

# The Development and Use of Clinically Relevant Learning Activities in a Human Neuroanatomy Course

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## BACKGROUND

Courses in human neuroanatomy typically consist of lectures by the faculty, readings in assigned textbooks and sometimes dissection exercises with cadavers. However, as student's progress into the more clinically oriented phases of the curriculum, many discover that the anatomical knowledge they need is somewhat different from the kind they possess. We developed a series of applied neuroanatomy learning activities structured around the general neurological examination to help students appreciate the importance of neuroanatomy in the evaluation and management of patients.

## METHODS

We developed seven (7) "applied neuroanatomy" laboratory sessions with content appropriate to each of five (5) common components of the neurological examination. The exercises involve inspection, palpation and other maneuvers commonly included in the general physical examination.

Students are divided into small groups and instructed to perform each exercise on all other members of the group. Faculty circulate among the groups to guide students in the performance of tasks and to answer questions as they arise. Short written questions accompany many of the exercises that highlight central and peripheral neuroanatomic structures and relationships. Students were surveyed at the end of each unit regarding their perception of the value of these exercises.

Because these activities are intended for use in a basic medical neuroscience course, emphasis is placed on principles of neural structure, organization and function. The activities are intended to support rather than replace content typically included in courses focused on the physical examination.

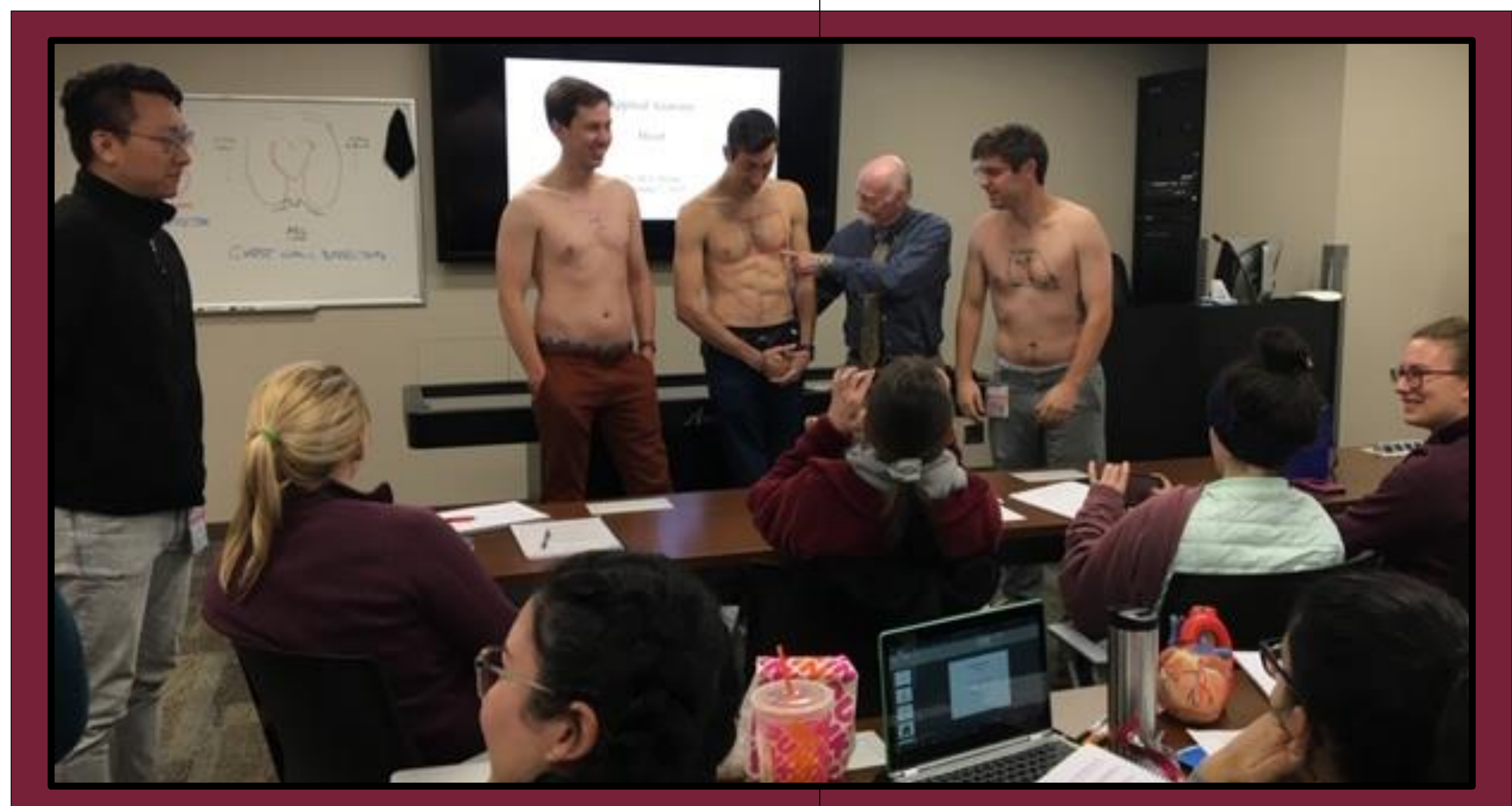
## RESULTS

Students generally liked the active learning format of these sessions, particularly their close relationship to the clinical skills they were learning concurrently in other courses. Students appreciated the fill in the blank questions which they viewed as "practice questions" for the upcoming final exams. Some students felt somewhat uncomfortable serving as subjects for their peers. This hesitancy gradually diminished as the year progressed.

neurologic examination, students are engaged in a learning activity that is closely aligned with knowledge and skills students will need during their clinical rotations.

## CONCLUSION

Students acknowledged the value of these active learning activities early in the curriculum as directly related to essential knowledge and skill sets that will be necessary in the clerkship and elective years.



## DISCUSSION

The student-centered, small group exercises described here are designed to complement and reinforce neuroscience concepts and principles taught in a more traditionally structured course. The "group activity" approach, in which the student performs each exercise on a small number of "normal" subjects (classmates), is founded on the belief that the ability to recognize an abnormal finding on clinical examination requires a familiarity with the range of normal findings in the otherwise healthy population.

Based on procedures and tests actually used in the

Learning is most engaging and effective when it is closely linked to situations in which it will be used. We developed a series of applied neuroscience exercises that involve typical tests and maneuvers associated with the neurologic examination, but emphasize neuroanatomic and neurophysiologic principles rather than clinical skills. These applied learning activities serve to bridge the gap between basic science content and its use in a clinical examination.

This study (IRB #19-1032) was reviewed and approved by the Institutional Review Board of the Virginia Polytechnic Institute & State University (Virginia Tech) on November 12, 2019.