

# Suggested Curricular Guidelines for Musculoskeletal and Sports Medicine in Family Medicine Residency Training

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## Abstract

Patients often seek care from a family physician when they have a musculoskeletal injury or sport-related ailment. Family physicians must be adequately trained to provide this care. While general guidance is provided by the Accreditation Counsel for Graduate Medical Education (ACGME) it is left up to the individual programs to develop, implement, and execute their orthopedic and sports medicine curriculums. The American Academy of Family Physicians' (AAFP) Recommended Curriculum Guideline for Family Medicine Residents — Musculoskeletal and Sports Medicine provides a basic outline format for curriculum content and reference resources. The aim of this article is to elaborate on those training requirements and help programs to develop a curriculum implementation plan that will deliver a baseline level of competence for family medicine trainees.

## Introduction

As primary care physicians are encouraged to emphasize exercise for the prevention and treatment of chronic diseases, and as the United States population continues to age, family physicians are likely to see a significantly higher number of musculoskeletal and sports-related complaints in their clinical practices. The current estimate is that up to 60% of primary care visits encompass musculoskeletal complaints (1,2). Considering the broad scope of other sports-related conditions (for example, sports concussions, exercise-induced

asthma, athletes with exertional chest pain, eating/nutritional concerns, and sports-related dermatologic conditions) that will present to the family physician, family medicine residents must be competent to diagnose and treat a broad spectrum of sports medicine topics. Unfortunately, the literature has shown that many family medicine residents and practicing physicians feel that their training and knowledge of sports and musculoskeletal medicine is insufficient (1). This lack of training could result in unnecessary referrals, a decline in patient satisfaction, and additional health care costs. The 2019 Accreditation Counsel for Graduate Medical Education (ACGME) Requirements for Graduate Medical Education in Family Medicine outlines the requirement for at least 200 h (or 2 months) of exposure/care of patients with a breadth of musculoskeletal conditions to include 1 month of a structured sports medicine exposure (3). The American Academy of Family Physicians Recommended Curriculum Guideline for Family Medicine Residents-Musculoskeletal and Sports Medicine provides a basic outline format for curriculum content and reference resources (4). The goals of this article are 1) to summarize key required curricular components and 2) to provide ideas to improve the quality of training in family medicine residency programs. Practicing physicians may use this reference to perform a personal knowledge “gap analysis” which can direct them to sports medicine opportunities. We

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recognize that limitations in time and resources may hinder programs' attempts to fulfill these educational goals. However, a well-designed longitudinal curriculum starting in the first postgraduate year of family medicine residency can substantially improve a resident physician's knowledge and confidence in treating sports and musculoskeletal injuries (5). Interactive didactic conferences, hands-on physical examination and injection workshops, point of care ultrasound workshops, a multitude of online educational videos, traditional textbooks, and online references are useful modalities through which to train and educate residents. The American Medical Society for Sports Medicine (AMSSM), American College of Sports Medicine (ACSM), American Orthopedic Society for Sports Medicine, and American Osteopathic Academy of Sports Medicine can provide resources to assist in the development of an outstanding musculoskeletal and sports medicine curriculum. Community sports medicine specialists also are invaluable educators for educating residents.

### Competencies

The ACGME expects family medicine residents to achieve "milestone" Level 3 competency in patient care, medical knowledge, interpersonal and communication skills, professionalism, practice-based learning and improvement, and systems-based practice (3). It is imperative that family medicine residents develop these competencies in musculoskeletal and sports medicine during their training.

**First, residents should be able to perform a precise musculoskeletal history and physical examination. This includes formulating a differential diagnosis for musculoskeletal complaints, determining applicable diagnostic tests, recommending initial treatment, and understanding when specialty referral is necessary.** They should have an awareness of how mechanism of injury and knowledge of anatomy can lead to the correct diagnosis. **Systemic and psychological conditions may present as a musculoskeletal complaint.** Young clinicians must be aware of this concept.

Family physicians often perform preparticipation examinations (PPE). The PPE provides an opportunity for the family physician to interact with younger members of his or her community while gaining an understanding of relative health risks and sport-specific concerns. By providing this service, the PPE can serve to connect primary care providers with local communities and their sport and health-related issues (6). Residents must be able to perform evidence-based, age-appropriate, and activity-specific PPEs by the end of their training. They should understand the limitations of the current evidence associated with PPEs.

Resident physicians should be encouraged to provide medical care at mass participation events (*e.g.*, treating patients in a marathon medical tent) and sideline events (*e.g.*, a high school football game). These events are a forum to refine their acute care skills and a means to make a connection with their community through service.

Resident physicians should be able to care for athletes involved in competition within the context of a multidisciplinary team. Learning how to obtain background information on the athlete's specific training and competition circumstances is essential. Care for the athlete includes performing a risk assessment, providing medical services,

collaborating with other team members (athletic trainers, physical therapists, nutritionists, etc.), and following up with injured athletes after an event to then recommend postevent treatment modalities for injury and recovery.

Because a variety of patients, active and sedentary, will present to their primary care physician with musculoskeletal and other sports medical complaints, residents must be able to communicate effectively with a wide array of patient populations. This also may involve concise communication with their family, coaches, school administrators or medical personnel, and employers.

Given the high rates of obesity and related medical comorbidities (*e.g.*, diabetes, hypertension) in the United States (7), residents should understand how regular exercise impacts these disease states and how getting patients more active affects their health. For patients who are not exercising, the resident should be able to formulate an individualized exercise prescription. Skills in motivational interviewing are important in this process (8). Residents should be aware of the resources within their community and/or hospital system to help address these issues while being cognizant of the patient's insurance and socioeconomic status.

Residents must understand the importance of taking a holistic approach to athlete care. Even if the only complaint is musculoskeletal in nature, they should inquire about other underlying medical issues and psychosocial factors and treat as necessary.

Finally, it is important for residents to have an understanding of data related to outcome metrics for musculoskeletal and sports medicine related care and referrals. This information should be utilized for quality improvement initiatives to provide the best possible care for their patient population.

### Attitudes and Behaviors

As part of the knowledge acquired through a comprehensive musculoskeletal and sports medicine curriculum, the resident should demonstrate attitudes and behaviors that reflect promotion of health and wellness through a wide variety of contexts. The resident should recognize the importance of possessing a set of skills to appropriately and accurately diagnose and treat musculoskeletal and sports medical conditions, disorders, and injuries, and should seek clinical experience to develop and refine these skills (9–13). Inclusive to those skills should be an awareness of the role appropriate rest and rehabilitation play in returning patients with musculoskeletal disorders to activities of daily living and/or sports participation without risking reinjury or further disability. Residents should recognize and integrate discussions regarding exercise as medicine for chronic disease management into appropriate clinic visits (9,13–15). Exercise and physical activity have clearly been shown to be an important part of health and disease prevention (16,17). Furthermore, providing informed evaluations and advice to patients embarking on a new activity or fitness program is similarly important regardless of age or comorbidities. Finally, the resident should demonstrate and apply the same attitudes and behaviors to their own health and well-being. Physicians who engage in healthy behaviors are much more likely to advise their patients about healthy lifestyles and the role of exercise in health (18).

## Knowledge

Musculoskeletal medicine is based on a working knowledge of anatomy, physiology, normal growth and development, basic exercise physiology, and biomechanics (4). Graduating family medicine residents should demonstrate knowledge of the topics below and apply the information to the **diagnosis, prevention, treatment, and rehabilitation of musculoskeletal disease**. They should understand medical care considerations unique to special athlete populations, including **preadolescent, adolescent, geriatric, physically challenged** (including those participating in Special Olympics and Paralympics), and **pregnant athletes**. Residents should understand unique considerations based on level of sport (recreational, youth, high school, collegiate, etc.). Furthermore, residents should recognize when management of these disease processes warrants subspecialty referral (4).

## Musculoskeletal Examinations and Imaging

Family medicine residents should know **how to obtain an appropriate sports medicine-related history and perform a systematic focused musculoskeletal physical examination of all major joints**. Residents should know **indications for radiographs** based on their clinical history and examination (19–23) and demonstrate an understanding of the **indications for advanced imaging (MRI, CT, bone scan, ultrasound, DEXA, etc.); electromyography; and nerve conduction studies (4,19–23)**.

## Musculoskeletal Injury

Residents should demonstrate an understanding of the clinical presentation, pathophysiology, and management of common musculoskeletal diseases, including but not limited to (4):

- 1) **Conditions of the bones and joints: degenerative joint conditions, inflammatory joint disease, infection, meniscal tears, metabolic bone diseases, congenital anomalies, avascular necrosis, bone and joint deformity, osteoporosis, trauma, fractures, and dislocations.**
- 2) **Conditions of the soft tissues: muscular pain and trauma, tendinosis, tendon injuries, ligament injuries, congenital abnormalities, compartment syndrome, and overuse syndromes.**
- 3) **Conditions affecting the nervous system: peripheral nerve entrapments, nerve injuries, and back pain syndromes.**
- 4) **Pediatric conditions: congenital hip dysplasia, avascular necrosis of the femoral head (legg-calve-perthes), slipped capital femoral epiphysis, transient synovitis, septic joints, club foot (talipes equinovarus), congenital pes planus, genu varum and valgum, common apophysitis of the upper and lower extremities, inflammatory arthropathies, osteogenesis imperfecta, physeal injuries (Salter-Harris classification), dislocation of the radial head (nursemaid's elbow), and recognition of child abuse patterns of injury.**

Residents should be aware of how the mechanism of injury in combination with knowing the corresponding anatomy can **refine the injury differential diagnosis** and improve awareness of potential complications from such injury.

## Sports-Related Concussions

Residents should possess knowledge regarding the **diagnosis and management of sports-related concussions**, including their local and state statutes regarding concussion clearance and return to activity. Residents should be aware of current **postconcussion guidelines as patients return to learning, school, work, and sport** (24).

## Preparticipation Examination

The PPE is preferably performed by an athlete's primary care physician in an office setting (6). Residents must learn the **components of the PPE, those conditions that warrant further evaluation prior to clearance, and the indications that restrict athletes from sport**. This knowledge should encompass care of the athlete with physical or cognitive disabilities. Residents should be familiar with disease processes associated with different disabilities to identify conditions that may endanger the athlete (6). The resident should recognize both the benefits and limitations of the preparticipation examination (6,16). A **cardiovascular history and physical examination, with or without electrocardiogram or other diagnostic tests, is an important component of the PPE (16)**. Residents should be aware that there are **athlete-specific criteria to address physiologic variants that are commonly observed on an athlete's electrocardiogram (EKG) (25)**. They should know where to find the most current athletic EKG evaluation criteria and know when to restrict the athlete from activity to obtain a cardiologist's expert opinion. Finally, they should be able to **identify prior musculoskeletal and medical issues that may limit sports participation**, or that could lead to significant disability (17).

## Mass Participation Events

Residents should be aware of the ethical, psychosocial, economic, and medicolegal issues unique to the team physician. Similarly, residents should be aware of the potential role of a family physician as a medical director and/or on-site medical care provider for a large sporting event (4). They should be able to **assess and care for an acutely injured athlete on a field or sideline, monitor illness or injury progress during rehabilitation, and have a basic understanding of the underlying factors that contribute to return-to-play decisions**.

## Exercise Medicine

Residents must know the effects, contraindications, and benefits of exercise. They should understand the morphologic changes in the heart and the concept of **athletic heart syndrome**, as well as the differentiating factors that distinguish it from pathologic cardiovascular diseases like **hypertrophic cardiomyopathy**. They also should be aware of the pulmonary adaptations that occur in highly trained individuals. Family medicine residents should advocate for healthy lifestyle choices and encourage patients to meet the general exercise guidelines (26,27). They should be aware of the benefits of exercise, as well as its impact on disease processes, such as hypertension, depression, diabetes, chronic obstructive pulmonary disease (COPD), etc. (27). Specifically, residents should learn to **prescribe exercise** for healthy individuals of all ages, including pregnant and postpartum women (27). A basic knowledge of the concepts related to conditioning and training techniques helps residents to write an exercise prescription using

the **Frequency, Intensity, Time, Type (FITT) principle**. ACSM's Exercise is Medicine® web site (<https://www.exerciseismedicine.org>) is an invaluable resource for educators and learners.

### Problems Associated with Exercise

Residents must become familiar with the potential negative consequences of exercise and sports participation and be able to recognize signs or symptoms of these conditions (2). Such disorders include those with the potential risk of sudden cardiac arrest, exercise addiction, illicit use of performance enhancing substances, alcohol and drugs, disordered eating, relative energy deficiency syndrome (REDS), and the psychologic stressors associated with athletic performance placed on the athlete by internal or external sources (coaches, parents, etc.) (4). Also, residents should understand environmental challenges and consequences of exercising in extreme temperatures, including recognition and treatment of hypothermia and exertional heat illness/injury.

### Injury Reduction and Rehabilitation

As family medicine residents should understand musculoskeletal injuries, so too should they be familiar with principles of injury reduction (4). Residents should know how to counsel patients on proper exercise technique (start slow and gradually build on time and intensity), the basic concept of buddy taping, and the selection of protective “off the shelf” braces. They should be alert to environmental factors that can adversely affect participant and spectator safety (heat illness, cold injury, lightning safety) and their important role in promoting the enforcement of rules that enhance sports safety (graded return to sport after concussion, heat acclimatization rules, etc.).

Resident family physicians must be familiar with the principles of rehabilitation, including the difference in skill sets of physical and occupational therapists. They should have an awareness of adjunct rehabilitation options (acupuncture, manual medical techniques and modalities, etc.) and the psychologic impact of injury/illness, as well as its effects on recovery (4). They should know how to prescribe an effective home exercise program and/or when to refer to other professional resources. Lastly, residents should recognize when surgical intervention is necessary and demonstrate a fundamental knowledge of surgical interventions, such as joint replacement, ligament reconstruction, and arthroscopy.

### Sports Nutrition and Supplements

Family medicine residents should understand basic concepts of sports nutrition and hydration. They should have a working knowledge of commonly utilized dietary supplements and the potential risks associated with their use/misuse (28). If caring for high-level competitive athletes, family medicine residents must know how to avoid substances banned by the National Collegiate Athletic Association, World Anti-Doping Association, International, and United States Olympic committees, professional sports leagues, and other sports governing bodies that mandate random drug testing (29,30). Finally, family medicine residents should be aware of the policies (therapeutic use exemptions) and procedures when use of banned substances is deemed medically necessary.

### Skills

Family medicine residents should demonstrate competence in the spectrum of sports medicine-related skills by independently managing or appropriately referring commonly encountered conditions in the primary care setting. An important aspect in the application of these musculoskeletal skills is the correct identification of the underlying condition and determination if the presenting condition is amenable to nonsurgical management. Common conditions may include fractures, joint dislocations, muscle strains, ligamentous sprains and tears, tendinopathy, bursitis, acute and chronic back pain, patellofemoral pain syndrome, synovial cysts, conditions of the hand and foot, peripheral neuropathies, rheumatologic disorders, sports-related concussion, crystal-induced arthropathies, osteoarthritis, osteochondroses, apophysitis, metabolic bone disorders, and osteomyelitis (4).

It is recommended that family medicine residents exhibit proficiency in common musculoskeletal procedures, including landmark-guided injections, methods of bone and joint immobilization, and simple common reduction techniques (31–38). In addition to proper execution, the resident should have the ability to identify appropriate patients for the procedure, understand indications and contraindications, and recognize possible complications.

- 1) Landmark-guided injection includes joint aspiration and injection, injection of bursae (subacromial, greater trochanteric, pes anserine), injection of tendon sheaths, and peritendinous injections (31–33). Residents are expected and encouraged to be capable of counseling patients on risks and benefits of various injectates for particular diagnoses and be able to manage any subsequent complications.
- 2) Immobilization includes splinting and casting of upper and lower extremities and proper use of durable medical equipment for immobilization. Casting including but not limited to short and long arm, thumb spica, ulnar and radial gutter, and short leg casts (34). Knowledge of the proper use of walking boots, slings, braces, and apparatuses to maintain immobilization is imperative. Residents should be able to recognize clinically appropriate scenarios for the selection of each individual mode of immobilization, in addition to counseling on complications and exhibit the ability to manage any subsequent complications.
- 3) Dislocation reduction techniques include patella, phalanges, radial head/nursemaid's elbow, and anterior shoulder reduction techniques with accompanying postreduction management (35–38). Residents should understand the signs and symptoms to monitor before and after performing a reduction, provide counseling on follow-up immobilization and recovery expectations, and refer when appropriate.

Residents are expected to have the ability to recognize and adequately stabilize musculoskeletal emergencies that may be encountered in the scope of primary care practice or

sideline event coverage. These include acute compartment syndromes, dislocations of the hip and knee, unstable fractures of the cervical spine and pelvis, spinal cord injuries and cauda equina syndrome, and any injury that results in neurovascular compromise (38–41). Quick recognition of these conditions, patient stabilization, and emergency referral are imperative to improving the patient's chance of a successful recovery.

Residents should be aware of life-threatening emergencies, such as sudden cardiac arrest, anaphylaxis, status asthmaticus, blunt trauma, and traumatic brain injury. They must manage these appropriately utilizing knowledge and skills obtained through basic life support.

Additional recommended skills for residents include competence in basic primary care musculoskeletal radiology and provision of patient-specific home exercise programs, including exercise prescription. Residents are encouraged to identify conditions that warrant radiographic imaging, determine method of imaging, and practice skill in interpretation of acquired studies (42,43). Exposure to and practice with sports ultrasound is encouraged. Competence in sports ultrasound is not required.

### Implementation

The Musculoskeletal and Sports Medicine Curricular Guideline is intended to be implemented longitudinally over the entire residency experience. Tables 1 and 2 provide some guidance on strategy for implementation. A majority of the learning for family medicine residents occurs in their outpatient continuity clinic setting, and likely, the vast majority of sports medicine training occurs in that family medicine clinic, on elective sports medicine rotations, or during sideline medical experiences.

### Early Sports Medicine Exposure

To prepare residents for outpatient encounters, exposure to an outpatient musculoskeletal and sports medicine rotation at the beginning of the training experience to solidify their musculoskeletal examination skills and enhance their ability to diagnose and manage musculoskeletal and sports medical conditions is beneficial. The literature suggests that medical knowledge in musculoskeletal medicine is enhanced by early clinical exposure (1). During the PGY-1 year, consider implementing a 2-wk medicine/exercise-as-medicine experience followed by a 2-wk musculoskeletal medical experience. This provides residents with an early exposure to musculoskeletal medicine, and the medical considerations in sports, exercise, and health.

These early rotations can effectively prepare residents to see patients with musculoskeletal complaints or other sports medicine-related conditions in the continuity clinic setting. The preceptor is able to assess basic medical knowledge of the resident with regard to the musculoskeletal examination, ordering of diagnostic procedures, and the management of uncomplicated sports medicine related conditions by direct observation and discussion of various patient cases. After multiple encounters, the preceptor should be able to address deficiencies in knowledge and skills, so that at the completion of the rotation, the resident is better prepared to care for their patients with various musculoskeletal complaints and are familiar with the resources that are helpful in guiding this care.

### Sports Medicine Preceptors

Preceptors competent in musculoskeletal and sports medicine are vital to successful implementation of the goals and objectives of the curriculum. Some residencies have a faculty member with fellowship training in primary care sports medicine. For those residency programs without this resource, it is helpful for at least one faculty member to serve as a curricular champion. That person should seek sports medicine continuing medical education activities to enhance their ability to take ownership and assist in teaching the curriculum. Other specialists, such as orthopedists, podiatrists, physical therapists, athletic trainers, and physiatrists, can significantly contribute to the musculoskeletal training of the residents. A clinical rotation with a radiologist helps to develop the skill of fracture recognition and a systematic way to evaluate plain x-rays. Exposure to a multidisciplinary team to include Pharm Ds and behavioral specialists will help foster the concept of shared collaborative care when caring for injured or physically compromised patients.

### Other Outpatient Clinical Experiences

A clinical exposure to outpatient rehabilitation clinics can offer valuable teaching moments for family medicine residents. Emergency departments and urgent care centers offer opportunities for residents to diagnose and initially manage acute injuries. If available, a faculty-supervised experience providing medical support for a local sporting event provides a venue for residents to potentially stabilize an orthopedic or medical emergency "on the field." Live event medical support also teaches residents to perform within a health care team. Faculty members who have relationships with local high schools or other sports organizations can provide this experience. For those programs that do not have a sports medicine faculty member, a clinical rotation at a multidisciplinary sports medical facility provides many educational opportunities for the learner.

### Didactics

Didactic lectures are a common method of teaching knowledge and skills needed for a family physician to competently address the musculoskeletal and medical complaints, as well as promote patient behaviors that serve to improve the health and wellness of patients. These can be incorporated longitudinally throughout the residency training as regularly scheduled lectures given by preceptors with expertise in these various areas. In addition to teaching basic skills in these sessions, it is helpful to emphasize topics infrequently seen in the resident's outpatient clinic, such as environmental conditions. Sports concussion evaluation and management should be taught in didactic sessions because the guidelines continuously evolve. These lectures augment the hands-on clinical exposures (24). Simple fracture care can be taught in lectures as a way of reinforcing the knowledge gained in rotations that provide hands-on experience with acute fracture reductions. With the emphasis on prevention of illness and exercise as medicine, writing an exercise prescription is something that residents should learn and practice before completing their residency (44).

Hands-on symposia can be an effective way of practicing musculoskeletal examination skills. With respect to teaching procedures such as joint injections, there are joint models that

**Table 1.****Suggestions for accomplishing recommended curricular tasks and goals.**

Task/Goal	Methods to Accomplish	Assessment
Perform preparticipation physical examinations with an understanding of conditions that may require restriction or further evaluation	Core and adjunct clinical faculty supervised; pediatric and adolescent examinations preferably performed in the student-athletes' medical clinic	Verbal and written evaluation by supervising faculty
Ability to perform acute musculoskeletal examinations and initial stabilization to include application of splints and casts	<ul style="list-style-type: none"> <li>–ED and UC rotation with focus on MSK injuries</li> <li>–Outpatient orthopedic and sports medicine rotations</li> <li>–Continuity clinics</li> </ul>	Verbal and written evaluation by supervising faculty
Ability to perform landmark-based joint injections	<ul style="list-style-type: none"> <li>–Clinical workshops by specialists or sports medicine faculty</li> <li>–Academic videos</li> <li>–Injection models</li> <li>–Continuity clinics</li> </ul>	Verbal and written evaluation by supervising faculty
Be able to write a patient-specific exercise prescription Understand the concepts and implementation of <b>Exercise is Medicine (EIM)</b> in patient care	<ul style="list-style-type: none"> <li>–ACSM Exercise is Medicine resources (textbooks, articles, videos, online resources)</li> <li>–Faculty presented didactics</li> </ul>	<ul style="list-style-type: none"> <li>–Verbal and written evaluation by supervising faculty</li> <li>–Requirement to write exercise prescriptions for patients of varying ages, ability, and with chronic disease</li> </ul>
Acute management of sports concussions both in the office and “on the field”	<ul style="list-style-type: none"> <li>–Continuity clinics</li> <li>–Rotation in sports medicine or neurology clinics</li> <li>–Faculty supervised contact sport event coverage (football, soccer, hockey, etc.)</li> </ul>	Verbal and written evaluation by supervising faculty
Exposure to mass participation event and roles of team physicians in sports	Assist core or adjunct faculty by volunteering to work a mass participation event, and high school or college athletic event	Verbal and written evaluation by supervising faculty
Understanding the role and be able to work collaboratively with athletic trainers, physical and occupational therapists, as well as development of the athlete's care team ( <i>i.e.</i> , sports psychologist)	<ul style="list-style-type: none"> <li>–Spend several clinical half days with each of these professionals in their usual work setting</li> <li>–Observe athletic trainers at the high school or college level</li> </ul>	Verbal and written feedback from these professionals and other members
Become familiar with basic concepts in sports nutrition, fluid requirements, and supplement use	<ul style="list-style-type: none"> <li>–Spend 2–4 half day clinical sessions with a sports nutritionist or nutritionist with experience assisting athletes</li> <li>–Didactic lectures and ACSM online seminars</li> </ul>	Written evaluation/feedback from adjunct clinical faculty (nutritionist)
Become familiar with x-rays for musculoskeletal complaints, and know when and which advanced imaging is appropriate	<ul style="list-style-type: none"> <li>–Continuity clinics and annual radiology didactic lectures</li> <li>–ED and UC rotations</li> <li>–Elective 2-wk rotation within radiology department</li> </ul>	<ul style="list-style-type: none"> <li>–Online teaching modules with certificates</li> <li>–Verbal and written feedback from core and adjunct (radiology) clinical faculty</li> </ul>
Interpretation and understanding basics of athletic EKGs	<ul style="list-style-type: none"> <li>–AMSSM online teaching modules (free to public): <a href="https://learning.bmj.com/learning/course-intro/.html?courseId=10042239">https://learning.bmj.com/learning/course-intro/.html?courseId=10042239</a></li> <li>–Preparticipation physical examination sessions</li> </ul>	<ul style="list-style-type: none"> <li>–AMSSM EKG module examinations and completion certificates</li> <li>–Faculty written evaluation/observations</li> </ul>

MSK, musculoskeletal; ED, emergency department; UC, urgent care.

**Table 2.****Checklist for musculoskeletal/sports medicine curriculum in family medicine residency.**

PGY1	PGY2	PGY3
<input type="checkbox"/> Sports Medicine/MSK rotation 1 <sup>a</sup> <input type="checkbox"/> Understand basic anatomy and physiology <input type="checkbox"/> Perform pertinent MSK history <input type="checkbox"/> Perform basic MSK physical examination <input type="checkbox"/> Recognize and diagnose concussion, basic management principles (return to learn, return to play) <input type="checkbox"/> Access to educational resources specific to MSK conditions <input type="checkbox"/> Videos for examination maneuvers <input type="checkbox"/> Provider educational materials <input type="checkbox"/> Patient educational materials <input type="checkbox"/> Position statements and relevant literature <input type="checkbox"/> Preceptors/advisors within the program	<input type="checkbox"/> Sports Medicine/MSK rotation 2 <sup>b</sup> <input type="checkbox"/> Perform comprehensive MSK physical examination with appropriate special tests <ul style="list-style-type: none"> <li>○ Shoulder</li> <li>○ Elbow</li> <li>○ Wrist/Hand</li> <li>○ Spine</li> <li>○ Hip</li> <li>○ Knee</li> <li>○ Foot/Ankle</li> </ul> <input type="checkbox"/> Recognize common MSK complaints that present to primary care office ( <i>i.e.</i> , ankle sprains, osteoarthritis, etc.) <input type="checkbox"/> Basic management of common conditions <input type="checkbox"/> Basic interpretation of x-rays <input type="checkbox"/> Exposure to procedures (including common joint injections, dislocation reduction techniques) <input type="checkbox"/> Exposure to fracture and sprain management (including splinting/casting workshops) <input type="checkbox"/> Basic understanding of physical and occupational therapy — including indications for referral and common modalities	<input type="checkbox"/> Increase level of comfort with common procedures ( <i>i.e.</i> , injections, splinting, reduction) <input type="checkbox"/> Increase recognition of MSK conditions, expand differential, improve management plans and ability to educate and counsel patients appropriately <input type="checkbox"/> Understand when to utilize advanced MSK imaging <input type="checkbox"/> Understand when to refer to Sports Medicine and/or orthopedic surgery <input type="checkbox"/> Understand indications for common orthopedic surgeries <input type="checkbox"/> Recognize and triage orthopedic emergencies appropriately ( <i>i.e.</i> , open fracture, acute compartment syndrome, etc.) <input type="checkbox"/> Cardiac screening in athletes (when to screen, basic ECG interpretation specific to athletes, restriction from sport)
	<input type="checkbox"/> Participate in medical coverage of sporting events ( <i>i.e.</i> , mass participation event like running race, or sideline coverage at local high school or college, tournament) <input type="checkbox"/> Preparticipation examinations for athletes	
<input type="checkbox"/> Longitudinal exposure to MSK/sports medicine within primary care clinical setting <input type="checkbox"/> Write and counsel patients on Exercise Prescriptions (FITT, disease-specific guidelines) <input type="checkbox"/> Additional exposure to sports cardiology, concussion evaluation and management, MSK ultrasound, sports coverage, journal clubs based on resident interest — consider addition of Sports Medicine Track if resident interest and program resources allow.		

<sup>a</sup>MSK 1 rotation in PG1 or PGY 2 yr.<sup>b</sup>MSK 2 rotation in PGY 2 or PGY 3 yr.

are available for simulation of these injections and can be used in a small group situation for instruction and practice. An introduction to musculoskeletal ultrasound can be demonstrated in this type of teaching forum as well.

### Conclusions and Discussion

Sports medicine training is an integral component of a comprehensive family medicine residency education. With a high proportion of office visits encompassing musculoskeletal complaints, adequate training throughout residency will allow family physicians-in-training to competently and confidently care for patients they see in their clinical practice.

There are many sports medicine and musculoskeletal competencies that family medicine residents must learn. Although many may see this as a challenge, we see it as a unique opportunity

to improve patient care, reduce referrals to specialty care, and improve patient experience and provider satisfaction. This document intends to serve as a guideline for curricular development and implementation to maximize education in this important realm.

Competence in accurately evaluating and treating musculoskeletal and sports conditions is assessed in the same standard fashion by which family medicine residents are accustomed to being evaluated. As the resident progresses through the 3 years of training, their ability to accurately identify, diagnose, and treat sports and musculoskeletal conditions will improve. As a result, residents will have the opportunity to grow as patient educators and improve communication skills. Being able to explain risk factors for injury, the role of rehabilitation in recovery, and the importance

of physical activity and exercise for a healthy lifestyle are topics that lend themselves easily to ensuring residents become effective communicators and patient advocates. Resident physicians should leave their training programs feeling comfortable in managing common sports medicine complaints as described in this document.

Implementation of a comprehensive sports medicine curriculum can take many different forms. We advocate for a **combination of longitudinal exposure, as well as dedicated sports medicine rotations**. This combination allows for flexibility in scheduling based on program resources and demands, as well as maximizing a resident's learning opportunities. Each program should identify at least one faculty member with an interest or training in sports medicine to oversee this important curriculum and its implementation.

Musculoskeletal and sports medicine training complements the comprehensive, patient-centered care provided by family medicine physicians. Sports medicine allows for engagement by providing medical care at local schools or mass community sporting events. These recommendations serve as a guide for developing a comprehensive curriculum that offers exposure to the wide breadth of this field. A well-rounded education in musculoskeletal and sports medicine will ensure that family medicine residents graduate with the requisite skills to serve their patients and communities.

All contributing authors are members of the American Medical Society for Sports Medicine (AMSSM) Education Committee. [www.amssm.org](http://www.amssm.org).

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