

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN SPORTS MEDICINE

Preamble:

With the awareness of fitness among the youth in our country indulgence in various sporting activities is on the rise. Also participation of Indian sportsmen and athletes in various sporting events at a national and International level has increased in the last decade. Sports, whether competitive or recreational, has become fitness oriented and has led to an increase in the number of injuries due to sports.

Sports Medicine is a multi-disciplinary field, which caters to a large number of sub-specialties like Sports Psychology, Biomechanics, Nutrition, Trauma, Rehabilitation, doping in sports, Sports Physiology etc. Sports Medicine is essentially ensuring optimal fitness before and after the sporting event. Also it deals with prevention and treatment of sporting injuries. In the recent past, Sports Medicine has gained wide popularity in India. What is needed is multi-skilling where the consultants are experts in a wide range of interrelated disciplines with synchronization of skills.

The need today is to start a Sports Medicine specialty course so as to train doctors for delivering this science. Sports Medicine is a recognized specialty in most advanced countries. These countries appoint a sports medicine consultant for most of their sports teams and Olympic contingents. Once this course is introduced in India, our athletes and sports men will be highly benefited and this will reflect on the performance of our sportsmen and athletes in various sports at national and international level.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by various subject-content specialists. The Reconciliation Board of the Academic Committee has attempted to render uniformity without compromise to purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of “domains of learning” under the heading “competencies”.

SUBJECT SPECIFIC LEARNING OBJECTIVES

At the end of the course, the student should:

1. acquire in-depth knowledge of structure and function of human body related to the respective branch of specialty of Sports Medicine.

2. demonstrate skill in medical, physical and functional diagnosis pertaining to athletes under care.
3. be able to estimate the baseline physical fitness of the sporting population and designing programmes for various sports depending upon the fitness level of the individuals based on the exercise physiology principles.
4. be able to use Kinanthropometric principles for designing and recommending games to the young children so that they can excel according to their genetic and physical characteristics.
5. be able to evaluate the age of the sporting individual for sports which are compartmentalized according to age.
6. be able to do a complete psychological analysis and using the principles of psychology for relaxation and peaking.
7. be able to use biomechanical principles for prevention and rehabilitation of sporting injuries.
8. be able to give advice on ergogenic procedures and sports nutrition for performance enhancement.
9. be able to utilize a thorough knowledge and understanding of Sports Medicine and relevant applied sciences to maintain standards of best practice in prevention and treatment of sports related injuries.
10. be able to demonstrate ability to critically appraise recent and related medical literature from journals and adopt diagnostic and therapeutic procedures based on it.

SUBJECT SPECIFIC COMPETENCIES

By the end of the course, the student should have acquired knowledge (cognitive domain), professionalism (affective domain) and skills (psychomotor domain) as given below:

A. Cognitive domain

1. Utilize knowledge of relevant aspects of musculo-skeletal medicine in prevention and treatment of sports related injuries
2. Integrate and apply thorough knowledge and understanding of applied anatomy, sports bio-mechanics and relevant kinesiology to clinical Sports Medicine practice.
3. Utilize advanced clinical competency and expertise, including clinical reasoning, in assessment and treatment of sports related injuries.
4. Develop an evidence-based approach. This will help to interpret and utilize published literature using analytical and critical approach.
5. Acquire knowledge and ability to conceptualize and write a research proposal

B. Affective domain

1. Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
2. Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.
3. Develop communication skills to interact with patients, relatives, peers and paramedical staff, and for effective teaching.
4. Communicate effectively and appropriately with athletes, coaches and health professionals in maintaining standards of best practice in Sports Medicine.

C. Psychomotor domain

1. Design, implement, evaluate and modify programs specifically related to prevention and management of sports injuries.
2. Perform detailed and relevant musculo-skeletal assessment, which are specific to the athlete.
3. Demonstrate oral and written communication skills and critical thinking at masters level of competency
4. For Training:

Students will undergo practical training as follows:

- Application of above learnt theoretical knowledge (Anatomy and Physiology) to understand applied sports sciences and for on-field purpose.
- Application of research knowledge to do research, paper presentations, posters related to sports medicine.
- Undergo training in the Sports Psychology and Exercise Physiology Laboratories
- Undergo training on Kinanthropometry equipment for body composition analysis, somatotyping and age determination
- Undergo training on Biomechanical Principles
- Undergo Clinical training in departments of Orthopaedics, Cardiology, General Medical and Emergency Care
- Undergo training in hospital and field management

Syllabus

Course contents:

1. Basic Medical Sciences and Research Methodology (BMSRM-P1)

Applied Basic Medical Sciences

Applied Clinical Anatomy

- Anatomy of the nerve injuries
- Bodily habitus
- Anatomical angles and stiff joints
- The pathology of nerve, bones in terms of anatomy
- Anatomical basis of clinical tests
- Anatomy of following diseases:
 - Headache
 - Infections of the hand
 - Common dislocations
 - Lesions of supraspinatous and subdeltoidbursae
 - Hernias associated with sports persons
 - Low back pain
 - Sciatica
 - Lesions of inter-vertebral disk
 - Abscesses of spine

Applied General Physiology

- Blood
- Cardiovascular system
- Neuromuscular system
- Respiratory system
- Temperature regulation
- Endocrine system

Applied Paraclinical Sciences

- Pathology and tissue healing
- Pharmacology
- Radiology

Research and Educational Methodology

- Introduction
- Ethical issues in research
- Structure, formulation and implementation of a research project
- Research questions
- Types of research
- Data analysis
- Experimental research
- Survey research
- Presentation
- Presenting research
- Review of an indexed refereed research paper

- Oral Presentations at Conferences/Seminars

2. Applied Sports Sciences (ASS-II)

- Assessment
- Kinanthrometry
- Biomechanics

Kinesiology

- Introduction
- Anatomical Concepts in Kinesiology

Assessment and Evaluation in Sports Medicine

Kinanthropometry

Biomechanics: of all joints

Exercise Physiology and Nutrition

- Nutrition
- Energy Transfer for physical activity
- Cardiovascular system and exercise
- Exercise and respiratory system
- Skeletal system
- Gastrointestinal tract
- Endocrine system

Applied Exercise Physiology

- Body composition
- Aging and exercise
- Temperature regulation
- Miscellaneoustopics

Physiological Basis and Principles of Training and Conditioning

- Principles of endurance and strength training
- Fundamentals that aid training and performance
- Analysis of Training

Sports Psychology

- History and current status of Sports Psychology
- Personality assessment and sports personality
- Attention and perception in sports
- Concentration training in sports
- Motivational orientation in sports

- Pre-competitive anxiety
- Relaxation training
- Aggression in sports
- Role of Psychology in dealing with injuries
- Eating disorders
- Goal setting (Psychological aspect of doping, stress management, group behaviour and leadership, emotion)

3. Clinical Sports Medicine (CSM-PIII)

Non-Traumatic Medical Conditions

- Female specific problems
- Rheumatology and geriatric disorder
- Age specific problems

Medical Aspects of Sports Medicine

- Exercise and common pulmonary conditions
- Exercise and cardiac conditions
- Doping in sports
- Diabetes and exercise
- Exercises for special categories
- Miscellaneous conditions

Emergency Care and Cardiopulmonary Therapeutics

- Cardio-pulmonary Resuscitation
- Health club and fitness concept, use and misuse of equipment
- Basics of cardiac rehabilitation

Sports Traumatology

- Pre-participation examination
- Causes and mechanism of Sports Injuries, prevention of sports injuries
- Common acute and overuse injuries, sporting emergencies and first aid and pharmacological treatment of injuries in the athletes
- Cardio pulmonary resuscitation
- Sports specific injuries, with special emphasis on the specific risk factor, nature of sports, kind of medical intervention anticipated and prevention with respect to individual sports (Individual events: Team events: Contact and Non-contact sports, Water sports specific injuries)
- Over-use training in Sports

Physical Medicine

- Rehabilitation and therapeutic exercises
- Mobilization and strengthening techniques

- Neuromuscular training
- Health club and fitness
- Physical therapy and law
- Morale and ethics

4. Sports Physical Therapy, Current concepts and Fundamentals of Health Care Management (SPTCCFH-PIV)

Sports Physical Therapy:

- Massage
- Heat therapy
- Hydrotherapy
- Electrotherapy
- Functional Bandages and Orthotic aids
- Cryotherapy
- Manual therapy
- Clinical reasoning and decision making

Current Concepts in Sports Medicine

- Segmental Stabilization Concepts of spine
- Emergency medical planning and cover for Sports events
- Exercise for growing bones
- Effect of physical activity intervention in youth
- Precision heart rate training
- Current concepts in obesity management
- Electromyography and Rehabilitation
- Current concepts in comprehensive physical examination for the instabilities of knee
- Current concepts in tendinopathies

Foundations and Principles of Healthcare Management

- Health care management
- Organization
- Emergency services and disaster management
- Technology in health care
- Importance and role of modern technology in hospitals and health care systems.
- Records management
- International perspective on health care
- Ethics in medical profession

TEACHING AND LEARNING METHODS

Teaching methodology

General principles

Acquisition of practical competencies being the keystone of post graduate medical education, post graduate training should be skills oriented. Learning in post graduate programme should be essentially self-directed and primarily emanating from clinical and academic work. The formal sessions are merely meant to supplement this core effort.

1. Formal teaching sessions

At least 5-hrs of formal teaching per week per subject is necessary. The departments may select a mix of the following sessions:

Journal club	Once a week
Seminar; lecture	Once a week
Case discussions	Twice a week
Interdepartmental case or seminar	Once a week

[Genetic, Biotechnology, anti-doping, Sports Psychology, Physical Education and Rehabilitation]

Additional sessions on basic sciences, biostatistics, research methodology, teaching methodology, hospital waste management, health economics, medical ethics and legal issues related to Sports Medicine practice are suggested.

Note: These sessions may be organised as an institutional activity for all post graduates as

Annexure 1

2. Rotations

The postgraduate student should rotate through all the laboratories in the department along with field assessment and attachments with sports teams in on and off season camps etc.

Mandatory

Attachments in Kinanthropometry, Sports Psychology, Isokinetics, Human Performance, Fitness assessment, exercise physiology, anti-doping, Neurophysiology, Biomechanics and Rehabilitation laboratories are mandatory and essential part of clinical training.

Optional

Attachment with sporting teams off and on season and during tournaments and competitions is desirable.

3. **Thesis:** Thesis writing is compulsory.

Objectives

By carrying out a research project and presenting his work in the form of thesis, the student shall be able to:

- identify a relevant research question
- conduct a critical review of literature
- formulate a hypothesis
- determine the most suitable study design
- state the objectives of the study
- prepare a study protocol
- undertake a study according to the protocol
- analyze and interpret research data, and draw conclusions
- write a research paper

Guidelines

While selecting the topic, following should be kept in mind:

- the scope of study is limited to enable its conduct within the resources and time available
- the study must be ethically approved
- the emphasis should be on the process of research rather than the results
- the protocol, interim progress and final presentation is made formally to the department

There should be periodic department review of the thesis work, as per following schedule:

End of 6 months	Submission of protocol
During second year	Mid-term presentation
Six months prior to examination	Final presentation; submission

4. General observations

There should be a training program on Research methodology for existing faculty to build capacity to guide research.

5. Log book

During his/her training, the candidate should maintain a Log Book indicating the duration of the postings/work done in sports specific laboratories and field work. This should indicate the procedures assisted and performed, and the teaching sessions attended.

The purpose of the Log Book is to:

- a) Help maintain a record of the work done during training
- b) Enable Consultants to have direct information about the work; intervene if necessary.
- c) Use it to assess the experience gained periodically

The log book shall be used to aid the internal evaluation of the student and must be signed by the Faculty-in charge.

6. Teaching skills

The postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.

7. A postgraduate student of a postgraduate degree course in broad specialities/super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.
8. **Continuing Medical Education Programmes (CME):** Each student should attend at least two CME programmes, in 3 years. The student should attend courses, conferences and seminars relevant to the specialty.
9. Department should encourage e-learning activities

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models or manikins, later to be performed under supervision followed by performing independently; for this purpose, provision of skills laboratories in medical colleges is mandatory.

ASSESSMENT

FORMATIVE ASSESSMENT, ie., assessment during the training

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

Quarterly assessment during the MD training should be based on:

1. Journal based / recent advances learning
2. Patient based /Laboratory or Skill based learning
3. Self directed learning and teaching
4. Departmental and interdepartmental learning activity
5. External and Outreach Activities / CMEs

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure 2).

Formative assessment should be valid, objective and reliable; it should cover cognitive, psychomotor and affective domains, as below:

- Personal attributes Ongoing after each clinical/ lab. posting

- Clinical skills and performance -do-
- Academic activities -do-
- Theory assessment End of 1-yr, 2-yr and at 2-yr 9 months
- Practical assessment -do-

Syllabus

1-year: Exercise physiology, Kinanthropometry, Neurophysiology, Nutrition

2-year :Sports Psychology, Biomechanics, Rehabilitation, Anti doping, Human performance

3-yr :Whole syllabus

Practical Assessment

1-yr OSCE and lab. Assessment in Exercise physiology, Kinanthropometry, Neurophysiology

2-yr OSCE and Lab Assessment, Sports Psychology, Biomechanics, Rehabilitation, Anti doping, human performance

3-yr OSCE and two cases (like main exam), all lab assessments

Clinical and laboratory skills and performance, academic performance and personal attributes shall be graded on a scale of 1 to 5 (5 being the highest). The academic presentations shall be graded at the time of presentation of the consultant in-charge. Evaluation on clinical skills and personal attributes others shall be done by the Unit in-charge at the end of every semester.

SUMMATIVE ASSESSMENT, ie., assessment at the end of training

The summative examination would be carried out as per the Rules given in POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.

The Post Graduate Examination shall be in three parts:

1. Thesis:

Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A candidate shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

2. Theory Examination:

There shall be four theory papers.

Paper	Paper Code	Course Title
Paper I:	BMSRM-P1	Basis Medical Sciences and Research Methodology

Paper II:	ASS - P. II	Basic and Applied Sports Sciences
Paper III:	CSM - P.III	Clinical Sports Medicine
Paper IV:	SPTCCFH- P.IV	Advances in Sports Physical Therapy, Current concepts, and Fundamentals of Health Care management

2. Clinical/Practical and oral examination

- Case I
- Case II
- Laboratory examination in all Sports Sciences labs.
- Objective Structured Clinical Examination (OSCE)
- Viva voce on defined areas by each examiner separately

Objective Structured Clinical Examination (OSCE)

The OSCE shall consist of 10 stations. It shall consist of six observed stations (one by each examiner) and four unobserved stations.

The observed stations shall assess the students on the following skills, e.g.,

- Field Side Assessment
- Assessment in laboratory controlled environment
- Communication/Counselling skills
- History taking
- Examination
- Procedural skills
- Application skills on sports persons

The unobserved stations shall check the analytic skills of the students for example: interpretation of laboratory results, normative sports medicine data, radiological investigations.

3. Oral/Viva voce examination

Oral examination shall be thorough and cover all aspects of the syllabus.

Recommended Reading:

Books (latest edition)

1. Torg, Welsh and Shephard: *Current Therapy in Sports Medicine III* - Mosby.
2. Reed: *Sports Injuries – Assessment and Rehabilitation*, W.B. Saunders.
3. Nordin and Frankel: *Basic Biomechanics of Muscular Skeletal System*: Williams and Wilkins.
4. Mc Ardle, Katch, Katch: *Exercise Physiology*.
5. Brukner and Khan: *Clinical Sports Medicine*, McGraw Hill.
6. O'Leary: *Drugs and Doping in sports*.

7. Lee and Dress: *Orthopaedic Sports Medicine* - W.B Saunders
8. Kurt Dorr and Jonathan S. Rakich: *Hospital Organization and Management*: Spectrum Publication, New York.
9. Mahajan: *Methods in Biostatistics*, Jay Pee Brothers.

Journals

03-05 international Journals and 02 national (all indexed) Journals



Annexure I: Orientation sessions for

- Orientation to the Sports Sciences laboratories
- Orientation regarding field assessment on sports persons
- Communication skills: Sports scientists, coaches and sports persons
- Literature search
- Basic research methodology
- Protocol writing and thesis
- Introduction to post graduation in Sports Medicine
- Universal precautions and appropriate disposal of lab waste
- Management of Sports injuries
- Rehabilitation protocols in Sports Medicine
- Interpretation and management of data generated by sports sciences lab.
- On field evaluation of sports persons
- Awareness of anti-doping procedures and drugs
- Visit to internationally accredited Anti-doping lab.
- Designing of evidence based rehab and fitness development protocols based on neurophysiological studies
- Effective communication of lab data to coaches and sports persons
- Attachment with sports teams both on and off season



**Postgraduate Students Appraisal Form
Clinical Disciplines**

Name of the Department/Unit :

Name of the PG Student :

Period of Training : FROM.....TO.....

Sr. No.	PARTICULARS	Not Satisfactory			Satisfactory			More Than Satisfactory			Remarks
		1	2	3	4	5	6	7	8	9	
1.	Journal based / recent advances learning										
2.	Patient based /Laboratory or Skill based learning										
3.	Self directed learning and teaching										
4.	Departmental and interdepartmental learning activity										
5.	External and Outreach Activities / CMEs										
6.	Thesis / Research work										
7.	Log Book Maintenance										

Publications

Yes/ No

Remarks*

***REMARKS:** Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.

SIGNATURE OF ASSESSEE SIGNATURE OF CONSULTANT SIGNATURE OF HOD