**Title and Focus of Activity**: Differential Diagnosis Cases

*Diagnosis*

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**Course Information:**

Management of Neuromuscular System Dysfunction; 9 credits; 5th out of 7 semesters, following clinical management courses on musculoskeletal and cardiovascular and pulmonary dysfunction.

**Learning Activity Description:**

Context/Purpose: This class session comes late in the semester. Its’ purpose is to challenge students to make a “treat, treat and refer, or refer” decision based on complex patient cases that include exam findings and other observations. Some of the cases feature previously-learned content, and others, new content.

The class session begins with a brief review of the purpose of differential diagnosis in neurologic physical therapy (see slides), and the framework of clinical decision making that includes “treat, treat and refer, or refer”. Students then spend about 90 minutes working on the cases alone or with another student (their choice), answering the same 3 questions that follow each case:

1. Are there additional interview questions or tests and measures which would be critical in order to determine the “treat, treat and refer, refer” decision? If so, list these with a rationale for each.
2. Should you treat, treat and refer, or refer? Provide an explanation for your decision.
3. If appropriate, how do you communicate your decision with the patient/family/physician/other providers?

The instructor subsequently leads a discussion about each case, providing content if necessary (e.g., conversion reaction is mentioned here for the first time in the course, and it is covered using this format, rather than via a traditional lecture). **Cases are provided in Appendix A.**

Time for student to complete the activity: Preparation for activity outside of/before class: 45 minutes (reading); Class time completion of the activity: 2 hours

Readings/other preparatory materials:

Sullivan KJ. Hershberg J. Howard R. Fisher BE. Neurologic Differential Diagnosis for Physical Therapy. *JNPT*. 2004;28:162-168.

Learning Objectives:

1. Differentiate nervous system symptomatology from that of other major body systems
2. In a patient with neurologic dysfunction, appropriately screen other systems for potential impairment
3. Determine whether presenting symptoms fall within the realm of typical presentation for a given neurologic medical diagnosis
4. Evaluate whether symptoms require referral to another practitioner
5. Evaluate whether symptoms require urgent vs. non-urgent referral to the physician before physical therapy intervention can occur

Methods of evaluation of student learning: Multiple-choice examination

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Differential Diagnosis



Direct access?



Differentiate need for medical (or other)

referral



Refer if



Inconsistent with medical dx



Inconsistent with

neuromusculoskeletal

dx

)

e.g. systemic signs

(



Medical emergency



Need for other services

General Health Checklist

(

Umphred

2007)



Fatigue



Malaise



Fever/chills/sweating



Nausea



Unexplained weight change



Dizziness/light

-

headedness



Unexplained paresthesia/numbness



Unexplained weakness



Unexplained cognitive and emotional

changes



**Appendix A: Cases**

Key learning points are included following each case in *italics.*

# Case #1

***Background:*** Your friend remarks that her elderly mother has experienced a number of falls recently and really seems to be slowing down. The friend is receptive to your comment that physical therapy can be helpful in these instances, and that you would be happy to see her mother as a patient if they can get a PT referral from the family doctor.

***Setting:*** Outpatient PT clinic

***Referral reads:*** “Pt. with falls; physical therapy 3 x’s/week”, from PCP

***Interview:*** The patient (VC) is a 72 year-old female who lives with her husband in a first floor apartment. She raised 12 children, many of whom are still local and very supportive. Her husband is independent but has many medical problems. He does still drive, and they are regular church goers.

Functionally, VC is independent in all functional activities, but feels that a few falls over the past year have made her cautious and a bit more of a homebody. She does all homemaking tasks except for heavy cleaning. She does tire easily, and takes frequent rests. It takes her a long time to do things, and sometimes she stops walking and can’t start again, especially when she is nervous (about once per day). She admits to depression and sometimes just sits and does nothing. She knows she would be better off staying active but often doesn’t feel like it. She is also anxious and “shaky” at times. She describes her falls as 3 in the last year or so, 2 in the past 3 months; all occurred when turning, reaching, or tripping.

Medically, the patient has a history of depression and hypertension. She takes Zoloft and Lopressor.

When asked, the patient states she is hoping physical therapy will help her “get going” again. She would like to be able to do more with less fatigue. She is willing to do a home exercise program.

***Tests and Measures:***

RHR is 72; RBP in sitting is 130/86. VC denies any pain. PROM is WNL throughout. MMT reveals 5/5 strength at the elbows, wrists and hands, 4-/5 at both shoulders. Hips are 3-4/5, quads 5/5, hamstrings 4-/5, PF/DF 5/5. Sensation is intact to light touch and proprioception in the LE’s, NT in the UE’s. Extremity movement is normal in pattern and smooth with evidence of mild distal tremor in the UE’s.

Sitting balance appears to be intact. In standing VC is willing to reach 6-8” in all directions. FRT is 8”, 8”, 9” for three trials. During anterior perturbations, there is an adequate ankle and stepping strategy but no hip strategy; posteriorly, there is an ankle strategy, but with larger perturbations the patient falls backward requiring assistance from the PT to regain her balance. On the CTSIB the patient has increased sway in conditions 2, 4, and 5, but does not fall. Timed Up and Go is 18 seconds.

The patient uses her arms for sit to stand. She walks independently at least 250’; gait velocity is 1m/sec on the 10m walk test. She has a slouched posture, decreased arm swing, small base of support, and somewhat diminished heel strike and step length. VC can negotiate a flight of stairs independently with a handrail, reciprocally. She requires contact spot to do the stairs without a railing.

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*Students usually suspect a diagnosis of Parkinson’s disease in this case, and we discuss their rationale for that hypothesis, that they can treat and refer (non-urgently), the type of referral to make (neurologist), and how to convey this to the patient in a way that is non-threatening and within the scope of physical therapist practice (see question below).*

*In fact, this patient was referred to a neurologist who found her symptoms largely unresponsive to a trial with Sinemet. A subsequent CTS revealed normal pressure hydrocephalus. Instructor provides content on the definition of NPH, the common triad of symptoms, and medical treatment (VPS).*

## Case #2

***Background:*** This patient woke up from a nap 3 days ago unable to move his right side. His wife called an ambulance and he was transported to the Emergency Room and admitted for a work-up of his symptoms.

***Setting:*** Acute care PT department

***Referral reads:*** “PT”, from neurology resident

***Chart Review:*** This 52 year-old male (LM) lives with his wife in a 2-story home. He is employed as a pipe-fitter but was recently laid off from his job and is collecting unemployment. The couple has 2 high-school aged children, and LM has assisted in coaching the high school baseball team for the past 2 years. PMH is negative except for a history of depression; the patient took Prozac but this was discontinued several years ago. PSH includes s/p ORIF of left tibia due to an auto accident 10 years ago. LM does not smoke, and uses alcohol socially (10 drinks/week). CT scan of the head was negative. Blood work was normal. The patient was started on prophylactic anti-coagulants.

***Interview:*** LM is pleasant and conversant, and appears to be cognitively intact. He seems bewildered by what has happened to him, and believes that it could be a stroke. He denies pain, and when questioned states he has been sitting up at bedside but has not attempted to walk. He has been using a bedside commode in his room. He states that he would like to get home and get back to work.

***Tests and Measures:*** RHR is 68, RBP is 120/84, SpO2 is 99%. PROM is WNL throughout. MMT is 5/5 on the left side, 0/5 in the right arm and leg. Sensation is intact on the left, but impaired to PP, LT and proprioception in the entire right arm and leg (inconsistent responses). DTR’s are 2+ bilaterally. Skin is intact throughout.

LM transfers from wheelchair to mat in a scooting manner with min assist. In sitting he is easily able to reach with his left arm 10-12 inches in all directions. He is able to roll side to side and move from supine to sitting and back independently, though without use of his right arm. You notice occasional spontaneous use of the right leg during these activities, in a normal pattern of movement. He requires min-mod assistance to stand up, and loses his balance slightly during this maneuver. His weight distribution appears to be symmetrical in sit to stand. In supported standing for one minute, the patient displays moderate A-P sway, though without frank loss of balance. He reaches 8-10” in all directions using his left arm. The patient ambulates for 40’ with a great deal of effort. He requires min-mod assist of one. Gait observation shows an upright posture with right arm hanging at his side. During right stance there is inconsistent partial buckling of the knee. During right swing phase you note leg circumduction, knee extension (stiff leg) and ankle dorsiflexion.

After instruction, LM is able to propel his wheelchair 300’ using his left extremities.

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*Students generally believe this patient has had a stroke, but with prompting they are able to discern an atypical presentation (e.g., 0/5 strength in R. extremities yet functional sitting balance and symmetrical weight distribution in sit to stand; gait deviations that are not consistent with impairment testing).*

*Instructor introduces content on conversion reaction, and the importance of pattern recognition in neurologic physical therapy (i.e., patient presentation consistent with medical diagnosis). Instructor provided background and treatment suggestions related to conversion reaction, and discussion ensues about how to make a non-urgent referral, how to approach/treat the patient in a supportive manner, and the importance of interdisciplinary management.*

# Case #3

***Background:*** This patient experienced a R. posterior inferior cerebellar infarct 8 months ago, after which he was an inpatient in a rehab hospital for 1 week. He has had ongoing unsteadiness and dizziness.

***Setting:*** Outpatient PT clinic

***Referral reads:*** “s/p CVA, balance dysfunction; PT 2-3 x’s/wk for 4 wks”, from neurologist

***Interview:*** This 65 year-old male (JR) lives alone in a 2-story home. He is independent with his daily activities, and uses a cane to walk. He states he doesn’t go out much since he is afraid of falling (he has not fallen, however). His girlfriend helps with errands and drives him when necessary. He feels off balance and dizzy. The dizziness, which he describes as “the room spins” has gotten worse over the past 3 weeks. When questioned, he states he gets dizzy when lying down/sitting up in bed, looking up, and bending down to tie his shoes. He is a retired attorney. PMH includes prostate cancer and Type II diabetes.

***Tests and Measures:*** PROM and strength is normal throughout. JR has impaired proprioception in his right great toe and ankle. DTR’s are 2+ throughout except 1+ in the left. Saccades are slightly dysmetric, pursuits are normal, and VOR testing/cancellation does not provoke dizziness.

Functionally the patient is independent in bed mobility and sit to stand, though he moves slowly with a great deal of reliance on his arms, with little head movement. In standing he is able to reach 10-12” in all directions, though slowly. FRT is 10”, 11”, 12” over three trials. Timed Up and Go is 12 seconds. The CTSIB shows increased sway in conditions 4 and 5, with loss of balance occurring at 15 seconds in condition 5. Unilateral stance is 20 seconds on the left and 8 seconds on the right (best of 3 trials). Coordination testing reveals slowing on the right UE and LE, with mild dysmetria.

JR ambulates independently with a straight cane at least 250’. He has a wide base of support and an ataxic-type of gait – sway, velocity and foot placement are all mildly inconsistent. When turning he moves quite slowly with little head movement. He can easily negotiate a flight of stairs with a handrail in a reciprocal fashion.

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*Students generally recognize that a Dix-Hallpike test might reveal a new peripheral lesion in addition to this patient’s central vestibular pathology. Instructor provides additional content about PICA infarct presentation, and discussion ensues about treating this patient depending upon the Dix-Hallpike results, and how to communicate this with the patient and the MD.*

# Case #4

***Background:*** This 48 year-old patient (CL) is s/p recurrent glioblastoma multiforme removal 2 weeks ago. She is now admitted for one week for her first cycle of chemotherapy. You are familiar with her from her previous hospital admissions. Today is her 3rd day of physical therapy, which has been focused on advanced balance and gait training. The patient is ambulatory with a straight cane and supervision, but has bouts of nausea and fatigue which limit her activities.

***Setting:*** Acute care PT department

***Referral reads:*** “PT eval and treat”, from neurosurgical resident

Situation: CL arrives in the department via wheelchair. She feels “ok but tired” today. Her resting vitals are HR = 76, BP = 110/70, SaO2 = 98%. She begins by taking a “warm-up” walk for about 300’ with your supervision – this walk includes level, carpet, turns, and a 6” curb. She rests while you are with another patient. Next CL works on negotiating 3 stairs (6” rise) without using the handrail – she repeats this 3 times, then returns for a rest. When you return to CL after 5 minutes of rest, she looks distressed. Her breathing is shallow, tachypnic and labored. Her vitals are HR = 130, BP = 120/90, SpO2 = 80%.

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*This case provides a review of the presentation of pulmonary embolus, including the need for urgent action/”referral” and medical treatment.*

# Case #5

***Background:*** This 36 year-old patient (EB) has been diagnosed with multiple sclerosis for 6 years.

***Setting:*** Home care

***Referral reads:*** “PT evaluate for new wheelchair”, from neurologist

***Interview:*** EB lives alone in a one-story home. She is divorced and her 18 year-old son lives out of state. She was discharged from the hospital recently following an exacerbation which worsened the weakness in both legs, she states. At this time her neighbor and some friends have been looking in on her regularly. Prior to the exacerbation she used a scooter around the house and was able to do limited walking (into the bathroom, e.g.). She now feels unable to walk safely and has been transferring only. She would like to restore her walking ability. She was given a home exercise program in the hospital but has not yet tried it at home. When questioned, EB states that her neurologist felt she may benefit from a less bulky scooter – she is not sold on the idea, however.

EB does daily injections of Copaxone, and also takes Baclofen. She has problems with her bowel and bladder, uses a stool softener, and does self-catheterization every 6 hours. She smokes about ½ pack per day, and does not use alcohol. EB works about 20 hours/week at her house editing book copy for a local publishing house.

***Tests and Measures:*** EB has a flat affect but appears to be cognitively intact, and to understand her disease well. She denies pain other than a constant pressure in her lower left abdomen. This is relieved somewhat by cathing, but never goes away completely. She reports her appetite has been poor for some time now – she attributes this to “indigestion/stomach ache more often than not”.

RHR is 80, RBP is 132/88. PROM in her UE’s is WNL, LE’s PSLR is to 45 degrees, ankles are to neutral, hips are –10 degrees of extension. Strength in the UE’s is 4-5/5. LE strength is symmetrical bilaterally: hip flexion 3/5, hip abduction and extension 2/5, knee extension 4/5, knee flexion 3/5, ankle DF/PF 2/5. Sensation is impaired to LT, PP and proprioception distal to the knees bilaterally. DTR’s are 3+ in both LE’s, and tone is 2-3 on the Ashworth scale in both LE’s. Skin is intact.

In her bed, EB rolls from side to side using primarily her UE’s. She is able to get to sitting by using a trapeze-like device over her bed. Sitting on the edge of the bed, EB is able to reach 4-6” in all directions. She transfers independently to her scooter from her bed and from the couch. In the bathroom this transfer is somewhat more precarious (though independent) due to the small confines of the room. EB is able to get to standing from her scooter with mod assist, and stand for about 15 seconds before tiring.

EB maneuvers her scooter easily about her home and outdoors on the sidewalk and driveway. She has a van with a lift and hand controls, although she has not driven since the exacerbation.

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*This case provides an opportunity to discuss the need to question the patient about non-neuromusculoskeletal signs, and to advise the patient to follow-up with her physician (urgent but not an emergency) while the PT proceeds with treatment. This patient was in fact exhibiting symptoms of ovarian cancer.*

# Case #6

***Background:*** This 80 year-old female sustained a mild head injury following an auto accident last week. She spent 2 days in the hospital and was d/c home with her husband.

***Setting:*** Home care

***Referral reads:*** “PT – home evaluation” from PCP (who was also her attending physician in the hospital)

***Interview:*** You meet with the patient (AT) and her husband. He provides most of the information in the interview. Though you direct questions to AT, she seems somewhat confused, and her husband jumps in to answer. AT was being transported to the grocery store by a church member when the car accident occurred – no one was injured but AT hit her head on the dash (was not wearing her seat belt). She did not receive PT in the hospital because of a computer error, so her doctor wanted her to be seen now. The couple lives in a small one-story house. Prior to the accident, AT had no difficulty getting around, performing ADL’s, or doing the cooking and housework. The husband has been doing light meal preparation now. The husband can articulate no real goals for physical therapy, he states: “We’ll be just fine now that she’s home”.

 According to her husband, AT had breast cancer in 1988, has poor circulation in both legs, and heart trouble. When you ask about medicines, AT’s husband shows you several prescription bottles on the kitchen table. These include Valium, Lanoxin, Lasix, Bactrim, Citracal, Celebrex, and Tylenol. You note that some of the prescriptions are out of date.

 Both AT and her husband are of slight stature. Their clothes are not clean, and their hygiene is inadequate. The house is cluttered and dusty, and the yard is unkempt. You surreptitiously note that there is very little food in the refrigerator.

***Tests and Measures:*** RHR is 68, RBP is 126/88. AT is oriented to person, place and month. She knows she was in a car accident but is unsure about whether she went to the hospital afterwards. AT has eccymoses (fading to yellow now) under both eyes. When questioned about pain, AT states she is “achy all over” but cannot be more specific than that. She displays a kyphotic posture and forward head. Shoulder PROM is limited to 160 deg of flexion and abduction, otherwise PROM is WNL. Strength in UE’s and LE’s is generally 4/5 except knee extension is 5/5, hip extension and abduction is 3-/5. Sensation was not tested secondary to AT’s inability to follow the test directions.

Sitting balance appears to be normal. Romberg test is negative. Functional Reach Test is 4”, 5”, 5” in 3 trials. AT is independent in bed mobility, sit to stand and ambulation. Gait pattern is unremarkable, other than a somewhat tentative quality.

Throughout the exam AT’s husband hovers. He makes occasional comments which suggest he is anxious for you to complete your exam and go.

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*Instructor facilitates a discussion about the need for treatment and referral for additional resources if this couple is willing. It provides an opportunity to apply knowledge about the Area Agency on Aging and other community resources, communication with the home care agency case worker and/or family (with permission), as well as referral for perhaps home care nursing for a medication review, and occupational therapy.*