Implications of Clinical Reasoning on Implementation of the Human Movement System: A Comparison of Student and Licensed Clinicians

Margaret Thon, PT, DPT, Jeffrey Thompson, PT, DPT, Melissa Peterson, PT, PhD, GCS, Brenda Pratt, PT, DSc, & Jamie Way, PT, DPT

BACKGROUND

It has been acknowledged that medical diagnoses are not sufficient in the directing of physical therapy intervention; however, few diagnostic systems have been proposed. The Human Movement System (HMS) bases diagnosis on the results of diagnostic tests performed during a standardized clinical examination, focusing on deficits in motor control, muscle tone and strength, coordination, sensation, postural control, motion sensitivity, mental status, and range of motion.[1] Exam findings are used to determine a classification, including Force Production Deficit, Movement Pattern Coordination Deficit, Fractionated Movement Deficit, Sensory Selection and Weighting Deficit, Sensory Detection Deficit, Hypokinesia, Dysmetria, and Posture Vertical Deficit. Research shows high interrater reliability amongst novice clinicians using the HMS approach to classify low back pain;[2] however, there is little available research regarding the use of this approach for a patient population with primarily neurological conditions.

PURPOSE

The purpose of this study was to compare the clinical decision making skills of Doctor of Physical Therapy students to a licensed therapist while using the Human Movement System evaluation in a neurologically involved patient population. Specifically, we aimed to compare the overall HMS classification and the rationale behind why the classification was chosen, as well as to collect feedback on the use of the HMS evaluation.

PARTICIPANTS

- 46 second and third year Doctor of Physical Therapy students
- 1 licensed Physical Therapist
- 12 neurologically involved patients from Bradley University's Clinic for Fitness and Function
  - Medical diagnoses include: stroke, spinal cord injury, Multiple Sclerosis, Parkinson's Disease, brain aneurysm, cervical fusion, and brain cancer

METHODS

- A Movement System evaluation form with 8 diagnoses (see Figure 1) was developed based on the work of Scheets et al.[3]
- Students conducted evaluations using the Movement System evaluation form.
  - Each patient was evaluated by two second year students and two third year students.
  - All students used the same form and individually completed a real time assessment.
  - By the conclusion of the evaluation, each student determined the most appropriate Movement System diagnosis.
  - Interviews regarding their decision-making process occurred close to patient discharge.
- The clinician used the same form and determined the most appropriate diagnosis based on videos of the students conducting the exam and objective data collected by the students.
  - The clinician provided a rationale for her diagnoses.
- The researchers compared the HMS classifications and rationale supporting each student's and the clinician's decision.

RESULTS

For the twelve clinic patients, frequencies for HMS classifications were calculated for the students and the clinician. Collectively, students chose Force Production Deficit as the predominant classification for most patients (61%), while the clinician chose it for only 46% of patients. The clinician chose Movement Pattern Coordination Deficit for 36% of patients, whereas the students chose it for only 17% of patients. The clinician identified Postural Vertical Deficit for 9% of patients, but this classification was never chosen by the group of students.(Figure 1).

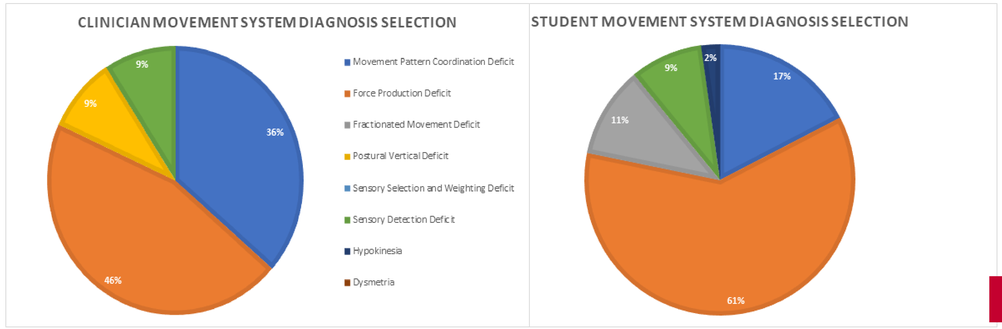

Figure 1: Percentage each diagnosis was selected. Note: some diagnoses in legend were not selected.

During individual interviews, all participants were asked to provide rationale regarding both the process of making the classification and the examination findings used to make it. While the clinician reported using a comprehensive approach, only 21.7% of students described taking this approach. Most students (60.9%) reported focusing on one primary impairment, especially strength deficits. Nearly 20% of students described the process as relying on the evaluation form to make the classification, choosing the diagnosis based on number of times it was checked on the form (Figure 2).

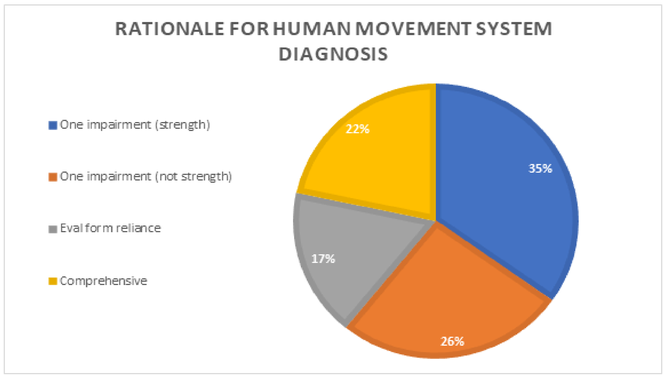

Figure 2: Clinical reasoning trends supporting the Human Movement System diagnosis selection based on student interviews.

RESULTS CONTINUED

Responses from the student and clinician interviews were transcribed and reviewed. The example below illustrates the differences in clinical reasoning between the experienced clinician and novice student therapist:

- **Clinician**: *"I chose Movement Pattern Coordination Deficit due to deficits in timing and sequencing of one segment in relationship to another. During postural control tasks, she had difficulty coordinating taking a step to regain balance when her center of mass was outside of her base of support. [The patient] had difficulty manipulating and grasping objects, and difficulty manipulating objects while reaching. When she performed the sit to stand task she actually crossed her feet, there was insufficient dorsiflexion. During gait, she demonstrated variable foot placement with slow, small steps."*
- **Student**: *"I chose Force Production Deficit because it seemed to fit her best and that was the most counted on the eval form."*

CONCLUSIONS

- The clinician provided more comprehensive clinical reasoning both ruling in and ruling out potential movement deficits.
- The student therapists tended to choose the more obvious Force Production Deficit diagnosis due to weakness being the most apparent impairment, regardless of whether the lack of force production was attributed to a different movement deficit.
- Most students tended to make their diagnosis based on one impairment, typically strength. Some relied heavily upon the evaluation form by counting up all of their observations for each deficit, guiding them to the diagnosis. While not at the same level of expertise as the clinician, other students did demonstrate higher-level clinical decision-making through a comprehensive synthesis of the evaluation.
- Since the interviews were held close to patient discharge, some students reported in hindsight their diagnosis was not the most appropriate, and attributed this to their lack of ability to see beyond the most obvious impairments. These students based the diagnosis on the surface-level observations instead of trying to understand the root cause of the impairment.
- Because diagnosis-specific treatment is crucial for optimal outcomes, processes to facilitate the development of these clinical reasoning skills should be studied.

REFERENCES

1. Scheets PL, Sahrmann S, Norton BJ. Use of movement system diagnoses in the management of patients with neuromuscular conditions: A multiple-patient case report. *Physical Therapy.* 2007;87(6):1-16.
2. Henry S, Van Dillen L, Trombley A, Dee J, Bunn J. Reliability of novice raters in using the movement system impairment approach to classify people with low back pain. *Manual Therapy*. 2013;18(1):35-40. doi:10.1016/j.math.2012.06.008.
3. Scheets PL, Crowner BE, Norton BJ, Sahrmann SA, Stith JS. Movement system diagnoses neuromuscular conditions: Examination. 2014;1-31.