

Peripheral Brain Access in Small Group Discussion in Anatomy

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ABSTRACT

Background and Objective. The pandemic has forced medical education to adopt online and hybrid set-ups, and this has greatly changed the way human anatomy is taught. Course-required knowledge can be accessed using raw references like original publications, collected reviews such as those found in books, as well as in shorter versions like summaries, and in online or electronic applications or software. With readily accessible online physical materials and human resources in anatomy, the value of learning by seeking out verifiable information to answer a real time query may change the current method of teaching and assessment of outcome-based learning in a heavy-recall subject such as human anatomy. For the student, sources of information or instruction are termed the “peripheral brain”. The objective of this study is to describe the medical students’ method in accessing medical information during a hybrid small group discussion.

Methods. In a modified hybrid laboratory set-up, a class of 200 students were divided into 18 groups, with two students in each group acting as laboratory dissector, who will broadcast their in-person classroom activities to the group members via zoom. The groups rotated in nine specimen stations consisting of soft-embalmed cadavers, plastinated specimen, models, bones, and VH dissector™ virtual dissector. Students were allowed to use any type of resources to accomplish the following tasks: 1) look for listed structures, 2) identify landmarks, and 3) describe functions. A Google sheet survey was administered a month after the activity on the following domains: search strategy, targeted references, and verifiability of information.

Results. There were 110 students with age range of 19-27 years old, who participated in the study. Their most accessed reference is still personally prepared notes, followed by electronic books. When using ebooks, the first thing students reported exploring is the table of contents, followed by the search button. If doing online search, the key word used is the structure or function of interest. In group dynamics, students prefer to divide the work and assign tasks to each member, instead of collectively and simultaneously discussing a topic. For them, the most important characteristic of a reliable peripheral brain is that it is the recommended reference, followed by how current the reference is, i.e., published in the last 3 to 5 years. Interestingly, for most students, the information must be acquired in 5 minutes, which is contrary to the preferred mode of reference.

Artificial intelligence may enhance SGD's according to most of the students. In accessing peripheral brain, Google is perceived as the quickest, books are most reliable, and Pubmed is the most up-to-date. Most of the students preferred pre-assigned questions or tasks during SGD's, with equal distribution of work. Giving and receiving remote instructions is not a problem. Dealing with a difficult group member is important, but is not a problem in hybrid discussion.

Conclusion. The survey results provide valuable insight on learning strategies used by the current generation of medical students, who have started medical school during the pandemic and are used to online teaching-learning modes of instruction. These findings can be



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exploited in designing course activities. The concept of peripheral brain in small group discussions can be formally introduced to students learning anatomy to utilize modern technology in enhancing knowledge.

Keywords: anatomy, medical education, hybrid learning

INTRODUCTION

The COVID-19 pandemic has forced the study of anatomy to utilize digital learning and virtual laboratories.^{1,2} The access to online knowledge and information has never been more utilized than in the last three years, due to increasing availability as well as necessity. In the first year of the pandemic, the University of the Philippines College of Medicine shifted towards online teaching of anatomy, with very minimal face-to-face class activity. During this time, pure online learning may have resulted in a decrease in self-motivation due to lack of confidence, as well as perceived and experienced difficulties studying topics normally covered in laboratory dissection.

The college implemented limited face-to-face dissection with strict social distancing in a laboratory activity. The LEAP or learning enhancement in anatomy program was implemented in order to bridge the gap between virtual and online anatomy concepts and actual with spatial orientation using real human formalin cadavers, soft-embalmed cadavers, plastinated human specimen, and virtual human cadaver table. Gaining knowledge through experiential learning not just by students but also by course instructors allows for continuous modification of the conduct of teaching human anatomy. The Department of Anatomy has therefore learned to be adaptive as well as innovative in demonstrating the art and science of human dissection by combining both traditional and modern teaching methods.

The rapid and unplanned shift to the utilization of online teaching methods and technologies has brought about a debate on how to enhance anatomy that is taught using virtual reality and online learning. Both teachers and students have differing opinions and the long-term effects on anatomical education has been questioned: will cadaver dissection be discontinued?³ It should be noted that even pre-pandemic, there is a trend towards pure online virtual anatomy dissection due to decreased body donations.

In order to utilize both advantages of actual cadaveric dissection and online/virtual learning, as well as to increase student interaction, the Department of Anatomy executed a student-oriented small group discussion laboratory where Year Level III (first year medicine proper students) discussed online actual plastinated specimens, soft-embalmed cadavers, models and bones, and virtual human cadaver dissector tables in the 2022 head and neck course. This was achieved by a hybrid online and limited face-to-face mode, wherein two student representatives in a group of 10 students, demonstrated actual material via an online platform. The

method is student-directed with enumerated tasks for completion. The deliverable tasks were anatomic structures, landmarks, and functions.

In small group discussions, a structured approach hopes to provide a reproducible learning method with clear planning and execution of mechanics and method assessment.⁴ However, in outcome-based learning, while deliverables are concrete measures of achieving knowledge, it is also important to demonstrate the method by which the knowledge was obtained as this promotes versatility and flexibility.

References and resources, whether human (classmates), ebooks, artificial intelligence, search engines, and notes, have been described informally as the peripheral brain. These are generally readily accessible information to augment memory-based knowledge or facilitate recall, as well as synthesize topics and give a different perspective. Such is the case in clinical rounds where students will often peek into their notes, ask classmates or even look at phones during small group discussions. Formally incorporating this as a structured method in facilitating learning may provide quick and consistent outcome-based learning.

With readily accessible online physical materials and human resources in anatomy, the value of learning by seeking out verifiable information to answer a real time query may change the current method of teaching and assessment of outcome-based learning in a heavy recall subject such as human anatomy. Therefore, during a task-oriented small group discussion, how do first year medical students accomplish queries and what are the resources they utilize in participating in a small group discussion?

The objective of this study is to describe the medical students' method in accessing medical information during a hybrid small group discussion. Specific objectives are to determine medical student behavior and practice in seeking out answers during small group discussion in human anatomy, to determine the current readily accessible material utilized, to describe the characteristics of an acceptable, reliable, and reproducible reference in human anatomy as utilized by students during small group discussion, and to describe student perception and dynamics in hybrid small group discussion.

METHODS

In Organ System 204 Head and Neck Course (Human Body and Mind III) for first year medical students, 200 students were divided into 18 groups, with two representatives for each group utilizing zoom connectivity to share their classroom activity to their groupmates. They went through nine head and neck anatomy stations and nine rest stations. The groups were tasked to accomplish a checklist of structures, landmarks, and functions, and were then asked to discuss the required outcomes as a group with very minimal instructor supervision. The students may use any physical or online references to accomplish the task in each station.

Online references, ebooks, classmates or group members, online search engine, e.g., Google or Pubmed were allowed. (Figure 1)

A 13-page Google form survey was administered to students right after the small group discussion, with the following domains: prioritization of search terms when doing query, prioritization of target references, and acceptability and verification of search. It can be accomplished within a month. The survey was voluntary and not graded.

The study is approved by the institutional research ethics board and classified as exempted from review (UPMREB 2022-0575-EX).

RESULTS

There were 110 student respondents in the survey with an average age of 22.33 years old (range of 19-27 years old). The most accessed references were personal notes (84.5%), followed by electronic books (79.1%). (Figure 2)

If asked to do a google search, first search term: specific structure or function (64.5%), followed by the word anatomy (20.9%). (Figure 3)

When utilizing ebook, first part to explore: table of contents (46.4%), search button or icon (41.8%). (Figure 4)

In group dynamics, 71.8% prefer to divide the work and assign tasks to a member of the group, while 15.5% let the group collectively and simultaneously discuss a structure. (Figure 5)

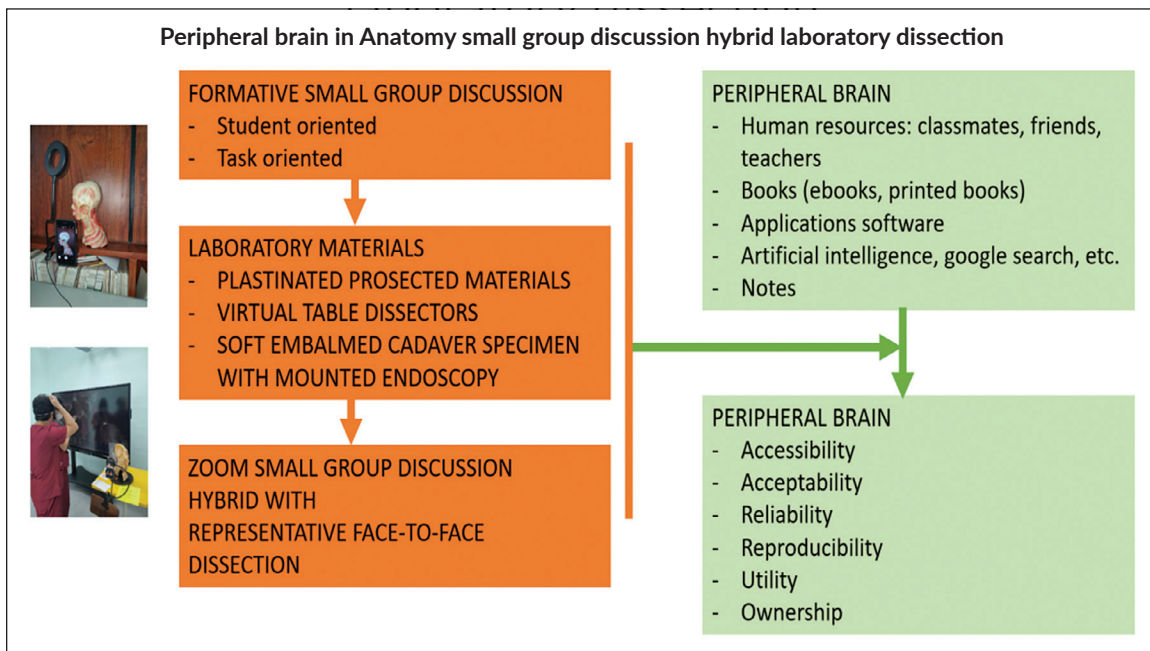


Figure 1. Conceptual Framework. A time bound small group discussion during a laboratory dissection may be enhanced by use of knowledge obtained from a “peripheral brain”.

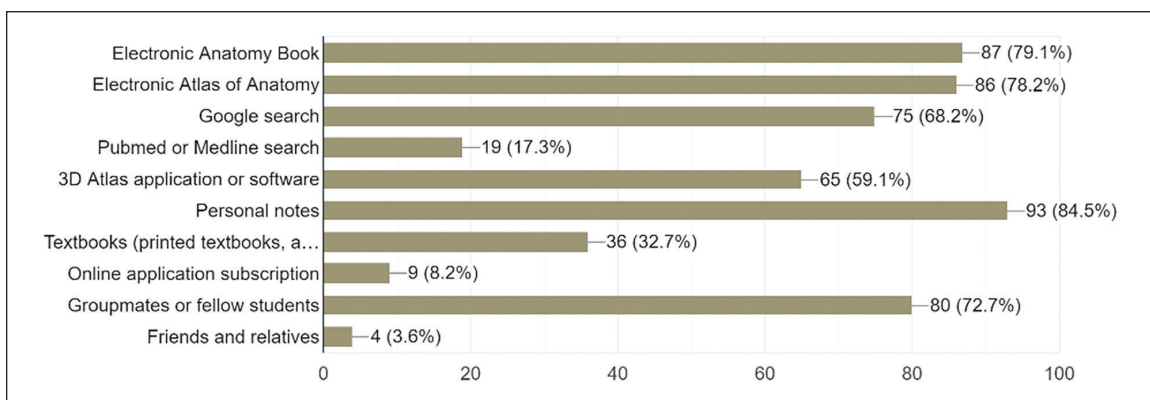


Figure 2. In an open-notes formative activity, which references did you use during the student-oriented small group discussion in Anatomy? (110 responses)

For peripheral brain reliability: 93.6% follow course recommended references, while 63.6% preferred updated references, published in the last 3 to 5 years. (Figure 6)

For peripheral brain accessibility, 45.5% prefer to access reference in 5 minutes, and 23.6% prefer to access reference in 1 minute. (Figure 7)

Around 64.6% agree that artificial intelligence and search engines may enhance small group discussion. (Figure 8)

When one can't produce answers automatically from stock knowledge, the utilization of the peripheral brain is best described as follows: quickest is google search, most reliable is books, most updated is pubmed search, most peer reviewed is pubmed, most creative are anatomy applications and personal notes, most likely source of landmark references is books. (Figure 9)

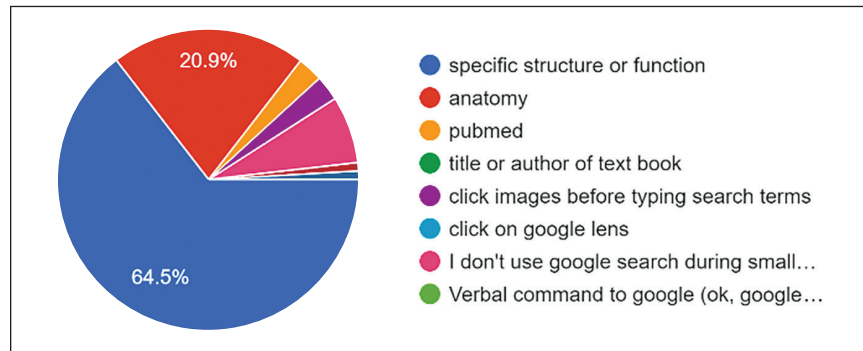


Figure 3. When asked to identify and discuss specific anatomic structure, its function and adjacent landmarks, what is the first word that comes to mind? What is the first word you put in the search field? (110 responses)

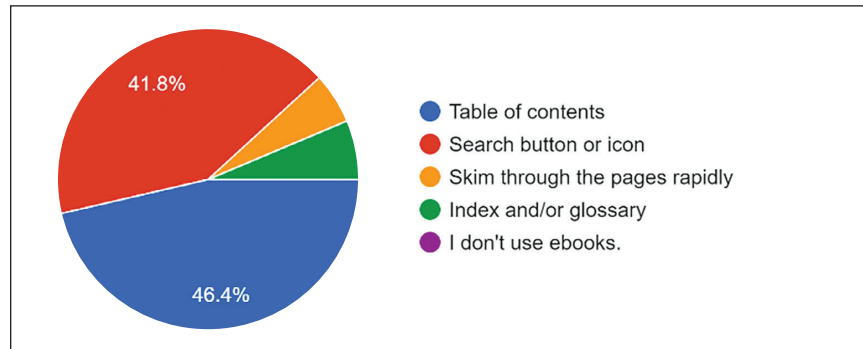


Figure 4. When asked to identify and discuss specific anatomic structure, its function and adjacent landmarks, what is the first part of an ebook you will explore/tick? (110 responses)

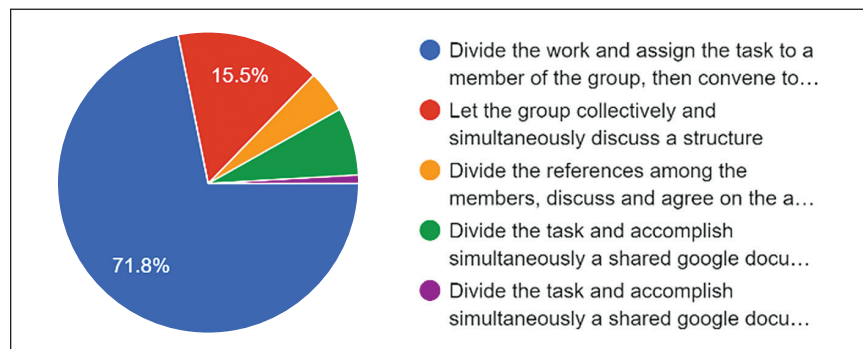


Figure 5. In a group task to identify and discuss specific anatomic structure, its function and adjacent land-marks, which do you prefer? (110 responses)

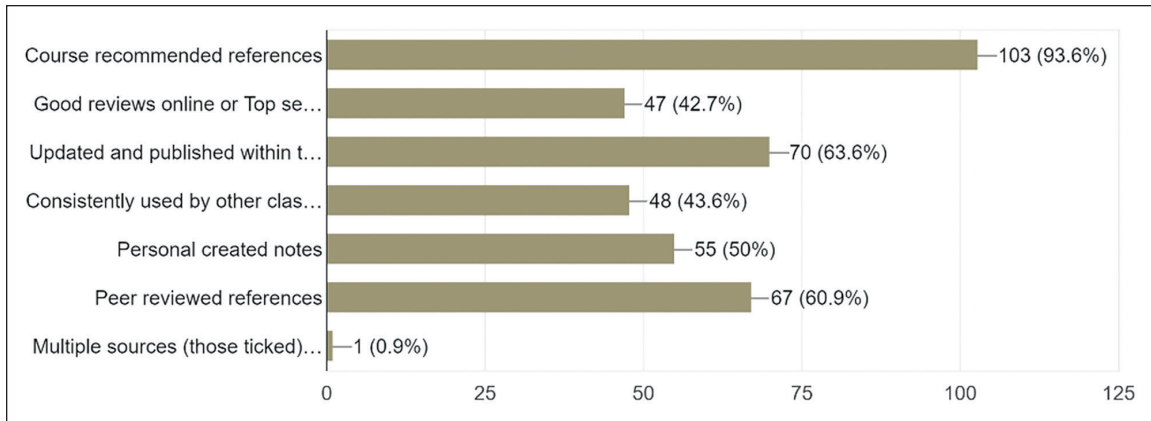


Figure 6. Peripheral brain reliability. (110 responses)

When asked regarding activities, 94.5% of the respondents prefer getting pre-assigned questions or tasks, 80% believe in equal contribution in work, 78.2% feel comfortable suggesting or giving instructions remotely, 88.2% feel comfortable carrying out remote instructions, 78.2% feel comfortable asking teacher or classmate for help given remotely during a task-oriented activity. Group learning

and group dynamics are most important in an SGD, while ownership and contribution are least important. Among the respondents, 48% strongly think that dealing with difficult group members is an important SGD experience, and 44.5% fairly think that dealing with difficult group members in hybrid group discussion is important. (Figure 10)

DISCUSSION

First year medicine students prefer pre-assigned tasks where they are likely to divide the work and use the traditional recommended book and personal notes. This often leads to reporting that is scripted, divided, and not cohesive. In a real-time discussion situation where spontaneous tasks or questions arise, proper strategies on how to gain quick and reliable knowledge can be devised such that students not only gain verifiable information quickly, but may also be more dynamic in applying modern technology in medical education.

The hybrid laboratory small group discussion set-up may simulate similar other scenarios, for example,

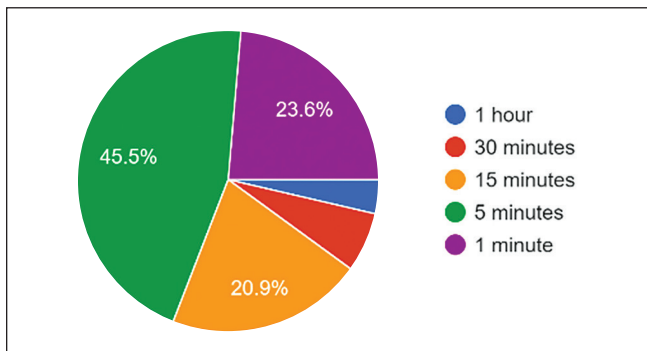


Figure 7. Peripheral brain accessibility. (110 responses)

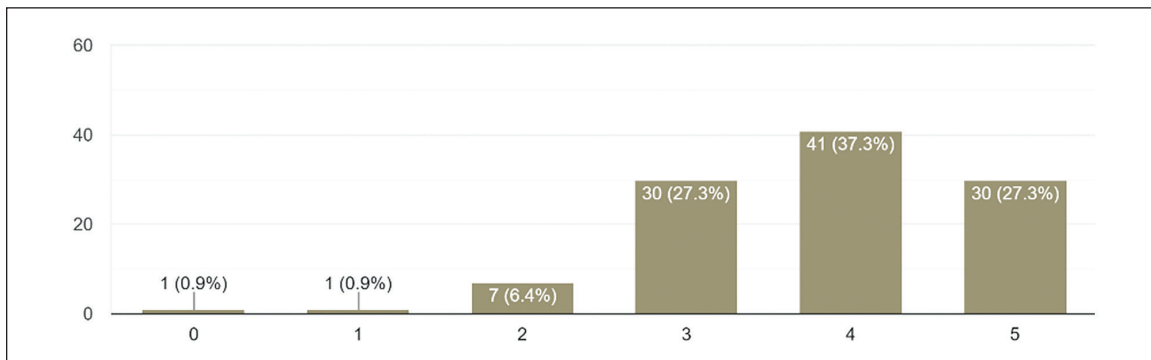


Figure 8. Do you think artificial intelligence, search engines and the like will enhance learning in a small group discussion? Is the use of search engines or ... Alexa) during small group discussion acceptable? (110 responses)

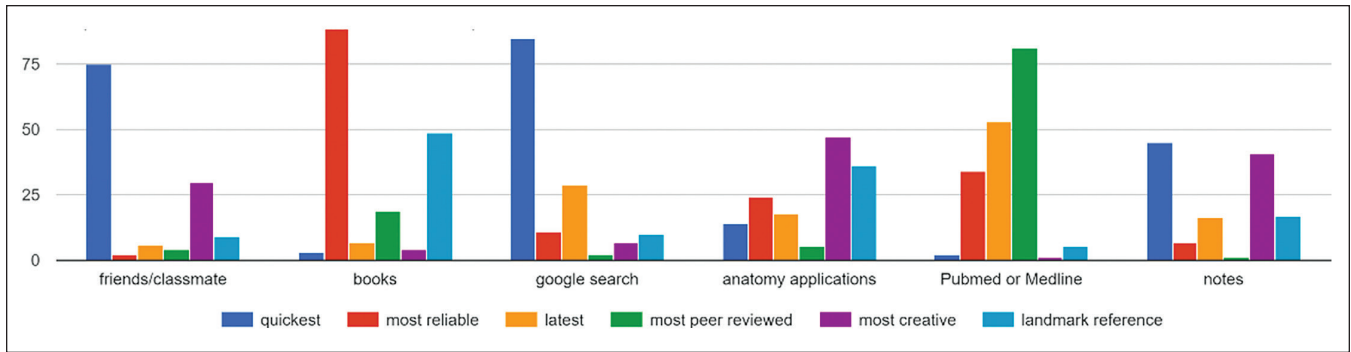


Figure 9. Characteristic of a peripheral brain.

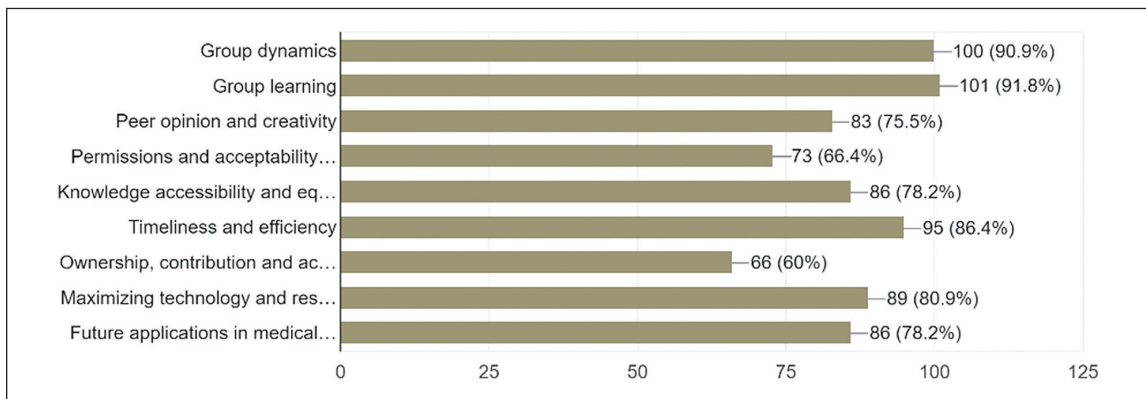


Figure 10. Important experiences in small group discussion.

multidisciplinary conferences, mentor-trainees supervising during school or hospital-related activities. Accessing and using peripheral brain resources may enhance formative learning processes. As the authors experienced in more senior students and residents, connectivity and online set-up allows training on how to get proper information in a timely fashion in real time.

CONCLUSION

The survey results provide valuable insight on learning strategies used by the current generation of medical students, who have started medical school during the pandemic and are used to online teaching-learning modes of instruction. These findings can be exploited in designing course activities. The concept of peripheral brain in small group discussions can be formally introduced to students learning anatomy to utilize and maximize modern technologies in enhancing outcomes-based learning.

Statement of Authorship

Both authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

Both authors declared no conflicts of interest.

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