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PT 567.01: Neurorehabilitation I

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PT-567/568
PRINCIPLES OF ADULT NEUROLOGICAL REHABILITATION

I. PT-567/568 Principles of Adult Neurological Rehabilitation

II. Credit: 2 Credits

III. Instructor: Chuck Leonard, Ph.D., PT

IV. Clock Hours: Class meets Tuesday and Thursday 1-3
 For first 8 weeks only

V. 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.

VI. Readings from:

 Introduction to the Neurological Examination by M. Nolan
 The Neuroscience of Human Movement by CT Leonard
 Physical Rehabilitation by O'Sullivan

VII. Schedule and Course Content (subject to change)

VIII. Objectives: See attached

IX. Course Requirements and Methods of Evaluation:

 Cumulative written final: 80%
 Laboratory observation: 10%
 Classroom participation: 10%

Weeks 1-2

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

Weeks 2-4

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). These presentations are usually scheduled for Thursdays if possible.

Weeks 4-6

Measurement of Functional Outcomes

Guide to PT Practice (Adult CVA)

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

Patient Presentation #2

Weeks 6-8

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

Mon-Tech Visit

Community Rehabilitation Center Rotations

Final Examination- To be announced

PT 567 Neurorehabilitation I

Instructors:

Chuck Leonard, P.T., Ph.D.
SB 108, 243-2710

Steven Fehrer, P.T., Ph.D.
SB 107, 243-2429
steven.fehrer@umontana.edu

Guest presenter: Mary O,Connell. P.T.

Department Offering Course: School of Physical Therapy and Rehabilitation Science

Credits: 3

Course Description: Neurologic physical therapy assessment and intervention for adults with cerebrovascular accidents, Parkinson disease, multiple sclerosis, or vestibular dysfunction.

Class Schedule: 48 hours lecture and 8 hours lab

Required Textbooks: none

Additional Resources/Suggested Readings:

Herdman SJ. Vestibular Rehabilitation, 2nd edition. F.A. Davis Company, 2000.

O'Sullivan SB and Schmitz TJ. Physical Rehabilitation, 5th edition. F.A. Davis Company, 2007.

Leonard CT. The Neuroscience of Human Movement

Nolan MF. Introduction to the Neurological Examination

Umphred DA. Neurologic Rehabilitation, 4th edition. Mosby, 2001.

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

Grading: Regular class attendance is expected. Student performance evaluation will be based on an exam covering stroke rehabilitation (50% of grade) and a final exam covering Parkinson, multiple sclerosis, vestibular, and wheelchair rehabilitation (50% of grade). Grade distribution: A = 90-100%, B+ = 87-89%, B = 83-86%, B- = 80-82%, C+ = 77-79%, C = 73-76%, C- 70-72%, D+ 67-69%, D = 63-66%, D- 60-62%, F <60%. Student academic performance will be communicated to the student through the grading procedure of Blackboard 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. The Code is available for review online at <http://www.umn.edu/SA/VPSA/index.cfm/page/1321>

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Schedule:

1 hour Impact of stroke on health care system and demographics
2 hours pathophysiology of stroke

4 hours (2 lecture; 2 lab) neurological examination of the stroke patient
2 hours spasticity assessment and definitional terms (pharmacological management)
2 hours positive and negative sign assessment (pharmacological management)
1 hour PT practice patterns (includes reimbursement issues)
1 hour chart documentation (disablement model)
1 hour gait analysis (disablement model)
1 hour prognosis
1 hour functional outcomes
6 hours (2 lecture; 4 lab) treatment interventions
4 hours patient presentations (grand round format)
4 hours observation of treatment at regional rehabilitation center
2 hours communication aids and environmental control units
8 hours Assessment and interventions for the client with Parkinson disease
6 hours Assessment and interventions for the client with multiple sclerosis
6 hours (4 hours lecture; 2 hours lab) Assessment and fitting of clients for wheelchairs
4 hours Assessment and interventions for the client with vestibular dysfunction

Course Objectives:

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

A. Pathophysiology of Adult-Onset Stroke (CVA) (CC-1, 2, 3, 4, 5,)

1.1) Describe the differences (clinical, pathology) between occlusive and hemorrhagic CVA. (CC-1; EXO-1)

2.1) Demonstrate application of this knowledge during patient case presentations. Verbal responses and examination results will assess acquisition of this skill. (CC-1-5; EXO-1,2,3,4,8,9,11,12)

B. Prognosis: Time course of recovery from acute to chronic stages

1.1) Describe the time course of clinical and pathological changes associated with acute onset CVA and chronic changes. (CC-1; EXO-1, 12)

2.1) Demonstrate acquisition of knowledge by appropriate verbal responses during class lecture and on written examination. (CC-1,2,4: EXO-1,2,3,8,11,12)

C. Spasticity: Definition, mechanisms, evaluation, and treatment (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 laboratories, 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. (CC-5.30; EXO-1,2,3)

1.2) Understand how exam fits into disablement model. (CC-5.30; EXO-2,3,12)

2.1) Demonstrate application during laboratories, and 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 quickly, thoroughly, and efficiently.(CC-5.3; EXO-2,3)

4.2) Given a case study, student will be able to determine appropriate neuroloigcal 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 Hemiplegic Patient (CC-1, 2, 3, 5.1, 5.3, 5.8, 5.9- 5.20)

1.1) Describe common impairments in gait following CVA. (CC-1,2,3;EXO-1,2,3,)

2.1) Demonstrate application during laboratories, and 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, student will be able to complete gait evaluation quickly, thoroughly, and efficiently. (CC-1,2,3;EXO-1,2,3,)

4.2) Given a case study, student will be able to determine major 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)

F. Shoulder/Hand Syndrome Following CVA (CC-1, 2, 3)

1.1) Describe common causes.(CC1-3; EXO-1,2)

2.1) Demonstrate knowledge during written examination. (CC-1,2,3;EXO-1,2,3,)

G. Transfer and Bed Mobility Techniques , (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 CVA 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 by written examination. (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 (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 (CC-5.6-5.20; EXO-8,9,11,12)

Pathophysiology of Parkinson disease, multiple sclerosis, vestibular dysfunction

- 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 clients with these conditions. CC-5.52, EXO-10

Examination/Evaluation

- 1.1 Understand the classification schemes for clients with Parkinson (Hoehn and Yahr) and multiple sclerosis (Relapsing, Progressing). 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 client 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 and effective physical therapy examination protocol for a client 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 clients with these conditions. CC-5.39e, EXO-1
- 3.1 Demonstrate by role playing how you would instruct the client in functional training. CC-5.39c, c, EXO-4
- 4.1 Using the results of a physical therapy examination of a client 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