**Title and Focus of Activity:** Traumatic Brain Injury Rehabilitation Part B: Physical Therapy Intervention using Standardized Patients *Intervention*

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**Course Information:** Neurological Rehabilitation II; 3 credits (including lab and lecture); Spring semester of the last academic year of the program. Students have completed Neuroanatomy, Neurophysiology, Motor Development, Fundamentals of Neurologic Examination, and Neurological Rehabilitation I prior to this course. The course is concurrent with Prosthetics/Orthotics.

**Learning Activity Description:** Context: In previous coursework students learn about neurotherapeutics, neuroplasticity, and the delivery of physical therapy interventions for patients with neurologic pathologies in lecture and lab sessions. In the lecture portion of this unit on Traumatic Brain Injury (TBI), the etiology, pathophysiology, mechanism of injury, medical management, and physical therapy management are presented. In the corresponding lab sessions the students practice examination techniques for patients with TBI.

Two lab sessions are included in this intervention-focused learning activity. Standardized patients (SPs) are used to simulate clinical cases. In the first session students select, deliver, and modify physical therapy interventions for standardized patients at various stages of recovery after TBI. In the second 2-hour lab session the students present their interventions to their peers. There are 3 clinical case scenarios.

At Ithaca College there are 90 students per cohort and these students are divided into 3 lab sections (30 students per section) with 3 lab instructors. Each lab instructor oversees 2 groups of 5 students who receive the same clinical case.

Prior to Lab 1: Students are assigned to groups and to one of the cases listed below (see Appendix A). Students are responsible for reading the textbook, reading their assigned case, and answering the critical thinking questions. These patient cases are each a description of the same patient at a different time, stage of recovery, and in a different treatment setting. (cases are written generically as male and are adjusted based on the SP playing the case.)

SP Training: Prior to the lab sessions, the instructors train at least 8 SPs. The SPs are students at Ithaca College in the Theatre Arts Program. Six of these students are trained to portray individuals with TBI at various stages of recovery, and 2 students are trained to portray a family member of the low functioning patient. Two 1-hour sessions are spent with the SPs prior to the intervention session. The faculty members provide a lecture to the SPs about brain injury, the typical clinical presentation of an individual after brain injury, and the typical stages of cognitive recovery after brain injury. Afterwards, each SP is provided their case and individually coached on the physical, cognitive, and affective presentation of the case. The instructors practice the interventions with the SP, so the SP has some knowledge of how the physical therapy interventions should be delivered. The SP is not provided a specific script but is given general information about their responses and is instructed to improvise as appropriate. Two of the actors are trained to be a parent of the patient in case 1. These actors are trained in the typical emotions a parent may feel in this situation and the questions/concerns a parent would typically have. A few days before the intervention lab, the SPs meet with the instructors again to review any questions and practice the portrayal of the case.

Lab 1: Intervention Delivery with the SP

* Preparation: During the first 30 minutes, each faculty member leads 2 small groups who are working on the same clinical case in discussion about the case. This includes discussion of the assigned critical thinking questions, confirming the plan for the intervention session, and having each group get the space and equipment ready for the session.
* Intervention with the SP: The SP arrives in character and the faculty member assists the patient into the most appropriate position to start the intervention. For case 1 the patient’s parent (another actor) is also present. The group of 5 students is then responsible for delivering physical therapy interventions to work on 2-3 different goals. The faculty member can provide guidance when beneficial, or call a “time out” during which the clinical scenario is paused. This can be helpful for the faculty member to ask questions to stimulate clinical reasoning, correct mistakes, provide feedback, or have the students practice a skill again. When students are monitoring physiologic responses during the intervention, the faculty member will provide the patient’s vitals. The students have 60 minutes to provide the interventions.
* Post Intervention Discussion: After the intervention is complete, the SP (and family member) comes out of character and provides feedback to the students about the experience. This feedback has been incredibly valuable for the students and usually includes information about how enjoyable the interventions were, the students’ handling skills and instruction during the intervention. After providing the feedback, the SP leaves and the during the remaining 25 minutes the faculty member leads discussion about the experience with the 2 groups assigned to the same case. Students are asked to reflect on the experience and their clinical decisions. Additional questions include: “Did the intervention plan go as you expected?”; “Why or why not?”; “How did you modify your intervention plan based on the patient response?”; “What would you do the same/differently if you were to repeat this intervention?”

Lab 2: Intervention Presentation

Two rooms are used for the intervention presentations, with half the class in each room. One group that was assigned each patient case is in each room. In each room there are 3 30-minute presentations, followed by 30 minutes of open discussion time. During each 30-minute presentation, the 5 students are responsible for presenting the physical therapy plan of care and selected interventions using a visual aid (usually PowerPoint). In addition, the group demonstrates these interventions with the SP, who is present for the presentation. This provides an opportunity for everyone in the class to experience all phases of recovery after brain injury. In addition, the presenting group is required to synthesize the information in a more organized manner through creating the presentation.

Time for student to complete the activity: 1. Preparation for intervention lab (outside of class time): 1-2 hours is estimated prior to the lab session. 2. Intervention lab: 2 hours 3. Preparation for presentation lab (outside of class time): 1-2 hours with group members to prepare the presentation. 4. Presentation lab: 2 hours (30 minutes presenting)

Readings/other preparatory materials: Fulk GD, Nirider CD. Traumatic Brain Injury. In O’Sullivan SB, Schmidt TJ, Fulk GD. Physical Rehabilitation*.* 6th ed. Philadephia, PA: F.A. Davis Company; 2014:873-888.

Learning Objectives: 1. Describe how the patient’s level of cognitive functioning will impact the physical therapy intervention delivery. 2. Design an intervention plan of care that addresses the patient’s impairments, functional limitations and participation restrictions. 3. Safely deliver 2-3 appropriate physical therapy interventions with the SP. Students will: a. justify the selection of the intervention strategy based on the patient presentation and best available evidence. b. modify the intervention based on the SP response. 4. Describe and demonstrate physical therapy interventions appropriate for the patient to the class using appropriate communication strategies (volume, rate of speech) to enhance the ability for the entire class to understand PT management at the patient's level of cognitive functioning. 5. Demonstrate professional behavior and effective communication strategies with the patient and family.

Methods of evaluation of student learning: Students are evaluated on professional behavior during the intervention session with the SP, and graded on their presentation to the class in the second lab session. The professional behavior grade is an individual grade.

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| **Professional Behavior** | Comments | Possible Points |
| * Demonstrates safe practice |  | \_\_\_/4 |
| * Demonstrates appropriate verbal and nonverbal communication   + Includes the patient’s perspective in the examination   + Provides education as appropriate that is consistent with the patient’s background, culture, and current level of cognition |  | \_\_\_/4 |
| * Develops a positive working relationship with their peers and the facilitator during the lab session |  | \_\_/2 |
| * Demonstrates professional behavior (timeliness, appropriate dress, accountability, preparedness, appropriate participation in discussion) |  | \_\_\_/2 |
| Individual Grade |  | \_\_\_/12 |

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| **Intervention Section (*based on intervention with SP; Group Grade)*** | | |
| Introduction: (no points are associated with this section)  Provide the class a summary of the patient presentation, level of cognitive functioning, evaluation, diagnosis, and prognosis. In your handout, list the 3 short term and 3 long term goals you developed for this patient based on the examination findings.  *\*Note: in this program the patient intervention follows the examination where students were already graded on this component. If it were to be performed as an independent activity, more time may be required to dedicate to the evaluation and setting up the plan of care.* | | |
| Describe all of the interventions that would be included in the physical therapy plan of care in the next 1-2 weeks for this patient. |  | \_\_\_/10 |
| Describe each of the 3 interventions you designed and demonstrate 5 minutes of each intervention for the class with your SP. For each intervention address the following questions:   * What features of neuroplasticity did you include consider when designing the intervention? * What modifications did you make to the intervention during the session? * How did the patient’s level of cognitive functioning impact the delivery of the intervention? |  | \_\_\_\_/30 |
| Describe 1-2 outcome measures that could be used to monitor response to the intervention and justify your selection. |  | \_\_\_\_/5 |
| What went well, and what would you change if you were going to see this patient again tomorrow? |  | \_\_\_/5 |
| Total Intervention Presentation Score | | \_\_\_/50 |

**Appendix A Simulated Patient Cases**

Cases:

*(In our program the students perform a full patient examination prior to this activity. If this intervention activity is performed alone the students would require more specific examination findings to design the physical therapy plan of care for the patient prior to this lab session.)*

Case 1:

You are a PT in an acute care hospital where you are working with a patient, named John. John is a 20 year old male who was involved in a high speed motorcycle accident 5 days ago that resulted in a severe traumatic brain injury. You performed his examination yesterday and will start your physical therapy plan of care today. When doing his chart review you read that his Glasgow Coma Scale score at the scene was 3 and he was intubated upon arrival of the emergency responders. His initial oxygen saturation upon admission to the hospital was 86%, his blood pressure was 90/40 and heart rate was 180. Neuroimaging revealed focal injury of the right frontal/parietal lobes. His orthopedic injuries include left rib fractures 7-11 and a right clavicle fracture. The patient is currently using oxygen through his tracheotomy site and had an NG tube was placed to meet his nutritional needs. He is non-weight bearing on the right upper extremity at this time due to the clavicle fracture and is not able to raise his arm above 90 degrees of flexion/abduction. John has a large skin abrasion on his right lower leg that was a result of the accident. You learned yesterday from John’s parents that he is a college student who was home on a school break when the accident occurred. He is currently living with his parents who live in a 2 story home with 3 steps to enter and 12 stairs to John’s bedroom and the full bathroom. You noted during your examination that John is starting to open his eyes for longer periods of time, and that he inconsistently demonstrates generalized responses (groaning and minimal movements of his extremities) to stimuli in his environment. John demonstrated minimal activation of his right hand and right leg yesterday in response to sensory stimulation. Yesterday he was dependent for all aspects of mobility, including a transfer to a tilt in space wheelchair. John’s parents have been very involved in his care and have been taking shifts at the hospital so one of them is always with him. Either John’s mother or father will be present for the intervention session today.

Case 2:

You are a PT working at an inpatient rehabilitation facility. Yesterday you evaluated a patient, John, who was admitted from the acute care hospital. John is a 20 year old who was involved in a high speed motorcycle accident 4 weeks ago resulting in a severe traumatic brain injury. His Glasgow Coma Scale score at the scene was 3 and he was intubated and ventilated immediately. He is now using a tracheostomy to maintain oxygen saturation on room air. Neuroimaging revealed focal injury of the right frontal/parietal lobes. His orthopedic injuries include left rib fractures 7-11 and a right clavicle fracture. John had a G-tube placed 5 days ago and now receives all nutrition through the G-tube. He is non-weight bearing on the right upper extremity at this time due to the clavicle fracture and is not able to raise his arm above 90 degrees of flexion/abduction. John has a large skin abrasion on his right lower leg that was a result of the accident. John is a college student who was home on a school break when the accident occurs, and that he is currently living with his parents. His parents live in a 2 story home with 3 steps to enter and 12 stairs to John’s bedroom and the full bathroom. Over the past 4 weeks John was receiving care in the intensive care unit and step down unit at the acute care hospital. John is now awake and alert for longer periods during the day. He is verbalizing and able to produce some intelligible speech. Nursing and therapy notes indicate that John demonstrates agitated and confused behavior. He is not oriented to self, place, or situation. During your examination yesterday he required moderate assistance for bed mobility and transfers and moderate-maximal amount of assistance for standing. He presents with impaired motor control of the left extremities, increased extensor tone of the left lower extremity and increased flexor tone in the left upper extremity. He was not able to safely ambulate during your session yesterday due to impairments with motor control, fatigue, and agitation.

Case 3:

You are working at an outpatient comprehensive rehabilitation center. Two days ago you evaluated a new patient, John, who is coming in for his first follow up session today. John is a 20 year old with traumatic brain injury related to a high speed motorcycle accident ~12 weeks ago. Prior to the accident John was attending college 4 hours away to pursue a major in business with a concentration in marketing. John was discharged from the rehabilitation center this week and is now living at home with his parents. John’s mother modified her work responsibilities to be home with him so she can provide him supervision, assistance, and transportation to appointments. They live in a 2 story home with the bedroom and full bathroom on the second floor. There is a half bath accessible on the first floor. In your chart review you read that his Glasgow Coma Scale score at the scene was 3. He required intubation, ventilation at first then had a tracheotomy placed. Neuroimaging revealed focal injury of the right frontal/parietal lobes. His orthopedic injuries include left rib fractures 7-11 and a right clavicle fracture. The physician cleared him for weight bearing as tolerated on his right upper extremity and does not have any ROM restrictions. John received care at the acute care hospital for 4 weeks, then inpatient rehabilitation for a total of 6 weeks. During your examination yesterday he was oriented to self, place, and intermittently oriented to situation. John required cues and supervision for safety during all tasks, and did not recognize his current limitations and the implications of these implications on his ability to be independent. Your primary findings of the examination included impaired isolated left extremity movements out of synergy pattern, increased left lower extremity extensor tone, decreased strength of his trunk and left extremities, especially in the distal left lower extremity. He requires minimal assistance for dynamic sitting, minimal assistance for sit to stand transitions and moderate cueing during all tasks for safety. John is able to ambulate 150 feet with minimal assistance and moderate cues using a custom, jointed left ankle foot orthosis. John scored 30/56 on the Berg Balance Scale earlier this week. He will also be working with the speech language pathologist, occupational therapist, social worker, and neuropsychologist at your facility.

Answer the questions below prior to the intervention lab to help guide your intervention selection:

1. Rancho Level: Based on the information provided in the case, what level is this patient on the Rancho Los Amigos Levels of Cognitive Functioning? What will you look for to know that the patient is starting to progress to the next level?
2. How will you structure your interaction given the level of cognitive functioning that you determined?
3. What are considerations based on the practice setting? (i.e. time allotted for PT intervention, team members present, equipment available….)
4. As a group, plan 2-3 interventions appropriate for this patient. Ideally these will work on different functional goals. For each intervention consider the following questions:
   1. What features of neuroplasticity did you consider when designing this intervention?
   2. How will you set up the environment to maximize the patient’s success?
   3. How will you sequence the interventions within the session to maximize patient outcomes?
   4. How will you know the intervention is appropriately challenging? What signs will you look for to know it is too easy or too difficult? What physiologic signs will you monitor to ensure patient safety and response to exercise?
   5. How will you modify the intervention to make it more or less challenging as appropriate for the patient?