Examining the Efficacy of a Cumulative Study Document that Encompasses Necessary Resources

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Introduction

- The need for a study resource during this unit was recognized by both faculty and previous students, who noted that the Brainstem unit was the one in which student performance was weakest.
- The field of neuroanatomy has long been considered one of the more difficult subjects for medical students to master.
- The purpose of this study was to determine if providing a comprehensive study source, which incorporates images, lecture notes, clinical scenarios, and textbook information, to students in the Neuroscience course at the Brody School of Medicine will improve their performance on assessments in the course.
- The study also attempted to determine if having the comprehensive source contributed to a difference in perceived preparedness by the students

Methods

- Observational study was done to assess which students used the available study documents and how it affected performance/preparedness.
- First year medical students from the classes of 2023 and 2024
- Cumulative study document example shown
- Main outcome being measured is student performance and preparedness on exam, comparing students who used the documents and those that did not.

Figures 7 and 8 – Mid Pons. At this level, most of the anterior pons is made up of **pontocerebellar** fibers and corticospinal fibers. The pontocerebellar fibers will compose the **middle cerebellar peduncles**, which border the lateral aspects of the pons. The corticospinal fibers will continue into the medulla and the spinal cord. The spinal trigeminal nucleus and tract are still present at this level in the pons and will continue ascending until the trigeminal nerve exits from the pons. The **rubrospinal** tract, which descends from the red nucleus (from the midbrain) into the spinal cord is also still present at this level of the brainstem. The central tegmental tract is still present at this level of the brainstem as well (remember this tract is composed of rubroolivary fibers as well as other tracts). The CTT will terminate at the inferior olivary nucleus in the medulla. The **Abducens and Facial nuclei** make an appearance at this level of the pons. Because of the addition of the abducens nucleus, the MLF superior to this point will carry signals from the Abducens nerve to the Oculomotor nerve to cooperate in conjugate horizontal gaze. The **superior olivary nucleus (SON)** and trapezoid body become visible at this level of the brainstem as well. Both of these structures are associated with auditory function. You will learn more about auditory function and how the SON and trapezoid body work together to make audition possible in a different exam block.

What nucleus lies underneath the facial colliculus of the brainstem's external surface?

The abducens nucleus.

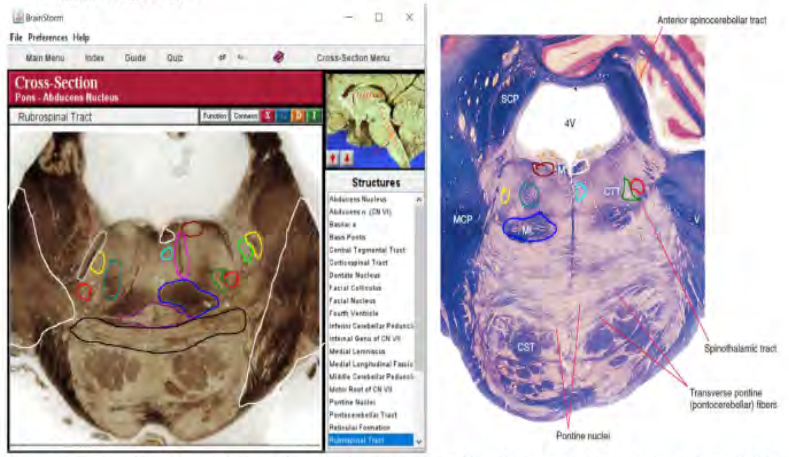


Figure 7 and 8 – The mid pons contains descending fibers as well as ascending fibers. Many of the tracts seen here were also seen in more inferior sections of the brainstem (medulla) and will continue to be seen in more superior sections (towards the midbrain). The medial lemniscus (blue) is still carrying sensory information from the contralateral side of the body. The spinal trigeminal nucleus (light green) and tract (yellow) are carrying pain and temperature from the face. These fibers will terminate at the main sensory nucleus of the trigeminal nerve at a more superior location. The central tegmental tract (teal) can also still be seen at this level as it descends from the midbrain into the ION in the medulla. The rubrospinal tract (red) is still present and will be seen at more superior levels as well since it originates from the red nucleus in the midbrain. The tectospinal tract (light blue) and MLF (white) are also still seen in this area of the brainstem. The MLF at this point is also carrying fibers from the Abducens nucleus (burgundy) to interact with the Oculomotor nucleus at a more superior level in the midbrain so that conjugate gaze is possible. The Abducens nerve is outlined in pink. The Facial nucleus (yellow) and nerve (silver) are also found at this portion of the brainstem. The white on the lateral aspects represents the middle cerebellar peduncle, which is ONLY composed of pontocerebellar fibers (black). The superior olivary nucleus (green) sends and receives signals from the trapezoid body (purple) to function in audition.

Results

Figure 1: The majority of students who used the study document felt prepared for the exam

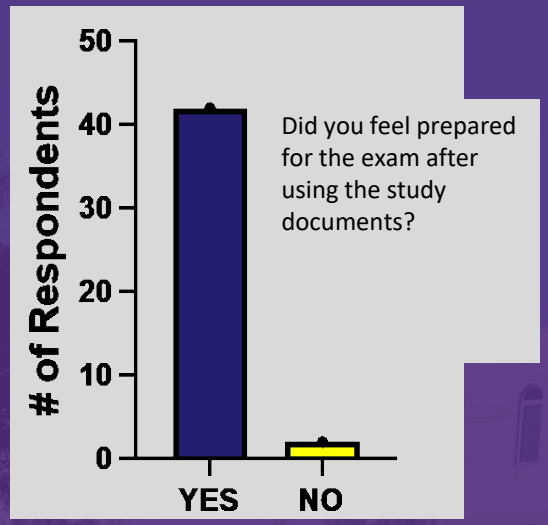


Figure 2: Average exam scores were similar for students who used the study document vs. those that did not (p=0.21)

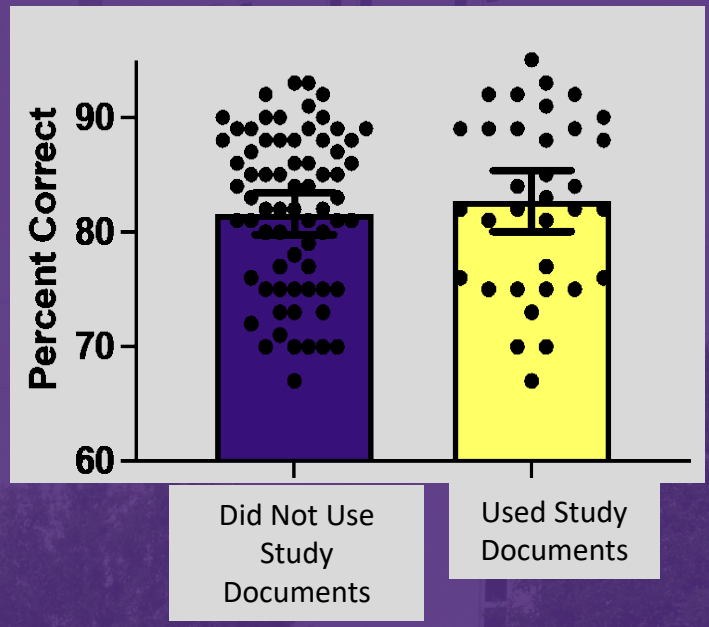
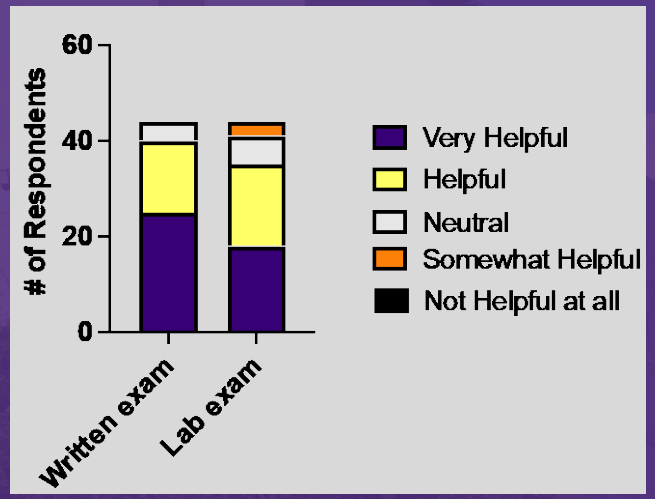


Figure 3: Students rated study document to be mostly helpful or very helpful in preparing for written or laboratory exam



- 179 first year medical students were given unlimited access to the study documents, and 48 (26.8%) used the documents
- Survey feedback demonstrated the documents' utility in helping students organize material while also providing a well-rounded view of the brainstem. Other feedback noted the documents could have contained more detail for lab exam preparation.

Conclusion

- The exam scores themselves did not show statistical significance in assessing if the use of the study documents had an impact on the students' overall grade on the exam.
- However, the results of the qualitative surveys demonstrated the effectiveness of the study documents in increasing preparation for the final exam.
- There is limited data to reject or accept the null hypothesis, and future studies are needed in order to increase the response rate of students.
- Future studies can also survey students who did not use the documents to analyze their perceived preparedness for the exam, and compare that to those who used the documents