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

5TH ANNUAL BRODY MEDICAL EDUCATION DAY
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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
Neurological and MSK complaints represent 6% and 20% of total requests for medical care in primary care settings, respectively.\textsuperscript{1, 2}


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


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.

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

<table>
<thead>
<tr>
<th>Task</th>
<th>Pre-Clerkship</th>
<th>Post-Clerkship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform a neurologic physical exam</td>
<td>44%</td>
<td>92% *</td>
</tr>
<tr>
<td>Perform a MSK physical exam</td>
<td>33%</td>
<td>87% *</td>
</tr>
<tr>
<td>Localize central nervous system lesions</td>
<td>15%</td>
<td>85% *</td>
</tr>
<tr>
<td>Localize peripheral nervous system lesions</td>
<td>8%</td>
<td>85% *</td>
</tr>
<tr>
<td>Apply gross anatomy knowledge to clinical practice</td>
<td>17%</td>
<td>82% *</td>
</tr>
<tr>
<td>Apply principles of neuropathology to clinical practice</td>
<td>10%</td>
<td>82% *</td>
</tr>
<tr>
<td>Prioritize a DDX for a neurologic complaint</td>
<td>29%</td>
<td>82% *</td>
</tr>
<tr>
<td>Prioritize a DDX for a MSK complaint</td>
<td>29%</td>
<td>87% *</td>
</tr>
<tr>
<td>Educate patients on the benefits of behavior change</td>
<td>37%</td>
<td>87% *</td>
</tr>
<tr>
<td>Utilize motivational interviewing techniques</td>
<td>41%</td>
<td>69% *</td>
</tr>
<tr>
<td>Recommend alternatives to opioids to treat chronic pain</td>
<td>25%</td>
<td>77% *</td>
</tr>
<tr>
<td>Recommend &amp; interpret MSK diagnostic tests</td>
<td>4%</td>
<td>67% *</td>
</tr>
<tr>
<td>Recommend &amp; interpret neurologic diagnostic tests</td>
<td>12%</td>
<td>72% *</td>
</tr>
<tr>
<td>Apply evidence-based strategies to resolve a conflict</td>
<td>31%</td>
<td>85% *</td>
</tr>
</tbody>
</table>

*DDX = Differential Diagnosis

* = p<0.05
A combined Neuro-PM&R course is valuable to my education.

I have received education in the acute care of a patient with a devastating neurologic injury.

I have received education in the rehabilitation care of a patient with a devastating neurologic injury.

I feel comfortable explaining pain to a patient with chronic pain.

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

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