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Recommended Curriculum Guidelines for Family Medicine Residents

Musculoskeletal and Sports Medicine

This document was endorsed by the American Academy of Family Physicians (AAFP).

Introduction

This Curriculum Guideline defines a recommended training strategy for family medicine residents. Topic competencies, attitudes, knowledge, and skills that are critical to family medicine should be attained through longitudinal experience that promotes educational competencies defined by the Accreditation Council for Graduate Medical Education (ACGME), www.acgme.org. The curriculum must include structured experience in several specified areas. Most of the resident's knowledge will be gained by caring for ambulatory patients who visit the family medicine center. Structured didactic lectures, conferences, journal clubs, and workshops must be included in the curriculum with an emphasis on outcomes-oriented, evidence-based studies that delineate common and chronic diseases affecting patients of all ages. Targeted techniques of health promotion and disease prevention are hallmarks of family medicine. Appropriate referral patterns and provision of cost-effective care should also be part of the curriculum.

Program requirements specific to family medicine residencies may be found on the ACGME website. Current AAFP Curriculum Guidelines may be found online at www.aafp.org/cg. These guidelines are periodically updated and endorsed by the AAFP and, in many instances, other specialty societies, as indicated on each guideline.

Each residency program is responsible for its own curriculum. ***This guideline provides a useful strategy to help residency programs form their curricula for educating family physicians.***

Preamble

The approach to diseases and disorders of the musculoskeletal system requires specific attitudes, knowledge, and skills. Residency education is designed to provide experiences in a variety of settings that will give residents expertise in the diagnosis, prevention, treatment, and rehabilitation of musculoskeletal diseases. These experiences should include patients of all ages and conditions of congenital, traumatic, and degenerative causes.

The combined burden of medical conditions affecting the musculoskeletal system and preventable chronic diseases that are related to improper nutrition and inactivity in the United States is staggering. Musculoskeletal complaints rank second only to upper respiratory infections as the reason for seeking medical attention (Woodwell 2004). Yet, studies indicate musculoskeletal and sports medicine education in U.S. medical schools and primary care residencies may be inadequate (Freedman 1998). The attitudes, knowledge, and skills provided in this Curriculum Guideline will equip family medicine training programs to provide optimal care of patients in preventing and treating those who have musculoskeletal complaints.

Competencies

At the completion of residency training, a family medicine resident should:

- Perform an appropriate musculoskeletal history and physical examination, and formulate an appropriate differential diagnosis and recommend treatment, including requisite subspecialty referrals (Patient Care, Medical Knowledge, Systems-based Practice)
- Perform an evidence-based, age-appropriate, and activity-specific preparticipation physical examination (Patient Care, Medical Knowledge, Interpersonal and Communication Skills, Professionalism)
- Communicate effectively with a wide range of individuals regarding musculoskeletal health care, including patients, their families, coaches, school administrators, and employers (Interpersonal and Communication Skills)
- Understand how exercise impacts disease states such as diabetes and hypertension and be able to formulate an appropriate exercise prescription (Patient Care, Medical Knowledge, Interpersonal and Communication Skills)
- Understand that sports medicine involves caring for the medical conditions of athletes in addition to the musculoskeletal conditions (Patient Care)

Attitudes

The resident should demonstrate attitudes that encompass:

- The importance of diagnosing and treating musculoskeletal injuries in family medicine
- Exercise as an important and beneficial part of patients' lives
- Appropriate preparticipation evaluation of athletes
- Awareness of the special needs of patients who have acute injuries
- Proper rehabilitation of acute musculoskeletal injuries to help speed recovery, maximize function, and minimize the risks of re-injury, chronic pain, and chronic disability
- Prevention strategies as an important part of the care of the musculoskeletal system

Knowledge

In the appropriate setting, the resident should demonstrate the ability to apply knowledge of:

1. Normal anatomy and physiology
2. Normal growth and development
3. Musculoskeletal history taking
4. Principles of musculoskeletal physical examination
5. Indications, contraindications, and interpretation of laboratory data (e.g., joint fluid)
6. Indications, limitations, contraindications, and informed consent for office-based musculoskeletal procedures such as:
 - a. Common joint aspirations
 - b. Common joint injections
 - c. Common injections for bursitis
 - d. Common injections for tendinopathy
7. Testing
 - a. Interpretation of radiographs
 - b. Use of magnetic resonance imaging (MRI), computed tomography (CT) scanning, bone scanning, and musculoskeletal ultrasound

- c. Indications for arthrogram, myelogram and arthroscopy
 - d. Application of electromyography (EMG) and nerve conduction studies
8. Pathogenesis/pathophysiology and recognition of:
- a. Joint pain, swelling, and erythema
 - b. Muscular pain, swelling, and injury
 - c. Musculoskeletal trauma
 - d. Fractures
 - e. Dislocations
 - f. Tendinopathy spectrum
 - g. Tendon ruptures (partial and complete)
 - h. Nerve injuries
 - i. Bone and joint deformities
 - j. Bone and joint infections
 - k. Metabolic bone diseases
 - l. Musculoskeletal congenital anomalies
 - m. Musculoskeletal birth injuries
 - n. Compartment syndrome
 - o. Avascular necrosis
 - p. Osteoporosis
 - q. Overuse syndromes
 - r. Back pain syndromes
9. Pediatric problems
- a. Hip dislocation
 - b. Congenital hip dysplasia
 - c. Legg-Calvé-Perthes disease
 - d. Osgood-Schlatter disease
 - e. Slipped capital femoral epiphysis
 - f. "Clubfoot" (talipes equinovarus)
 - g. Intoeing (metatarsus adductus, tibial torsion, femoral anteversion)
 - h. "Bowleg" (genu varum) and "knock knee" (genu valgum)
 - i. Physeal injuries (Salter-Harris classification)
 - j. Transient synovitis

- k. Child abuse patterns of injury
- l. Dislocation of the radial head (nursemaid's elbow)
- m. Blount disease
- n. Rickets
- o. Osteogenesis imperfecta
- p. Thoracolumbar scoliosis

10. Sports medicine-specific considerations

- a. General considerations
- b. Ethical, psychosocial, economic, and medicolegal issues
- c. Interaction with members of the sports medicine team
- d. Nutrition, fluids and electrolytes, and dietary supplements
- e. Injury prevention
 - i. Discouraging use of improper techniques
 - ii. Promoting rule changes and enforcement of rules designed to enhance participant safety
 - iii. Proper equipment, fit, and maintenance
 - iv. Taping, strapping, and bracing techniques
 - v. Environmental factors affecting participant and spectator safety
- f. Conditioning and training techniques, including principles of aerobic and resistance training
- g. Appropriate exercise prescription for:
 - i. Healthy persons of all ages, taking into account physiologic differences related to age and sex
 - ii. Patients who have chronic illnesses, including diabetes, hypertension, congestive heart failure, asthma, and chronic obstructive pulmonary disease
 - iii. Pregnant women
 - iv. Physically or mentally challenged athletes
 - v. Patients who have various cardiovascular conditions, especially those known to increase the risk of sudden death
- h. Sports medicine education promotion for patients and their families, athletes and their families, allied health professionals, coaches, and school administrators
- i. Patient care aspects
 - i. The important role of family physicians as part of a team of physicians for organized sports
 - ii. The role of family physicians as medical directors and/or on-site medical care providers for mass participation sporting events

- iii. Appropriate assessment and care of acutely injured athletes, including, but not limited to:
 - 1) Evaluation, on-field management, and transport of suspected cervical spine injury
 - 2) Evaluation, and on-field and sideline management of suspected concussion or other head injury
 - 3) Evaluation, on-field management and transport of severe fractures and dislocations
- iv. Medical management of ill and injured athletes, taking into account important sport-specific considerations
- v. Rehabilitation oversight for ill and injured athletes, and return to play decision-making
- j. Medical care considerations for special athlete groups
 - i. Preadolescent athletes
 - ii. Adolescent athletes
 - iii. Female athletes
 - iv. Geriatric athletes
 - v. Physically challenged athletes
 - vi. Student athletes
 - vii. Recreational athletes
 - viii. Athletes who have chronic diseases
- k. Communication and interaction with patients and their families, athletes and their families, coaches, and school administrators
- l. Exercise-induced asthma testing
- m. Understanding of cardiac screening for exercise-related cardiac problems

11. Problems associated with exercise

- a. Exercise addiction
- b. Abuse of anabolic steroids and other performance-enhancing drugs
- c. Pressures placed on athletes by themselves, family members, teammates, coaches, and fans to participate even when injured
- d. Performance pressures placed on athletes by themselves, family members, teammates, coaches, and fans
- e. The intermittent exerciser
- f. How to deal with unmet and unrealized expectations
- g. Alcohol and illicit drug use and abuse
- h. Eating disorders

12. Management and therapy

- a. Outline of expected course with and without therapy
- b. Patient education for acute and chronic problems

- c. Targeted pharmacologic treatment
- d. Supportive/corrective devices, including braces, casts, splints, and orthotics
- e. Complementary and alternative modalities
- f. Prevention
 - i. Preparticipation screening
 - ii. Conditioning and training
 - iii. Injury prevention
 - iv. Physical fitness/exercise prescription
 - v. Bone loss
 - 1) Nutrition
 - 2) Exercise
 - 3) Pharmacology
- g. Rehabilitation
 - i. Physical therapy
 - 1) Cold, heat
 - 2) Ultrasound and phonophoresis
 - 3) Exercises
 - 4) Electrical stimulation (e-stim) and iontophoresis
 - ii. Occupational therapy
 - iii. Complementary modalities (e.g., osteopathic manipulative therapy [OMT], massage, acupuncture)
 - iv. Psychosocial aspects of trauma
- h. Surgery and follow-up care
 - i. Internal and external fixation devices
 - ii. Artificial joint replacement
 - iii. Arthroscopy

Skills

In the appropriate setting, the resident should demonstrate the ability to independently perform or appropriately refer:

1. Basic management of:
 - a. Fractures (simple, stable, closed, and nondisplaced that do not require surgical correction)
 - b. Ligament sprains
 - i. Finger
 - ii. Toe
 - iii. Ankle
 - iv. Knee
 - v. Vertebral column
 - vi. Wrist

- vii. Elbow
- viii. Shoulder
- c. Muscular strains (e.g., hamstring, trapezius)
- d. Other problems
 - i. Costochondritis
 - ii. Bursitis, tendinopathy, tenosynovitis
 - iii. Common fibrocartilage injuries such as labral and meniscal tears
 - iv. Dislocations (e.g., nursemaid's elbow)
 - v. Neurologic conditions (e.g., concussions, nerve entrapment syndromes, brachial plexopathies)
 - vi. Synovial cysts (e.g. Baker cyst, ganglion cysts)
 - vii. Patellofemoral syndrome apophysitis (e.g., Osgood-Schlatter disease)
 - viii. Osteochondroses/aseptic necrosis
 - ix. Osteoarthritis/crystalline-induced arthritis (e.g., gout, pseudogout)
 - x. Metabolic bone disease (osteoporosis, Paget disease)
 - xi. Acute and chronic low back pain
 - xii. Foot conditions
 - 1) Hallux valgus (bunions)
 - 2) Plantar fasciitis
 - 3) Morton neuroma
 - xiii. Osteomyelitis
 - xiv. Rheumatologic disorders
- e. Procedures (indications, contraindications, and complications)
 - i. Joint aspiration (arthrocentesis)
 - ii. Joint injection
 - iii. Common injections for bursitis
 - iv. Common injections for tendinopathy
 - v. Splints (upper and lower extremity)
 - vi. Plaster and fiberglass casts
 - 1) Short leg
 - 2) Short and long arm
 - 3) Thumb spica
 - 4) Cast problems
 - vii. Dislocation reduction
 - 1) Simple anterior shoulder
 - 2) Radial head
 - 3) Simple posterior elbow
 - 4) Phalanges
 - 5) Patella
 - 6) Mandible

2. Additional skills

- a. Fractures
 - i. Closed tarsal and carpal bones, particularly navicular
 - ii. Smith and Colles fractures

- iii. Nondisplaced medial or lateral epicondyle of humerus
 - iv. Nondisplaced humeral neck fractures
 - v. Nondisplaced Salter-Harris Type I or Type II epiphyseal injuries in children
 - vi. Dancer's and Jones fractures (proximal 5th metatarsal)
- b. Meniscal tears
 - c. Recurrent dislocations (e.g., patella, shoulder)
3. Orthopedic emergency recognition and stabilization
- a. Acute compartment syndrome
 - b. Hip dislocation
 - c. Knee dislocation
 - d. Unstable pelvis fracture
 - e. Cervical spine fracture
 - f. Spinal cord injury
 - g. Cauda equina syndrome
 - h. Neurovascular compromise
4. Functional rehabilitation
- a. Prescription of home exercise programs
 - b. Prescription of physical therapy
5. Surgical assistance

Implementation

This Curriculum Guideline should be implemented longitudinally throughout the three years of residency training. Research has shown that early exposure to a sports medicine curriculum enhances basic medical knowledge in musculoskeletal medicine (Watts 2011). The continuing patient care experience in the family medicine center provides the principal site for training in ambulatory musculoskeletal care. Residents should have at least minimal experience in inpatient orthopedics. 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 musculoskeletal care lends itself well to hands-on training in core conferences and workshops, using films, patient demonstrations, and models. Experience can be provided in bone, muscle, and joint examination; splinting; taping; casting; arthrocentesis; and rehabilitative measures. Additional training sites that have proved useful include private orthopedic offices; emergency departments; sports medicine and rehabilitation centers; game-time sidelines care sites; and specialized clinics, including adult back, scoliosis, and foot clinics. Electives can serve to consolidate orthopedic training, to expose the resident to

a greater concentration of common problems, or to provide experience with unusual problems (e.g., acute ski injury clinics, military bases, paratrooper training, gait and balance clinics for the elderly).

Resources

Articles

American Family Physician by Topic: Musculoskeletal Care. (Multiple articles)
www.aafp.org/afp/topicModules/viewTopicModule.htm?topicModuleId=17

American Board of Family Medicine Sports Medicine Examination Content; 2007.
<https://www.theabfm.org/cert/SportsMedExaminationOutline.pdf>

Cassas KJ, Cassettari-Wayhs A. Childhood and adolescent sports-related overuse injuries. *Am Fam Physician*. 2006;73(6):1014-1022.
www.aafp.org/afp/2006/0315/p1014.pdf

Freedman KB, Bernstein J. The adequacy of medical school education in musculoskeletal medicine. *J Bone Joint Surg Am*. 1998;80(10):1421-1427.

Giese EA, O'Connor FG, Brennan FH, Depenbrock PJ, Oriscello RG. The athletic preparticipation evaluation: cardiovascular assessment. *Am Fam Physician*. 2007;75(7):1008-1014. www.aafp.org/afp/20070401/1008.pdf

Swarz EE, Boden BP, Courson RW, et al. National Athletic Trainers' Association position statement: acute management of the cervical spine-injured athlete. *J Athl Train*. 2009;44(3):306-331.
www.nata.org/sites/default/files/AcuteMgmtOfCervicalSpineInjuredAthlete.pdf

Watts SA, Zhang Z. Competency in musculoskeletal and sports medicine: evaluating a PGY-1 curriculum. *Fam Med*. 2011;43(9):659-663.

Whiteside JW. Management of head and neck injuries by the sideline physician. *Am Fam Physician*. 2006;74(8):1357-1362. www.aafp.org/afp/2006/1015/p1357.pdf

Woodwell DA, Cherry DK. National Ambulatory Medical Care Survey: 2002 summary. *Adv Data*. 2004;(346):1-44.

Books

Primary Resources (recommended for all residencies):

American College of Sports Medicine. *ACSM's Guidelines for Exercise Testing and Prescription*. 8th ed. Baltimore, MD: Lippincott Williams & Wilkins; 2010.

Eiff MP, Hatch RL. *Fracture Management for Primary Care*. 3rd ed. Philadelphia, PA: Elsevier Saunders; 2011.

McKeag DB, Moeller JL. *ACSM's Primary Care Sports Medicine*. 2nd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2007.

Sarwark JF, ed. *Essentials of Musculoskeletal Care*. 4th ed. Rosemont, IL: American Academy of Orthopaedic Surgeons; 2010.

Secondary Resources (supplement primary resources):

DeLee JC, Drez D, Miller MD. *DeLee & Drez's Orthopaedic Sports Medicine: Principles and Practice*. 3rd ed. Philadelphia, PA: Elsevier Saunders; 2010.

O'Connor FG, ed. *ACSM's Sports Medicine: A Comprehensive Review*. Philadelphia, PA: Lippincott Williams & Wilkins; 2012.

Pfenninger J, Fowler GC. *Pfenninger and Fowler's Procedures for Primary Care*. 3rd ed. Philadelphia, PA: Elsevier Mosby; 2011.

Website Resources

Atlas of signs in musculoskeletal radiology. (Listing of radiographic signs by location and diagnosis, peer reviewed by the *American Journal of Radiology*)
www.gentili.net/signs/

Bernhardt DT, Roberts WO, eds. Preparticipation Physical Evaluation. 4th ed. 2010.
<https://nf.aafp.org/Shop/forms-downloads/preparticipation-physican-evaluation-monograph>

Bryan S, Heiman D, Hong E, Turner J, Trojian T. Evidence-based musculoskeletal examination: faculty development for competence in teaching musculoskeletal examination techniques; 2007.
www.fmdrl.org/index.cfm?event=c.getAttachment&riid=1550

Childress S, Buckwalter K, Indiana University Radiology Department. Online cross-sectional anatomy atlas. www.indyrad.iupui.edu/public/childres/viewer/launch.html

DMOZ (Open Directory Project). Musculoskeletal disorders.
http://dmoz.org/Health/Conditions_and_Diseases/Musculoskeletal_Disorders/

University of California, San Diego (UCSD). Online musculoskeletal exam tutorial. (Detailed tutorial on musculoskeletal exam by joint; provides several anatomic and clinical photos and videos with step-by-step review of detailed examination)
<http://meded.ucsd.edu/clinicalmed/joints.htm>

University of West Alabama Athletic Training & Sports Medicine Center. Online musculoskeletal exam list and explanation with video. (Joint-specific physical exam test listing with detailed explanations and short video clips of the exam being performed)
<http://at.uwa.edu/CurrHome/AH323/skillsshoulder.asp>

Organizations

American Academy of Family Physicians. www.aafp.org

American Academy of Orthopaedic Surgeons. www.aaos.org

American College of Radiology. <http://acr.org>

American College of Rheumatology. www.rheumatology.org

American College of Sports Medicine. www.acsm.org

American Medical Society for Sports Medicine. www.amssm.org

American Orthopaedic Society for Sports Medicine. www.sportsmed.org

Arthritis Foundation. <http://arthritis.org>

Society of Teachers of Family Medicine. www.stfm.org

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