



INTERSECTIONS

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A Case-Based Approach to Teaching Adolescent Biological and Psychosocial Development

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TAKE HOME POINT – This case addressing the clinical assessment of adolescent physical and psychological development would be relevant to students of any health profession that addresses childhood disease, well childcare, or human development. The teaching notes demonstrate how a cognitive apprenticeship approach can be used to teach fundamental biology and clinical skills together via an authentic “whole task” case, such as an annual visit.

INTRODUCTION

Adolescence is a core developmental stage in the human lifespan that includes profound social, psychological, and physical changes (Christine et al., 2005). This case, which was originally created for an introductory course on Human Development for first year medical students, addresses the biological development of adolescents and the clinical approach to interviewing adolescents in the office setting. The case was designed using a cognitive apprenticeship approach (Collins et al., 1991) to replicate the whole task of an adolescent well child visit, beginning with

the initial patient presentation and proceeding to assessment of physical growth, pubertal status, and psychosocial development. In the context of cognitive apprenticeship, a “whole task” approach means learners are initially introduced to and practice performing the entire task, fostering a holistic understanding and application of the skill, before breaking the task down into smaller skills or steps. Prerequisites required for this learning material were minimal as it occurred early in the first foundational science year for medical students. Students had completed two weeks of basic cellular biology and embryology, as well as a week-long introduction to the

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biopsychosocial model, pregnancy, and development of the infant and young child. This case could be delivered outside of a Human Development course context as a singular learning experience if appropriate pre-work is assigned. For this session, learners were given two short readings – one on the biology of puberty (Katzman et al., 2023) and a second on the biopsychosocial approach to adolescent clinical assessments (Ginsberg, 2020).

LEARNING OBJECTIVES

After participating in this activity, students will be able to:

1. State the major changes that occur in skeletal growth and body composition as a child progresses to and through adolescence.
2. Identify the major reproductive physiological changes that occur in males and females throughout puberty.
3. Itemize the features of the SSHADESS assessment for teens at a health check and explain the purpose of this approach.
4. Discuss the pros/cons of privileged communication with teens regarding issues of sexuality and drug use.

IMPLEMENTATION

Setting – This case was designed for and taught to 140 first-year medical students in an MD program at Emory University

School of Medicine. Learners were seated in large lecture hall with tiered seating at desks arranged in rows with movable chairs as this was the physical space and number of students assigned to the faculty by the course director. Students were instructed to work collaboratively in self-selected groups of 3-4 at their desk area. This session was scheduled for 120 minutes. Two clinical faculty members facilitated this session.

Pre-Work – Students were assigned to read a ScholarRX™ Brick on the "Biological Development of the Adolescent." This brick was adapted from the published ScholarRX™ brick on "Sexual Maturation" (ScholarRX, 2024). Edits were made to the published brick using Emory's site license to better align the content to the Emory-specific session learning objectives. ScholarRX™ bricks were chosen for pre-work to reinforce the use of this valuable tool for Step 1 studying for students (Le, 2018). Teachers without access to this resource could consider assigning a chapter on Adolescent Biological Development (Katzman et al., 2023). Students were also assigned the seminal article on biopsychosocial interviewing (Ginsberg, 2020) for adolescents. The article also includes embedded videos on interviewing techniques for students who wish to go deeper with their learning. Finally, students were assigned 5 board-style MCQs from the ScholarRX™ question bank (ScholarRX, 2024). This was used as

both a knowledge check and board practice self-assessment for the students, and to give the instructors data on how many students completed the pre-work and their baseline readiness for class. This assignment was formative and not graded. All assignments were posted to the learning management system along with a short description of the cognitive apprenticeship pedagogical approach to prepare them for case-based learning.

Activity Descriptions and Classroom Management – Table 1 below describes the flow of the session anchored in the session learning objectives and aligned with the associated classroom materials found in the appendices. Multiple engagement strategies were used to facilitate an active learning environment including individual reflection, small group discussion, large group discussion, role play, and answering open-ended questions. Students collaboratively completed case prompts during small group time. During this time, two faculty instructors moved around the room to facilitate discussion amongst small groups. Learners were also instructed to put their responses to questions posed during small group time into an open polling software link to make their thinking visible to the faculty (Table 2).

Introduction: Students were instructed to introduce themselves to each other using

the strengths-based assessment from the pre-reading. Faculty modeled this activity and showed photos of themselves as adolescents to foster a psychologically safe learning environment. Faculty then briefly discussed the pedagogical strategy and showed the learning objectives.

Part 1– Full Task: Students were given the case of a 14-year-old presenting for an annual visit and asked to work together in teams of 3–4 to answer three open-ended questions. Faculty then facilitated a discussion of student responses, modeling their approach to the adolescent annual visit.

Part 2– Growth Charts: Students were given further details of the patient’s historical growth and asked to work in teams to plot the patient’s growth and answer additional questions. Faculty then facilitated a discussion of student responses before showing a bone age which was discussed in the large group.

Part 3 – Growth Plate Analysis: Faculty led students through a large group discussion of the interpretation of bone age radiographs. A summary slide reinforced learning points.

Part 4– Sexual Maturity Rating: Students were asked to predict the patient’s sexual maturity rating on physical exam and discuss what additional evaluation they would like to complete in the small group.

Table 1: List of Activities Aligned to Learning Objectives and Resources

<i>Activity</i>	<i>L.O. Addressed</i>	<i>Resources and Links</i>	<i>Time (Min)</i>
Introduction	N/A	Appendix 1: Slides 2-4	10
Part 1- Whole Task <i>Students-</i> small groups work on handout and put answers in Poll Everywhere <i>Instructors-</i> circulate during group work and then lead a discussion inviting students to express what their group discussed, referencing responses in Poll Everywhere	L.O. 1, 2, 3, 4	Appendix 1: Slide 5-6 Appendix 2: Case Handout	20
Part 2- Growth Chart <i>Students-</i> work in small groups to plot patient's heights and weights on growth chart <i>Instructors-</i> circulate during group work and then lead a discussion inviting students to express what their group discussed, referencing responses in Poll Everywhere throughout the discussion	L.O. 1	Appendix 1: Slide 7 Print CDC Girls Growth Charts ages 2-20 Years	15
Part 3 – Growth Plate Analysis <i>Students</i> – students reflect independently on differences seen on the two x-rays, followed by large group discussion where students posed questions and explained reasoning <i>Instructors</i> – model how to interpret of bone age radiographs by describing their approach in the large group, then reinforce core teaching points	L.O.2	Appendix: Slide 8-9	10
Part 4- Sexual Maturity Rating <i>Students-</i> students work in small groups to predict sexual maturity rating and submit to poll <i>Instructors-</i> debrief responses in large group using responses submitted to Poll Everywhere	L.O. 2	Appendix 1: Slide 10	10

Activity	L.O. Addressed	Resources and Links	Time (Min)
Part 5- Hypothalamus-Pituitary-Gonad Axis <i>Students-</i> students work in small groups and submit responses in Poll Everywhere <i>Instructors-</i> circulate during group work and then lead a discussion inviting students to express what their group discussed using responses submitted to Poll Everywhere, then reinforce core teaching points		Appendix 1: Slide 11-12	15
Part 6- SSHADESS <i>Students-</i> students work in pairs to write down questions they would like to ask the patient corresponding to the SSHADESS framework (10 minutes) <i>Instructors-</i> One instructor plays the role of the adolescent and the other plays the role of the parent; students take turns asking them questions in front of the large group. Instructors gave real-time feedback on how students were or were not adhering to SSHADESS criteria (15 minutes). Instructors then deliver key teaching points about confidential communication (5 minutes).	L.O. 3, 4	Appendix 1: Slide 13-14	30
Wrap Up <i>Students</i> – complete CIQ <i>Instructors</i> – provide key teaching points	N/A	Appendix 1: Slides 15-19	10

Table 2: List of Polling Questions Aligned to Learning Objectives

Activity	Poll Everywhere Questions
Part 1- Whole Task	What questions come to mind as you think about your approach? What more information do you want to inform your assessment? How might you get that information?
Part 2- Growth Chart	What do you notice about her growth pattern? What do you think might be happening? What more information do you want?
Part 3- Sexual Maturity	What do you expect to find on her physical exam? Is her pubertal status what you would expect for her age? What additional information do you want?
Part 5- Hypothalamus-Pituitary-Gonad Axis	How do you interpret these labs in the context of her growth pattern? Where on this diagram do you think the problem is?

Part 5- Hypothalamic-Pituitary-Gonad

Axis: Faculty then discussed possible laboratory findings of delayed puberty in the large group. A summary slide reinforced learning points.

Part 6- SSHADESS: Students were instructed to role play the SSHADESS assessment in dyads. Faculty facilitated a discussion of confidential aspects of care in the large group.

Wrap Up: Take home points were shared with students and student feedback was collected.

Evaluation and Assessment - At the conclusion of the session, students were encouraged to revisit the 5 assigned MCQs for their own self-assessment. Students took a final exam at the conclusion of the Human Development

course which included approximately 15 MCQs relevant to this session and one short answer clinical scenario. The 15 MCQs assessed the learning objectives of pubertal timing, legal and ethical aspects of adolescent confidentiality in health care settings, and changes in height, weight, and linear growth during adolescence. The short answer clinical scenario assessed the ability to generate questions for each of the SSHADESS domains germane to a clinical case that was distinct from the one used in the teaching case. While student performance data were collected as part of the broader course assessment, they are not included here as the primary focus is on the instructional design and implementation of the session.

LESSONS LEARNED AND SUGGESTIONS FOR IMPROVEMENT

We used multiple strategies to evaluate the session. Students completed the Brookfield Critical Incident Questionnaire (Brookfield, 2017) immediately after the session to provide faculty with formative feedback on the students' experience. Education specialists from the Emory Center for Humanizing Innovations in Medical Education provided direct observation of the session followed by debriefing and feedback. Collaboration with these education specialists in the development of the session was also an essential feature as it assisted the faculty in revising and improving the session based on feedback from the prior course year.

Feedback from the education specialists noted that the case was authentic to real clinical experiences and well matched to all assigned learning objectives. The majority of suggested improvements were in the areas of facilitation and classroom management. Student engagement was high, attributed to clear communication about the value of making thinking visible to integrate your new knowledge, correct common misconceptions, and expertise. Poll Everywhere worked well to allow the faculty to visualize the thinking of a large number of students in a lecture hall setting. Co-facilitation by two content experts allowed for comparing and

contrasting different approaches to clinical scenarios.

Suggestions for improvement included better time management of the case facilitation, specifically adhering to time goals for each learning objective and corresponding case segment. Observers and co-facilitators, if available, should consider tracking faculty movement to ensure faculty are visiting as many student groups as possible and being inclusive in their questioning pattern. Coordination with patient interviewing and physical exam course components, if present, can also enhance elements of the case discussion.

Students felt most engaged during small group discussions and interactive portions of the session. Student feedback highlighted specific areas where time management adjustments could enhance engagement and efficiency. Several students noted that discussion segments, particularly small-group breakouts, occasionally ran longer than necessary, leading to downtime or repetitive conversations. Additionally, some students found large-group discussions to be less inclusive, as they were often dominated by a few voices. Additional student feedback is found in Table 3.

By refining the pacing of discussions, setting clearer time limits, and ensuring equitable faculty engagement across all

Table 3: Student Comments from the Brookfield Critical Incident Questionnaire

Quotes:

"Group discussion helped me process information better."
"When talking in the small groups and discussing the questions, I felt like I really understood the content."
"Small groups were the most helpful part of the session."
"Some of the small group discussions went on for too long."
"When people were sharing their thoughts and ideas, I think it took a little too long to go around and have everyone share. Maybe one or two people should share, and then we discuss as a group?"
"Class-wide discussions where the same 2 people answered every question [were less effective]"

student groups, future iterations of the session can foster a more balanced and dynamic learning environment. While one goal of this teaching experience was to demonstrate the applicability of this case with cognitive apprenticeship principles in large lecture hall settings, facilitation of this case could also occur with fewer students to allow for more faculty to student interaction.

While this case was developed for an MD curriculum, it is applicable to any health professional who provides clinical care for adolescents. Case elements could be altered to emphasize different physical exam findings as relevant for certain health professionals (i.e., the musculoskeletal exam for physical therapy students) or to emphasize interviewing techniques over the physical exam (i.e., for psychology students).



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