

Original Publication

 OPEN ACCESS

Pediatric Rheumatology Curriculum for the Pediatrics Resident: A Case-Based Approach to Learning

Miriah Gillispie, MD*, Eyal Muscal, MD, Jennifer Rama, MD, MEd, Carla Falco, MD, Amanda Brown, MD

*Corresponding author: miriah.gillispie@gmail.com

Citation: Gillispie M, Muscal E, Rama J, Falco C, Brown A. Pediatric rheumatology curriculum for the pediatrics resident: a case-based approach to learning. *MedEdPORTAL*. 2018;14:10767.

https://doi.org/10.15766/mep_2374-8265.10767

Copyright: © 2018 Gillispie et al. This is an open-access publication distributed under the terms of the Creative Commons Attribution-NonCommercial-Share Alike license.

Abstract

Introduction: Pediatric rheumatologic disease occurs more frequently than several other chronic pediatric diseases but is often underrecognized. It is estimated that in the US, one in 250 children has some form of juvenile arthritis and 300,000 children have a form of rheumatologic disease. However, there are only approximately 400 practicing pediatric rheumatologists nationwide. **Methods:** Kern's six-step method was used to develop a pediatric rheumatology curriculum based on respondents' perceived lack of training and comfort with four key areas: workup, musculoskeletal exam, laboratory interpretation, and referral to rheumatology. These cases were developed for second-year pediatric and second- and third-year internal medicine-pediatric residents rotating with the service. The curriculum was composed of four 30-minute case discussions as well as an observed musculoskeletal exam session. **Results:** In 2017, weekly case study sessions reached 34 trainees. Survey results from these trainees are representative of our overall results and reveal that learners felt the content of the cases helped increase comfort with compiling pertinent history and information of symptoms consistent with autoimmune disease, recognizing physical exam findings of autoimmune disease, ordering and interpreting laboratory studies in children with concerns for autoimmune disease, and referring to pediatric rheumatology. **Discussion:** This case-based curriculum exposed residents to presentations of the more common autoimmune diseases encountered in the pediatric population. The curriculum helps fill a gap in pediatric training through increased exposure to this subset of chronic diseases and expands physical examination skills not typically taught in general pediatrics.

Keywords

Editor's Choice, Fever, Kawasaki Disease, Mucocutaneous Lymph Node Syndrome, Juvenile Idiopathic Arthritis, Henoch-Schönlein Purpura, Pediatric Rheumatology, pGALS, JIA, Vasculitis, Lupus, Myositis

Educational Objectives

By the end of these sessions, learners will be able to:

1. Compile pertinent information and history of symptoms concerning for an autoimmune disease.
2. Recognize physical signs of autoimmune disease during the examination of a pediatric patient, specifically, abnormalities in the musculoskeletal exam.
3. Explain the use of commonly ordered laboratory tests to evaluate pediatric autoimmune disease.
4. Recommend basic interventions and supportive care for patients prior to referral to rheumatology.
5. Define when to refer to rheumatology.
6. Demonstrate a musculoskeletal exam using pGALS (pediatric gait, arms, legs, and spine).

Introduction

Several studies show that a large portion of primary care, urgent care, and emergency room visits are due to musculoskeletal complaints.¹⁻⁴ Thus, it is imperative to prepare physicians to distinguish between a benign musculoskeletal condition and a complaint that warrants further evaluation and management. Often, autoimmune diseases present insidiously with various musculoskeletal complaints, and patients

Appendices

- A. Case 1 FUO.pptx
- B. Case 1 FUO Teaching Guide.docx
- C. Case 2 JIA.pptx
- D. Case 2 JIA Teaching Guide .docx
- E. Case 3 SLE.pptx
- F. Case 3 SLE Teaching Guide .docx
- G. Case 4 JDMS.pptx
- H. Case 4 JDMS Teaching Guide.docx
- I. Case 5 KD.pptx
- J. Case 5 KD Teaching Guide .docx
- K. Case 6 HSP.pptx
- L. Case 6 HSP Teaching Guide.docx
- M. CORE Lecture Series Survey.docx

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

seek care from several providers in various locations before a diagnosis can be made. Pediatric rheumatologic disease, specifically, juvenile idiopathic arthritis (JIA), occurs more frequently than several other chronic pediatric diseases, including cystic fibrosis and sickle cell anemia,^{5,6} but is an often underrecognized disease entity owing to the misconception that children are too young to have arthritis. It is estimated that one in 250 children in the US has some form of juvenile arthritis and 300,000 children in the US have a form of rheumatologic disease; in addition, autoimmune diseases in the pediatric age group are becoming more prevalent in the United States.⁷ Thus, rheumatologic diseases are some of the most common chronic illnesses in pediatrics. JIA and other rheumatologic diseases are serious conditions that pose unique challenges and require specialized care to prevent morbidity and mortality. Often, providers are unaware of the variable presentations possible for patients with autoimmune diseases and are uncertain as to the initial workup.

At our large academic institution with 11 pediatric rheumatology faculty as well as fellows, pediatric rheumatology teaching encompasses only approximately 5 hours of total teaching throughout 3 years of residency. This is in part because even in institutions with pediatric rheumatologists, rotating with pediatric rheumatology is not an ACGME requirement.⁸ Most recent workforce research indicates that approximately 40% of pediatric residency programs do not have access to a board-certified pediatric rheumatologist, and 11 states have no pediatric rheumatologists at all.⁹ Many children who do have access to a pediatric rheumatologist travel several hours, and sometimes days, to see a subspecialist, and wait times at many centers are several weeks or months.⁹ As a result, pediatric rheumatologists oftentimes must rely on both generalists and other subspecialists to help judiciously refer and also manage these patients during times of illness or disease flare.

In addition to lack of access to subspecialists, there is also a paucity of teaching tools available and no widely accepted curriculum for pediatric rheumatology. The American College of Rheumatology does host Rheum2Learn, a module focused on adult rheumatology patients, but provides very limited information on pediatric rheumatology.¹⁰ The Hospital for Sick Kids in Toronto, Ontario, Canada, has described the utility of an interactive teaching tool developed there, but this tool is not widely available.¹¹ There are several existing publications in *MedEdPORTAL* that cover some pediatric autoimmune disease topics, including JIA and Kawasaki disease (KD),^{12,13} but no series of lectures to cover the most common pediatric autoimmune diseases. An easily accessible, pediatric-focused, and needs-based curriculum would be beneficial to those residents both with and without an onsite pediatric rheumatologist as a supplement to their existing general pediatrics curriculum.

Because of the lack of pediatric rheumatologists nationwide, general pediatricians and other providers need to become more comfortable with the diagnosis and early management of both inflammatory and noninflammatory musculoskeletal conditions. This general principle led to a focused needs assessment. We used Kern's six-step method¹⁴ to help identify perceived gaps in comfort with pediatric patients presenting with autoimmune disease (the content) and help develop the curriculum. A survey of our targeted learners (pediatric and medicine-pediatric residents) identified the learning style desired to deliver the content in the most effective way possible during the rotation.

After review of the needs assessment, overarching goals and defined objectives, including both cognitive and psychomotor objectives, were developed. Our goals were to introduce typical presentations of common autoimmune diseases and increase resident comfort level with workup, laboratory interpretation, musculoskeletal exam, and referral to rheumatology. Cognitive objectives were accomplished through a combination of small-group discussion and problem-based learning. Anonymous evaluations about the group discussions were performed every 4 weeks and were used to continually adjust the curriculum. To

meet psychomotor objectives, residents were given a demonstration of the pediatric gait, arms, legs, and spine (pGALS)¹⁵⁻¹⁷ exam and then supervised in clinic performing the exam on patients. Feedback on this exam was given in real time.

The target audience is intermediate and advanced learners who have the basic ability to perform history taking and physical examination and are able to give anticipatory guidance to patients. At our institution, the curriculum has been implemented during the second year of pediatric residency and second or third year of medicine-pediatric residency, although these sessions can be held at any point in the residency curriculum.

Methods

Every year, the Baylor College of Medicine Pediatric Rheumatology Program conducts four case-based teaching sessions for second-year pediatrics and second- or third-year medicine-pediatrics residents as part of their inpatient subspecialty rotation. This year, six cases were developed by a third-year fellow in conjunction with rheumatology, hospital medicine, and other subspecialty faculty to expose residents to common presentations of pediatric autoimmune diseases encountered in practice amongst generalists and other pediatric subspecialists. Each case was chosen due to prevalence at our institution and based on actual patients cared for by Miriah Gillispie, the primary author.

Each case required one facilitator and a small group of one to five residents. In our institution with pediatric rheumatology fellows, the fellows guided the discussion while faculty were available to answer more complex questions. In institutions without a pediatric rheumatology fellowship or pediatric rheumatology faculty, generalists or any number of subspecialists could serve as facilitators with adequate preparation. Another alternative allowed residents to proceed through cases via self-study, as there were teaching points and explanations embedded throughout each case. Each case took 30 minutes to complete, with time for questions throughout the case. To run the cases, a room with minimal distraction was needed. Facilitators had to have access to PowerPoint or a whiteboard in order to write pertinent information from the cases for residents to review.

Facilitators did not need to be formally trained in pediatric rheumatology to successfully implement this curriculum. They did need to have a basic understanding of the technique and interpretation of the laboratory studies and a basic understanding of the musculoskeletal exam. Comfort with the musculoskeletal exam was also improved by watching a series of videos.¹⁵ Facilitators familiarized themselves with the papers and websites listed as references at the end of the cases if there was no rheumatologist available to answer questions. These steps helped fill gaps in knowledge and increase comfort prior to presenting the cases.

Facilitators were provided with speaker notes and learning points embedded in each case. Cases included fever of unknown origin (Appendix A, with accompanying teaching guide, Appendix B), JIA with pGALS exam component (Appendix C, with accompanying teaching guide, Appendix D), systemic lupus erythematosus (SLE; Appendix E, with accompanying teaching guide, Appendix F), juvenile dermatomyositis (Appendix G, with accompanying teaching guide, Appendix H), KD (Appendix I, with accompanying teaching guide, Appendix J), and Henoch-Schönlein purpura (Appendix K, with accompanying teaching guide, Appendix L). Disease-specific cases stood alone, with no need to progress through them in any order. Learners were also expected to spend half a day participating in an outpatient rheumatology clinic. There, they received real-time feedback on an observed pediatric musculoskeletal exam from either a rheumatology faculty member or a fellow. In clinic, they were also encouraged to download a nonproprietary smartphone application and watch videos in order to have a reference for the

pGALS exam after completing the rotation.¹⁵⁻¹⁷ Permission was obtained from the creator of the application for its use during the sessions and inclusion in this curriculum.

The designated case topic for a session was given prior to the session to allow learners to read about the topic if they chose. However, the learners did not require formal preparation. The sessions were conducted using PowerPoints developed for the curriculum so that learners could see images associated with the cases. However, if the facilitator had no access to allow learners to view the PowerPoints, providing all other necessary information about the case without the images was also a method of content delivery.

The debriefing sessions included evaluation of the content and delivery as well as facilitator evaluation. Facilitators were encouraged to ensure that the goals and objectives were discussed at the beginning of each case, and the teaching pearls at the end of each case. However, facilitators were free to facilitate as the discussion warranted.

Learners completed anonymous evaluations (Appendix M) during the final week of the course at the end of each resident block and rated their comfort level regarding workup, laboratory interpretation, musculoskeletal exam, and referral to rheumatology on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*) both before and after the rotation. Respondents were asked to report their plans after residency as well as any additional comments. In addition to these surveys, Miriah Gillispie conducted semistructured interviews with fellows and rheumatology faculty throughout the data-collection period to inform the content and delivery methods of the cases.

Results

During the 2017 calendar year, we hosted approximately 45 half-hour teaching sessions with a total of 62 residents. Of the residents surveyed during the targeted needs assessment, only 16% (10 out of 62) indicated that they felt comfortable with workup of a patient with a possible autoimmune disease, 35% (22 out of 62) indicated comfort with the pediatric musculoskeletal exam (pGALS), and 42% (27 out of 62) indicated comfort with rheumatology referral in patients presenting with concerns for autoimmune disease. Almost 81% (51 out of 62) of respondents indicated that they felt they had received too little exposure to pediatric rheumatology, and only 8% (five out of 62) reported feeling knowledgeable about autoimmune diseases.

In total, 73% (35 out of 48) of residents rotating with rheumatology responded to the survey during the data-collection period. Throughout the survey period for the rheumatology curriculum, self-assessment of the residents' comfort level with laboratory workup, musculoskeletal exam, and referrals indicated improvement after working through cases while on the rotation. Based on written feedback, cases that were perceived by the residents as most beneficial and that stimulated the most discussion were the JIA cases with musculoskeletal components and the SLE case. Feedback from residents was positive, and they reported feeling more comfortable going forward when encountering patients with rheumatologic presentations.

Average survey responses to "Information presented helped me feel more competent when addressing issues related to autoimmune disease" and "I acquired knowledge through this curriculum about autoimmune diseases that will help me in the future" were both 4.5 (5-point Likert scale: 1 = *strongly disagree*, 5 = *strongly agree*). Our pre- and postsurvey analysis showed an increase in the percentage of residents who either strongly agreed or agreed after the rotation, as compared to prior to the rotation, with all objectives addressed by the curriculum. Please see [Table 1](#) for raw values recorded from learners' surveys.

Table 1. Pre- and Postrotation Data Collected Via Anonymous Survey From Learners (N = 34)

| Question | Strongly Disagree Disagree Neutral Agree Strongly Agree | | | | |
|--|---|----------|---------|-------|----------------|
| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| Prior to this rotation, I felt competent with workup of a patient who presents with concerns for autoimmune disease. | 1 | 14 | 12 | 4 | 3 |
| After this rotation, I feel competent with workup of a patient who presents with concerns for autoimmune disease. | 0 | 0 | 6 | 20 | 8 |
| Prior to this rotation, I felt competent performing a musculoskeletal exam. | 4 | 12 | 8 | 6 | 4 |
| After this rotation, I feel competent performing a musculoskeletal exam. | 0 | 1 | 7 | 19 | 7 |
| Prior to this rotation, I felt competent knowing when to appropriately refer to rheumatology. | 1 | 6 | 11 | 14 | 2 |
| After this rotation, I feel competent knowing when to appropriately refer to rheumatology. ^a | 0 | 0 | 2 | 19 | 12 |
| Prior to this rotation, I felt competent knowing what laboratory studies to order in a patient with concerns for autoimmune disease. | 3 | 11 | 12 | 8 | 0 |
| After this rotation, I feel competent knowing what laboratory studies to order in a patient with concerns for autoimmune disease. | 0 | 0 | 5 | 23 | 6 |
| Information presented helped me feel more competent when addressing issues related to autoimmune disease. | 0 | 0 | 0 | 17 | 17 |
| I acquired knowledge through this curriculum about autoimmune diseases that will help me in the future. | 0 | 0 | 1 | 14 | 19 |

^aOne respondent left this question blank, so the total here is 33, not 34.

A paired-samples *t* test was conducted to compare residents' feelings of competence with regard to workup for patients presenting with concerns for autoimmune disease prior to rotating with rheumatology and after rotating with rheumatology. Average Likert-scale responses were significantly different ($p < .001$) when comparing pre- and postrotation survey results for all learning objectives. Results suggest that learners were more comfortable with workup, musculoskeletal examination, laboratory interpretation, and referral to rheumatology for patients presenting with concerns for pediatric autoimmune or autoinflammatory disease (Table 2).

Table 2. Pre- and Postrotation Levels of Comfort Across Concepts Addressed During the Rotation (N = 34)

| Concept | Prerotation Survey | | Postrotation Survey | |
|--|--------------------|-----------|---------------------|-----------|
| | M | 95% CI | M | 95% CI |
| Comfort with workup | 2.74 | 2.37-3.12 | 3.91 | 3.59-4.24 |
| Comfort with laboratory interpretation | 2.74 | 2.42-3.06 | 3.82 | 3.72-4.16 |
| Comfort with musculoskeletal exam | 2.74 | 2.30-3.19 | 3.94 | 3.49-1.47 |
| Comfort with rheumatology referral | 3.20 | 2.83-3.57 | 4.06 | 3.66-4.46 |

Abbreviation: CI, confidence interval.

Comments and feedback were consistently positive, with most residents stating that their comfort level with these less common pediatric conditions improved. Residents also appreciated that the cases were based on real patients who may not have presented in a textbook manner. Most residents enjoyed the interactive nature of the series and the content; example comments included the following:

- “The power points were excellent. I liked that we got to work through the problem list and tests. That helped to test our knowledge.”
- “The lectures were awesome and well organized. Enjoyed the case-based nature. Did not get observed in clinic but really appreciate the pGALS app.”
- “Lectures were extremely helpful. Organized with just enough information given. Interactive.”
- “Great organization. I like the case-based format.”

Residents who received the curriculum also offered suggestions for additional lectures that they thought would be beneficial for their education. Some free-text responses for improvements in the curriculum were as follows:

- “Reviewing the pGALS during the first lecture instead of waiting for clinic week would have been helpful.”
- “Board focused ‘pearls’ would have been helpful—maybe at the end of lectures.”
- “The SLE lecture would have been great to prioritize.”

- “Maybe pause and let us form or brainstorm differential and work up a little longer.”
- “Would have liked to bedside round a little more to learn MSK [musculoskeletal] exam.”

Five semistructured interviews were conducted amongst faculty and fellows. Based on feedback received during these interviews, fellows who delivered the content appreciated having a prepared lecture and not having to come up with a new topic and teaching points every week. This allowed them to become very comfortable with the lectures over time and to lead residents through the cases while emphasizing pearls and teaching points. A consistent request from those who delivered the content was to consider adding more interactive slides.

In response to feedback received from residents, fellows, and faculty members, we prioritized some cases, including JIA with pGALS and SLE, to be discussed every month and typically tried to discuss them early in the month. We also dedicated specific providers, including three faculty members who consistently had clinic on the day residents rotated with us as well as two first-year fellows who taught pGALS in clinic, to help reinforce physical exam teaching. Finally, we added teaching pearls and take-home points at the end of the lectures, but due to constraints on time and space, we were not able to lengthen the lectures.

Discussion

Our results show that this curriculum met its goals by helping learners increase their comfort with the workup, laboratory evaluation, physical exam skills, and referrals to rheumatology. This rheumatology curriculum can supplement existing general pediatric education and assist with teaching the musculoskeletal exam to residents and medical students taking care of children. The curriculum can be used with a variety of learners, including as an introduction to pediatric rheumatology in graduate medical education, as continuing education for those with minimal exposure to rheumatology, and as a teaching supplement for institutions with pediatric rheumatology.

Challenges

There were several challenges and limitations noted throughout the data-collection period and when considering disseminating the curriculum. The greatest challenge was comfort with delivery of the material if there was no provider trained in rheumatology, although this could be mitigated by a prereading of the cases and of articles in the references for each case. Another challenge was that responses from learners were limited due to the nature of the surveys, which were in multiple-choice format with one free-response question. To more effectively evaluate the cases and delivery method, semistructured interviews with residents, fellows, and faculty would allow for more robust feedback and help guide further evolution of the content.

Future Goals/Direction

Future goals include reassessing learners to evaluate whether their comfort level with the workup, laboratory studies, musculoskeletal exam, and referral patterns is sustained after the end of the rotation. This would allow for long-term evaluation of the curriculum. Also, an assessment that tests knowledge instead of self-reported comfort levels would help to more objectively evaluate differences in knowledge both before and after case discussion.

Cases were chosen based on clinical experience and to provide exposure to the most commonly occurring pediatric autoimmune diseases likely to be seen by general pediatricians. The key issues we focused on were the diversity of clinical presentations for autoimmune diseases and how to appropriately work up a patient who presents with these symptoms. We did not include less common diagnoses such as mixed connective tissue disease or overlap syndromes as these are thought to be beyond the scope of material for residents and general pediatricians. These diagnoses are also very rare in the pediatric population, and we did not feel that we would have adequate time to address diagnostic criteria and management associated with them.

This curriculum is a multimodal resource that helps reinforce pediatric rheumatology objectives outlined by the American Board of Pediatrics. Given additional resources, the curriculum could expand to include further lectures, such as a dedicated lecture to discuss common laboratory tests, the utility of imaging studies, sexual health/reproductive counseling for adolescent patients, and health maintenance issues for patients on immunosuppressive medications.

Miriah Gillispie, MD: Fellow, Department of Pediatrics, Section of Immunology, Allergy, and Rheumatology, Baylor College of Medicine at Texas Children's Hospital

Eyal Muscal, MD: Associate Professor, Department of Pediatrics, Section of Immunology, Allergy, and Rheumatology, Baylor College of Medicine at Texas Children's Hospital; Associate Professor, Department of Neurology, Section of Immunology, Allergy, and Rheumatology, Baylor College of Medicine at Texas Children's Hospital

Jennifer Rama, MD, MEd: Assistant Professor, Department of Pediatrics, Section of Pulmonology, Baylor College of Medicine at Texas Children's Hospital

Carla Falco, MD: Assistant Professor, Department of Pediatrics, Section of Hospital Medicine, Baylor College of Medicine at Texas Children's Hospital

Amanda Brown, MD: Assistant Professor, Department of Pediatrics, Section of Immunology, Allergy, and Rheumatology, Baylor College of Medicine at Texas Children's Hospital

Disclosures

None to report.

Funding/Support

None to report.

Informed Consent

All identifiable persons in this resource have granted their permission.

Prior Presentations

Gillispie MC, Muscal E, Falco C, Rama J, Brown A. Developing a pediatric rheumatology curriculum for the pediatric resident. Presented at: Baylor College of Medicine Educator's Showcase; September 2017; Houston, TX.

Gillispie MC, Muscal E, Falco C, Rama J, Brown A. Developing a pediatric rheumatology curriculum for the pediatric resident. Presented at: American College of Rheumatology Annual Meeting; November 2017; San Diego, CA.

Ethical Approval

The Baylor College of Medicine Institutional Board Review approved this study.

References

1. de Inocencio J. Musculoskeletal pain in primary pediatric care: analysis of 1000 consecutive general pediatric clinic visits. *Pediatrics*. 1998;102(6):e63. <https://doi.org/10.1542/peds.102.6.e63>
2. de Inocencio J, Carro MÁ, Flores M, Carpio C, Mesa S, Marín M. Epidemiology of musculoskeletal pain in a pediatric emergency department. *Rheumatol Int*. 2016;36(1):83-89. <https://doi.org/10.1007/s00296-015-3335-9>
3. Rosenfeld SB, Schroeder K, Watkins-Castillo SI. The economic burden of musculoskeletal disease in children and adolescents in the United States. *J Pediatr Orthop*. 2018;38(4):e230-e236. <https://doi.org/10.1097/BPO.0000000000001131>
4. Tan A, Strauss VY, Protheroe J, Dunn KM. Epidemiology of paediatric presentations with musculoskeletal problems in primary care. *BMC Musculoskelet Disord*. 2018;19(1):40. <https://doi.org/10.1186/s12891-018-1952-7>
5. About cystic fibrosis. Cystic Fibrosis Foundation website. <https://www.cff.org/What-is-CF/About-Cystic-Fibrosis/>. Accessed February 14, 2018.
6. Data & statistics on sickle cell disease. Centers for Disease Control and Prevention website. <https://www.cdc.gov/ncbddd/sicklecell/data.html>. Published August 31, 2016. Updated August 9, 2017. Accessed February 14, 2018.
7. *Arthritis by the Numbers: Book of Trusted Facts & Figures*. Atlanta, GA: Arthritis Foundation; 2018.
8. Mayer ML, Brogan L, Sandborg CI. Availability of pediatric rheumatology training in United States pediatrics residencies. *Arthritis Rheum*. 2006;55(6):836-842. <https://doi.org/10.1002/art.22347>

9. Duke EM. *The Pediatric Rheumatology Workforce: A Study of the Supply and Demand for Pediatric Rheumatologists—Report to Congress*. North Bethesda, MD: Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services; 2007.
10. Mehta J. Pediatric rheumatology [Rheum2Learn module]. American College of Rheumatology website. <https://www.rheumatology.org/Learning-Center/Educational-Activities/Rheum2Learn/Pediatric-Rheumatology>. Updated April 2016. Accessed March 1, 2018.
11. Batthish M, Bassilious E, Schneider R, Feldman BM, Hyman A, Tse SML. A unique, interactive and web-based pediatric rheumatology teaching module: residents' perceptions. *Pediatr Rheumatol Online J*. 2013;11:22. <https://doi.org/10.1186/1546-0096-11-22>
12. Rogers B, Ellsworth J. PedsCases: a learning module for an approach to juvenile idiopathic arthritis for medical students. *MedEdPORTAL*. 2016;12:10383. https://doi.org/10.15766/mep_2374-8265.10383
13. Gerdung C, Lewis M, LeBlanc C, Ellsworth J. PedsCases - a learning module for Kawasaki disease for medical students. *MedEdPORTAL*. 2010;6:7977. https://doi.org/10.15766/mep_2374-8265.7977
14. Thomas PA, Kern DE, Hughes MT, Chen BY, eds. *Curriculum Development for Medical Education: A Six-Step Approach*. 3rd ed. Baltimore, MD: Johns Hopkins University Press; 2016.
15. pGALS—paediatric gait arms legs and spine [video]. Paediatric Musculoskeletal Matters International website. <http://www.pmmonline.org/video.aspx?id=757>. Accessed April 20, 2018.
16. Foster HE, Jandial S. pGALS—paediatric gait arms legs and spine: a simple examination of the musculoskeletal system. *Pediatr Rheumatol Online J*. 2013;11:44. <https://doi.org/10.1186/1546-0096-11-44>
17. Smith N, Jandial S, Rae L, Foster H. *pGALS* [mobile application]. Version 1.6. Gateshead, England: Boxmodel Digital Media Limited; 2016.

Received: May 31, 2018 | **Accepted:** September 16, 2018 | **Published:** October 26, 2018