Recommended Curriculum Guidelines for Pediatric Residents

Sports Medicine Curriculum Guideline

Introduction
The following curriculum guideline defines a recommended training strategy for pediatric residents. Attitude, knowledge and skills that are critical to pediatrics should be attained through a longitudinal experience that promotes educational competencies defined by the Accreditation Council for Graduate Medical Education (ACGME) [http://www.acgme.org](http://www.acgme.org). The curriculum must include structured experience in several specified areas. Most of the resident’s knowledge in sports medicine will be developed by caring for patients in ambulatory settings, such as the Emergency Department, outpatient clinic and Urgent Care. Structured didactic lectures, conferences, journal clubs and workshops that emphasize outcomes-oriented and evidence-based studies must be included in the curriculum. In addition, appropriate referral patterns and cost-effective care should be emphasized and taught as part of the curriculum. This document provides residency programs with a strategy can be implemented as an elective.

The program requirements specific to pediatric residencies may be found on the ACGME website. ([http://www.acgme.org/acgmeweb/](http://www.acgme.org/acgmeweb/)) This curriculum will be periodically updated to reflect current practice and incorporate new evidence-based guidelines.

The curriculum and its implementation will be the responsibility of the individual residency program. *This guideline should be a useful strategy for the formation of the curriculum for educating future pediatric physicians.*

Preamble
Specific attitudes, knowledge and skills are required to understand and manage sports medicine related diseases, disorders and injuries. Residency education is designed to provide experiences in a variety of setting that will give residents expertise in the diagnosis, treatment and prevention of these disorders. Residency experiences should include elementary school aged and adolescent patients, acute and chronic disorders, as well as patients with underlying medical conditions.

The combined burden of medical conditions affecting the musculoskeletal system and preventable chronic diseases that are related to inactivity and improper nutrition in the United States is enormous. Unfortunately, studies indicate that musculoskeletal and sports medicine training in pediatric residency programs is inadequate. Hergenroeder et al reported that pediatric residents were able to correctly perform 37% of ankle physical exam techniques and 18% of knee exam techniques. After a teaching intervention that involved a video, standardized patient observation of the attending examining a standardized patient and the resident demonstrated hands-on skills, there was a significant improvement in the residents’ knowledge and physical exam skills.
Residents performed 77% of the ankle exam techniques correctly 1 month post-intervention and 67% at 9 months. The residents performed 55% of the knee exam techniques correctly at 1 month and 47% at 9 months.

A survey of PL3s and chief residents in pediatric residency programs indicated the pre-participation evaluation and joint exams were the most poorly taught components of the physical evaluation (Demorest 2005). This survey indicated 77% of pediatric residency programs used lectures as the primary method for sports medicine education, while the majority of residents reported hands-on teaching and patient experience as the best methods of improving sports medicine education. Respondents stated that 29% of the programs surveyed did not include musculoskeletal examination teaching in the curriculum, while 24% did not include formal teaching of concussion management. Another study found that 83% of pediatric residency programs reported less than 6 hours of sports medicine training longitudinally (Stirling 1996).

It has been estimated that musculoskeletal complaints account for 10 to 15% of all visits to primary care physicians (Houston 2004), and that 6.1% of visits to a pediatrician for patients aged 3 to 14 were related to musculoskeletal complaints (De Inocencio 1998). The prevalence of musculoskeletal pain increases as children grow older, 2.4-5.7% at age 3 to 27.5-36% at age 14 (De Inocencio 2004). Pediatricians were found to have low confidence in their ability to care for patients with musculoskeletal injuries (Jandial 2009) with 51% of general pediatricians in practice between 1 and 5 years indicating that they did not receive enough training in sports medicine (Freed 2009).

As the nature and epidemiology of pediatric care change, our educational system must change as well. Sports medicine education in pediatric residency programs is deficient and should be improved with a standardized curriculum.


Competencies
At the completion of residency training, a pediatric resident should:

- Perform an appropriate sports medicine history and musculoskeletal physical examination, formulate an appropriate differential diagnosis list, identify the diagnosis and recommend treatment, including subspecialty referrals (patient care, medical knowledge, systems-based practice).
- Perform an evidence-based, age-appropriate and activity-specific pre-participation evaluation, and provide guidance for exercise prescription and participation (patient care, medical knowledge, interpersonal and communication skills, professionalism).
- Communicate effectively with a wide range of individuals regarding sports medicine health care, including patients, families, coaches, school administrators and other health care providers (interpersonal and communication skills, professionalism).

Attitudes
The pediatric resident should demonstrate attitudes that encompass:

- The importance of diagnosing and treating sports medicine disorders in pediatrics.
- Awareness of the expectations and stresses placed on young athletes by themselves, their parents, coaches and peers.
- Exercise is an important and beneficial component of patients’ lives.
- Appropriate pre-participation evaluation of athletes.
- Awareness of the needs of patients with acute injuries.
- Awareness of potential concerns for athletes with underlying medical issues and special needs.
- Proper rehabilitation of acute musculoskeletal injuries to help speed recovery, maximize function and minimize the risks or re-injury, chronic pain and disability.
- Prevention strategies as an important part of the care of musculoskeletal system.

General Knowledge and Skills
1. Normal anatomy and physiology
2. Normal growth and development
3. Sports medicine history taking
4. Principles of a musculoskeletal physical exam
5. Indications, contraindications and interpretation of laboratory data
6. Interpretation of radiographs
7. Indications for use of advanced imaging: bone scan, CT, MRI, arthrogram
8. Indications for referral to pediatric subspecialist or other specialist
9. Pathogenesis/pathophysiology and recognition of:
   a. Joint pain, swelling and injury
   b. Muscular pain, swelling and injury
c. Musculoskeletal trauma
d. Fractures and dislocations
e. Overuse syndromes
f. Compartment syndrome

**Sports Medicine Specific Knowledge, Skills and Considerations**

1. Pre-participation Physical Evaluation – James Hahn (Page 1)
2. Exertional Heat Illness – Lora Harrison (Page 7)
3. Sport-related Concussion – Kelsey Logan (Page 14)
4. Apophyseal Injuries – Mark Halstead (Page 20)
5. Shoulder Injuries – Mike Chapman (Page 27)
7. Hip Injuries – Laurie Donaldson (Page 54)
8. Knee Injuries – Becky Demorest (Page 64)
9. Ankle Injuries – Suz Briskin (Page 78)
10. Female Athlete Triad – Kevin Walter/Shayne Fehr (Page 90)

**Implementation**

This curriculum guideline should be implemented longitudinally throughout the three years of pediatric residency training. The continuing patient care experience in pediatric continuity clinics provides the principle site for training in ambulatory musculoskeletal care. Residents should have at least a minimal experience with primary care sports medicine or orthopaedic specialists. Preceptors who are competently trained must be available to work individually with residents, and to teach and assess performance of residents’ desired skills.

The teaching of sports medicine care lends itself well to hands-on training in core conferences and workshops, using video, patient demonstrations and models. Experience can be provided in musculoskeletal physical examination, splinting, taping, casting, interpretation of radiographs and rehabilitative measures.

It is recognized that not every pediatric training program is affiliated with a pediatric sports medicine center. Additional training sites that may prove helpful include orthopaedic surgery clinics, emergency departments, family medicine-based sports medicine clinics, private primary care clinics and rehabilitation centers. Community allied health professionals (athletic trainers, physical therapists, chiropractors, etc.) may be helpful liaisons for residents seeking to improve their sports medicine skill set.

Electives can serve to improve sports medicine training by exposing the resident to a greater concentration of common problems while providing experience with uncommon disorders. For residents to truly have a complete knowledge of the pediatric musculoskeletal system and all of the possible injuries, disorders and congenital anomalies, it is recommended that time is spent with pediatric rheumatology and pediatric orthopaedics.
Web Sites and Web-based Resources

Bryan ST, Heiman D, Hong E, Trojan TH. Evidence-based Musculoskeletal Examination: Faculty Development for Competence in Teaching Musculoskeletal Examination Techniques. Available at http://www.fmdrl.org/index.cfm?event=c.beginBrowseD&clearSelections=1&criteria=heiman#1184


Online MSK Exam List and Explanation with Video
Joint specific physical exam test listing with detailed explanations and short video clips of the exam being performed. From University of West Alabama Department of Sports Medicine and Athletic Training. http://at.uwa.edu/CurrHome/AH323/skillsshoulder.asp

Online Library of Radiographic Signs
Listing of radiographic signs by location and diagnosis. Very helpful for clinical teaching. From the UCLA Department of Radiology and peer reviewed by the American Journal of Radiology. http://www.gentili.net/signs/

Organizational Resources

AAP Council on Sports Medicine & Fitness

Policy Statements
http://pediatrics.aappublications.org/collection/council-sports-medicine-and-fitness
ACSM  www.acsm.org
Position Stands
http://www.acsm.org/public-information/position-stands

Team Physician Statements
http://www.acsm.org/public-information/team-physician-consensus-conference-statements

AMSSM  www.amssm.org
Position Statements
http://www.amssm.org/Publications.html

NFHS  www.nfhs.org
Sports Medicine  http://www.nfhs.org/resources/sports-medicine/

Textbooks

Pediatric Orthopaedics and Sports Injuries, 2nd edition (Sarwark and Labella)

Care of the Young Athlete, 2nd edition (Harris and Anderson)

Sports Medicine in the Pediatric Office (Metzl)

Essentials of Musculoskeletal Care, 5th edition