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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), the Association of Departments of Family Medicine (ADFM), the Association of Family Medicine Residency Directors (AFMRD), and the Society of Teachers of Family Medicine (STFM), and was developed in cooperation with the American Medical Society for Sports Medicine (AMSSM) and the University of Connecticut-St. Francis Family Medicine Residency Program.

Introduction

This Curriculum Guideline defines a recommended training strategy for family medicine residents. 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) http://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 Web site. Current AAFP Curriculum Guidelines may be found online at http://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). Training programs in family medicine that will lead to optimal care of patients who have musculoskeletal complaints, including those related to sports medicine, should encompass the outline of the attitudes, knowledge and skills provided in this curriculum guideline.

Competencies

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

- Perform an appropriate musculoskeletal history and physical examination, and formulate an appropriate 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 evaluation, and provide guidance for an appropriate exercise prescription (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)

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 pre-participation physical 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, computed tomographic scanning and bone scanning
    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 (tendinitis to tendinosis)
    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. In-toeing (metatarsus adductus, tibial torsion, femoral anteversion)
    h. “Bowleg” (genu varum) and “knock knee” (genu valgum)
    i. Epiphyseal 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 medico-legal 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 rules 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, on-field and sideline management of suspected concussion (also known as mild traumatic brain injury or mTBI)

3) Evaluation, on-field management and transport of suspected intracranial hemorrhage

4) 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. Pre-adolescent 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. Dealing with unmet and unrealized expectations
    g. Alcohol and illicit drug use and abuse
    h. Eating disorders

12. Management and therapy
    a. Outline 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. Pre-participation 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 treatment [OMT], massage)
    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. Nerve entrapment syndromes
vi. Baker's cyst
vii. Chondromalacia patellae
viii. Apophysitis (e.g., Osgood-Schlatter disease)
ix. Osteochondroses/aseptic necrosis
x. Osteoarthritis/crystalline-induced arthritis (e.g., gout, pseudo-gout)
xi. Metabolic bone disease (osteoporosis, Paget's disease)
xii. Acute and chronic low back pain
xiii. Foot conditions
    1) Hallux valgus (bunions)
    2) Plantar fasciitis
    3) Mortons neuroma
xiv. Osteomyelitis
xv. Overuse syndromes
    1) Shoulder impingement
    2) Patellofemoral syndrome
xvi. 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. Strapping and taping techniques
    1) Elasticized bandage
    2) Ankle taping
    3) Clavicular figure-of-eight bandage
vi. Splints (upper and lower extremity)
vii. Plaster and fiberglass casts
    1) Short and long leg, with and without walker
    2) Short and long arm
    3) Thumb spica
    4) Cast wedging

5) Cast problems

viii. Dislocation reduction

1) Simple anterior shoulder
2) Radial head
3) Simple posterior elbow
4) Phalanges
5) Patella
6) Mandible

ix. Traction application (Buck's, cervical)

2. Additional skills
   a. Fractures
      i. Closed tarsal and carpal bones, particularly navicular
      ii. Smith's and Colles' fractures
      iii. Nondisplaced medial or lateral epicondyle of humerus
      iv. Nondisplaced Salter-Harris Type I or Type II epiphyseal injuries in children
      v. 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 equine 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. The continuing patient care experience in the family medicine center provides the principle 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, 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, training paratroopers, gait and balance clinics for the elderly).

Web Sites and Web-based Resources

American Board of Family Medicine, Sports Medicine Self-Assessment Module Practice Examination: https://sam.theabfm.org/SportsMedPE/index.html

American College of Sports Medicine: http://www.acsm.org

American Medical Society for Sports Medicine: http://www.amssm.org

Blueprint for content of Certificate of Added Qualifications in Sports Medicine Examination administered by ABFM:
https://www.theabfm.org/cert/SportsMedExaminationOutline.pdf

Bryan ST, Heiman D, Hong E, Trojian TH. Evidence-based Musculoskeletal Examination: Faculty Development for Competence in Teaching Musculoskeletal Examination Techniques. Available at
http://www.fmdrl.org/index.cfm?event=c.getAttachment&riid=1550
PowerPoint at http://www.fmdrl.org/index.cfm?event=c.getAttachment&riid=1550

Examination Skills of the Musculoskeletal System DVD and Syllabus:
https://secure.aafp.org/catalog/viewItem.do?itemId=2775&productId=871&categoryId=2

Indiana University Radiology Department, Online Cross-Sectional Anatomy Atlas (provides images of major joints with anatomy labels that pop-up when pointer over structure): http://www.indyrad.iupui.edu/public/childres/viewer/launch.html

Joint Injection & Aspiration DVD and Syllabus Author:
https://secure.aafp.org/catalog/viewItem.do?itemId=2774&productId=870&categoryId=2

Massachusetts General Hospital, Musculoskeletal Disorders:
http://www.massgeneral.org/children/adolescenthealth/articles/aa_musculoskeletal_disorders.aspx

Musculoskeletal Disorders:
http://dmoz.org/Health/Conditions_and_Diseases/Musculoskeletal_Disorders/

National Athletic Trainers' Association:
Prehospital Care of the Spine-Injured Athlete:
http://www.spine.org/Documents/NATA_Prehospital_Care.pdf

Accompanying Spine Injury Management video ordering information:
http://www.humankinetics.com/products/showproduct.cfm?isbn=0736040781#Companion_Resources)

Preparticipation Physical Evaluation Monograph, 3rd Edition, 2004 McGraw-Hill Healthcare Information Group: http://www.aafp.org/fpr/20040800/6.html

Society of Teachers of Family Medicine (STFM) Online Bookstore (recommended sports medicine books):
http://www.stfm.org/publications/stfmbookstore.cfm

Sports Medicine Audio CD and Syllabus:
https://secure.aafp.org/catalog/viewItem.do?itemId=2502&productId=862&categoryId=2

The Physician and Sports Medicine: http://www.physsportsmed.com

University of California, Los Angeles, Online Library of Radiographic Signs (listing of radiographic signs by location and diagnosis, peer reviewed by the American Journal of Radiology):
http://www.gentili.net/signs/

University of California, San Diego, A Practical Guide to Clinical Medicine:
http://meded.ucsd.edu/clinicalmed

University of California, San Diego, 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 Florida, College of Medicine:
http://medinfo.ufl.edu/other/opeta/musculo/MS_main.html

University of Florida, College of Medicine, Examination of the Extremities and Back:
http://medinfo.ufl.edu/year1/bcs/clist/extrem.html

University of Washington Department of Radiology, Online Plain Radiograph Atlas of Major Joints, Plain x-rays of Musculoskeletal System with Labels on Major Landmarks and Bones:

http://www.rad.washington.edu/radanat/

University of Florida Online Physical Exam Teaching Assistant Program, Musculoskeletal Exam Teaching Videos (peer reviewed by MedEdPORTAL): http://medinfo.ufl.edu/other/opeta/musculo/MS_main.html

University Hospitals of Cleveland Department of Radiology, Online Musculoskeletal Radiology Teaching Cases (musculoskeletal cases with description and image files): http://www.uhrad.com/msiarc.htm

University of West Alabama Department of Sports Medicine and Athletic Training, 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

U.S. Department of Labor, Ergonomics for the Prevention of Musculoskeletal Disorders Guidelines for Retail Grocery Stores: http://www.at.uwa.edu/currHome/AH323/skillsshoulder.asp

Articles

Cassas KJ, Cassettari-Wayhs A. Childhood and adolescent sports-related overuse injuries. Am Fam Physician 2006;73:1014-22. http://www.aafp.org/afp/20060315/1014.pdf

Freedman KB, Bernstein J. The Adequacy of Medical School Education in Musculoskeletal Medicine. J Bone Joint Surg Am. 1998 Oct;80(10:1421-7.

Giese EA, O'Connor FG, Brennan FH, Depenbrock PJ, Oriscello RG. The athletic preparticipation evaluation: cardiovascular assessment. Am Fam Physician 2007;75(7):1008-14. http://www.aafp.org/afp/20070401/1008.pdf

Whiteside JW. Management of head and neck injuries by the sideline physician. Am Fam Physician 2006;74:1357-62. http://www.aafp.org/afp/20061015/1357.pdf

Woodwell DA, Cherry DK. National Ambulatory Medical Care Survey: 2002 summary. Adv Data. 2004 Aug 26;(346);1-44.

Books

Primary Resources (recommended for all residencies):

Green W, Griffin LY ed., Essentials of musculoskeletal care. 3rd ed. Rosemont, Il: American Academy of Orthopaedic Surgeons; 2005.

McKeag DB, Moeller JL. ACSM's primary care sports medicine, comprehensive sports medicine references geared to primary care practitioners. 2nd ed. Philadelphia, Pa: Lippincott, Williams & Wilkins, 2007.

ACSM's guidelines for exercise testing and prescription. 7th ed. Baltimore, Md: Lippincott, Williams & Wilkins, 2005.

Eiff MP, Hatch RL, Calmbach WL, Hatch RL. Fracture management for primary care. 2nd ed. Philadelphia, Pa: Saunders, 2002.

Reider B. The orthopaedic physical examination. 2nd ed. Philadelphia, Pa: Elsevier Saunders; 2005.

Secondary Resources (supplement primary resources):

DeLee JC, Drez D, Miller MD. DeLee & Drez's orthopaedic sports medicine: principles and practice. 2nd ed. Philadelphia, Pa: Saunders; 2002.

Simon RR, Koenigsknecht SJ. Emergency orthopedics, the extremities. 4th ed. New York: McGraw-Hill Professional; 2001.

Pfenninger J, Garcia G, Fowler GC, Newkirk G, Tuggy M. Pfenninger and Fowler's procedures for primary care. 2nd ed. Elsevier Health Sciences; 2003.

Mellion MB, Walsh WM, Madden C, Putukian M, Shelton GL. The team physician's handbook. 3rd ed. Philadelphia, Pa: Hanley & Belfus; 2001.

Hoppenfeld S. Physical examination of the spine and extremities. 1st ed. New York, Ny: Appleton & Lange; 1976.

Organizations

American Academy of Family Physicians: http://www.aafp.org

American Academy of Orthopaedic Surgeons: http://www.aaos.org

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

American College of Rheumatology: http://www.rheumatology.org

American College of Sports Medicine: http://www.acsm.org

American Medical Society for Sports Medicine: http://www.newamssm.org

American Orthopaedic Society for Sports Medicine: http://www.sportsmed.org

Arthritis Foundation: http://arthritis.org

Society of Teachers of Family Medicine: http://www.stfm.org

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