

Original Publication

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Senior Medical Student–Led Interactive Small-Group Module on Acute Fracture Management

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Abstract

Introduction: Medical students receive insufficient training in musculoskeletal diagnosis and management. To address this deficiency, a senior medical student at our institution designed and moderated small-group interactive discussions with third-year medical students on acute fracture management during their family medicine clerkship. **Methods:** In these sessions, students learned how to diagnose and comprehensively work up a case of a suspected fracture, how to effectively communicate findings from physical exam and X-ray, and when to appropriately consult a surgeon for treatment. **Results:** This module was piloted with a total of 14 students in two separate small groups. One hundred percent of students regarded the module as very useful, and there was a 50% improvement in pre- versus posteducational assessment. **Discussion:** Our experience suggests that students can quickly improve clinical skills for fracture management in a focused smallgroup interactive session. In addition, these sessions can be effectively designed and implemented by senior medical students. This module may be used with either clinical or preclinical students, but we believe that this information would be best received by clinical students on family medicine, emergency medicine, or orthopedic rotations.

Keywords

Trauma, Wounds and Injuries, Case-Based Learning, Fractures, Bone, Musculoskeletal

Educational Objectives

By the end of the session, learners will be able to:

1. Perform a focused physical exam evaluating for a suspected fracture.
2. Correctly order and interpret relevant musculoskeletal radiographs.
3. Effectively communicate the findings from physical exam and X-ray.
4. Appropriately identify when to consult a specialist for fracture management.

Introduction

Musculoskeletal (MSK) disease comprises as much as 18% of a primary care physician's workload but continues to be underrepresented in medical student education.¹⁻³ Barriers to increasing the amount of MSK exposure include time, lack of resources, and lack of enthusiasm from relevant departments.⁴ Medical schools that have implemented new MSK curricula have received largely positive feedback from students.⁵⁻⁸ Furthermore, small-group discussion and simulation-based teaching may be more effective than lectures in terms of clinical skill competency and knowledge retention.^{9,10} We have, therefore, tried to utilize features of both.

This module was implemented as an interactive small-group discussion twice with a group of third-year medical students on their family medicine clerkship. It was led by a senior medical student, and materials were derived from American Association of Family Physicians literature on fractures as well as Kenneth Egol's *Handbook of Fractures*.¹¹⁻¹⁴ Rather than cover a broad array of topics, we chose to focus in depth on two specific fractures because of their high incidence.

Appendices

- A. Fracture Module.pptx
- B. Basic Ortho Trauma Handout.docx

All appendices are peer reviewed as integral parts of the Original Publication.

Methods

This session module (Appendix A) can accommodate class sizes of 10-15 students. In our sessions, we very comfortably taught nine students. The two cases were discussed in 1 hour. Several days before the discussion, the students were provided with a handout (Appendix B) detailing the contents of the discussion. This was meant more for student reference than preparation material.

After the assessment, the instructor introduced the four questions that the students would need to answer for each case.

- How do you perform the physical exam?
- What do you x-ray?
- Do you consult surgery, and if so, what would be your one-line description to the surgeon?
- What do you do in the interim?

After the introduction of each case, students were asked to describe their approach to the physical exam and provide their reasoning. Next, students were provided gloves and given the opportunity to practice physical exam skills on each other. The instructor corrected students on proper exam technique and helped them identify the proper location of different bones. At each step of the way, students were asked to correctly communicate their findings. After the practice physical exam, basic radiographic anatomy of the relevant bones was reviewed. The instructor also offered a specific systematic approach to reading the radiograph and, most importantly, described how to properly communicate radiographic findings to a third party. Finally, during the review of the radiographs, students were asked to guess whether the injury would require surgery and how to phrase their one-line diagnosis to the consulting physician.

The session started and ended with a pre- and posteducational assessment on the second- and third-to-last slides, respectively. The assessment was performed by having the medical students write down a one-line diagnosis to an ankle radiograph shown. Criteria for a correct answer included using the word *malleoli/malleolus* to describe the location of the fracture, assigning correct laterality, and correctly ascertaining the number of malleoli involved. *Fibula* or *tibia* was not considered a correct answer as it was not considered specific enough.

Results

This module was piloted twice on a total of 14 third-year medical students. It was led by the same senior medical student on both occasions. One of 14 students correctly answered the preeducational assessment; however, eight of 14 correctly answered the posteducational assessment. Of the six who were incorrect, one student assigned incorrect laterality, two students used fibula instead of malleolus, and four students misdiagnosed the fracture of just the lateral malleolus versus a bimalleolar fracture. All students thought that the session was useful and would have liked to participate in additional sessions. Specifically, many students recalled a situation during their rotation in which they were confronted with a similar injury but did not know how to appropriately manage the condition. One of the students did not feel comfortable performing a physical exam on another classmate's foot.

Discussion

Our experience suggests that students can quickly improve clinical skills for fracture management in a focused small-group interactive session. In addition, these sessions can be effectively designed and implemented by senior medical students. This module may be used with either clinical or preclinical students, but we believe that this information would be best received by clinical students on family medicine, emergency medicine, or orthopedic rotations. These students are most likely to encounter injuries similar to the ones described in the module and hence have the greatest amount of interest and knowledge retention. In this module, it is essential to have the instructor teach the students the proper way to communicate findings from the physical exam and X-ray. Communication is more important than ever in modern medicine but too often is not formally taught. Finally, we focus in depth on two specific

cases to give students enough information to handle a similar case by themselves. We hope this increases student confidence, knowledge retention, and satisfaction with the material. However, this has not been statistically verified.

The specificity of the knowledge imparted is one of the greatest limitations of our session. Students know little about management of soft tissue injuries, which are more common than fractures. Furthermore, only 57% of students correctly answered the posteducational assessment. This may reflect the inexperience of the senior medical student with teaching, but considering that only 7% of the students correctly answered the preeducational assessment, this is still a significant improvement.

Ideally, each of these sessions would be led by a senior medical student. However, many senior medical students themselves do not have sufficient knowledge or experience to comfortably lead the session, especially near the beginning of the academic year. Therefore, future implementations of this module would likely need a resident to lead the first several sessions, followed by senior medical students for the remainder of the year.

Many students were interested in attending additional sessions; however, these are difficult to schedule. One method to expand this module would be to teach it to fourth-year students in the second semester of their fourth year where, traditionally, schedules are much lighter.

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Ethical Approval

Reported as not applicable.

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