

Lecture 1: Introduction to Sports Medicine.

Definition :

Sports and Exercise Medicine can be defined as that scope of medical practice which focuses on (i) the prevention, diagnosis, treatment and rehabilitation of injuries that occur during physical activity, (ii) the prevention, diagnosis, and management of medical conditions that occur during or after physical activity, and (iii) the promotion and implementation of regular physical activity in the prevention, treatment and rehabilitation of chronic diseases of lifestyle. Over the past two to three decades, there has been an exponential increase in the number of published research articles, books and other publications that cover these areas of medical practice. In general, most publications (in particular textbooks) cover the first (injury prevention and treatment) and the third (chronic disease prevention and rehabilitation) areas of Sports and Exercise Medicine very well. However, the area in Sports and Exercise Medicine that has not received the same attention in the published literature is the prevention, diagnosis, and management of medical conditions that occur during or after physical activity. It is for that reason, that this new volume of *The Encyclopaedia of Sports Medicine* series has been compiled, specifically to provide sports medicine practitioners with a systematic approach to this very important aspect of sports medicine practice.

Sports and exercise medicine includes:

injury prevention, diagnosis, treatment, and rehabilitation management of medical problems
exercise prescription in health and in chronic disease states the needs of exercising in special subpopulations the medical care of sporting teams and events medical care in situations of altered physiology, such as at altitude or at depth performance enhancement through training, nutrition, and psychology ethical issues, such as the problem of drug abuse in sport.

2- CAREERS IN SPORTS MEDICINE

Today, sports medicine involves a comprehensive team of healthcare professionals trained in a variety of backgrounds. Sports medicine is not a single profession, but rather an umbrella under which there are diverse professions and many available employment opportunities. Following is a depiction, in alphabetical order, of the most common careers.

- Athlete

Being an athlete involves more than competing in a competition every now and then. Today's athletes spend many hours every day practicing skills and developing teamwork. They watch videotapes to analyze their own performances and to learn strategies for competing against their opponents.

Athletic Trainer (Sports Therapist)

Athletic trainers work with team physicians, coaches, and other sports professionals to prevent and treat illness and injuries related to sports and exercise. As of 2004, an undergraduate degree from a program accredited by the Commission on Accreditation of Allied Health Education Programs is required in order to take the National Athletic Trainer Association (NATA) certification examination. In most states, licensure is required and calls for successful completion of the NATA examination.

Athletic trainers typically work with athletes at the high school, college, or professional level. They are also employed in sports medicine clinics. This profession has been experiencing significant growth for nearly thirty years, and membership in the NATA has grown more than 520 percent since 1974.

Biomechanic/Kinesiologist

A biomechanic/kinesiologist seeks to apply the laws of physics to physical activity, exercise, and sports. Biomechanics study injury to muscles, bones, and joints under certain conditions. They analyze body mechanics and attempt to improve athletic performance. Biomechanics are typically employed in research settings and clinical sites, but future growth appears to be in industrial ergonomic settings. The minimal requirement is a master's degree.

Chiropractor

Chiropractors are specially educated in treating the joints and muscles of the body with their hands. Chiropractors treat individuals with lowback problems, sports injuries, and other health problems associated with the muscular, nervous, and skeletal systems, especially the spine. To become a chiropractor, one must obtain a doctorate of chiropractic degree and pass four national board exams. In addition, an aspiring chiropractor must obtain licensure in the state of practice. In many states, additional exams are required for this licensure.

Exercise Physiologist

Exercise physiologists study the acute and chronic physiological responses of physical activity. Their goal is to improve health, fitness, and performance. Traditionally, exercise physiologists worked only with athletes. However, today's exercise physiologists also work in commercial, clinical, and other professional settings for the general population. At a minimum, an undergraduate degree is required to be an exercise physiologist. Certification can be obtained from the American College of Sports Medicine.

Fitness Instructor/Personal Trainer

Fitness instructors, or personal trainers, typically work one-on-one with clients either in the client's home, the trainer's office, or a fitness facility. Personal trainers are generally employed as freelance contractors paid by the hour or per session. It is recommended that a personal trainer have a strong background in anatomy and kinesiology at a minimum, and preferably an undergraduate degree in a science-related area. In addition, personal trainers must obtain the American College of Sports Medicine Certified Personal Trainer certification.

Massage Therapist (Therapeutic Massage Therapist)

Massage therapists relieve muscle tension, spasms, inflammation, fluid retention, aches, stiffness, and pain by applying structured pressure, tension, motion, or vibration to the soft tissues of the body. Other benefits of massage include improved circulation (blood and lymph), general flexibility, range of motion, and increased tissue elasticity. Massage can aid in the healing of injuries by limiting scar formation. On completion of a massage therapy training program, a massage therapist can seek certification through state examinations. A national certification examination is offered by the National Certification Board for Therapeutic Massage and Body Certification. Massage therapists may work as faculty in a sports/rehabilitation medicine or fitness/spa facility. They commonly act as support for professional athletes or teams.

Nutritionist/Sport Dietitian

Dietitians study dietary patterns to prevent disease and improve health. Dietetics is the study of nutrient intake and how the body uses foods. This field of science links food and nutrition to health management. To become a registered dietitian, one must complete an undergraduate degree in dietetics, complete a nine-month American Dietetics Association (ADA)-approved internship, and pass the ADA certification examination. Dietitians work in hospitals, clinics, sports complexes, school systems, and

public health facilities. They may also be hired by private clients or sports teams to design proper nutrition plans for weight loss, weight gain, performance, and health maintenance.

Orthopedist

Orthopedists diagnose and treat disorders of the bones and joints. Because of their knowledge of the functioning of the musculoskeletal system, orthopedists often treat sports injuries and sometimes serve as the primary physician for athletic teams. An orthopedist is required to complete a one-year internship in general surgery, four years of training in orthopedic surgery, and a year of medical practice before taking specialty board examinations.

Physical/Occupational Therapist

Physical therapists work to improve mobility, relieve pain, and prevent or limit permanent physical disabilities of patients suffering from injuries or disease. A graduate from an accredited educational program must pass a state licensure exam before being allowed to practice. Physical therapists work in hospitals, clinics, or private offices with specially equipped facilities. They may also treat patients in hospital rooms, homes, or schools.

Whereas the physical therapist helps people recover from injury or disease, the occupational therapist works more with the development of fine motor skills and dexterity. Most occupational therapy schools require two to three years of specialized education after a four-year undergraduate degree. In addition, one must pass a national examination to become a licensed physical or occupational therapist. Most employment opportunities are in hospitals and clinics.

Podiatrist

Podiatrists are devoted to the study and medical treatment of disorders of the foot, ankle, and lower extremity, which consists of a significant portion of the human skeleton. (The human foot is a complex structure containing twenty-six bones, in addition to muscles, nerves, ligaments, and blood vessels.) The fifty-two bones in the feet make up about one fourth of all the bones in the human body. Podiatrists need a state license that requires the completion of at least ninety hours of undergraduate study; the completion of a four-year program at a college of podiatric medicine; and, in most states, a postdoctoral residency program of at least one year.

Researcher in Exercise Science

Exercise science is the study of physiological, biochemical, and molecular components of movement. Most colleges and universities provide specific curriculum or academic majors in

the exercise sciences. Related undergraduate college programs include biology, chemistry, biochemistry, anatomy and physiology, kinesiology, exercise physiology, and fitness programming. Graduate students typically study specific areas of exercise physiology with an emphasis on research. Researchers conduct studies from either a basic or clinical perspective. Basic researchers usually perform studies with a focus on the cellular and molecular levels, such as how organ systems work, adapt, or respond to various factors. Clinical researchers usually carry out studies with a focus on the individual as a whole and seek to increase athletic performance or to improve health and reduce disease. Both careers require a graduate degree, such as a master's or Ph.D., which involves two to five years beyond the undergraduate level. Most researchers are employed at universities and hospitals.

Sports Medicine Physician/Medical Doctor

Sports medicine physicians are highly trained in the diagnosis and treatment of sports-related injuries. Most professional teams employ sports medicine physicians, whereas other physicians are employed by clinics or hospitals. A physician interested in sports medicine normally seeks specialized training in sports medicine, orthopedics, cardiology, or other areas. Each field has three to five years of internship and residency training, in addition to one to two more years of fellowship training.

Sport Psychologist

Sport psychologists study the psychological factors associated with participation and performance in sports, exercise, and other types of physical activity. Specifically, a sport psychologist helps athletes use psychological principles to achieve optimal mental health and athletic performance.

In most cases, a college undergraduate degree is the principal requirement for entry into this profession. In addition to obtaining a degree in psychology, one should acquire national certification. The Executive Committee of the Division 47 (Exercise and Sport Psychology) of the American Psychological Association recommends that an individual obtain certification from the Association for the Advancement of Applied Sport Psychology in order to practice sport psychology.

Strength and Conditioning Coach

Strength and conditioning coaches develop and monitor training plans for athletes. Their goal is to improve and enhance an athlete's power and performance. High school, college, and professional athletic teams often

require the services of a strength and conditioning coach. Employment in this field usually requires a master's degree, as well as certification by the National Strength and Conditioning Association (NSCA). In addition, a strength and conditioning coach must participate in the Certified Strength and Conditioning Specialist program.

Responsibilities of the Team Physician

The team physician has a range of ethical responsibilities that reflect the many relationships involved in the care of the team. Responsibilities to the athlete, the team, and the institution and its representatives must be balanced.

Responsibilities to Athletes

To allow participation: The team physician should not arbitrarily disqualify athletes from participation for reasons that are insignificant or out of line with current thinking. Especially in school-based programs, athletes have a right to participate if there is no valid medical contraindication.

To protect: Athletes must be protected from injury, reinjury, permanent disability, and themselves. When there is valid medical contraindication to participation or resumption of participation, athletes must be counseled and thoroughly informed. It may be especially difficult to reason with an athlete who has a "participate at any cost" attitude.

To educate: It is the responsibility of the team physician to educate the athlete as to the nature of the injury and the potential treatment options. This also includes educating the athlete on potential risks and benefits that may be associated with the treatment options. Additionally, the team physician educates the athlete about injury prevention.

To provide optimal health care: Physicians must strive for quality health care, while being mindful of the costs of diagnostic tests and treatment and of the athlete's competitive schedule.

To ensure confidentiality: Physicians must balance the demands of the Health Insurance Portability and Accountability Act of 1996 (HIPAA), which limit the release of information, with the rights of the team under worker's compensation law and the need for others (e.g., trainers and coaches) to plan appropriate activities for the athlete's medical condition. Confidentiality is often challenged by the relationship to the school or professional club. Seldom may information be held in strict physician-patient confidentiality. However, the team physician must be sensitive to how widely information is disseminated. For example, if an athlete wishes to resign from the team without the physician telling others the medical reasons for this

decision, that wish should be honored. It is a cardinal rule that the team physician may not sacrifice the welfare of the athlete to the welfare of the team or the institution. Rob Johnson, in commentary on ethics and legal issues in *Clinics in Sports Medicine*, appropriately states: "Hand in hand with altruism is an ethical sense that is both accepted by the physician and expected by those who seek that physician's guidance and counsel.

The Preparticipation Physical Examination:

INTRODUCTION

- The preparticipation sports examination is a tool to detect medical and orthopedic conditions that may be problematic for safe participation in athletics.
- The origins of the preparticipation examination date back about 35 years when the American Medical Association Committee on Medical Aspects of Sports drafted the first guidelines for a preparticipation examination.¹ Since then, there have been many alterations and changes to the way in which physicians complete the examination.
- It is now an annual event that sports medicine physicians conduct to clear athletes to participate in sports.

PREPARTICIPATION PHYSICAL EVALUATION

(PPPE)

- History and physical examination performed before participation in sport that meets several objectives and is one of the most important functions provided by the sports medicine physician.
- Often the first interaction between the physician and the athlete; for many young adults, it is the first exposure to the health care system.
- Does not take the place of regular physical examinations, although many athletes think that it covers all health care needs.
- Encompasses clearance for participation in sport, and provides education and information to athletes about issues such as nutrition, supplementation, training and conditioning, injury prevention, and rehabilitation.
- Special considerations of PPPE include age specificity, gender specificity (special concerns for female vs. male athletes), and sport specificity (specific demands of each sport should be considered).

OBJECTIVES OF THE PPPE

- Emphasize cardiovascular, neurologic, and musculoskeletal issues.

- Identify any life-threatening or disabling conditions (e.g., underlying cardiovascular or neurologic abnormalities).
- Identify any conditions that may place athlete at risk for injury or illness (e.g., underlying ligamentous instability, musculoskeletal abnormalities, organomegaly, or acute medical illness).
- Assess for an injury that has not been properly rehabilitated.
- Assess for medical conditions and strength and flexibility deficits that place athlete at risk for injury.
- Assess general health status (e.g., immunizations), fitness, and maturity.
- Meet insurance or legal requirements.
- Screen for menstrual dysfunction, stress fractures, eating disorders (female athlete triad).
- Introduce athletes to health care system and preventive medicine concepts.
- Offer an opportunity to address issues such as recreational and performance-enhancing substance use and abuse, sexuality issues, depression and emotional issues, and health promotional activities (seat belts, helmets, self breast or testicular examination).

Table 3-1 REQUIRED AND OPTIONAL STATIONS AND PERSONNEL FOR COORDINATED PREPARTICIPATION PHYSICAL EVALUATION

Required stations	Personnel
Sign-in, height and weight (BMI*), blood pressure, vision	Ancillary personnel (coach, nurse, community volunteer)
History review, physical examination†, clearance	Physician
Optional stations	Personnel
Nutrition	Dietitian
Dental	Dentist
Injury evaluation‡	Physician
Flexibility	Trainer or therapist
Body composition	Physiologist
Strength	Trainer, coach, therapist, physiologist
Speed, agility, power, balance, endurance	Trainer, coach, physiologist