

Sports Medicine Specialty Training Core Curriculum for European Countries

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Glossary

- UEMS: UNION EUROPEENNE DES MEDECINS SPECIALISTES
MJC: MULTIDISCIPLINARY JOINT COMMITTEE
EFSMA: EUROPEAN FEDERATION OF SPORTS MEDICINE ASSOCIATIONS
NSMA: NATIONAL SPORTS MEDICINE ASSOCIATION
NMA: NATIONAL MEDICAL ASSOCIATION
SM: SPORTS MEDICINE
STA: SPECIALIST TRAINING AUTHORITY
ST: SPECIALIST TRAINING
PGT: POST GRADUATE TRAINING

1. INTRODUCTION

This document describes the curriculum for Clinical Specialist Training (ST) in Sport Medicine (SM) for medical doctors adopted to harmonize national requirements within all countries of the European Union.

2. BASIC PRINCIPLES

2.1. There is a strong relationship between physical activity and health

2.2. Physical activity is essential to good health and

quality of life. Physical activity and exercise exerts a positive influence on muscular-skeletal, cardiovascular, respiratory, hormonal-immunological, hematological, neurosensory and gastrointestinal systems.

2.3. Physical activity levels are declining in most developed countries and in all age categories. Regular physical activity and sport, especially during childhood and adolescence, promotes proper growth and development, maintains health and counteracts negative risk factors such as obesity, type 2 diabetes, osteoporosis, hypertension, coronary heart disease and other ailments.

2.4. Risk factor profiles for many ailments limiting

the quality of life are beneficially affected by physical activity and exercise.

2.5. The Sports Medicine Specialist and other parties involved in this work may have a substantial impact on all the above points raised including reduction of health care costs.

3. DEFINITION AND SCOPE OF SPORTS MEDICINE

Sports medicine is a multidisciplinary clinical and academic speciality (and subspeciality in some countries) of medicine dealing with health promotion for the general population by stimulating a physically active lifestyle and diagnosis, treatment, prevention and rehabilitation following injuries or illnesses from participation to physical activities, exercises and sport at all levels.

Sports medicine is globally defined and recognised not solely for taking care of the sporting elite athletes. It is mainly focused on:

- Prevention of chronic diseases caused by sedentary lifestyle as a major area of increasing interest which can partially be served by expertise in sports medicine.
- Pre-participation clinical screening and examination before exercise and competition as well as medical assistance to the athletes engaged in all sports.
- The use of supplements, pharmacological agents, doping control and gender verification and its complex moral, legal and health-related difficulties.
- Special medical issues associated with international sporting events of athletes, including disabled athletes, such as the effects of travel and acclimatization.
- Research in basic science and extensive clinical undertaken in the sports medicine domains within a great variety of specialities. The increased attention from media and significant financial and political interactions in international sports events creates an atmosphere where business and sports meet, not always for the benefit of involved athletes. Consequently, sports medicine can encompass an array of areas including internal medicine, exercise physiology, cardiology, orthopaedics and traumatology, physical and rehabilitation medicine etc. Sports medicine is a multidisciplinary specialty, integrating teams with physicians, athletic trainers, physical therapists, coaches, sport scientists, nutritionists, psychologists, athletes and other related specialties. Besides his clinical expertise, the sports medicine specialist should be considered as head of the multidisciplinary sports medicine team, coordinating the direct planning of the athlete's health activities, related to his health.

4. ROLE OF THE SPORTS MEDICINE SPECIALIST

A specialist in sports medicine may work in different environments and should therefore besides the basic training as outlined in this curriculum also have specific competence on medical problems arising from the specific practice/sport in which he/she will work. That may include as an example a thorough understanding of the needs in dance medicine or football medicine or ranging to the physical needs of professionals such as firemen, policemen and armed forces' personnel. That sport specific knowledge must be achieved outside this curriculum in close collaboration with relevant parties. A specialist in sports medicine should however be competent to fulfil basic general requirements such as the practice of first aid, and possessing ability to address common clinical problems occurring in sports in general. The specialist will also be able to promote the development of sports medicine, being able to contribute to scientific research by an in depth understanding how to critically analyze scientific data from literature and understand fundamentals on how to plan and undertake research including ethical and statistical considerations. A specialist in Sports Medicine should also have basic managerial skills allowing for example a smooth planning and execution of preventative measures in relation to travelling with teams or during competitions in unfamiliar environment and cultures.

5. AIMS OF SPORTS MEDICINE SPECIALTY TRAINING

These studies in sports medicine aim to provide theoretical understanding and practical skills as detailed in this curriculum, sufficient to provide first line clinical services of the highest possible standard and leading to formal recognition as Clinical Specialist in Sports Medicine, equivalent within all the European countries.

Basic skills provided by this curriculum include:

Clinical

To provide pre-participation clinical screening and examination before exercise and competition as well as medical assistance to the athletes engaged in all sports.

- To cover primary responsibility to achieve, by own means or by referral, an accurate diagnosis and treatment for injury or illness caused by or affecting exercise and sport.
- To provide leadership in the management of injury or disease from onset to return to sport.
- To provide appropriate and courteous communication with other clinical professionals asked for an opinion, investigations or treatment.

- To work closely with allied health professionals to ensure that the athlete receives the highest level of care in each stage of their treatment process.
- To work in close collaboration within the sport specific organisation to ensure a safe and healthy environment
- To promote the highest level of ethical standards within the sporting environment including antidoping activities

Public health

- As part of a multi-disciplinary team to encourage and promote physical activity as a lever for healthy living.
- To identify impediments to an active lifestyle and work within a multi-disciplinary framework to remove those impediments or minimise their impact.
- To work alongside local health authorities/public health clinicians/developing exercise opportunities for the general public for health gain.
- To liaise with public (local authorities/education/voluntary) and private sector so as to advise on the health aspects of exercise programmes.

Managerial

To work closely with a network of specialists in other fields such as general practice, orthopaedics, rheumatology, emergency medicine, physical & rehabilitation medicine, neurology etc to further understanding of medical conditions affecting the active population

- To liaise with health authorities at all levels for provision of resources to promote increased physical activity for the general population to improve community health.
- To establish liaison with public agencies such as social services, housing, education, unemployment and voluntary agencies as well as the private sector, involved in the provision of services to disabled people in the community.
- To contribute to organisations which promote the dissemination of knowledge throughout the community for the improvement of community health and for the advancement of sports.

Education and research

- To participate in regular clinical audits and governance.
- To promote and participate in scientific research in close collaboration with academic professionals.
- To critically review scientific literature and apply evidence based principles in practice.
- To actively participate in educational activities for children, community groups, sports organisations, athletes and other medical professionals to promote

an active lifestyle and to improve safety standards in sports.

- To participate in all approved training programmes.

6. ENTRY REQUIREMENTS

Applicants for Specialist Training (ST) should have completed basic medical training and achieved corresponding National basic medical degree.

Already recognized specialists from other one of the relevant specialties may apply to enter the program for at least two years of training, suited to fit appropriate further education to achieve a particular competence title in Sports Medicine. This will include competencies as described in both curricula involved and there must be jointly agreed assessment.

6.1. Flexible training

Trainees who are unable to work full-time are entitled to choose for flexible training programmes. EC Directive 93/16/EEC requires that:

i. Part-time training shall meet the same requirements as full-time training, from which it will differ only in the possibility of limiting participation in medical activities to a period of at least half of that provided for full-time trainees.

ii. The competent authorities shall ensure that the total duration and quality of part-time training of specialists are not less than those of full-time trainees.

7. STRUCTURE, DURATION AND ORGANISATION OF SPORTS MEDICINE SPECIALTY TRAINING

The curriculum should be organized in the sense that the specialist in sports medicine could serve in his role in national health service but also specifically in his/her preferred sport.

Key characteristics of practising clinical Sports Medicine are:

- It involves both clinical services and educational activities.
- It requires simultaneous patient centred and learner centred interaction with the emphasis on effective communication, allowing clinical events to be seen and treated as individually designed educational experiences.

Teaching will be undertaken in a variety of clinical settings. Work will be undertaken independently or supervised by senior staff. Trainees should have opportunities for practicing skills and performing practical procedures during their placements. Supervision

will always be given where the trainee has not yet acquired a sufficient level of competence. The responsibility in choosing appropriate tasks lies with the Supervisor. The responsibility in conducting tasks or clinical procedures and to inform supervisors of lack of training or competence on any procedure lies with the Trainee.

Personal study (self-directed learning) including the reading of relevant professional journals and textbooks and use of CDs, DVDs, searching the worldwide web and use of other library resources are considered important aspects in ST.

Trainees are expected to complete evidence of reflective practice through case reports and other experiences in their training record. Other self-directed work will be planning, data collection, analysis and presentation of audit and research work. The mandatory training record (hand written diary or preferably logbook) will contain evidence of academic pursuits and should be checked and documented regularly by the Supervisor.

Trainees will take part and be able to lead in teaching and will be expected to develop skills to teach undergraduates, postgraduates and non-medical staff in small groups and formal lectures making personal presentations using a variety of audiovisual methods. They will be expected to present at journal clubs, and make case presentations at grand rounds or similar settings. They will be expected to undertake personal audit and research and make presentations of their findings at clinical meetings.

An important objective of the practical training is to foster the integration of knowledge and practical skills acquired during the cardiology, orthopaedics, physical & rehabilitation medicine, general practice medicine and physiology internships. Trainees will also learn to put into practice information gained in the relevant course work. Trainees will also extend and deepen their knowledge in the assessment of fitness, such as isokinetic and functional muscle performance, cycle ergometry and treadmill ergometry. Trainees will gain experience in the use of such test results in the decision-making with regard to diagnosis, recommendations and therapy for people of both gender and in different age groups and performance levels. With regard to elite sport, trainees will learn how to diagnose, treat and prevent overtraining and overexertion. While supervising competitions and training, trainees will become proficient in activities related to, for example, hygiene and nutrition, and will work closely with trainers, athletes, physiotherapists, officials, etc.

7.1. Course work (contact hours)

The theoretical training will be given as lectures,

tutorials or seminars. Regular progress meetings and supervision on written projects and reports are agreed with relevant course instructor. In the clinical setting the teacher-trainee contact is in particular important when the work involves clinical skills.

7.2. Practical training

During practical clinical training, trainees should be supervised by a relevant specialist and considerations of ethical issues (such as presence of parents or tutors), and liability must be addressed. A condition for the continued recognition of undertaken training is that tools for assessment should be available to determine whether the teaching objectives have been reached. A completed and approved curriculum is required to achieve national recognition.

7.3. Teaching staff

7.3.1. The Head of the training programme should have been practicing in the specialty of Sports Medicine for at least five years. He/she should be qualified specialist with a commitment to training and recognized by the relevant National Authority. He/she should have documented experience in research and postgraduate education preferably having a senior academic degree. The associated team should include qualified and relevant specialists, guaranteeing that the full range of required learning is covered in the programme. In countries developing the specialty, transitional arrangements may exist.

7.3.2. The Head of the training programme will be responsible for the individualized training programme for each trainee in accordance with national rules, following the recommendations of the European MJC on Sports Medicine for training programmes in Sports Medicine.

7.3.3. The teaching staff will be sufficient in number in relation to the number of trainees on the programme – according to the national regulations - in order to guarantee adequate supervision of the trainee in the programme.

7.4. Training program

A minimum curriculum of supervised specialist training should correspond to 4 years (or equivalent of in total 3200 -contact-course and practical training hours). As a basic recommendation it is proposed to include

- 1 year Internal Medicine with special emphasis to cardiological problems, emergency medicine and clinical nutrition (or metabolic and endocrinological diseases or other relevant areas)

- 6-12 months Orthopaedics and Traumatology
- 6-12 months Physical and Rehabilitation Medicine
- 12-24 months at - recognized Sports Medicine Centres, including theoretical and clinical practice and experience as a team physician

For scientific knowledge, skills and experience (see Annex 1)

7.4.1. Training record

The trainee will maintain a hand written training record or preferably a logbook throughout the programme. It will regularly be counter-signed as appropriate by the Supervisor to confirm the satisfactory fulfilment of the required training experience, and the acquisition of the competences that are outlined in the Specialty syllabus.

7.5. Assessment

Course work and hands on skills are preferably assessed by the supervisor as well as by an unbiased external examiner. Assessment of practical skills will also form a regular part during the training and evaluated by the course leader or supervisor. A standardized form of assessment may be developed within the framework of the supervision but must include a comprehensive view of the skills required by the curriculum.

8. TRAINING INSTITUTION

8.1. Training institutions must be recognised by the National Authorities responsible for the training in Sports Medicine. A list of recognized training institutions may be issued by the National Authorities. If these institutions meet the requirements provided in Chapter 6 of the UEMS Charter on PGT, they will be recognised by the UEMS MJC on Sports Medicine for specialist training in Sports Medicine.

8.2. Training institutions should constitute one or several facilities within a restricted area to allow easy access and preferably be placed within or associated with a university hospital or a major hospital with adequate support services to provide an optimal training environment. This includes training programmes for other clinical specialties allowing easy access to interdisciplinary consultation. The institution should provide access to library and scientific literature. Occasionally, periods of training may be undertaken in other approved specialist clinics or institutes for Sports Sciences.

8.3. The Sports Medicine Training Centre will set up a programme for quality management

8.4. The Sports Medicine Training Centre will meet national standards and will have access to the following facilities:

- A fully equipped and staffed outpatient department for consultation with athletes and patients. Equipment should be available for basic diagnostic and therapeutic procedures.
- Conference facilities for tutorial sessions.
- Relevant laboratory resources

9. RESPONSIBILITY FOR THE CURRICULUM

The UEMS MJC on Sports Medicine is responsible for the core curriculum.

At National level the training should fulfil the requirements laid down by the respective Authority. Ideally, in the process of harmonisation, those national requirements should be enriched by those proposed by the UEMS MJC on Sports Medicine.

10. RESEARCH

Conducting regular clinical audit is an essential part of the specialty training. Participation in clinical research is encouraged, but not mandatory. Trainees will be encouraged and supported to publish quality research in peer-reviewed journals.

11. THE ROLE OF THE SUPERVISOR

Each trainee should have one or more assigned supervisors throughout the program. He/she will discuss issues of clinical governance, risk management and requirements of reporting clinical incidents or complications involving the trainee. The supervisor is part of the clinical specialty team. If the clinical director has any concerns about the performance of the trainee, or where there are issues of physician's or patient's safety, these would be discussed with the supervisor. This includes clinical routines, study leave, sick leave and annual leave arrangements, on-call rotas, educational opportunities, documentation and agreements. Special attention will be given to the nature of work-based learning, so it is clear about the roles and responsibilities.

12. EQUALITY AND NATIONAL DIVERSITY

The specialisation training bodies are expected to comply, and ensure compliance, with the requirements of legislation.

REFERENCE DOCUMENTS

1. Chapter 6 of the UEMS Charter on Postgraduate Training for the requirements to be specialised in Sports Medicine. UEMS 2007/21, as endorsed by Bratislava UEMS Council meeting in Oct. 2007. www.uems.org
2. Faculty of Sport and Exercise Medicine (UK), SPECIALTY TRAINING CURRICULUM FOR SPORT AND EXERCISE MEDICINE September 2006, <http://www.jrcptb.org.uk>
3. CENTRUM MEDYCZNE KSZTALCENIA USTAWICZNEGO, CONSULTANT IN SPORTS MEDICINE, Curriculum, Warszawa 2003, <http://www.cmkp.edu.pl>
4. Curriculum for training specialists in sports medicine, M. Koornneef, A.M.G.J. Bruinsma, Stichting Nederlands Instituut Opleiding Sportartsen (NIOS) 1991, Vondellaan 24, 3521 GG Utrecht.
5. Ergen E, Pigozzi F, Bachl N, et al. (2006) Sports medicine: a European perspective. Historical roots, definitions and scope JOURNAL OF SPORTS MEDICINE AND PHYSICAL FITNESS 46 (2): 167-175.
6. Austrian, Hungarian, Italian, Romanian and Turkish sports medicine specialisation training curricula. Emin Ergen et al: 2008, EFSMA, www.efsm.net

Sports Medicine Specialty Training Programme

ACADEMIC AND CLINICAL KNOWLEDGE/SKILLS AND EXPERIENCE

EXERCISE PHYSIOLOGY

1. Origins and applications of basic and applied exercise physiology
2. Cellular metabolism and biomechanical pathways of energy production
3. Human energy transfer systems during exercise
4. Energy systems in exercise
5. Measurement/energy costs of exercise
6. Cardiovascular response and adaptations to exercise
7. Respiratory response and adaptations to exercise
8. Neuromuscular response to exercise
9. Evaluating exercise metabolism/neuromuscular activity
10. Hormones and endocrine systems in exercise
11. Principles of training
12. Strength and conditioning
13. Monitoring of exercise capacity/training/ over-training
14. Fitness assessment
15. Environment and exercise
16. Ergogenic aids
17. Genetics and exercise

Practical skills

1. Calculating energy utilisation
2. Estimating maximal oxygen consumption
3. Lung function testing
4. Isokinetic testing
5. Force measurement

CLINICAL ANATOMY

1. Clinically relevant regional anatomy, including the upper limb, lower limb, groin & pelvis, head & neck, thorax and abdomen, cervical spine, thoracolumbar spine
2. Normal variations in anatomy and the relevance for injury risk, injury prevention and injury management

NUTRITION AND EXERCISE

1. Macronutrients and energy

2. Micronutrients
3. Hydration for Exercise
4. Substrate utilisation during exercise
5. Diet and exercise in extreme environments
6. Body composition
7. Diet and health
8. Obesity, exercise and weight control
9. Nutrition for exercise
10. Diet, glycogen stores and endurance
11. High fat diets and exercise
12. Protein and anabolic diets
13. Supplements
14. Alcohol and exercise performance
15. Disordered eating, bone health and female athlete triad
16. Calculation of calorific expenditure
17. Formulation and analysis of food diaries
18. Calculation of body composition
19. To advise on dietary requirements for different exercise conditions/training regimes and supplement use

PUBLIC HEALTH

Primary care

1. Basic treatment options for common conditions seen in General practice including ENT, respiratory, cardiology, gastroenterology, ophthalmology, and dermatology
2. Acute management of common musculoskeletal injuries
3. Referral procedures to secondary or tertiary services
4. Indications and contraindications for exercise in healthy population and those with medical conditions
5. Challenges facing deprived communities and ethnic minorities
6. Effects of medications on exercise tolerance
7. Understanding of community physiotherapy services

Public health

Benefits of exercise in primary and secondary dis-

- imaging techniques and their ability to demonstrate both normal and abnormal structures within tendons, ligaments, muscles, bones and joints
4. A full appreciation of the role of imaging in investigating patients presenting to a team physician and sports medicine specialist. This will include the investigation of patients with both acute and chronic symptoms including acute traumatic injury and chronic overuse injury
 5. The ability to construct a differential diagnosis based on history and clinical findings and the targeted use of imaging to reach a definitive diagnosis
 6. An understanding of the use of medical imaging for targeted treatment (e.g. guided injections) to complement history & examination

Gait and biomechanical assessment

Knowledge

1. Functional anatomy of joints and musculo-tendinous units
2. Characteristics of bone, tendon, ligament, articular cartilage, muscle under stress and strain and potential for fatigue
3. Human movement analysis – basic kinematics and kinetics
4. Biomechanical analysis of sport-specific techniques
5. Effects of faulty biomechanics, influence of posture
6. Methods and effects of changing biomechanics
7. Principles of body morphology
8. Biomechanics experience with podiatrist/physiotherapy/biomechanist
9. Attend workshops on orthotic construction

WORKING WITHIN THE TEAM ENVIRONMENT

Team physician

Knowledge

1. The role of the team physician
2. Pre-participation screening
3. Health education and pre-season assessment
4. Acquisition of skills and physique
5. Protective equipment
6. Medical equipment, pharmacy supplies required for coverage of teams
7. Structuring training to prevent injury
8. Doping classes and methods/permitted use of banned drugs/doping control

9. Traveller's health issues, combating jet lag and immunisations
10. Athlete confidentiality and medico-legal aspects of team care
11. Disordered eating, female athlete triad
12. Child protection

Skills

1. Communication skills
2. Ability to prepare a medical team for travel
3. Ability to monitor environment/hygiene/facilities
4. Ability to work both with individual athletes and a team
5. Ability to undertake pre-hospital care of an injured athlete
6. Show adequate record keeping

Experience

1. Supervised for minimum of 2 years as physician in team sporting environment
2. Maintain a logbook of athletes and, teams and conditions seen
3. Experience of travelling with a variety of teams
4. Attend appropriate courses such as Advanced Life Support

Physician in charge of events

General knowledge

1. Legislative and medico-legal guidelines with regard to medical and crowd safety facilities at sporting venues
2. Guidelines for number and type of medical personnel required for sporting events with large participant numbers and/or large crowds
3. Relevant EU safety legislation governing the running of sporting events with large participation numbers and/or large crowds
4. Procedures for evacuation of injured athlete or member of the crowd from any given sporting event
5. Procedures for evaluating requirements in terms of pharmacy supplies, medical equipment, medical personnel, paramedical personnel and communication equipment at any given sporting event

Specific sports

Knowledge

1. Familiarity with a wide variety of sports in terms

- of rules and regulations, physiological requirements and injury risk profiles
- 2. Provide medical treatment for athletes involved in these sports
- 3. Provide advice to team management regarding pre-participation screening, training programs, injury risk management and injury treatment, for any of these sports

Experience

- 1. Spend time with teams involved in these sports
- 2. Attend appropriate courses relating to the care of athletes involved in these sports

MEDICAL EMERGENCIES

Head injury and concussion

- 1. Pathophysiology of concussion
- 2. Various definitions of concussion
- 3. Grading concussion severity – historical perspectives
- 4. Understanding of possible significant complications
- 5. Assessment of concussion
- 6. Understanding of short and long-term sequelae of concussion
- 7. Rehabilitation of concussed athlete
- 8. Rationale for return to play
- 9. Sport-specific regulations
- 10. Maxillofacial and dental issues

Sudden death in sport

Knowledge

- 1. Incidence and prevalence of sudden death in sport
- 2. Aetiology of sudden death in sport
- 3. Cardiological causes, including
- 4. Traumatic causes including
- 5. Environmental factors
- 6. Understanding of the role of pre-participation screening

Skills

- 1. Implement strategies to reduce risk of sudden death in sport
- 2. Ability to identify at risk athletes through history, examination and appropriate investigation
- 3. Ability to manage athletes with known risk factors

Experience

- 1. Provide coverage at contact sport events
- 2. Attend cardiological testing sessions
- 3. Read ECGs and identify relevant patterns of pathology
- 4. Observe echocardiograms
- 5. Attend clinic specialising in connective tissue diseases, including Marfan's syndrome
- 6. Participate in pre-participation screening

Resuscitation training

- 1. On field assessment including basic life support, advanced life support, shock, anaphylaxis, basic and advanced airway management, spinal immobilisation and principles of safe patient transfer
- 2. Basic pharmacology of drugs used in resuscitation
- 3. Thorough understanding of the principles of care for the unconscious patient
- 4. Basic knowledge of the principles of trauma care
- 5. Principles of the management of spinal injury, head injury, thermal injury, chest and abdominal injury eye trauma, dental trauma and genitourinary trauma

Accident and emergency

- 1. Basic triage of injuries
- 2. Acute assessment and treatment of soft tissue injuries
- 3. Principles of basic fracture management
- 4. Knowledge of common fractures and dislocations in upper and lower limbs
- 5. Assessment and treatment of minor and major head injuries
- 6. Differential diagnoses in acute eye trauma
- 7. Differential diagnoses in acute ear, nose and throat trauma
- 8. Understanding of the principles and practice of local anaesthetic use including field and regional anaesthesia

DRUGS IN SPORTS

- 1. Understanding of effects of various pharmaceutical agents on exercise performance
- 2. History of Drugs in Sport
- 3. Banned substances/methods
- 4. Therapeutic use of drugs for illness and injury
- 5. Education of athletes and administrators – the doctor's roles & responsibilities
- 6. Regulatory authorities including government, IOC, WADA and individual sporting organisations

PSYCHOSOCIAL ASPECTS OF SPORTS MEDICINE

1. Awareness of motor learning, selective attention and information processing theories and models
2. Psychology of behavioural change – sedentary to active living
3. Psychological aspects of stress, trauma, disability, rehabilitation, and failure in sport
4. Psychological aspects of motivation, arousal and performance
5. Group psychology: of team, coach, medical team, group dynamics, behaviour remodelling
6. Psychological/mood effects of physical activity
7. Sociology of sport: including violence in sport, behavioural norm and values in sport, effect of sport and physical activity on socialisation, influence of role models, drug issues in sport
8. Psychosocial effects of retirement from sport

INVESTIGATIONS AND PROCEDURES

1. Knowledge of muscle and nerve physiology – the motor unit
2. Understanding of the methodology behind electrophysiological testing (NCS and EMG)
3. An understanding of the indications for electrophysiological studies and their strengths and weaknesses
4. Be able to describe the components of the normal EMG and NCS
5. Understanding of the EMG findings in denervated muscle, myopathy and inflammatory myositis
6. Be able to describe the three main types of nerve injury (neuropraxia, axonotmesis, and neurotmesis)
7. Thorough knowledge of muscle compartment anatomy, specifically related to possible complications of muscle compartment pressure testing
8. Joint anatomy, specifically related to possible complications of aspiration/injection of joints
9. Principles of lower limb biomechanics and the use of orthotics
10. Principles and techniques of musculoskeletal ultrasonography

SPINAL INJURIES, AMPUTEE REHABILITATION AND SPORTS FOR THE DISABLED

1. Awareness of the special needs of disabled athletes and exercisers e.g. cerebral palsy, amputees, visually and hearing impaired, learning difficulties etc
2. Awareness of the special medical needs of disabled athletes and exercisers e.g. knowledge of catheters, pressure sores, stump care etc

3. Have an understanding of the physical problems experienced by amputees and wheelchair users with everyday living and with respect to sport
4. Have knowledge of the types of prosthesis available, particularly those used for sport
5. Have knowledge of the types of wheelchair available and adaptations required for different sports
6. Awareness of support groups and sports organisations for disabled people
7. Knowledge of the effects of spinal injury at different vertebral levels
8. Awareness of disability classification and relevant competition rules and regulations – Special Olympics, Paralympics Associations

PHYSICAL ACTIVITY IN SPECIAL GROUPS

Children and adolescents

1. Anatomical and physiological differences of the child and adolescent, in relation to the management of injury and illness
2. Paediatric musculoskeletal injuries: epiphyseal plate injuries, traction apophysitis, common fractures and specific soft tissue injuries
3. An understanding of non-accidental injury in all its forms, to include an appreciation of child protection issues and the relevant laws
4. Understanding of Gillick competency and the legality of treating minors
5. Basic knowledge of metabolic diseases encountered in children and adolescents
6. Understanding and knowledge of the principles of pre participation screening in children, with particular emphasis on cardiology screens for HOCM
7. Diagnosis and treatment of exercise induced asthma in childhood
8. Application of appropriate training workloads to the developing skeleton and metabolism
9. Identification of common eating and body perception disorders in the developing athlete, with particular reference to amenorrhoea (primary and secondary) and the female athlete triad

Differences based on gender

1. Understanding on the effect of hormone cycles on performance
2. Understanding the effects of exercise on the menstrual cycle
3. Principles of manipulation of menstrual cycle
4. Contraception options for athletes and the relevant merits & disadvantages in relation to performance

5. Understanding of the relationship between hormones, weight, osteoporosis and stress fractures in female athletes
6. Relationship between pregnancy and exercise, in terms of both safety and performance
7. Principles of return to exercise postpartum
8. Understanding of gender differences in exercise

Elderly athletes

1. Understanding of the effect of ageing on muscle bulk, cardiovascular fitness, endurance etc
2. Knowledge of considerations when exercising with chronic diseases, and the effect of chronic diseases on performance
3. Understanding of the risks and benefits of exercise in older people
4. Knowledge of the effect of medications e.g. beta-blockers on exercise capacity
5. Knowledge of exercise prescription

RESEARCH AND STATISTICS

Knowledge

1. Ethics of clinical research
2. Types of study design – experiments, observational, controlled, single case.
3. Principles of statistics, trial design, randomisation and techniques of data analysis
4. Epidemiology of sports injuries and health problems associated with exercise

Skills

1. To be able to read scientific and clinical and other relevant papers and reports critically
2. To be able to evaluate the evidence presented in papers, literature reviews and meta-analysis
3. To report research findings in written papers and at meetings
4. To design and implement a clinical audit
5. To incorporate research findings into clinical practice
6. To take the appropriate action arising from the clinical audit
7. To demonstrate an ability to design research

TEACHING AND PRESENTATION SKILLS

1. Principles of presentation construct

2. Principles of customising information presentation to groups of varying levels of medical understanding (athletes, trainers, allied health professionals, other Sports Medicine specialists etc)
3. Familiarity with commonly used software packages for presenting information
4. Presentation (case history, literature review, research update) at Sports Medicine conference on an annual basis: regional, national and international (preferred)
5. Attendance at formal teaching courses and workshops

SPORTS MEDICINE MANAGEMENT

1. Principles of personal effectiveness/time management
2. Principles of business planning and marketing strategy
3. Understanding of IT in medical practice and potential for enhancing practice efficiency
4. Human Resources Issues
5. Principles of good communication, counselling
6. Principles of good teamwork -group dynamics, leadership techniques, conflict resolution, motivation, promotion of team identity
7. Ability to work effectively within multidisciplinary teams around athletes and exercisers physiotherapists, sports scientists, osteopaths, chiropractors, coaches and others
8. Principles of effective financial accounting, planning, policy development and budgeting
9. Organizations within the medical profession
10. Clinical Governance
11. Appraisal
- 12 Principles of planning and running a formal meeting with emphasis on formal structure of the meeting

ETHICAL AND MEDICO-LEGAL ASPECTS

1. Relevant EU legislation and medico-legal guidelines
2. Legislation regarding patient confidentiality
3. Legislation regarding keeping of medical records
4. Requirements for patient consent
5. Guidelines for dealing with minors and other potentially vulnerable individuals
6. Strategies utilised by media and other interested parties to gain information in breach of patient confidentiality
7. Privacy legislation

Ethical Codes in Sports Medicine

International Federation of Sports Medicine (FIMS) ethical codes apply to all sports medicine specialists

A summary of these items is given below:

1. Medical ethics in general: The same ethical principles that apply to the practice of medicine shall apply to sports medicine. The main duties of a physician include: Always make the health of the athlete a priority. Never do harm. Never impose your authority in a way that impinges on the individual right of the athlete to make his/her own decisions.

2. Ethics in sports medicine: Physicians who care for athletes of all ages have an ethical obligation to understand the specific physical, mental and emotional demands of physical activity, exercise and sports training. A different relationship exists between sports medicine practitioners, their employers, official sports organization, professional colleagues and the athletes. In sports medicine there is also a link between the pathologic concern and specific recreational and professional activity. An athletic injury has a direct and immediate impact on the participation in this activity that may have psychological and financial implications.

3. Special ethical issues in sports medicine: The physician's duty to the athlete must be his/her first concern and contractual or other responsibilities are of secondary importance. A medical decision must be taken honestly and conscientiously. A basic ethical principle in health care is that of respect for autonomy. An essential component of autonomy is knowledge. Failure to obtain informed consent is to undermine the athlete's autonomy.

4. The athlete-physician relationship: The physician shall not allow consideration of religion, nationality, race, party politics or social standing to intervene between his/her duty and the athlete. The basis of the relationship between the physician and the athlete should be that of absolute confidence and mutual respect. The athlete can expect a physician to exercise professional skill at all times. Advice given and action taken should always be in the athlete's best interest. The athlete's right to privacy must be protected. The regulations regarding medical records in health care and medicine shall also be applied in the field of sports medicine. The sports medicine physician should main-

tain a complete and accurate record of the patient. In view of the strong public and media interest in the health of athletes, the physician should decide with the athlete what information can be released for public distribution. When serving as a team physician, the sports medicine physician assumes the responsibility to athletes as well as team administrators and coaches. It is essential that each athlete is informed of that responsibility and authorizes disclosure of otherwise confidential medical information, but solely to the specific responsible persons and for the expressed purpose of determining the fitness of the athlete for participation. The sports medicine physician will inform the athlete about the treatment, the use of medication and the possible consequences in an understandable way and proceed to request his or her permission for the treatment.

5. Training and competition: Sports medicine physicians should oppose training and practices and competition rules as they may jeopardize the health of the athlete. In general, the physician shall obtain knowledge of the specific and mental demands made of athletes when they participate in sport activities. Relevant aspects in these respect include expertise, effectiveness and efficiency, and safety. If the athletes concerned are children or growing individuals, the physician must take into consideration the special risks that the sport in questions may represent to persons who have not yet reached physical or psychological maturity.

6. Education: Sports medicine physicians should participate in continuing education courses to improve and maintain the knowledge and skills that will allow them to provide optimal advice and care to their patient athletes. Knowledge should be shared with colleagues in the field.

7. Health promotion: Sports medicine physicians are obligated to educate people of all ages about the health benefits of physical activity and exercise.

8. Injuries and athletes: It is the responsibility of the sports medicine physician to determine whether the injured athletes should continue training or partici-

pate in competition. The outcome of the competition or the coaches should not influence the decision, but solely the possible risks and consequences to the health of the athlete. Injury prevention should receive the highest priority.

9. Therapeutic exercise: When supported by scientific research, a detailed exercise prescription should be part of the therapeutic plan for an athlete recovering from injury or disease.

10. Relationship with other professionals: The sports medicine physician should work in collaboration with professionals of other disciplines. The sports medicine physician should cooperate with physical therapists, podiatrists, psychologists, sport scientists including biochemist, biomechanics, physiologists, and others. The sports medicine physician has the final responsibility for the health and well-being of the athlete and should therefore coordinate the respective roles of these professionals and those of appropriate medical specialists in the prevention, treatment and rehabilitation of disease and injury. The concept of interdisciplinary team work is fundamental to the practice of sports medicine. A sports medicine physician should refrain from publicly criticizing fellow professionals who are involved in the treatment of athletes. When a sports medicine physician recognizes that the athlete's problems are beyond his level of expertise, it beholds him to advise the athlete of other persons with the necessary expertise and refer the athlete to such appropriate persons for assistance.

11. Relation to officials, clubs, etc.: At a sport venue, it is the responsibility of the sports medicine physician to determine when an injured athlete can participate in or return to an event or game. The physician should not delegate this decision. To enable the sports medicine physician to undertake this ethical obligation the sports medicine physician must insist on professional autonomy and responsibility for all medical decisions concerning the health, safety and legitimate interest of the athlete. No third party should influence these decisions. No information about an athlete may be given to a third party without the consent of the athlete.

12. Doping: The sports medicine physician should oppose and in practice refrain from using methods to improve performance artificially such as those prohibited by the IOC and WADA. The physicians have forcefully opposed the use of methods that are not in accordance with medical ethics or scientifically proven experience. Thus, it is contrary to medical ethics to condone doping in any form. Neither may the physician in anyway mask pain in order to enable the athlete's return to practicing the sport if there is any risk of aggravating the injury.

13. Research: Research should be conducted following the ethical principles accepted for research in animals and human subjects. Research should never be conducted in a manner which may injure athletes or jeopardize their athletic performance.