

9-2014

## PT 567.01: Neurorehabilitation I

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**PT-567**  
**Neurorehabilitation I**  
**Fall 2014, 2<sup>nd</sup> Block**

**Credit:** 3 Credits (total for Semester)

**Instructors:**

Chuck Leonard, PT, PhD  
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Guests Instructors: Greg Salisbury, MSPT (Community Medical Center)

**Class:** Meets Tues and Thur 8-12, SB 117, exceptions State holidays and labs TBD. See schedule below.

**Course Description:** Neurologic physical therapy assessment and intervention of adults with cerebrovascular accidents, Parkinson disease, multiple sclerosis. Motor control and motor learning and application to physical therapy neurorehabilitation. Includes wheelchair and home assessment.

**Required text:**

O'Sullivan and Schmitz (2010) Improving Functional Outcomes in Physical Rehabilitation  
O'Sullivan and Schmitz (2014). Physical Rehabilitation, 6<sup>th</sup> Edition F.A. Davis, Morris, ME

**Reading Assignments:** Refer to course schedule below

**Supplemental Readings:**

Additional articles and supportive material will be assigned and provided in class or through Moodle.

**Teaching Methods and Learning Experiences:** The course content will be presented through lectures and laboratory activities demonstrating/practicing evaluations and interventions. The course has a Moodle shell that may contain lecture power points, references, notes, assignments, and review questions/case studies.

**Objectives:** See below

**Grading:**

**Course Requirements and Methods of Evaluation:**

Ostertag/Leonard 50% of overall PT 567 Grade each

**Written exams and assignments from Ostertag portion:**

Cumulative Final: 60%  
Mid Block Quiz: 20%  
Assignments/Labs: 20%

*No repeat of written exams will be given.*

## ACADEMIC GUIDELINES

### I. ATTENDANCE

Students are expected to be **regular and punctual in class attendance** and **in clinical work**. They are asked to notify instructors in advance, whenever possible, if they do not expect to be present. It is the student's responsibility to take the initiative in making up any missed work. **If a student is ill, they should notify the school office before the first scheduled class.** Students who fail to appear for an examination without previous permission for absence from the instructor will usually not be allowed to make up the examination.

- A. Mandatory Attendance may be required at the discretion of the instructor.
- B. Excessive unexcused absences, as determined by the instructor, may be grounds for requiring remedial work, retake of the class, or dismissal from the program.
- C. Excessive absences and tardiness may be judged as unprofessional behavior and recorded into the student's record.

### II. GRADING SYSTEM

Percentage	Grade	Grade Point
90 – 100	<b>A</b>	4.0
87-89	<b>B+</b>	3.3
83-86	<b>B</b>	3.0
80-82	<b>B-</b>	2.7
77-79	<b>C+</b>	2.3
73-76	<b>C</b>	2.0
70-72	<b>C-</b>	1.7
67-69	<b>D+</b>	1.3
63-66	<b>D</b>	1.0
60-62	<b>D-</b>	0.7
<60	<b>F</b>	0.0

**N grade** – work on the course may be continued in later semesters and when the work is completed the final grade will be granted. This will require the completion of a grade change form.

**I grade** – incomplete. This grade is given at the discretion of the instructor within the following guidelines:

1. The student has been in attendance and **doing passing work up to three weeks** before the end of the semester. For reasons beyond their control and which are acceptable to the instructor, the student has been unable to complete the requirements of the course on time. Negligence and indifference are not acceptable reasons.
2. The instructor must also record an alternate grade which will be assigned if a grade change is not filed within one calendar year. This grade should typically be an F or NCR.

Student academic performance will be communicated to the student through the grading procedure of Moodle and CyberBear.

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. Any evidence of cheating or plagiarism will result in failure of the course. All students need to be familiar with the Student Conduct Code.

For information on plagiarism please visit these links:

<http://www.rbs2.com/plag.htm>

<http://owl.english.purdue.edu/owl/resource/589/01/>

**Professional Behaviors:**

Professional behaviors are expected in the course and are detailed in the student handbook. Unprofessional conduct by a student when involved in schoolwork, in and out of the department, may also be considered grounds for unsatisfactory progress in the program and is subject to review by the Academic Requirements Committee and the Dean of the College of Health Professions & Biomedical Sciences. Also, please refer to the "Generic Abilities" section in your student handbook. Unprofessional behavior will be subject to disciplinary action as per the discretion of the instructor.

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students (DSS). If you think you may have a disability adversely affecting your academic performance, and you have not already registered with DSS, please contact DSS in Lommasson 154. The course instructor will work with you and DSS to provide an appropriate accommodation.

**Course Content:** Various medical and societal aspects of adult-onset stroke with Dr. Leonard. Dr. Ostertag will cover Parkinsonism and Multiple Sclerosis diseases, physiology, pharmaceutical management, physical therapy, interdisciplinary and medical rehabilitation procedures. Pathophysiology, prognosis, spasticity (mechanisms and treatment), gait assessment, motor control issues, functional outcome measures, and various treatment approaches are discussed. Instruction also provided in patient assessment for wheelchair and seating system fitting, Home Assessments. Facilitation and intervention techniques for neurological rehabilitation are also included.

**Curricular Threads**

Disablement models – ICF

Documentation

Ethical issues

Evidence-base practice

Changes across the lifespan

Pharmacology/Pharmacotherapeutics

Physical stress theory

Prevention

Reimbursement

Regulation and compliance

Orthotics related to gait

## **Sue's Schedule 8:10-10:00**

**\*\*Complete reading assignment PRIOR to class\*\***

**Oct 16:** Review Syllabus, Expectations ; Lecture/Discussion: Clinical Decision Making in NeuroRehab;  
Use/interpretation of outcome measures in Neurological Rehab

**\*\*O'Sullivan and Schmitz Improving Functional Outcomes in Physical Rehabilitation. 2010 Chpt 1&2**

**\*\*O'Sullivan and Schmitz Physical Rehab 6<sup>th</sup> edition Chapter 1**

**Oct 21, 23, 28 (Lab TBD):** PT Management of the Patient with Parkinson's Disease

**\*\*O'Sullivan and Schmitz Physical Rehab 6<sup>th</sup> edition Chapter 18**

**\*\*Morris 2006. Locomotor training in people with Parkinson disease. Physical Therapy 86 (10) 1426-1435**

**Oct 30:** Salisbury – Introduction to Wheelchair assessment and fitting

**\*\*O'Sullivan and Schmitz Physical Rehab 6<sup>th</sup> edition Chapter 18**

**Nov 4:** HOLIDAY

**6:** Salisbury – Continuation of Wheelchair assessment and fitting

**MID BLOCK QUIZ**

**Nov 11:** HOLIDAY

**Nov 13, 18:** Salisbury – Wheelchair assessment, labs (on/off campus?)

**Nov 20, 25, Dec 2 (Lab TBD)**

PT Management of the Patient with Multiple Sclerosis

**\*\*Read: O'Sullivan and Schmitz Physical Rehab 6<sup>th</sup> edition Chapter 16**

**\*\*Review: O'Sullivan and Schmitz Physical Rehab 6<sup>th</sup> edition Chapter 9**

Home Assessment

**Dec 4:** Review and catch up day; (optional lab: Performing an Examination in Neurological Rehabilitation, Functional Mobility Training, and Inhibition/Facilitation Techniques)

**Comprehensive Final Examination- Dec 9<sup>th</sup>, 8-10**

**PRINCIPLES OF ADULT NEUROLOGICAL REHABILITATION (CVA)**

Clock Hours:            Fall semester, 2<sup>nd</sup> block (wks 8-15) 10-12

Course Description: Various medical and societal aspects of adult-onset stroke are presented in addition to physical therapy and medical rehabilitation procedures. Pathophysiology, prognosis, spasticity (mechanisms and treatment), gait assessment, motor control issues, functional outcome measures, and various treatment approaches are discussed.

Readings from:

Introduction to the Neurological Examination by M. Nolan

The Neuroscience of Human Movement by CT Leonard

Physical Rehabilitation by O'Sullivan

Schedule and Course Content (subject to change)

Course Requirements and Methods of Evaluation:

Cumulative written final: 100%

Week 8

Impact of Stroke on the Health Care System

Stroke Risk Factors

Pathophysiology of CVA

Neuroscientific Principles Related to CVA

Principles of Neurological Examination

Definitional Terms

Spasticity

Processes of Recovery

Pediatric vs. Adult

Principles of the Neurological Examination

Chart Documentation

Week 9

Gait Analysis of the Hemiplegic Patient

Prognosis

Time course of recovery from acute to chronic stages.

Treatment implications.

**Patient Presentation #1 (Students are expected to dress in a professional manner for these presentations).**

Weeks 10-11

Measurement of Functional Outcomes

Guide to PT Practice (Adult CVA)

LABS- (Spasticity Reduction, Balance, Coordination, Transfers, Trunk, UE, LE.

**Patient Presentation #2**

Weeks 12-13

Motor Control/Learning Theory and Techniques

Constraint Induced Therapies

Treadmill Training

Computer/Robot Assisted Therapies

Paired Associative Training or Peripheral Associative Training

Hemispheric Priming and Mirrored Movement Therapy

Weeks 14-15 **Mon-Tech Visit**

**Community Rehabilitation Center Rotations**

**Comprehensive Final Examination- Dec 9<sup>th</sup>, 8-10**

## **Course Objectives (including first half of course):**

- 1 = knowledge and comprehension
- 2 = application
- 3 = psychomotor
- 4 = synthesis
- 5 = affective

### C. Spasticity: Definition, mechanisms, evaluation, and treatment in patients with Parkinsons and Multiple Sclerosis (CC-1, 2, 3, 5, )

- 1.1) Describe definitions of spasticity and muscle tone. Describe potential mechanisms and physical therapy intervention that may address these mechanisms. (CC-1; EXO-1)
- 2.1) Demonstrate application during labs, patient case presentations and written examination. (CC-1-5; EXO-1,2,3,8)
- 3.1) Demonstrate appropriate spasticity reducing treatments during laboratories. Demonstrate an understanding of mechanisms during class discussions and written examination. (CC-1-5; EXO-1,2,3,9)

### D. Principles of the Neurological Examination (CC 5.3, 5.8, 5.9- 5.20)

- 1.1) Describe components of complete neurological examination and how to adapt a basic examination for patients with Parkinsons and Multiple Sclerosis. (CC-5.30; EXO-1,2,3)
- 1.2 Understand how exam fits into the ICF model. (CC-5.30; EXO-2,3,12)
- 2.1) Demonstrate application during labs and/or patient case presentations.(CC-5.8,5.9; EXO-8,12)
- 3.1) Demonstrate appropriate physical skills when performing neurological examination. (CC5.3; EXO-2,3)
- 4.1) Given a patient, student will be able to complete neurological examination thoroughly and efficiently.(CC-5.3; EXO-2,3)
- 4.2) Given a case study, student will be able to determine appropriate neurological tests to perform. (CC-5.3; EXO-2,3)
- 5.1) Students will exhibit appropriate professional behavior during patient examination process. .(CC-5.3, 5.8, 5.9; EXO-2,3,11,12)

### E. Gait Analysis of Patient with Parkinsons, patient with MS. (CC-1, 2, 3, 5.1, 5.3, 5.8, 5.9- 5.20)

- 1.1) Describe common impairments in gait. (CC-1,2,3;EXO-1,2,3,)
- 2.1) Demonstrate application during labs and/or patient case presentations. (CC-1,2,3;EXO-1,2,3,)
- 3.1) Demonstrate appropriate physical skills when performing gait evaluation. (CC-1,2,3;EXO-1,2,3,)
- 4.1) Given a patient or case study, student will be able to complete gait evaluation thoroughly and efficiently, describe and demonstrate strategies and tactics to address the gait deviations. (CC-1,2,3;EXO-1,2,3,)
- 5.1) Students will exhibit appropriate professional behavior during patient examination process. (CC-5.8,5.9;EXO-8,9,11,12)

### G. Transfer and Bed Mobility Assessment and Training (5.6- 5.17)

- 1.1) Describe principles of transfers and bed mobility skills.(CC-5.6-5.17; EXO-2,3,4,8,9,12)
- 2.1) Demonstrate abilities during laboratory sessions.(CC-5.6-5.17; EXO-2,3,4,8,9,12)
- 3.1) Demonstrate physical ability during laboratory sessions. .(CC-5.6-5.17; EXO-2,3,4,8,9,12)
- 5.1) Demonstrate appropriate behavior during laboratories. .(CC-5.6-5.17; EXO-2,3,4,8,9,12)

### H. Motor Control/Learning Theory and Treatment Guidelines (CC-1, 2, 3, 5, )

- 1.1) Describe recent findings in motor learning and how they apply to patients. (CC-1,2; EXO-1,2,3,4)
- 2.1) Demonstrate by verbal responses in class and during written examination. (CC-1,2,3,5; EXO-1,2,3,4)

### I. Measurement of Functional Outcomes (CC-1)

- 1.1) Describe the components of the FIM and Fugl-Meyer functional assessment tools. Be aware of other functional assessment tools. Describe limitations of the tools. ( CC-1; EXO-1,2,3,4)
- 2.1) Demonstrate knowledge by written examination and discussion. (CC-1; EXO-1,2,3,4)

### J. Pharmacological Issues (CC-1)

- 1.1 List spasticity reducing medications and common side effects (CC-1; EXO-1,2,3,4)
- 1.2 Understand rationale of injectable devices such as baclofen pumps (CC-1; EXO-1,2,3,4)
- 1.3 Understand principles of nerve or muscle injections (CC-1; EXO-1,2,3,4)
- 1.4 List American Academy of Neurology taxonomy of tx. approaches for tone reduction (CC-1; EXO-1,2,3,4)



#### K. Documentation, PT Practice Patterns and Reimbursement (CC 5.6-5.20)

- 2.1 Students will be able to document findings of neurological eval. (CC-5.6-5.20; EXO-8,9,11,12)
- 2.2 Students will know CPT codes and reimbursement patterns for CVA, Parkinsons, MS (CC-5.6-5.20; EXO-8,9,11,12)
- 2.3 Students will be able to identify the PT practice patterns applicable to CVA, Parkinsons, MS (CC-5.6-5.20; EXO-8,9,11,12)

#### Pathophysiology of Parkinson Disease, Multiple Sclerosis

- 1.1 Understand the etiology of these diseases. CC-1, EXO-1
- 1.2 Understand the mechanisms and cellular damage associated with these diseases CC-1, EXO-1
- 1.3 Understand the principles of medical management of these diseases CC-3, EXO-1
- 1.4 Understand the functional expectations of individuals with these diseases based on the progression of the condition. CC-3, EXO-1
- 1.5 Identify prognostic indicators for progression of these diseases. CC-3, EXO-1
- 4.1 Demonstrate the application of primary and secondary prevention interventions for patients with these conditions. CC-5.52, EXO-10

#### Examination/Evaluation

- 1.1 Understand the classification schemes for patients with Parkinson and multiple sclerosis CC-3, EXO-1
- 2.1 Apply understanding of the various examination scales for monitoring consequences of these diseases. CC-5.30, EXO-2
- 3.2 Demonstrate proper technique for patient examination. CC-5.29, EXO-2
- 4.1 Demonstrate clinical decision making skills in evaluation and planning treatment. CC-5.31, EXO-3
- 4.2 Using a case study, construct an effective physical therapy examination protocol for a patient exhibiting each of these conditions. CC-5.29, CC-5.30a,c, d, e, f, g, i, j, k, l, m, n, p, q, s, t, u, v, w; EXO-2

#### Clinical Management

- 1.1 Understand general physical therapy treatment strategies for each of these conditions. CC-5.39 a, b, g, EXO-4
- 1.2 Understand the psychosocial issues that accompany chronic conditions such as MS or Parkinson. CC-2, EXO-4
- 1.3 Identify assistive and adaptive equipment commonly used by patients with these conditions; identify components of a home evaluation. CC-5.39e, EXO-1
- 3.1 Demonstrate by role playing how you would instruct the patient in functional training. CC-5.39c, c, EXO-4
- 4.1 Using the results of a physical therapy examination of a patient with these conditions in the form of a case study, construct an intervention program for the client. CC-5.26, CC-5.39, EXO-4

#### Wheelchair Fitting

- 1.1 Identify the major parts of a manual and power wheelchair. CC-5.39e, EXO-4
- 1.2 Describe the components of a seating and positioning evaluation. CC-5.31. EXO-4
- 1.3 Identify common postural issues seen in clients utilizing wheelchairs. CC-3, EXO-1
- 1.4 Identify the rules regarding reimbursement for wheelchair and cushion procurement. CC-5.42, EXO-11
- 2.1 Complete an order and letter of justification for the procurement of a lightweight manual wheelchair. CC-5.42, EXO-11

#### Facilitation/Inhibition Techniques

- 1.1 Become familiar with theories and rehabilitation approaches including facilitation, inhibition to assist with motor relearning, functional mobility training
- 1.2 Identify normal and abnormal movement patterns on video and during laboratory sessions
- 2.1 Demonstrate manual skills for promoting more normal patterns of movement with functional activity and task specific training.