

THERAPEUTIC MODALITIES IN ATHLETIC TRAINING

EXRS 4100

Instructors: Mike Ferrara, 542-4801, mferrara@coe.uga.edu
Mike Dew, 542-6521, mjdew@yahoo.com
Tamerah Hunt, 542-3273, ladycat07@hotmail.com

COURSE DESCRIPTION

Examination of the treatment of athletic injuries through the use of cryotherapy, hydrotherapy, and electrotherapy. Indications and contraindications for the use of therapeutic modalities program will be explored.

COURSE OBJECTIVES

The student will gain a basic understanding of the following:

1. Normal physiological response of the human body to trauma, physiological wound healing and tissue repair, effect of trauma and inactivity on body tissue and resulting implications for the selection of therapeutic modalities.
2. Prevailing pain control theories and associated rationale for the selection and use of therapeutic modalities for the treatment and control of pain.
3. Systemic and physiological effects of therapeutic heat and cold on normal and injured tissue in the body.
4. Principles of electricity including electric units and wave frequencies.
5. Principles of electrotherapy and specific physiological effects, indications and contraindications of: (a) shortwave and microwave diathermy (b) TENS (c) ultrasound and, (d) muscle stimulations, (e) radiant energy devices, and (f) other contemporary therapeutic modalities.
6. Principles of hydrotherapy including specific physiological effects, indications and contraindications of: (a) whirlpool (b) contrast bath and, (c) moist heat packs.
7. Principles of cryotherapy including specific physiological effects, indications and contraindications of: (a) ice (b) slush (c) ice massage (d) compression units, and (e) coolant sprays.

REQUIRED TEXT

Starkey, C. (2004). Therapeutic Modalities for Athletic Trainer. 3rd Edition, F.A. Davis.

SUPPLEMENTAL TEXT

Belanger A.L. (2003). Evidenced Based Guide to Therapeutic Physical Agents. Lippincott, Williams and Wilkins.

Denegar, C.R. (2000). Therapeutic Modalities for Athletic Injuries. Human Kinetics.

Prentice, W. (1990). Therapeutic Modalities in Sports Medicine. Times Mirror/Mosby, 2nd Edition.

Arnhiem, D. and Prentice W. (1993). Principles of Athletic Training. Times Mirror/Mosby, 8th Edition.

Case Study

There will be a case study on an athlete from your sport. You must analyze the therapeutic modality program and its effectiveness in treating an injury. The case study will be due on April 18. **Late case studies will receive an automatic 75% reduction in grade.** The following structure will be used in the case study:

- a. Personal Data/Pertinent Medical history (age, sex, sport, primary complaint, and pertinent aspects of his/her medical history)
- b. Physical Signs and Symptoms (chronology of the physical findings and objective measures)
- c. Differential Diagnosis (array of possible injuries/conditions)
- d. Results of Diagnostic Imaging/Laboratory Tests
- e. Clinical Course (e.g., diagnosis, treatment, surgical technique, short-term and long-term goals, modalities and rehabilitation program, final outcome)
- f. Deviation From the Expected (a brief description of what makes this case unique)
- g. Medical literature supporting the use of your therapeutic modality program and potential outcome
- h. Overall impression of clinical modality program (did it work, could it have been more effective, role in return to play, etc.)

Competency Testing

You will be tested on the following modalities for patient set-up, modality operation, patient instruction, indication, contraindication and treatment time.

+

Cryotherapy: Ice bag, cold whirlpool, ice massage, cryocuff, intermittent compression

Thermotherapy: Hot pack, paraffin bath, whirlpool

Electrotherapy: Interferential stimulation, TENS, Iontophoresis, EMS pain protocol, EMS muscle reeducation protocol, EMS muscle hypertrophy protocol,

Mechanical: Ultrasound, massage, manual traction, mechanical traction

Class Presentation

Each student will be assigned a modality or a specific protocol for the application of the modality. For your presentation, you will provide information for the rationale for the use of this modality, patient set-up and instructions, modality protocol, contraindications and treatment effectiveness. The presentation should be 5-10 minutes.

Quizzes

There will be 8 quizzes given throughout the semester. Quizzes will be primarily based on definitions found in the footnotes of the text book chapters and course materials.

GRADING

Grades will be based on the following:

Test 1	100 Points
Test 2	100 Points
Test 3	75 Points
Test 4	75 Points
Final Examination (175 Points)	175 Points
Quizzes (8 at 10 points each)	80 Points
Case Study	30 Points
Modality Presentation	20 Points
Lab Points (see Lab Syllabus)	<u>100 Points</u>
TOTAL POINTS	755 Points

Final Grades will be based on points earned:

A	680 pts or better
B	604-679 pts
C	529-603 pts
D	453-528 pts
F	Less than 453 pts.

Special Student Needs

Student having any special needs (handicap problems or any other factor) that may affect their performance in class or require special instructions strategies should make these needs known to the instructor during the first week of the course.

Academic Honesty

The University of Georgia and the Athletic Training Education program seeks to promote and ensure academic honesty and personal integrity among students and members of the University community. Academic honesty means performing all academic work without cheating, lying, tampering, stealing or receiving assistance from any other person or using any source of information that is not common knowledge. You should read and become familiar with **A Culture of Honesty** publication which defines the policies, procedures and sanctions for academic honesty. These procedures will be strictly enforced by your instructor(s).

COURSE OUTLINE

<u>TOPIC</u>	<u>Starkey</u>
Problem Solving Approach to Injuries	3
Administrative Considerations	4
Injuries and Healing Process	1
Pain and Mechanism of Pain Relief	2
 TEST 1	
Thermal Agents	
Cryotherapy	5,6
Intermittent Compression	14
Heat Modalities	5,6
 TEST 2	
Transmission of Energy	App B
Principles of Electrical Stimulation	11
Electrical Stimulating Techniques	12
 TEST 3	
Clinical Electrical Modalities	13
HVPS	
TENS	
Interferential	
Microcurrent	
Lasers	
Iontophoresis	
 TEST 4	
Mechanical Agents	
Ultrasound	7,8
Massage	16
Traction	17
CPM and Biofeedback	15, 18

FINAL EXAMINATION - Friday, MAY 6 at 8:00 AM

Weekly Outline

Week	Monday	Wednesday
1/10	Intro to Course Problem Solving Methods	Problem Solving Method Administration Concepts
1/17	NO Class – MLK Day	Administration Concepts
1/24	Healing Process	Healing Process
1/31	Pain Theory and Control	Pain Theory and Control
2/7	TEST 1	Cryotherapy
2/14	Cryotherapy	Intermittent Compression
2/21	Thermotherapy	Thermotherapy
2/28	TEST 2	Transmission of Energy Principles of Electrical Stimulation
3/7	Principles of Electrical Stimulation	Electrical Stimulating Techniques
3/14	Spring Break	
3/21	Electrical Stimulating Techniques	Electrical Stimulating Techniques
3/28	TEST 3	HVPS/MENS
4/4	TENS/IFC	Laser
4/11	Microcurrent/Iontophoresis	TEST 4
4/18	Ultrasound	Ultrasound
4/25	Traction	CPM/Biofeedback
5/2	Light Modalities	5/6 FINAL EXAMINATION

Case Study Format

Personal Data/Pertinent Medical history (age, sex, sport, primary complaint, and pertinent aspects of his/her medical history)

A 45 year old runner injured his left IT band during a 14 mile run. The pain had begun after running 10 miles and continued to get worse. The athlete stopped running after 12 miles due to pain. The person had a minor injury to the left IT Band 3 weeks ago which was treated with ice, rest and NSAIDS. After 3 weeks of rest, the athlete gradually began running and felt sharp pain in the lateral aspect of the knee after 35 minutes of continuous running which caused him to stop running due to pain. Other than this instance, the runner never had any injuries with either IT Band. There is a history of three left Achilles tendon injuries which dates back to three years and none of these episodes was evaluated by a physician. The athlete was training for a marathon which is scheduled in two months.

Physical Signs and Symptoms (chronology of the physical findings and objective measures)

Initial evaluation was the injury found point tenderness at the insertion of the IT Band and at the lateral epicondyle of the knee. Palpation also elicited point tenderness in the piriformis region. The athlete reports that pain is a 7 when running and always feels a constant ache in the knee during activities of daily living (3/10). Knee ROM was WNL for flexion (137°) and extension (0°). However, hip flexion was decreased (-13°) and hip external rotation (not measured) was also limited due to muscle tightness. All other hip ROM were WNL. There was swelling noted in the knee (+0.35cm) when measured around the joint line and compared bilaterally. A positive Obers and Nobles test was found as well as a positive piriformis test. All MMT measurements of the knee were WNL and not painful. MMT for hip abduction was 4/5 and hip external rotation was also 4/5. All other hip MMT tests were WNL.

Date	Pain Level-ADL	Pain Level Activity	Swelling	Hip Flexion	Hip ER	MMT Hip ABD	MMT Hip ER
Nov. 15	3	7	+0.35	-130	NT	4	4
Nov 23	4	NT	+0.42	-150	-80	4	5
Dec 1	3	NT	+0.39	-120	-50	5	5
Dec 10	1	3	+0.50	-80	-40	5	5
Dec 20	0	2	+0.18	-100	-20	5	5
Jan 5	0	0	+0.15	-50	-20	5	5

Differential Diagnosis (array of possible injuries/conditions)

IT Band Syndrome

Piriformis Syndrome

LCL Sprain

Vastus Lateralis Strain

Results of Diagnostic Imaging/Laboratory Tests

X-rays were WNL for the left knee

Clinical Course (e.g., diagnosis, treatment, surgical technique, short-term and long-term goals, modalities and rehabilitation program, final outcome)

The clinical impression was left IT Band Strain as stated by the staff athletic trainer. The athlete was treated with ice, ultrasound (1.25 w/cm²) for 5 minutes daily over the insertion of the IT Band. Cross friction massage as tolerated by the athlete was also used. Finally, a comprehensive flexibility program was instituted to include IT Band and hamstring flexibility (see attachment). The athlete also started core stability exercises and rode a bike 30 minutes to maintain cardiovascular fitness. After three weeks, the athlete began to run again, but the pain immediately returned to the left knee. The athlete was referred to AOC and seen by Dr. Hancock. After physical examination and x-rays, the athlete was diagnosed with left IT Band Syndrome. The athlete was injected with depomedrol with lidocaine at the insertion of the IT Band and at Gerdy's tubercle on December 3. The athlete was told not to run for 7 days and gradually resume activities. The athlete was also told not to run the marathon to decrease the risk of further injury but could run the ½ marathon. The therapeutic modalities program was changed to consist of hot pack for 15 minutes, ultrasound, cross friction massage and stretching of the IT Band and hamstrings.

Summary of Therapeutic Modalities Program

Date	Ice	Hot Pack	US	Cross Friction Massage	Flexibility Program
Nov. 15	20 minutes TID	Not Indicated	1.25 w/cm ² for 7 min	5 minutes over IT Band insertion	IT Band and hamstring stretching
Nov 23	20 min BID	15 minutes to start treatment	1.25 w/cm ² for 7 min	5 minutes over IT Band insertion	IT Band and hamstring stretching
Dec 1	20 minutes BID	15 minutes to start treatment	1.25 w/cm ² for 5 min	5 minutes over IT Band insertion	IT Band and hamstring stretching
Dec 10	20 minutes BID	15 minutes to start treatment	Discontinued	5 minutes over IT Band insertion	IT Band and hamstring stretching
Dec 20	20 minutes after activity	Not Used	Discontinued	5 minutes over IT Band insertion	IT Band and hamstring stretching
Jan 5	20 minutes after activity	Not Used	Discontinued	5 minutes over IT Band insertion	IT Band and hamstring stretching

Short-Term Goals

1. The athlete will have no pain (0/10) on ADL in 5 days.
2. The swelling in the knee will reduce to +.10 in 7 days.
3. Hip flexion ROM will be -10 degrees compared bi-laterally in 10 days and ER will be -5 degrees in 10 days.

Long Term Goals

The athlete will be able to resume distance running in two months.

Final Outcome

The athlete was able resume running 8 days after the corticosteroid injection. Activity began at 20 minutes and gradually increased to 60 minutes. During this time, the pain in the knee did not return but continued IT Band and hamstring tightness was noted. The athlete was scheduled to complete a ½ marathon but instead completed the marathon race. The athlete stated that the knee was relatively pain free and felt good during the race and decided to continue for 26 miles.

Deviation from the Expected (a brief description of what makes this case unique)

This was a significant case of IT Band syndrome. The injury was probably due to drastically increasing mileage over a relatively short period of time. If the athlete had properly treated the IT Band on the initial injury, many of the complications and continued pain could have been reduced. Further, due to the athlete's overall tightness of the lower extremity, this probably increased the possibility of injury and contributed to the continued problems that he was having.

Medical literature supporting the use of your therapeutic modality program and potential outcome

The IT Band is a fibrous structure that originated from the tensor fascia latae and inserts on the head of the fibula. This structure has poor blood flow and recovery from this injury generally takes from several weeks to months. Numerous authors^{1;2} have used a comprehensive approach to the treatment of IT Band syndrome. Hertel³ reported that using ultrasound at high intensities ($>1.5 \text{ w/cm}^2$) for 15 minutes of the IT Band which could increase blood flow and extensibility of the structure. Field⁴ also supported this theory of using high ultrasound intensity and further stated that cross friction massage could also be indicated to reduce scar tissue.

Reference List

1. Riemann, B. L. and Guskiewicz, K. M. Objective mild head injury evaluation through a battery of clinical postural stability tests. *J Athl Train.* 1998; 33:S18.
2. Broglio SP, Guskiewicz KM. Soccer heading: Are there risks involved. *Athl Ther Today.* 2001;6:28-32.
3. Hertel JN, Guskiewicz KM, Kahler DM, Perrin DH. Effect of lateral ankle joint anesthesia on center of balance, postural sway, and joint position sense. *J Sport Rehabil.* 1996;5:111-119.
4. Field M, Collins MW, Lovell MR, Maroon J. Does Age Play a Role in Recovery From Sport-Related Concussion? A Comparison of High School and

Collegiate Athletes. J Pediatr. 2003;142:546-553.

Case Study

Name _____

Subjective Findings:

Objective Findings:

Signs	Initial	____ d PI	____ d PI	____ d PI	____ d PI
Pain Level					
Swelling					
ROM					
Strength					
Function					
Other					

Therapeutic Modality Treatment Program (what, why and effectiveness)

Initial

Progression of Modalities Program (what, why and effectiveness)