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Fall 9-1-2000

### PT 482.01: Measurement and Modalities

James J. Laskin

*University of Montana - Missoula*, [james.laskin@umontana.edu](mailto:james.laskin@umontana.edu)

Steve Fehrer

*University of Montana - Missoula*

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## PT 482/483 - Fall 2000

### Measurement and Modalities - Unit I (Physical Agents)

#### Course Coordinator:

James Laskin, M.S., P.T., Ph.D. (candidate)

Office: Skaggs Building, room 105

Phone: 243 - 4757

Email: [jlaskin@selway.umt.edu](mailto:jlaskin@selway.umt.edu)

Office Hours: by appointment (individual or groups)

#### Modality Section Lab Assistant:

Scott Richter, M.S.

- Credits: PT 482 (3 units), PT 483 (1 unit)
- Lecture Times: Wednesday and Friday- 8:10 to 10:00 AM
- Laboratory Times: Monday - 8:10 to 10:00 AM (All students)

#### Laboratory Attire:

Men and women must wear loose shorts and women must wear an appropriate bra, sports bra or the upper portion of a two piece swimsuit (one piece swimsuits are not acceptable). Sweats may be worn during lab when not acting as the client.

#### Required Textbooks:

Cameron, M.H. (1999). *Physical agents in rehabilitation*.  
Philadelphia, PA: W.B. Saunders, Co.

O'Sullivan, S. B. & Schmitz, T. J. (2000). *Physical Rehabilitation: Assessment and treatment* (4<sup>th</sup> ed.). Philadelphia, PA: F. A. Davis, Co.

#### Suggested Alternative Textbook:

Hayes, K.W. (2000). *Manual for Physical Agents* (5<sup>th</sup> ed.). Upper Saddle River, NJ: Prentice Hall Health.

#### Supplemental Readings:

Selected readings will either be available in required text from another course or a master copy will be placed in a binder in the student area.

## Unit Description:

Physiology, indications, contraindications, and methods of applying physical agents including, but not limited to superficial heat and cold, ultrasound, electromagnetic radiation, and mechanical traction.

## Unit Objectives:

To be handed out separately.

## Unit Evaluation:

### PT 482

Comprehensive Written Unit Examination	100 points
3 - Lecture Quizzes	30 points
Research Article Presentation (P.T. only)	20 points

### PT 483

Practical Exam (P.T. only)	100 points
4 - Lab Quizzes	40 points

**\*\*Exam and quizzes will cover lecture, lab, and assigned readings\*\***

## Research Article Assignment and Presentation (P.T. only):

This assignment is being done in conjunction with Dr. Gajdosik's "Introduction to Professional Literature" section of PT 503. This assignment will require that each student find a recent (within the last five years) research article (no descriptive or review of literature review) from a peer reviewed journal. The selected article must deal with the effectiveness and/or the clinical application of a modality discussed in class. If you have any questions please see Professor Laskin. The written component of this exercise will be dealt with in PT 503 by Professor Gajdosik.

Each student must review a different article. We will use a first come first served approach - in other words I will have a list posted on the bulletin board across from my office. When you have selected an article please come and put the details on the list. I would suggest that when you do your literature search you select several potential articles. A copy of the selected article must be handed in to Professor Laskin's mail box by 4:00 PM - Friday, September 29, 2000.

On Wednesday, October 18, 2000 the class will be divided into a number of small research presentation groups. Each student will have 10 minutes (7 minutes for the presentation and 3 minutes for questions) to present their research article assignment to their assigned research group. The presentation will be comprised of the following components: purpose of the study, methodology, results, and most importantly focus on the clinical relevance and the clinical application of the results. For each presentation a student within the group will be assigned to ask the initial question(s) and will be responsible to have read the article being presented prior to the presentation. Each small group will have a faculty member present and along with the rest of the student audience they will assess the presenters performance based primarily on the following criteria:

1) Clarity of the presentation (5 points)

- appropriate language
- clarity of speaking voice
- quality of AV and handout

2) Quality of the presentation (15 points)

- logical and concise presentation of material
- addressed each of the required components
- appropriate responses to questions
- adherence to the time limit

**Practical Examination (P.T. only):**

The practical examinations for this course will be conducted during the week of October 23, 2000. The requirements, format, and other details will be forthcoming. This practical exam is primarily to assess your skills, although specific questions to assess your knowledge regarding rationale and indications/contraindications are also addressed. The content of this practical exam includes both the material covered in the "Modalities" section of PT 482/483 and the components of draping, gait, transfers, and assistive devices from PT 516/517.

## Proposed Unit Schedule:

<b>W-Sep 6</b>	<b>Unit I - Introduction, Research Assignment, and Vitals Signs, Cameron - Chapter 1 O'Sullivan - Chapter 4</b>
<b>F-Sep 8</b>	<b>Vital Signs, Safety, and Pain (mechanisms and measurement) Cameron - Chapter 3</b>
<b>M-Sep 11</b>	<b>Lab: Vital Signs</b>
<b>W-Sep 13</b>	<b>Inflammation &amp; Tissue Repair and Documentation Cameron - Chapter 2</b>
<b>F-Sep 15</b>	<b>Thermal Agents: Superficial Heat Cameron - Chapter 6</b>
<b>M-Sep 18</b>	<b>Lab: Application of Hot &amp; Cold</b>
<b>W-Sep 20</b>	<b>Thermal Agents: Superficial Heat &amp; Cryotherapy Cameron - Chapter 6</b>
<b>F-Sep 22</b>	<b>Thermal Agents: Cryotherapy Cameron - Chapter 6</b>
<b>M-Sep 25</b>	<b>Lab: Application of Hot &amp; Cold</b>
<b>W-Sep 27</b>	<b>Therapeutic Ultrasound Cameron - Chapter 9</b>
<b>F-Sep 29</b>	<b>Therapeutic Ultrasound Cameron - Chapter 9 Research Article Due</b>
<b>M-Oct 2</b>	<b>Lab: Therapeutic Ultrasound</b>
<b>W-Oct 4</b>	<b>Mechanical Traction Cameron - Chapter 8</b>
<b>F-Oct 6</b>	<b>Hydrotherapy and Electromagnetic Radiation Cameron - Chapter 7 &amp; 10</b>

M-Oct 9            Lab: Therapeutic Ultrasound

W-Oct 11           Electromagnetic Radiation  
                         Cameron - Chapter 10

F-Oct 13           Clinical Decision Making - The Selection of the Ideal Physical Agent  
                         O'Sullivan - Chapter 1  
                         Cameron - Chapter 12

M-Oct 16           Lab: Review

W-Oct 18           Small Group Research Presentations

F-Oct 20           Modalities Written Exam

**PT 482/483 Unit 2 (50% of course)**  
**GONIOMETRY AND MANUAL MUSCLE TESTING**  
**FALL 2000**

**Instructors:**

Steven Fehrer, Ph.D., P.T.  
107 Skaggs Building  
243-2429, [sfehrer@selway.umt.edu](mailto:sfehrer@selway.umt.edu)  
Office hours by appointment.

Patti Jo Lane, P.T.  
[plane@selway.umt.edu](mailto:plane@selway.umt.edu)

**Required Textbooks:**

Norkin, Cynthia and D. Joyce White, Measurement of Joint Motion. A Guide to Goniometry 2<sup>nd</sup> edition. F.A. Davis Company, Philadelphia, 1995. **(N&W)**

Hislop, Helen and Jacqueline Montgomery, Daniels and Worthingham's Muscle Testing, Techniques of Manual Examination 6<sup>th</sup> edition. W.B. Saunders Company, Philadelphia, 1995. **(H&M)**

Assigned reading is expected to be completed prior to the start of class!

**Required Equipment/Supplies**

Each student will supply twelve and six inch universal goniometers and a clean towel. Each class session will include a lab component. Men are expected to wear shorts and T-shirt and women shorts and sports bra or two piece swimsuit. Students should change clothes before class begins. All students must be able to readily expose the joint being worked on during the specific lab session. Students are welcome to wear sweats over their lab cloths when not acting as the client. You will not be allowed to participate in lab if dressed inappropriately.

**Method of Evaluation:**

PT 482:

-November 17, 2000 - Written midterm examination - 50 points (PT and AT students)

-December 20, 2000 1:10-3:10 Rm SB 114 Written cumulative final examination - 75 points (PT and AT students). AT students, if you have a conflict with this examination time please see Dr. Fehrer to arrange for an alternative time.

-Two technique demonstrations to class – 10 points each (PT students only). Each PT student has been assigned a goniometer measurement group and a MMT group – see schedule. On the assigned day the student will give a brief demonstration to the class, correctly illustrating how the measurement is made.

It is recommended that the student visit with Dr. Fehrer and spend some time practicing prior to the presentation.

Course grades will be determined as follows: A = 90-100% achievement of course points, B = 80-89%, and C = 70-79%. Attainment of less than 70% of course points will obligate the student to retake the course. If a student scores below 70% on an exam they will be given the opportunity to retake an alternate version of the exam. If the student achieves a score of 70% or greater on the retake exam, the student will receive a 70% score for the exam.

#### PT 483:

-Upper Extremity Practical Exam 50 points – will be given November 16-22.

-Cumulative Practical Exam 50 points – will be given December 18-21.

For the PT students (not the AT students), these practical exams may be integrated with the practical exams for PT 517

Practical exams may be scheduled throughout the day and evening!

Course grades will be determined as described above for the AT students. For the PT students, competency is expected for all the requisite skills. This will result in a grade of B. PT students will need to repeat the practical exam if competency is not demonstrated. A grade of "A" will be given for demonstration of competency in skills beyond the requisite group.

Practical exams are given over a course of days, so there are times when some students have completed the exam while others are still studying. Students will be expected to adhere to the following:

1. Do not solicit any information from students who have completed the practical.
2. Do not discuss any part of the practical with **any** classmates!
3. Certain equipment may not be available to practice with while practical exams are being given. Plan accordingly!

#### **COURSE SCHEDULE**

Mon. Oct. 23 Introduction to goniometry (Goni)

N&W 1-37, 49-61

Goni – shoulder (shld) flexion (flex), extension (ext), abduction (abd), adduction (add)

Wed. Oct 25 Introduction of manual muscle testing (MMT)

H&M 1-9, 81-93

MMT – shld flex, ext, scaption\*, abd

\*skill beyond requisite group



Fri. Oct 27 Shoulder continued.

N&W 62-65, H&M 94-107

Goni – shld lateral/external rotation (ER), medial/internal rotation  
(IR) – Aarrestad

MMT – shld horiz abd\* and add\* – Kempfert  
shld ER and IR – Wilson

Mon Oct 30 Shoulder – scapular motion

H&M 58-81

MMT – scapular abd and upward rot, scap elev – Tonna  
scap add, scap dep – Schonberg  
scap add down rot – Rubel

WED Nov 1 Elbow

N&W 67-77, H&M 108-123

Goni – flex, ext – Anderson  
pronate, supinate – Atwood

MMT – flex, ext – Aarrestad  
pronate, supinate – Rose

Fri Nov 3 Wrist

N&W 79-91, H&M 124-131

Goni – flex, ext – Barna  
radial dev, ulnar dev – Benth

MMT – flex, ext – Rinaldi

Mon Nov 6 Hand (Bring small goniometer)

N&W 92-99, H&M 132-141

Goni – MCP flex, ext – Cardoza  
MCP abd, add – Clewley

MMT – MP flex, ext – Reesor  
PIP/DIP flex\* – Mollett

Wed Nov 8 Hand continued

N&W 100-104, H&M 142-147

Goni – PIP flex, ext – Cope  
DIP flex, ext – Feastline

MMT- Finger abd, add – Messer

Mon Nov 13 Thumb

N&W 104-116, H&M 148-165

Goni- CMC flex, ext, abd – Glass

CMC add, opp – Gordon

MCP flex, ext – Gustavson

IP flex, ext – Kimball

MMT- MP IP flex, ext – McDonough

Thumb abd, add – McCarthy

Thumb opp – MacDonald

Wed Nov 15 Cervical

N&W 181-197, H&M 11-31

Goni- flex, ext – Lewis

Lat flex, rot – MacDonald

MMT- combined ext, cap ext\*, cerv ext\* - Gustavson

Combined flex, cap flex\*, cerv flex\* - Gordon

Rotation – Glass

Fri Nov 17 Midterm written examination

Nov 16-Nov 22 Practical examination

Mon Nov 20 Trunk

N&W 199-213, H&M 33-49

Goni- flex, ext – McCarthy

Lat flex, ext – McDonough

MMT- flex, ext Lewis

Rot - Kimball

Mon Nov 27 Hip

N&W 119-135

Goni – flex, ext – Messer

Abd, add – Mollett

IR, ER – Reessor

Wed Nov 29 Hip continued

H&M 167-201

MMT – flex, ext – Feasline

Abd, add – Cope

ER, IR – Clewley

Fri Dec 1 Knee

N&W 137-145, H&M 202-209

Goni – flex, ext – Rinaldi

MMT – flex, ext – Cardoza

Mon Dec 4 Ankle/foot

N&W 147-161, H&M 211-220

Goni – dorsiflex, plantar flex – Rose

Tarsal invert, evert – Rubel

MMT – dorsiflex, plantarflex – Benth

Wed Dec 6 Foot

N&W 162-177

Goni – subtalar invert, evert – Schonberg

Transverse tarsal invert\*, evert\* – Tonna

MTP flex, ext – Wilson

MTP abd, add – Kempfert

PIP flex, ext and DIP flex, ext – on your own

Fri Dec 8 Foot continued

H&M 221-233

MMT – Foot invert, evert – Barna

Hallux and toe MP flex – Atwood

Hallux and toe DIP and PIP flex – Anderson

Hallux and toe MP and IP ext – on your own

Mon Dec 11 Screens/general assessment of ROM and Strength

Wed Dec 13 Alternative methods for assessing strength – dynamometers

Fri Dec 15 Review/practice

### **Objectives for Measures Unit**

- 1- Knowledge and Comprehension
- 2- Application
- 3- Psychomotor
- 4- Analysis, synthesis, evaluation
- 5- Affective

#### **I. Evaluation of Range of Motion**

##### **A. Instrumentation**

- 1.1 Identify common instruments used to measure joint motion.
- 1.2 Describe reliability and validity for ROM measurement procedures.
- 1.3 Given a case, select the appropriate instrument.

##### **B. Principles of evaluation and application.**

- 1.1 Give rationale for measuring ROM.
- 1.2 List indications and contraindications.
- 1.3 Explain normal and abnormal joint end-feel.
- 1.4 Explain the sequencing of goniometric procedure.
- 1.5 Identify the correct bony landmarks, client position and stabilization, and goniometer position.

- 1.6 State normal ROM and functional ROM values for joints.
- 1.7 Describe a technique to perform a screen of upper and lower extremity ROMs.
- 2.1 Given a case, determine which joints to measure.
- 2.2 Select the appropriate instrument for the joint and client.
- 2.3 State factors accounting for differences in active and passive motion.
- 2.4 Explain when you would assess active versus passive motion.
- 2.5 Identify substitutions and suggest stabilization or alternate test positions.
- 2.6 Demonstrate clear/concise documentation of ROM measures as a form of communication with other health care providers.
- 3.1 Perform the procedures accurately and efficiently in the correct order.
- 3.2 Use appropriate body mechanics.
- 3.3 Address appropriate comfort and positioning of client.
- 3.4 Provide client with clear verbal cues.
- 4.1 Given a specific case, determine components of the procedure that could be eliminated or modified.
- 4.2 Given a specific case, including end-feel, active and passive ROM measurements, and pain level, determine possible origins of pathology.
- 4.3 Propose further testing for a specific client.
- 5.1 Act professionally.

## II. Manual Evaluation of Muscle Strength

### C. Principles of muscle performance.

- 1.1 Define operationally strength and endurance.
- 1.2 Identify functional classifications of muscles.
- 1.3 List the three types of muscle contraction.
- 1.4 Name factors that impact muscle performance.

### D. Principles of evaluation and application.

- 1.1 Give rationale for measuring muscle strength and endurance.
- 1.2 Describe common instruments to test muscle strength/endurance.
- 1.3 Define the manual muscle testing grading scale.
- 1.4 List indications and contraindications to muscle testing.
- 1.5 Explain the normal sequence for performing a MMT.
- 1.6 Identify the correct client position, manual contacts, stabilization, and verbal cues to perform MMTs.
- 1.7 Describe the technique to perform a general screen of upper and lower extremity strength.
- 2.1 Given a specific muscle, choose the correct position, manual contact and verbal commands to make a manual assessment of strength.

- 2.2 Determine if MMT is the most appropriate measure of muscle performance for a given client.
- 2.3 Identify substitution patterns and implement stabilization or alternative test positions.
- 2.4 Demonstrate clear/concise documentation of strength measures to facilitate communication between health care providers.
- 3.1 Perform the procedures accurately and efficiently in the correct sequence.
- 3.2 Utilize appropriate body mechanics.
- 3.3 Address appropriate comfort and positioning of the client.
- 3.4 Provide clear verbal cues to the client.
- 4.1 Develop a hypothesis of origin of muscle impairments, given a specific case.
- 4.2 Propose further testing to evaluate hypothesis.
- 5.1 Act professionally.