Group Verbal Gateway Quizzing To Promote Understanding of Cardiovascular Anatomy

Dr. Sarah Reardon
Department of Biology, Culver-Stockton College, Canton, MO

Abstract

It is common practice to dissect organs such as the heart, brain, and kidney in human anatomy and physiology laboratory classes. Students who do not have a good understanding of organ anatomy before the dissection do not fully appreciate the dissection and have a difficult time identifying structures on the specimen. They also have a more difficult time connecting anatomical structures to physiological functions. Lab manuals used in most classrooms use practices such as labeling figures or sketching models as a way of preparing students for dissections, which does not promote group work or verbal communication. This approach uses verbal gateway quizzes administered before the specimen dissection in the anatomy and physiology laboratory. Students are split into groups of 3-4 and given an anatomical model and a list of structures to identify. Students must work together to identify and learn the structures and state its function. Verbal graded identification quizzes are administered by the professor and must be passed by the entire group for the students to begin the dissection. The use of verbal gateway quizzes creates a collaborative learning environment that engages students and promotes mastery of the anatomy and physiology of the given specimen.

Materials

Materials are listed per group of three to four students.
• Lab manual with a list of structures to be identified (figure 1)
• Heart model
• Blank notecards
• Sheep heart for dissection
• Dissection materials and PPE

Methods

It is critical that the instructor lets the group know that everyone in the group must be confident and prepared for the verbal quiz. When the group feels that they are ready to be quizzed the instructor will verify that each student is prepared for the quiz. If the instructor feels as if a student is reluctant and may be taking the quiz before he or she is ready, the instructor should tell the students to study for another ten minutes before circling back around to that group.

The verbal quiz is administered to each student individually, and the group is restricted from helping. The instructor randomly selected three structures for each student to identify on the model and provide a verbal description. Students earned two points per structure: one for correctly identifying the structure and one for providing the correct description. Students were also awarded a point if all students in the group got all structures correct. If all students pass the verbal quiz, they are then allowed to dissect the sheep’s heart. If all students do not pass the entire group is required to review the heart until all members of the group can pass the verbal quiz. Groups are required to study for an additional 10 minutes minimum.

During the sheep heart dissection, the instructor assisted and answered questions. Once the students finish the dissection the instructor asks the students to point out the structures that were studied on the model on the dissected heart. Functions are reviewed as well. Afterwards, students are instructed to clean up and lab is concluded.

The following week of lab, students were given a quiz over the anatomy of the heart. Students are asked to identify ten structures from the heart that were studied in lab the previous week. Results were compared to the scores of students who did not complete verbal gateway quizzing.

Discussion

The use of verbal gateway quizzes prior to the sheep heart dissection creates a collaborative learning environment that engages students and promotes mastery of organ anatomy and physiology. This method should be used with dissection of all organs in the anatomy and physiology lab.

Results

Instructor observation indicated that student interactions increased both during the study period for the gateway verbal quiz, and during the dissection itself. Students also appeared to be more engaged and active in the learning process. Instructor observation also suggests that students spent more time with the dissection specimen when compared to students that did not complete gateway quizzing. During the dissection, students appeared to have a better understanding of the dissection instructions and asked less questions about the procedure instructions and asked more questions about anatomical structure and function. Students scores on follow up quizzes indicate that students gained a better understanding of cardiovascular anatomy compared to students that did not participate in gateway quizzing through a student T-Test (figure 2).

References


Introduction

Dissection is a tool used in the anatomy and physiology lab to provide students with an experiential and real-world approach to learning structure and function of organs. Instructor observation indicates that without previous anatomical and physiological knowledge of the dissection specimen, students are not as engaged during the dissection. This approach aims to provide students with tools to learn collaboratively to prepare for the in-lab dissection and ensure that learning is achieved through gateway quizzing. This will improve understanding of organ anatomy and physiology.

Figure 1: List of structures to be identified on the heart model and sheep heart specimen. From Amerman (2010) pg. 465

Figure 2a: Comparison of Student Quiz Scores With and Without Gateway Verbal Quizzing

Figure 2b: Comparison of Student Quiz Scores With and Without Gateway Verbal Quizzing

Figure 2c: Comparison of Student Quiz Scores With and Without Gateway Verbal Quizzing

Table 1: Comparison of Student Quiz Scores With and Without Gateway Verbal Quizzing

<table>
<thead>
<tr>
<th></th>
<th>With Gateway</th>
<th>Without Gateway</th>
</tr>
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<tbody>
<tr>
<td>Mean</td>
<td>26.28</td>
<td>23.12</td>
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<tr>
<td>Variance</td>
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<td>8.12</td>
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<td>Standard Deviation</td>
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<tr>
<td>t-value</td>
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<tr>
<td>p-value</td>
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<td>.054</td>
</tr>
</tbody>
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Note: The difference is significant at p=.05.