. Rest
B. ROM
C. Strength
D. Function
E. Return to Play

Sources

- Cotler, H. B., Chow, R. T., Hamblin, M. R., & Carroll, J. (2015). The use of low level laser therapy (LLLT) for musculoskeletal pain. *MOJ orthopedics & rheumatology*, 2(5), 00068.
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Lesson Four – Creating First Aid Treatment Plans for Acute Injuries

Lesson Overview

In this lesson, participants will be introduced to the basics of creating a treatment plan for an acute injury and will have the opportunity to create a plan for a specific injury.

Lesson Objectives

After completing this lesson, participants will be able to:

- Understand the basic setup for EMS/TENS
- Understand the basics of acute injury treatment
- Create a treatment plan for the acute phase of a specific injury

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• EMS/TENS unit • EMS/TENS pads • Student volunteer	1. Turn on EMS/TENS unit and have pads available for use 2. Choose student volunteer	10-15 minutes
LEARN	• <i>Basics of Acute Injury Treatment Plans</i> slide presentation • <i>Basics of Acute Injury Treatment Plans Note Pages</i> • <i>Basics of Acute Injury Treatment Plans Note Pages – Answer Key</i>	1. Prepare <i>Basics of Acute Injury Treatment Plans</i> slide presentation for viewing	20-25 minutes
REVIEW	• <i>Create an Acute Injury Treatment Plan</i> • <i>Create an Acute Injury Treatment Plan Rubric</i> instructor resource	1. Print/photocopy <i>Create an Acute Injury Treatment Plan</i> (one per participant) 2. Have students get into groups of 3-4 individuals 3. Use the provided rubric to grade the completed group assignment	30-35 minutes

Lesson Four – Creating First Aid Treatment Plans for Acute Injuries

FOCUS: EMS/TENS Demonstration

10 minutes

Purpose:

Participants will watch a demonstration of the use of electrical muscle stimulation and/or transcutaneous electrical nerve stimulation (EMS/TENS), and one or more volunteers will experience how EMS/TENS contractions at the motor level feel.

Materials:

- Electrical Stimulation Unit/TENS Unit
- Electrical Stim/TENS Pads
- Volunteer

Facilitation Steps:

1. This is a continuation of the previous lesson on modalities and a chance for students to learn from a practical demonstration. Remind students of the previous lesson on safety procedures and call on some volunteers to tell what they remember from that lesson regarding safety procedures for electrical stimulation modalities.
2. One volunteer from class is selected and their forearm is exposed to apply therapy.
3. Two electrodes are placed in a linear pattern on the same muscle of the forearm.
4. Contraindications are discussed with the class. Call on volunteers for suggested contraindications from previous lessons:
 - a. Pacemaker
 - b. Near malignancies
 - c. Areas of bleeding
 - d. Pregnancy
 - e. Areas where contraction is not wanted
5. The EMS/TENS unit is turned up until the student feels a motor level stimulus.
6. Ask the student what they are feeling at the moment.
7. Discuss the physiology of muscle contraction when using EMS/TENS:
 - a. Muscle contractions are produced by applying electrical current to activate peripheral motor nerves that innervate a targeted muscle
 - b. A muscle contracts when the applied electrical current depolarizes the axonal membranes, which thereby generates action potentials in the muscle's lower motor axons
8. If time allows, additional volunteers can experience EMS/TENS contraction.

Lesson Four – Creating First Aid Treatment Plans for Acute Injuries

LEARN: Basics of Acute Injury Treatment Plans

20 minutes

Purpose:

Participants will watch a slide presentation and learn about the basics of acute injury treatment.

Materials:

- *Basics of Acute Injury Treatment Plans* slide presentation
- *Basics of Acute Injury Treatment Plans Note Pages*
- *Basics of Acute Injury Treatment Plans Note Pages – Answer Key*

Facilitation Steps:

1. Hand out the note page to students. Share the following information with the students as you show the slide presentation:

Slide 1: Introduction Slide

Who remembers what acute means? Call on a volunteer.

Slide 2: Short term goals following an acute injury include:

- Providing correct immediate first aid and management following the injury to limit and control swelling
- Reduce and minimize pain
- Restore full ROM
- Increase muscular strength, endurance, and power
- Reestablish neuromuscular coordination
- Improve balance
- Maintain cardiorespiratory fitness
- Incorporate appropriate functional progressions

Slide 3: Considerations when creating an acute treatment plan include:

- Protecting the healing tissue while also providing some stress for proper healing
- Wolff's law states that tissues will adapt to stresses/tension applied to them
- Safe ROM and planes of movement
- Appropriate exercise choice for injury

- Maintain total body conditioning to prevent atrophy

Slide 4: Your responsibility as a clinician is to understand the specific injury and subsequent healing phases in order to design an appropriate exercise regimen. Each exercise choice should have a specific goal and purpose.

You should be providing direction and instructions during the exercises to correct, modify, or adjust the program as needed based on pain, functional ability, and strength.

Supervise, be professional and courteous, and support and encourage the patient during the rehab process.

Slide 5: Immediate acute injury care can be accomplished following the acronym PEACE and LOVE. This is a progression from the original acronyms RICE, PRICE, and POLICE.

The PEACE and LOVE acronym is provided on the slide. This acronym has been chosen because the previous methods failed to address the sub-acute and post-acute phases of injury healing and rehabilitation.

Slide 6: PEACE and LOVE acronym explained further.

Protect. Avoid any aggravating activities/movements and deload the affected area for 1-3 days to minimize bleeding, reduce swelling, and lessen the risk of aggravating the injury.

Elevate. Elevate the limb higher than the level of the heart to promote fluid flow out of the injured tissues and reduce swelling.

Avoid Anti-inflammatories. Contrary to previous beliefs, research is showing that the various phases of inflammation help repair damaged tissues. Avoid anti-inflammatory medicine and modalities, including ice! The short-term reduction in pain provided by these can increase the length of healing time necessary to recover from the injury.

Compression. External mechanical pressure helps limit intra-articular edema and tissue hemorrhage. It also helps to reduce swelling.

Educate. Patients should be educated on the importance of active recovery and establish a realistic expectation for their recovery timeline.

After the days of the acute phase have passed, the soft tissues need LOVE.

Load. Mechanical stress should be added early and normal activities resumed as soon as symptoms allow. However, all without increasing pain.

Optimism. Optimistic patient beliefs and expectations are associated with better treatment outcomes and prognoses.

Vascularization. Pain-free aerobic exercise should start a few days after injury to boost motivation and increase blood flow to the injured structures.

Exercise. Exercise helps restore mobility, strength, and proprioception early after injury and reduces the risk of re-injury.

Slide 7: During the initial three days following an injury (acute phase), there is active swelling and inflammation at the site of the injury.

This chart shows the stage, time, physiology, therapy, and goals for the acute phase.

Slide 8: The next phase occurs during days 3-7. This is the sub-acute phase, where passive congestion is occurring at the injury site.

This slide contains the stage, time, physiology, modalities, and goals for the sub-acute phase.

Slide 9: The rebuilding phase occurs from approximately days 7-21 and is now considered the post-acute phase. During this phase, scar tissue is forming, and therapy progresses away from modalities toward therapeutic exercise.

This slide contains a chart with the stage, time, physiology, therapy, and goals for the rebuilding stage.

Slide 10: The remodeling phase occurs after day 21. The focus of this phase is sport-specific exercises and return to play.

Slide 11: Following an acute injury, the clinician must create a plan.

Start class discussion, call on volunteers:

- What would you have your athlete doing in training during the acute phase?
- How will you prevent deconditioning?
- How will you control pain and edema?

Slide 12: ROM must be restored to the injured area. Gentle, pain-free active range of motion can be started during the sub-acute phase to increase blood flow into and out of the injured joint.

Call on volunteers: How will you get your athlete back to full ROM?

Discuss Active Assisted Range of Motion (AAROM), Active Range of Motion (AROM), Passive Range of Motion (PROM), and Active Resisted Range of Motion (ARROM) with the class. Use volunteer to demonstrate PROM and ARROM.

Slide 13: The patient will also need to regain strength. Exercise progressions should begin with isometric exercises, then progressive resistance exercises, followed by isokinetic exercises and plyometric exercises (these were discussed in the last lesson.)

The clinician must remember to strengthen bilaterally and avoid progressing too quickly with strengthening exercises so as not to damage the healing tissues.

Slide 14: Maintaining cardiorespiratory fitness will aid in vascularization, improvement in mood, and return to activity.

The slide contains examples of activities that can be used to maintain overall fitness levels.

Slide 15: The athlete should progress to functional strength and movement. This includes balance/proprioception, agility, sport-specific drills, and game-like drills.

Slide 16: Return to play criteria must be determined.

- What criteria should be used to determine return to play?
- Who makes the return to play decision? Is it the ATC, ortho?

What happens if primary care releases an athlete to return to play, but as the AT, you do not feel that the athlete can safely do so?

Name: _____ Class: _____

Basics of Acute Injury Treatment Plans Note Pages

Short term goals following an acute injury include:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

Considerations when creating an acute treatment plan include:

- 1.
- 2.
- 3.
- 4.
- 5.

Immediate acute injury care can be accomplished with the acronym PEACE and LOVE.

Letter	Description and Notes
P	
E	
A	
C	
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O	
V	
E	

Basics of Acute Injury Treatment Plans Note Pages – Answer Key

Short term goals following an acute injury include:

- Providing correct immediate first aid and management following the injury to limit/control swelling
- Reduce/minimize pain
- Restore full ROM
- Increase muscular strength, endurance, and power
- Re-establish neuromuscular coordination
- Improve balance
- Maintain cardiorespiratory fitness
- Incorporate appropriate functional progressions

Considerations when creating an acute treatment plan include:

- Protecting the healing tissue while also providing some stress for proper healing
- Wolff's law states that tissues will adapt to stresses/tension applied to them
- Safe ROM and planes of movement
- Appropriate exercise choice for injury
- Maintain total body conditioning to prevent atrophy

Immediate acute injury care can be accomplished with the acronym PEACE and LOVE.

Protect

Elevate

Avoid Anti-inflammatories

Compression

Educate

Load

Optimism

Vascularization

Exercise

Lesson Four – Creating First Aid Treatment Plans for Acute Injuries

REVIEW: Create an Acute Injury Treatment Plan

10 minutes

Purpose:

Participants will work in groups of 3-4 to create an acute injury treatment plan for an injury.

Materials:

- *Create an Acute Injury Treatment Plan*
- *Create an Acute Injury Treatment Plan*
Rubric instructor resource

Facilitation Steps:

1. Provide each participant with a copy of the *Create an Acute Injury Treatment Plan*.
2. Have participants get into groups of 3-4 and choose an injury from the list provided on the worksheet.
3. Allow participants to work in their groups for the remainder of the class period to complete the project.
4. Additional time in class or outside of class can be used if desired.
5. Supervise group work and provide help to participants as needed while completing the project.

Name: _____ Class: _____

Create an Acute Injury Treatment Plan

Directions: You will create a rehab plan for the first week of rehab following an athlete's injury. You will need to set one short-term goal. Then create five days worth of exercises for the athlete to complete. All components of a rehab plan must be present in the five days; however, you do not have to have them all each day. You will need to include five "exercises" for the patient to do each day. The number of sets, reps, and resistance should be noted as well.

Injuries (choose one of the following):

ACL tear

Ankle sprain

AC sprain

Hamstring strain

Quad contusion

Wrist sprain

Things to include:

Short-term goal

Pain and swelling control

Restoring range of motion

Isometrics

Progressive resistance (if applicable)

Cardiorespiratory fitness

Optional Additions (+5 points):

Alternative pain control options

Therapeutic modality

All sources used should be documented in the appropriate format.

Create an Acute Injury Treatment Plan Rubric (Teacher Resource)

	25 pts	15 pts	5 pts	0 pts
Use of Class time	Student finished project within the given time frame without distracting others and while participating in group.	Student finished project within the given time frame but minimally distracted others and some participation in the group	Student finished within the time frame but greatly distracted others and with little participation in the group	Student did not finish the project within the given time frame and/or did not participate in the group.
Required Information	All required information is included.	There are 1-2 missing elements.	There are 3-4 missing elements.	There are more than 4 missing elements
Accuracy	All information is correct.	There are 1-2 mistakes.	There are 3-4 mistakes.	The information is inaccurate.
Sources	All sources are documented in the correct format.	Sources are documented but not in the correct format.		Sources are not documented.

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Lesson Five – Career Exploration: The Role of Various Rehabilitation Professionals

Lesson Overview

In this lesson, participants will be introduced to various careers within the rehabilitation field. They will also learn about the “athlete’s circle of care” and what professionals it’s made up of.

Lesson Objectives

After completing this lesson, participants will be able to:

- Understand and explain the individuals that make up an athlete’s circle of care
- Identify different careers within the field of rehabilitation
- Explain a rehabilitation career that they are personally interested in working in

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• <i>Circle of Care</i> slide presentation • <i>Circle of Care</i>	1. Print/photocopy <i>Circle of Care</i> (one per participant) 2. Prepare <i>Circle of Care</i> slide presentation	20-25 minutes
LEARN	• <i>Careers in Rehabilitation</i> slide presentation	1. Prepare <i>Careers in Rehabilitation</i> slide presentation for viewing	20-25 minutes
REVIEW	• <i>Research a Rehabilitation Career</i> instruction sheet • <i>Research a Rehabilitation Career Rubric</i> instructor resource	1. Print/photocopy <i>Research a Rehabilitation Career</i> instruction sheet for each participant 2. Use provided rubric for grading completed assignment	20-25 minutes

Lesson Five – Career Exploration: The Role of Various Rehabilitation Professionals

FOCUS: Sports Medicine Circle

20-25 minutes

Purpose:

Participants will watch a video and slide presentation to introduce them to an athlete's circle of care.

Materials:

- *Circle of Care* slide presentation
- *Circle of Care*

Facilitation Steps:

1. Share the following information with your students as you show the *Circle of Care* slide presentation:

Slide 1: Introduction Slide

Slide 2: Sports Medicine Circle of Care

The sports medicine circle of care is a group of individuals from all health care fields that work to ensure that athletes everywhere are well taken care of, promoting lifelong fitness. The group of medical professionals involved in the athlete's care will depend on the age of the athlete, the level of sport they play, and their familial status.

Slide 3: Watch the video about the Justin Sports Medicine Team

Discuss what medical professionals were seen in the video.

Slide 4: Central Team

The individuals closest to the athlete make up the central sports medicine team. These are people that have direct access to the athlete. The athlete themselves, their parent (if a minor) or spouse (if granted), their coach, their athletic trainer, and the team physician are all members of the circle of care for an athlete.

Slide 5: Peripheral Team

The peripheral team is composed of medical professionals that help the athlete recover from an injury but do not have daily contact with the athlete during the recovery and rehabilitation process (listed on slide).

Slide 6: Athlete's Circle of Care

Image of what a circle of care might look like for an athlete

2. Give each participant a *Circle of Care* worksheet.
3. Have participants work individually to find a well-known (college or professional) athlete that has been injured and fill out the worksheet based on the information they find on the web.

If time allows, call on volunteers to share the information they learned.

Name: _____ Class: _____

Circle of Care

Directions: Find 12 people surrounding a famous athlete (college or professional) that would be in the athlete's circle of care. In each box, write the person's name, job, and if they are a part of the central or peripheral team.

	Athlete:		
	Injury:		

Lesson Five – Career Exploration: The Role of Various Rehabilitation Professionals

LEARN: Careers in Rehabilitation

20-25 minutes

Purpose:

Participants will watch a slide presentation to learn about various careers in rehabilitation.

Materials:

- *Careers in Rehabilitation* slide presentation

Facilitation Steps:

1. Share the following information with the students as you show the *Careers in Rehabilitation* slide presentation:

Slide 1: Introduction Slide

Slide 2: Rehabilitation and Therapy

Health care workers in rehabilitative and therapy careers provide services designed to overcome physical, developmental, behavioral, and emotional disabilities. These disabilities may include impaired muscle strength, physical endurance, sensory or muscle coordination, and spatial discrimination. The type of therapy provided depends on the facility in which they work.

Slide 3: Athletic Trainer (AT)

Since we just talked about the Circle of Care, let's start with athletic trainers. ATs are certified and licensed health care professionals that practice in the field of sports medicine. Their job duties include prevention, evaluation, care, and rehabilitation of athletic injuries.

Slide 4: Salary, Education, and Growth

The median pay for an athletic trainer is \$47,381. Entry-level education requirements are graduation from an accredited program at the Bachelor or Master level and then passing the BOC certification test. In order to practice, ATs must be certified and licensed or registered in all states except CA, which does not have any regulations.

Projected 10-year growth: 16%

Slide 5: Job Settings (listed on slide)

Slide 6: Physical Therapist (PT)

A physical therapist evaluates and treats patients recovering from injury, disease, surgery, and other ailments. They work with patients to restore, maintain, and promote overall fitness and health, relieve pain, and improve mobility. Physical therapists work with the general population, worker's compensation patients, and athletes of all ages.

Slide 7: Salary, Education, and Growth

The median pay for a physical therapist is \$91,010. A physical therapist must have a Doctor of Physical Therapy degree and be licensed in the state they are practicing.

Projected 10-year growth: 22%.

Slide 8: Physical Therapy Assistant (PTA)

A PTA provides treatment and exercise sessions under the direction of a physical therapist. A PTA can't do the patient's initial evaluation, but they can follow the prescribed treatment plan provided by a physical therapist and does not require direct supervision while working.

Slide 9: Salary, Education, and Growth

The median salary for a PTA is \$59,770. They are required to have an associate degree from an accredited physical therapy assistant program and must be licensed in the state they are working.

Projected 10-year growth: 29%.

Slide 10: Job Settings for PTs and PTAs

Listed on slide

Slide 11: Occupational Therapist (OT)

An occupational therapist treats patients with mentally, physically, developmentally, or emotionally disabling conditions for daily living or their career. They assist patients in learning or re-learning how to do daily tasks, problem-solving, and exercises to improve overall daily function.

Slide 12: Salary, Education, and Growth

The median salary is \$86,280. To be an OT, you must have a minimum of a master's degree until 2027, when the minimum requirement becomes a doctorate.

Slide 13: Occupational Therapy Assistant

OTAs help clients with activities/exercises in a treatment plan developed by an occupational therapist. They monitor, record, document, and help patients perform activities. They must follow the treatment plan as written by an occupational therapist, but they can work without direct supervision.

Slide 14: Salary, Education, and Growth

The median salary is \$62,940 for occupational therapy assistants, and they must complete an associate degree from an accredited OTA program and be licensed in the state they are working.

Projected 10-year growth: 32%.

Slide 15: Job Settings for OTs and OTA (listed on the slide)

Slide 16: Chiropractor

Chiropractors diagnose and treat patients with health problems of the spine. They provide natural, drugless, nonsurgical health treatments related to the spine.

Slide 17: Salary, Education, and Growth

The median salary for a chiropractor is \$70,720. They are required to have a Doctor of Chiropractic Medicine degree, pass a national board exam, and attain a license.

Projected 10-year growth: 4%.

Slide 18: Job Settings

Chiropractors typically work in private practice and for professional sports teams. Some donate their time to working with college and high school teams while maintaining their private practice.

Slide 19: Massage Therapist

A massage therapist uses touch to manipulate the soft tissue of the body to restore function. They use techniques such as Swedish/deep tissue, reflexology, acupressure, and sports/neuromuscular massage.

Slide 20: Salary, Education, and Growth

The median salary for a massage therapist is \$43,620. They are required to complete a post-secondary program of 500 or more hours of study and experience but are not required to take a national certifying exam. Instead, each individual state regulates massage therapy with licensure required in all states except for 5 and certification required in 3 states.

Projected 10-year growth: 21%.

Slide 21: Job Settings for Massage Therapist (listed on slide)

Lesson Five – Career Exploration: The Role of Various Rehabilitation Professionals

REVIEW: Research Career in Rehabilitation

20-25 minutes

Purpose:

Participants will research one career choice in the field of rehabilitation to learn more about the career.

Materials:

- *Research a Rehabilitation Career* instruction sheet
- *Research a Rehabilitation Career Rubric* instructor resource

Facilitation Steps:

1. Provide each participant with a copy of the *Research a Rehabilitation Career* instruction sheet.
2. Review directions with the class to ensure understanding and ask participants if they have questions.
3. Allow the remainder of class time to begin work on research and assignment.
4. Instruct participants to complete the assignment and turn in based on instructor timeline.

Name: _____ Class: _____

Research a Rehabilitation Career

Directions: Choose a career in rehabilitation in which you are interested. Write a 1-2-page paper. Collect research materials from the library or internet. Include at least three citations from a minimum of 3 different sources. Prepare your report in proper MLA format with a separate reference page. The focus of your research should be:

Job Description/Duties:

What responsibilities would you have? Which responsibilities would you like and which would you dislike?

Personal Characteristics Needed:

What important characteristics do you think would be needed to be happy and successful in this career? Why does this career fit your personality? What personal values does this career provide that are important to you? (Examples: security, having fun, status, helping others, challenging, etc.)

Education Needed:

What specific high school classes would be most helpful in preparing for this career? What type of education or training do you need after high school?

Work Setting:

How many hours would you generally work? What would your work environment be? Would you travel? Would your job be stressful? What would you like and dislike about your work setting?

Wages and Benefits:

How much would the wage for working in this occupation generally start at? What is the range of wages that an experienced worker can earn? Do you see this occupation as providing enough income for you to live according to your expectations?

Employment Outlook:

What is the occupational outlook for this career?

Personal Assessment:

Explain why you think this occupation would be right for you. How does it fit your personality, interests, values, and educational plans?

Research a Rehabilitation Career Rubric

	25 pts	15 pts	5 pts	0 pts
Organization	Paper and paragraphs are mostly organized, in order, and make sense to the reader.	The organizational structure is strong enough to move the reader through the test without too much confusion.	Sentences within paragraphs make sense, but the order of paragraphs does not.	The writing lacks a clear sense of direction. Ideas, details, or events seem strung together in a loose or random fashion.
Required Information	All required information is included.	There are 1-2 missing elements.	There are 3-4 missing elements.	There are more than four missing elements.
Accuracy	All information is correct.	There are 1-2 mistakes.	There are 3-4 mistakes.	The information is inaccurate.
Sources	All sources are documented in the correct format.	Sources are documented but not in the correct format.		Sources are not documented.

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Lesson Six – Assessment and Application: Acute Injury Scenarios

Lesson Overview

In this lesson, participants will be assessed and have practical application of the rehabilitation modalities they have learned about to create a series of treatment plans.

Lesson Objectives

After completing this lesson, participants will be able to:

- Identify the appropriate modality to use based on the scenario
- Create a treatment plan for a sports injury based on knowledge of modalities

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• Lesson 4 Slide 6 • YouTube clips	1. Access the slide and video clips	10-15 minutes
LEARN	• Rehabilitation and Modalities Acute Injury Scenarios Workbook	1. Give each participant a workbook in order to complete the scenarios.	10-15 minutes per scenario x 25 (250-375 minutes)
REVIEW	• Rehabilitation and Modalities Acute Injury Scenarios Workbook • Rehabilitation and Modalities Acute Injury Scenarios – Answer Key	1. Access Answer Key	60-120 minutes

Lesson Six – Assessment and Application: Acute Injury Scenarios

FOCUS: Treatment Plans: Peace and Love

10-15 minutes

Purpose:

Participants will review the basics of treatment plans as they prepare to develop a series of 25 different plans based on sports injury scenarios.

Materials:

- *Basics of Acute Injury Treatment Plans* slide presentation – slide 6
- YouTube clips

Facilitation Steps:

1. Review the acronym PEACE and LOVE for treatment of acute injuries from Lesson 4. Show slide 6 of the *Basics of Acute Injury Treatment Plans* slide presentation.
2. Share a brief video about PEACE and LOVE. Suggested links include:

PEACE and LOVE: A Sports Injury

<https://www.youtube.com/watch?v=AR1MS1feKLY>

PEACE and LOVE for Acute Injuries

<https://www.youtube.com/watch?v=jl9UNyhrw1Q>

PEACE and LOVE New Acronym

<https://www.youtube.com/watch?v=HGTabgG7GIU>

Lesson Six – Assessment and Application: Acute Injury Scenarios

LEARN: Acute Injury Treatment Plans

10-15 minutes per scenario x 25 (250-375 minutes)

Purpose:

Participants will apply what they have learned to prepare treatment plans using appropriate rehabilitation and modality strategies.

Materials:

- Rehabilitation and Modalities Acute Injury Scenarios Workbook

Facilitation Steps:

1. Give each participant an Acute Injury Scenarios Workbook. Explain that they have 25 scenarios to work through.
2. Participants should read through each of the scenarios and choose the appropriate modality.
3. Finally, participants should develop a treatment plan for each of the scenarios presented.

Note: Instructors may assign scenarios over several days or specific scenarios as desired.

Lesson Six – Assessment and Application: Acute Injury Scenarios

REVIEW: Acute Injury Scenario Treatment Plan Review

60-120 minutes

Purpose:

Participants will share the treatment plans they developed and receive feedback

3. Share the suggested treatment plan from the Answer Key.

Materials:

- Rehabilitation and Modalities Acute Injury Scenarios Workbook
- *Rehabilitation and Modalities Acute Injury Scenarios* – Answer Key

Facilitation Steps:

1. Have each participant choose one of the scenarios in the workbook. Participants should read the scenario and share their treatment plans.
2. Discuss as a group. Does anyone else have a different treatment plan? Did anyone else choose a different modality?

Rehabilitation and Modalities

Acute Injury Scenarios – Answer Key

Scenario 1: You have a soccer athlete who just got stepped on in a game, and he says his ankle rolled under during the injury. He has lateral ankle swelling and rates his pain at 7/10. You are at an away game and will be traveling on the bus home for the next 10 hours.

Modality: Cryotherapy (ice bag)

Treatment Plan: ice bag wrapped on for compression combined with elevation for 20 minutes

Scenario 2: A gymnast sprained her ankle a week ago. She is doing therapy and her pain has decreased, but she continues to have a moderate amount of edema in her ankle.

Modality: Hydrotherapy (contrast bath)

Treatment Plan: Place lower extremity in warm water for 3 minutes, remove and place immediately in cold water for 2 minutes. Repeat cycle of 3 minutes warm/2 minutes cold for 4 cycles or a total of 20 minutes.

Scenario 3: A basketball player has a history of chronic patella tendinopathy. He comes to the training room before practice complaining of pain.

Modality: Therapeutic ultrasound

Treatment Plan: .8-1.0 w/cm² continuous wave at 3 MHz frequency using a small US head with the knee is slight flexion.

Scenario 4: A bowler sprained her left wrist during a match. There was immediate pain and swelling. She treated the swelling at home with ice and elevation, and the pain subsided. It is now a month later and there is persistent swelling and stiffness.

Modality: Thermal modality - heat (fluidotherapy)

Treatment Plan: Place the athlete's wrist and hand in the fluidotherapy chamber for 15-20 minutes.

Scenario 5: A soldier (tactical athlete) presents with extreme soreness following a long, 20-mile ruck march the day before. He reports that his quadriceps are very sore and that stretching is uncomfortable.

Modality: Thermal modality – cold (cold tub)

Treatment Plan: Have the athlete place the lower body in a cold tub up to her waist for 7-10 minutes.

Scenario 6: A track athlete comes to you after completing his last race. He reports that he was running the 200m and felt a sharp pain in the front of his hip when he came out of the blocks. After a thorough evaluation, you decide that he has strained his hip flexor. He is done for the day and reports to you the next day for treatment.

Modality: Manual therapy (stretching)

Treatment Plan: Instruct athlete on 2-3 stretches for the psoas and quadriceps muscle. Each stretch should be held for a minimum of 30 seconds and repeated 3-5 times.

Scenario 7: A gymnast has a chronic left-medial calf strain at the musculotendinous junction that is slowly resolving. She has developed some tightness in the gastric-soleus complex with a slight loss of ankle dorsiflexion.

Modality: Therapeutic ultrasound

Treatment Plan: 1.2-2.0 w/cm² continuous-wave at 1 MHz frequency for approximately 5-10 minutes. Stretching exercises should be performed immediately following the application of heat in order to promote soft-tissue lengthening.

Scenario 8: A football player suffered a grade-1 hamstring strain a few days ago. He has returned to practice but reports tightness in his hamstring when he first begins training.

Modality: Thermotherapy (moist hot pack)

Treatment: Apply a moist heat pack to the area for 15-20 minutes, followed by gentle stretching.

Scenario 9: A golfer presents to the training room complaining of pain in his lower back. He reports that he felt something pull in his back a few days ago but thought that it would go away. He explains that it has gotten better, but he feels tight and limited during his golf swing.

Modality: Thermotherapy (short wave diathermy)

Treatment: Continuous short-wave diathermy applied to the low back area for 20 minutes.

Scenario 10: A lacrosse player is two weeks post-op from an ACL surgery and continues to have quad weakness and difficulty performing rehab exercises.

Modality: Electrical stimulation (NMES)

Treatment Plan: 10 contractions per session which should result in a treatment time of 11-12 minutes based on a protocol of 75-second contractions followed by a 50-second rest period.

Scenario 11: A tennis player comes in complaining of pain in her elbow. She reports pain in her lateral elbow with radiating pain into her forearm when playing tennis. After evaluation, you determine that she has lateral epicondylitis (tennis elbow).

Modality: Light modality (high-intensity laser therapy (HILT))

Treatment Plan: HILT performed for 5 minutes followed by rehab exercises.

Scenario 12: A tennis player complains of low back pain radiating into the SI/buttocks region. When you palpate deep in the L4 region, it reproduces the pain to the region of the SI and buttock where he perceives most of the pain.

Modality: Therapeutic ultrasound

Treatment Plan: 1.2-2.0 w/cm² continuous wave at 1 MHz frequency to the L4 region followed by rehabilitation exercises.

Scenario 13: A golfer presents with medial epicondylitis. He has been stretching, icing, and wearing an elbow brace but has had no significant improvement.

Modality: Thermal modality - heat (ultrasound)

Treatment Plan: Apply ultrasound to the medial elbow for 5-7 minutes.

Scenario 14: A softball catcher presents to the training room complaining of ongoing low back pain. She states that it has been hurting since the beginning of the season when a runner collided with her. She has been icing and stretching but reports that her pain is not getting any better.

Modality: Light modality (infrared light therapy)

Treatment Plan: Apply an infrared low back wrap to the patient for her to wear during the day for treatment.

Scenario 15: A baseball player suffered an ankle sprain when he slid into 3rd base. You have been treating him for a few days. His pain has been decreasing, but the edema in his ankle has not changed despite using various modalities.

Modality: Manual therapy (sports massage)

Treatment Plan: With the athlete lying prone on the table and his knee bent at 90 degrees, perform a “milk massage” on his ankle. All massage strokes should be gently pushing the edema toward the heart. Perform massage for 5-7 minutes.

Scenario 16: A basketball player complains of low back pain from weightlifting yesterday after practice. He has mild swelling and loss of ROM due to pain.

Modality: Electrical stimulation (Interferential Muscle Stimulation)

Treatment Plan: Apply IFC with ice for 15-20 minutes to reduce pain and swelling in the low back.

Scenario 17: One of your running backs reports to the training room after practice and tells you that his shoulder hurts. He states that he is not sure what happened but that he was tackled several times during practice. He reports pain over the deltoid and AC joint. You notice mild edema and bruising, and upon further evaluation, the athlete tells you that he has pain with flexion and abduction of the shoulder.

Modality: Thermal modality – cold (ice and IFC)

Treatment Plan: Apply interferential stim and ice to the athlete’s shoulder for 15-20 minutes.

Scenario 18: A wrestler reports that he landed hard on his left elbow during his match yesterday. After a thorough evaluation, you determine that he has a ruptured olecranon bursa.

Modality: Cryotherapy (cold intermittent compression)

Treatment Plan: Cold compression for 15-20 minutes followed by a compression wrap.

Scenario 19: An athlete suffered a compression fracture of the proximal radius eight weeks ago and has decreased ROM with discomfort at the end ranges of flexion, extension, supination, and pronation. You want to increase his motion.

Modality: Hydrotherapy (warm whirlpool)

Treatment Plan: Place the wrist in water of 98-104 degrees for 15-20 minutes.

Scenario 20: A lacrosse player comes to you and reports that he injured his finger during his club practice about a week ago. He states that his parents took him to a walk-in clinic where he had x-rays and was told that he had dislocated his finger. He tells you that the doctor referred him to a specialist, but that he can play until he is seen because there wasn't a fracture.

Modality: Thermotherapy (paraffin bath)

Treatment: Dip hand 4-5 times, then wrap in an ice bag and towel for 20-30 minutes.

Scenario 21: A triple jumper comes to you and reports pain in her left Achilles. She states that every time she jumps, she gets a sharp pain and that it is getting worse every day. She tells you that she has been icing after practice, which helps some, but isn't sure what else to do.

Modality: Light modality (low-level laser therapy)

Treatment Plan: Perform treatment with low-level laser using a 1000 mW semi-conductor. The patient would receive four applications to the Achilles tendon per session, twice per week.

Scenario 22: A cross country runner complains of bilateral medial shin pain. She is extremely tender to palpation and complains of pain anytime she runs.

Modality: Hydrotherapy (ice bath)

Treatment Plan: Have the athlete place her lower extremities in an ice bath for 7-10 minutes

Scenario 23: A swimmer comes to the training room and complains of posterior/lateral neck pain. He has a noticeable spasm in the area of the upper trap and pain with AROM.

Modality: Cryotherapy (ice massage)

Treatment Plan: Ice massage with gentle ROM as tolerated in pain-free ranges following treatment.

Scenario 24: A soccer player reports to the training room after having ACL surgery. She is one-day post-op and has a lot of swelling and pain in her knee.

Modality: Electrical stimulation (Interferential muscle stim and ice)

Treatment Plan: Apply IFC and ice for 15-20 minutes.

Scenario 25: A wrestler comes to you and reports neck pain following his last match. He states that his neck is stiff and complains of minor tenderness along his upper trap.

Modality: Manual therapy (Graston technique)

Treatment Plan: Perform light scraping to the upper trap for 5-10 minutes, followed by AROM and light stretching.

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