How Can We Better Educate Our Residents?

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The optimal mode of resident education is unknown. Orthopedic surgery residency curriculum has historically been composed of a synergy of operative and wards experience, self-directed learning, online resources, and didactic lectures. Although some institutions may have historically relied heavily on lectures as the main form of information transmission to residents, recent restrictions on work hours, such as the 80-hour workweek, have forced programs to alter their training curriculum. Traditional learning modalities must adapt and maximize their efficiency with respect to both content and retention in order to transmit the same vast amount of information in a shorter period. Programs across the country are attempting to explore different methods of education in order to optimize learning so that information transmission and retention can occur in the most efficient way possible. Hands-on skill laboratories, arthroscopic simulations, and cadaver laboratories are all used; however, basic science and fundamental orthopedic principles need to be taught as a framework for further knowledge and surgical skills. Our institution still believes in the value of lecture for these essential principles.

Lectures are an important aspect of resident education, especially with rapid advances in medical care. There are many benefits associated with traditional lecture. Proponents point out that lectures are able to convey a large amount of information in a consolidated amount of time, are a cost-effective method of educating several individuals simultaneously, provide structure to a field of knowledge, and provide new information that is not always found in textbooks. However, despite the importance of lecture as a medium to transmit information to medical residents, there is little literature examining the effect of lecture length on maximization of information transmission and retention.

Several studies have attempted to assess attention span during lectures. Some authors argue that attention is generally lost between 10 and 20 minutes, with attention waning as a function of both time and lecture complexity. However, others refute these claims and believe that the relationship between lecture length and attention span is far more complex.

With an ever-changing education climate due to imposed regulations on resident work hours, it is crucial that educational modalities become as efficient as possible so that residents can maximally optimize both their clinical and educational obligations. We are still seeking to address this issue. Our institution employs an educational curriculum in which residents are lectured daily for approximately 30 minutes, with formal educational sessions twice a week for 2 hours a day including a formal grand rounds. However, we are aware of neighboring institutions where all formal academics occur on a single day due to the logistics of the attending physicians’ clinical and operative scheduling.

We attempted to explore the effect of lecture length on information retention in a population of orthopedic surgery residents through a prospective, nonrandomized study of 18 orthopedic surgery residents at our institution. One group received four 1-hour lectures given on consecutive days, while another group received a single 4-hour lecture of the same material. We found that, after controlling for postgraduate year (PGY), there was no significant difference in performance between the 2 groups.
There was a statistically significant difference between junior residents (PGY1-3) and senior residents (PGY4-5) ($P=.0375$), with senior residents consistently scoring higher than junior residents. At the 1-month posttest, we observed a nonsignificant trend, with lower scores in the 4-hour group compared with the 1-hour group when considering junior residents only. We believe that the issue of optimal lecture length needs further investigation after considering our results and the limited literature on this topic.

Bryner\(^8\) conducted a study of family medicine residents examining the difference between 20- and 50-minute lectures regarding both immediate and delayed recall. No difference was found between the 2 lecture lengths on the immediate test or the delayed test given 2 weeks later. More recently, Kerfoot et al\(^10\) attempted to explore “spaced education,”\(^11\) whereby repeated education encounters are administered over time are believed to result in improved retention, compared with “bolus education,” whereby all learning is done at one time in large quantity. To explore this concept, they randomized 156 urology medical students to receive serial e-mails after their rotation over a single year over a subset of 4 topics. One group received e-mails pertaining to 2 of the 4 topics and the other group received e-mails pertaining to the remaining 2 topics. They had students serve as their own internal controls by comparing their scores on the serially e-mailed topics with their scores on the 2 topics for which they received no e-mail after their rotation. Using the end-of-year examination as their primary outcome measure, Kerfoot et al\(^10\) determined that spaced education topics resulted in significantly improved scores ($P<.001$). This study showed that reintroducing the same material over a long period is effective.

Some educators believe that attention span sharply declines after 10 to 20 minutes as a result of the lack of interaction and difficulties with recall.\(^12,13\) However, others refute this claim. Sencerbo et al\(^8\) observed students as they viewed one of a series of taped lectures, evaluated the content of students’ notes, and tested students’ immediate recall. They found that there was no difference in retention despite less information being recorded in students’ notes as a function of time.\(^8\) Wilson and Korn\(^7\) reviewed the literature including studies on note taking, observational studies, physiological measures of attention, and self-reports of attention. They found little evidence to support the decline in attention span.\(^7\) It is clear that more studies are needed to further elucidate this correlation.

The educational curriculum in orthopedic residencies is changing and the didactic education needs to adapt with it. Teaching recently published data and studies, presenting material from recent conferences, and relaying personal experience are all benefits of lecture. However, there is some evidence of decreased performance and attention at the end of longer lecture blocks. Although other methods of instruction, such as self-directed learning modules, have become increasingly popular, we still believe that the best method to transmit large amounts of information concisely is through lecture. Optimal lecture length needs to be determined. We continue to pose 2 questions: How can we better educate our residents? What are the most appropriate methods to do this? As the breadth of knowledge continues to expand in orthopedics, we must be on the forefront of education and look to answer these questions.

REFERENCES