The Educational Impact of a Required, Combined Neurology-Physical Medicine and Rehabilitation Clerkship for Fourth-Year Medical Students

5TH ANNUAL BRODY MEDICAL EDUCATION DAY

APRIL 10TH, 2019

Collaborative Team Members

- Caitrin Curtis, MS3
- James Eubanks, M.D.
- Stephen Charles, Ph.D.
- Philip Boyer, M.D., Ph.D.
- Kelly Harrell, Ph.D., MPT
- Manjunath Markandaya, M.D.
- Luan Lawson, M.D.
- John Norbury, M.D.

Meeting the Needs of The Brody School of Medicine

- Relative weakness in exposure to clinical neuroscience
  - Reported by medical students and Brody graduates' residency directors
  - Performance on standardized tests
- Emphasis on working in interdisciplinary healthcare teams
- Lifestyle medicine education

Rationale

- Neurological and MSK complaints represent 6% and 20% of total requests for medical care in primary care settings, respectively.[1, 2]

[1] Casabella B, & Aguilar M (1990). Neurological disorders: A primary care approach. *Atencion Primaria, 7*(8), 538-544.

[2] Craton N, & Matheson GO (1993). Training and clinical competency in musculoskeletal medicine. Identifying the problem. *Sports Medicine (Auckland, N.Z.), 15*(5), 328-337.

NOT a Brody-specific issue

- A study demonstrated a lack of confidence among medical students regarding patients with neurologic complaints to a point where the term **"Neurophobia"** has been coined.[3]

- A study at Harvard Medical School found that students lacked "clinical confidence" and "cognitive mastery" in MSK medicine.[4]

[3] Zinchuk AV, Flanagan EP, Tubridy NJ, Miller WA, McCullough LD (2010). Attitudes of US medical trainees towards neurology education: "Neurophobia" - a global issue. *BMC Medical Education, 10*(49)

[4] Day CS, Yeh AC, Franko O, Ramirez M, Krupat E (2007). Musculoskeletal medicine: An assessment of the attitudes and knowledge of medical students at harvard medical school. *Academic Medicine : Journal of the Association of American Medical Colleges, 82*(5), 452-457.

How is this deficit being addressed?

Neurology was part of a combined clerkship in approximately 26% of schools, most frequently with pediatric neurology, psychiatry, or neurosurgery. [5]

A previous study has shown that a 2-week required PM&R clerkship increased knowledge of the specialty and enhanced clinical skills in fourth year medical students.[7]

- In the same clerkship, a revised curriculum that included a shift from rehabilitation specific topics towards more general content in clinical neurology and MSK care resulted in greater student satisfaction with the clerkship and an improvement in clinical skills.[8]

No prior studies documenting a required, combined Neurology-PM&R clerkship were identified in our literature search.

[5] Safdieh JE, Quick DA, Korb PJ, Torres-Russotto D, Gable KL, Rock M, Cahill C, Soni M (2018) A dozen years of evolution of neurology clerkships in the United States. *Neurology*. *91*(15), e1440-e1447.
[7] Faulk, C. E., Mali, J., Mendoza, P. M., Musick, D., & Sembrano, R. (2012). Impact of a required fourth-year medical student rotation in physical medicine and rehabilitation. *American Journal of Physical Medicine & Rehabilitation, 91*(5)
[8] Norbury, J. W., Faulk, C. E., Harrell, K. M., Lawson, L. E., & Moore, D. P. (2016). Impact of a revised curriculum focusing on clinical neurology and musculoskeletal care on a required fourth-year medical student physical medicine and rehabilitation clerkship. Rehabilitation Research and Practice, *2016*.

Background

- Mismatch between the need for neurology and MSK education and what was required by Brody School of Medicine and other US medical schools
- To address this deficit, a required PM&R fourth year clerkship was expanded to become a 4-week advanced core clerkship in Neurology-Physical Medicine and Rehabilitation (PM&R)

Study Design

- Institutional review board approval was sought and granted (#UMCIRB18-000273).
- Neurology components were developed and integrated with existing PM&R clerkship:
  - Clinic activities
  - Inpatient activities: wards and ICU
- Examinations (clinical and written) developed for administration at end of clerkship.
- Combined clerkship was made mandatory for 2018-2019 academic year.
- 52 fourth-year medical students in a new, four-week Neurology-PM&R clerkship volunteered to participate in the study.
- A survey assessing knowledge and skill-set topics was conducted before and after the clerkship.

The Combined Clerkship

- Didactic presentations:
  - Neurologic and MSK disorders
  - Lifestyle medicine
  - Pain management
  - Conflict resolution within interdisciplinary healthcare teams
- Laboratory-based gross neuropathology and neuroanatomy sessions
- Instruction in neurologic and MSK physical examinations
- Inpatient and outpatient services
- Final OSCE and Clinical exam

Didactic	Science	Discipline	Learning Style
Review of MSK and PNS Anatomy	Basic	PM&R	Kinesthetic/Visual
Review of CNS Anatomy	Basic	Neurology	Kinesthetic/Visual
PNS Localization and Pathology	Basic	PM&R / Neuropathology	Visual
CNS Localization and Pathology	Basic	Neurology / Neuropathology	Visual
Neurology Physical Exam Workshop	Clinical	Neurology	Kinesthetic
MSK Physical Examination Workshop	Clinical	PM&R	Kinesthetic
ECU Neurology lectures	Clinical	Neurology	Visual / Auditory
MSK Case Studies	Clinical	PM&R	Auditory
Neurology Case Studies	Clinical	Neurology	Auditory
Approach to LMN Disorders	Clinical	PM&R / Neurology	Visual / Auditory
Lifestyle Medicine	Clinical	PM&R	Visual / Auditory
Pain/Bowel/Bladder Lecture	Clinical	PM&R	Visual / Auditory
Interpersonal Conflict Resolution / Team Steps	Health Systems	PM&R	Visual / Auditory / Kinesthetic

Results

Significant gaps in knowledge were identified prior to the clerkship and successfully addressed by combined teaching modalities.

A statistically significant ($p<0.05$) difference was found between the pre-clerkship and post-clerkship surveys.

Table 1. Survey of self-perceived confidence of clinical ability taken at the beginning and end of the clerkship. Percentage of students who reported a moderate to high level of confidence. A statistically significant difference was found for all ($p<0.05$).	Pre-Clerkship N=52	Post-Clerkship N=39
Perform a neurologic physical exam	44%	92% *
Perform a MSK physical exam	33%	87% *
Localize central nervous system lesions	15%	85% *
Localize peripheral nervous system lesions	8%	85% *
Apply gross anatomy knowledge to clinical practice	17%	82% *
Apply principles of neuropathology to clinical practice	10%	82% *
Prioritize a DDX for a neurologic complaint	29%	82% *
Prioritize a DDX for a MSK complaint	29%	87% *
Educate patients on the benefits of behavior change	37%	87% *
Utilize motivational interviewing techniques	41%	69% *
Recommend alternatives to opioids to treat chronic pain	25%	77% *
Recommend & interpret MSK diagnostic tests	4%	67% *
Recommend & interpret neurologic diagnostic tests	12%	72% *
Apply evidence-based strategies to resolve a conflict	31%	85% *
*DDX = Differential Diagnosis		* = $p<0.05$

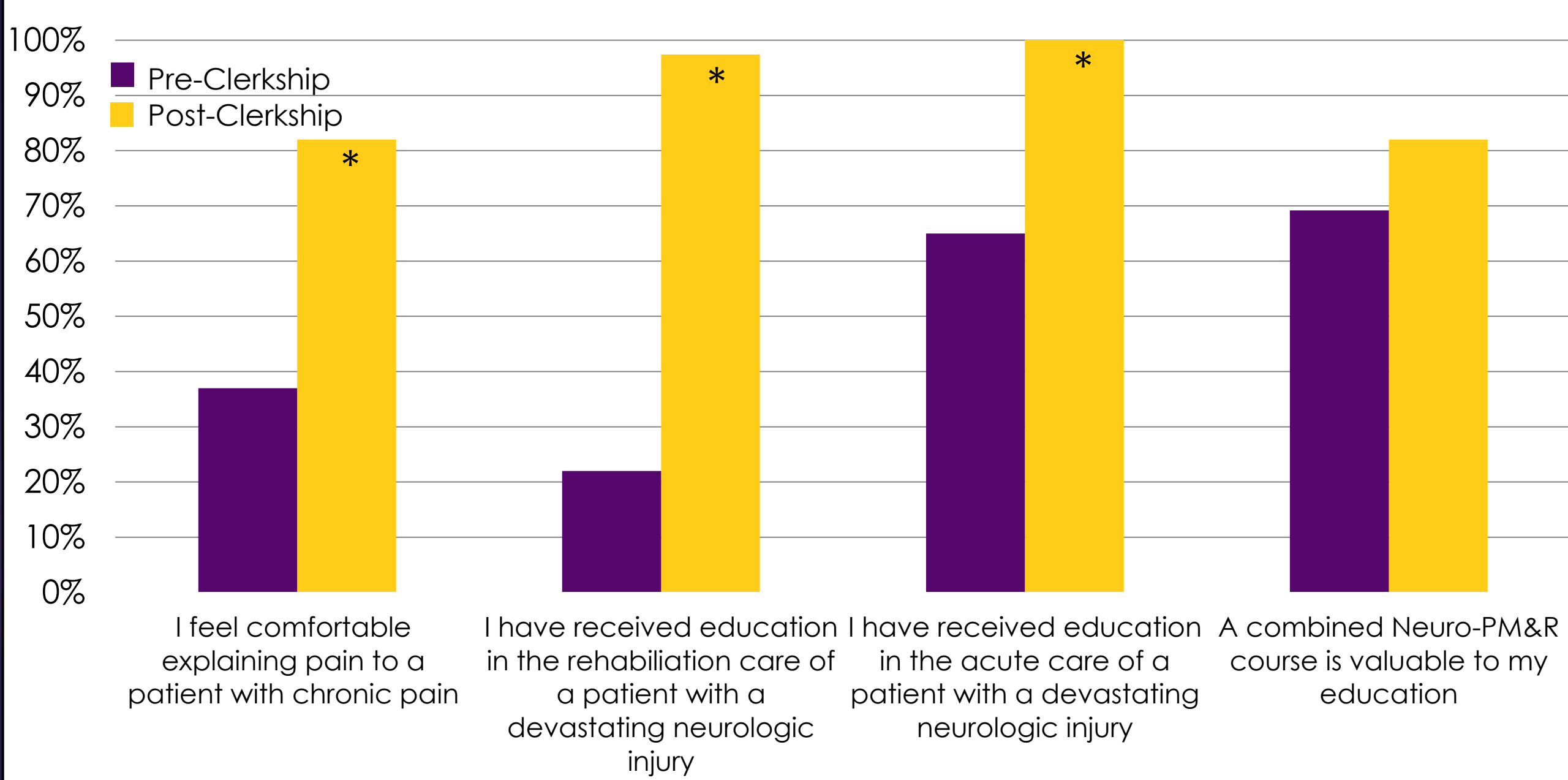

Figure 1. Survey of students at the beginning and end of the clerkship: Percentage of students who agreed or strongly agreed to the following statements. Pre-clerkship, N=52, post-clerkship, N=39. * = significant (p<0.05)

Conclusions

This data demonstrate that an integrated Neurology-PM&R clerkship can improve students' self-perceived confidence in multiple domains.

The combined clerkship encourages an **interdisciplinary approach** to the management of common complaints, such as low back pain, which have both MSK and neurologic dimensions.

The clerkship **addressed curriculum gaps** in pain management, health systems science, lifestyle medicine, and management of common neurological and MSK diseases.

Next Step

- Analysis of student feedback of the clerkship via e-value surveys

Acknowledgements

DR. ROBERT FRERE AND DR. DONALD PRICE FOR EXCELLENCE IN NEUROLOGY TEACHING

References

- [1] Casabella B, & Aguilar M (1990). Neurological disorders: A primary care approach. *Atencion Primaria, 7*(8), 538-544.
- [2] Craton N, & Matheson GO (1993). Training and clinical competency in musculoskeletal medicine. Identifying the problem. *Sports Medicine (Auckland, N.Z.), 15*(5), 328-337.
- [3] Zinchuk AV, Flanagan EP, Tubridy NJ, Miller WA, McCullough LD (2010). Attitudes of US medical trainees towards neurology education: "Neurophobia" - a global issue. *BMC Medical Education, 10*(49)
- [4] Day CS, Yeh AC, Franko O, Ramirez M, Krupat E (2007). Musculoskeletal medicine: An assessment of the attitudes and knowledge of medical students at harvard medical school. *Academic Medicine : Journal of the Association of American Medical Colleges, 82*(5), 452-457.
- [5] Safdieh JE, Quick DA, Korb PJ, Torres-Russotto D, Gable KL, Rock M, Cahill C, Soni M (2018) A dozen years of evolution of neurology clerkships in the United States. *Neurology*. *91*(15), e1440-e1447.
- [6] DiGiovanni BF, Sundem LT, Southgate RD, Lambert DR (2016). Musculoskeletal medicine is underrepresented in the american medical school clinical curriculum. *Clinical Orthopaedics and Related Research, 474*(4), 901-907.
- [7] Faulk, C. E., Mali, J., Mendoza, P. M., Musick, D., & Sembrano, R. (2012). Impact of a required fourth-year medical student rotation in physical medicine and rehabilitation. *American Journal of Physical Medicine & Rehabilitation, 91*(5)
- [8] Norbury, J. W., Faulk, C. E., Harrell, K. M., Lawson, L. E., & Moore, D. P. (2016). Impact of a revised curriculum focusing on clinical neurology and musculoskeletal care on a required fourth-year medical student physical medicine and rehabilitation clerkship. Rehabilitation Research and Practice, *2016*.
- [9] Altschuler EL, Cruz E, Salim SZ, Jani JV, STitik TP, Foye PM, Delisa JA (2014) Efficacy of a Checklist as Part of a Physical Medicine and Rehabilitation Clerkship to Teach Medical Students Musculoskeletal Physical Examination Skills. *American Journal of Physical Medicine & Rehabilitation, 93*(1)82-89.

Contact Information

Caitrin Curtis

Brody School of Medicine Class of 2021

Medical Education and Teaching Distinction Scholar

curtisc17@students.ecu.edu

(252)619-2463