**Title and Focus of Activity:** Movement Analysis Lab *Movement/task analysis*

**Contributor(s):** Jill Heitzman, PT, DPT, GCS, NCS, CWS, CEEAA, FACCWS; jheitzpt@aol.com Alabama State University, PT Program

**Course Information**: Introduction to Neurological PT; 3 credits; 4th semester, beginning of 2nd year. Previous courses include neuroanatomy, functional anatomy, neurophysiology, pathology, patient care concepts, biomechanics.

**Learning Activity Description:**  Purpose: The purpose of the activity is to allow students to observe the variations of movement and discuss the relationship between body types and movement.

Students observe 3 people the instructor has asked to be models for the class. These are selected from the staff, faculty and students who have already taken this class and are of various sizes, gender and ages. The models are asked to individually perform various movement transitions. All models perform the same task prior to moving to the next task. Tasks could include rolling to prone, reaching from prone on elbows, rolling from prone to supine, transitioning from supine to sit, reaching in sit, scooting forward in a chair, sit to stand, reaching in stand, or squatting from stand. Students are instructed to analyze how the models prepare for the task (base of support, alignment), initiate, sequence, and end the task. The model demonstration takes 1-2 hours, depending on the number of tasks demonstrated. The instructors are available to assist in observational skills and guide as needed. The students are given a matrix to record their individual observations during the class period (see Appendix A for the task of sit to stand).The students will meet in small groups and write a summary report after class.

The purpose of the group paper is to compare the variations noted among models completing the same movement transition. Group members discuss possible rationale for the differences and similarities for each observed task. They must include potential reasons for differences (possible contributing factors), how such factors may affect overall function and might influence future testing. The paper must contain references from class readings to support the reasons for the movement variations.

Time for student to complete the activity: 1. preparation for activity before class: reading chapters and handouts assigned, about 3 hours 2. class time completion of the activity: 3 hours 3. post-class time to complete the paper: 2 hours

Readings/other preparatory materials:

Shumway-Cook A & Woollacott, M. Motor Control: Translating Research into Clinical Practice, 4th ed. Lippincott, Willliams & Willliams, 2012. Ch. 2, 3

O’ Sullivan, Susan B., Physical Rehabilitation: Assessment and Treatment, 6th ed. F.A Davis, 2014 Ch. 5, 10

Functional Outcomes Handouts Notebook, Handouts provided online by instructor

Learning Objectives: 1. analyze movement and posture to determine movement variations 2. contrast the differences in moving among various sizes, shapes, physical abilities. 3. analyze potential causes of variations of movements and postures 4. correlate material learned in functional anatomy and biomechanics to specific functional movements.

Methods of evaluation of student learning: Each task is given 3 points for discussion of similarities/differences in the task analysis among the normal subjects. Students are given one point for discussion of impact on function, one point for implications for future testing, 5 points for inclusion of references from assigned readings, and 5 points for technical writing/grammar.

**Appendix A MOVEMENT/ TASK ANALYSIS**

**Analysis and comparison of tasks and movements of healthy individuals**

Analyze commonly performed functional tasks according to the movement analysis model. Use the attached chart to document your observations and thought as you go through the various movements and functional tasks with your lab partners.

1. What is the initial base of support?
2. What is the starting position/alignment?
3. Describe the movement initiation.
	1. Where is the movement initiated?
	2. What is the direction of the weight shift?
	3. What is the speed and direction of body movements?
4. Describe the overall sequence of movements used to execute the functional task or movement
	1. What occurs at the head?
	2. What occurs at the trunk?
	3. What occurs in the upper extremities?
	4. What occurs in the lower extremities?
	5. What muscle activity is needed to terminate the movement?
5. What musculoskeletal components (ROM, muscle length, strength) are needed to be able to perform the functional task?
6. What elements of motor control are necessary to perform the various components of the task?
	1. Where in the body does stability occur?
	2. Where (and when) in the body does mobility occur?
	3. Is controlled mobility necessary to do the task?
7. What is the ending base of support?
8. What is the ending alignment?
9. If we change any environmental or other characteristics (height of chair, base of support, etc…) how does performance of the movement task change?

**Task: sit to stand**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Model 1**  | **Model 2** | **Model 3** |
| **Starting Base of Support** |  |  |  |
| **Starting alignment** |  |  |  |
| **Movement Initiation** |  |  |  |
| **Movement Sequence** |  |  |  |
| **Musculoskeletal Components**  |  |  |  |
| **Stability/ mobility** |  |  |  |
| **Ending Base of Support** |  |  |  |
| **Ending Alignment** |  |  |  |
| **Personal and/or Environmental Factors** |  |  |  |

*Activity adapted from Kathleen M. Gill-Body PT MS NCS and Beth Fisher PhD PT NCS*