FACULTY OF SPORTS MEDICINE & PHYSIOTHERAPY

SYLLABUS

FOR

M.D. IN SPORTS MEDICINE

Examinations: 2013

GURU NANAK DEV UNIVERSITY
AMRITSAR

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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-specialities 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 Speciality 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 sportsmen will be highly benefited and this will reflect on the performance of our sportsmen and athletes in various sports at national and international level.

Goals

1. 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.

2. To use Kinathroprometric principles for designing and recommending games to the young children so that they can excel according to their genetic and physical characteristics.

3. To evaluate the age of the sporting individual for sports which are compartmentalised according to age.

4. To do a complete psychological analysis and using the principles of psychology for relaxation and peaking.

5. To use biomechanical principles for prevention and rehabilitation of sporting injuries.
6. To give advice on ergogenic procedures and spots nutrition for performance enhancement.

7. 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.

Specific Learning Objectives

Knowledge

1. Utilize know how 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 biomechanics 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

Skills

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 athlete.

3. Demonstrate oral and written communication skills and critical thinking at masters level of competency

4. Communicate effectively and appropriately with athletes, coaches and health professionals in maintaining standards of best practice in Sports Medicine

Attitude

1. Should have an evidence based approach. This will help to interpret and utilize published literature using analytical and critical approach

2. Have ability to conceptualise and write a research proposal
Subject specific theoretical competencies

Course Content

Guidelines

During the training period efforts will be made that adequate time is spent in lab & field assessment of sport persons noting their psychological profile, fitness assessment, genetic make up, physical deficiencies etc. and then subsequently advising remedial measures and followed by follow-up.

Basic Medical Sciences and Research Methodology (BMSRM-P1)

Applied Basic Medical Sciences

Applied General Clinical Anatomy

1. Anatomy of the Nerve Injuries
   Anatomical and Physiological loss resulting from nerve injury.
   Relaxation of nerves
   Peripheral nerve entrapment

2. Bodily Habitus
   Characteristics and its correlation to anatomy

3. Anatomical Angles and stiff joints
   Anatomical Angles
   Optimal attitude for stiff joints
   Snapping joints

4. The pathology of nerve, bones in terms of anatomy
   Anatomical facts regarding bones
   Pathological facts
   Anatomical disturbances in various bone pathologies

5. Anatomical basis of clinical tests
   All clinical tests associated to sports medicine to be covered
6. **Anatomy of certain diseases**
   - Headache
   - Infections of the hand
   - Common dislocations
   - Lesions of supraspinatous and subdeltoid bursae
   - Hernias associated with sports persons
   - Low back pain
   - Sciatica
   - Lesions of inter-vertebral disk
   - Abscesses of Spine

**Applied General Physiology**

1. **Blood**
   - The various components of blood
   - Viscosity correlation
   - Oxyhemoglobin Dissociation curves
   - Interrelationship between pressure flow and resistance
   - Pressure volume curves
   - Stress relaxation of vessels

2. **Cardiovascular system**
   - Physical characteristics of systemic circulation
   - Pressure pulses
   - Oxygen demand theory of local blood flow circulation
   - Nervous control of blood circulation
   - Humorous control of blood circulation
   - Mechanisms of arterial pulse regulation
   - Hypertension
   - Cardiac output and its regulation
   - Cardiac output in normal stress conditions
   - Methods of measuring cardiac output
   - Normal coronary blood flow along with variations
   - Physiological basis of ischemic heart disease
   - The cardiac reserve
   - Physiological causes of shock

3. **Neuromuscular System**
   - Basic physics of membrane potentials
   - Recording of membrane potentials and action potentials with basics of Electromyogram
   - Mechanism of muscle contraction
   - Sources of energy for muscle contraction
   - Neural control of movement
4. **Respiratory System**
   - Review of mechanics of respiration
   - Pulmonary volumes and capacities
   - Composition of Alveolar air
   - Transport of oxygen in blood
   - Carbon dioxide in blood
   - Regulation of respiration
   - Methods of studying respiratory abnormalities

5. **Temperature regulation**
   - Regulation of body temperature

6. **Endocrine System**
   - Pituitary hormones and their functions
   - Thyroid hormones
   - Adrenocortical hormones
   - Insulin Glucagon hormones
   - Parathyroid hormones

**Applied Para Clinical Sciences**

**Pathology**
- Inflammation and repair
- “Failed” healing responses
- Regional considerations of Inflammation & repair of soft tissue injuries.

**Pharmacology**
- Principles of drug action.
- Basic pharmacokinetics and Pharmacodynamics.
- The use of drugs in various musculoskeletal disorders.

**Radiology**
- Basics of radiology including ultrasonography CT & MRI scanning
- Imaging of the head and neck.
- Imaging of spine.
- Imaging of pelvis, hip and thigh.
- Imaging of Patello Femoral Joint & Knee joint.
- Imaging of the lower leg, foot and ankle.
Research & Educational Methodology

Research Methodology

1. Introduction
   Importance of research in clinical practice
   Scientific approach
   Characteristics
   Purposes and limitations.

2. Ethical issues in research.

3. Structure, formulation and implementation of a research project

4. Research questions
   Selection and statement of problem
   Literature review
   Meta-analysis.

5. Types of research
   Basic and Applied
   Qualitative & Quantitative
   Descriptive & Experimental
   Longitudinal & Cross-sectional

6. Data Analysis
   Statistical Tests of significance
   Correlation
   Reliability
   Validity
   Parametric and Non-parametric statistics

7. Experimental Research
   Types of Sampling
   Variables
   Experimental design
   Factorial design

8. Survey research
   Conducting a survey
   Questionnaires
   Steps in conducting survey research
   Epidemiological research
9. **Presentation**
   - Symposia
   - Seminar
   - Conference
   - Journal
   - Thesis
   - Book
   Key element of scientific writing.

10. **Presenting Research**
    - Writing and submitting papers
    - Strategies of paper writing
    - Design of paper writing
    - Tactics of paper writing
    - Where to publish

    Poster presentation of a research paper
    - Preamble
    - Poster space
    - Standard format
    - Planning
    - Design

11. **Review of an indexed refereed research paper**
    - Evaluating paper scientific merit
    - Providing constructive feedback to the author
    - Typical review formats for reviewing a paper
    - Reasons for rejection

12. **Oral Presentations at Conferences/Seminars**
    - Preparing presentation
    - Duration of presentation
    - What to present

**Educational Methodology**

    Aim, philosophy and issues in physiotherapy education
    Principles and methods of teaching with respect to physiotherapy students and
    client: Strategies and planning of teaching, curriculum development, formation of
    course objective, time management, role of Audio – visual aids, method of
    knowledge dissemination.
    Methods of outcome evaluation
Assessment, Kinanthrometry and Biomechanics

Kinesiology

Introduction
Definition, aims, objectives and role of Kinesiology in sports physiotherapy.

Review of fundamental concepts (applied aspect), Centre of gravity, Line of gravity, Planes, Lever system in Body, Fundamental starting positions.

Anatomical Concepts in Kinesiology

Frame work and joints of the body: Influence of trauma and classification of the muscles, Relation of structure, functions, role of muscles, types of Muscle, contractions (Static, Concentric and Eccentric), Two joint Muscles, Angle of pull, Role of Gravity affecting muscular action.

Physical Properties of bone, cartilage and muscle and functional adaptation under pathological conditions.

General features of the following bones: Scapula, Ribs, Vertebrae, Bones of skull, Humerus, Radius, Ulna, Hip bone, Femur, Tibia and Fibula, Bones of hands and feet.

Joints: Definition and Classification of joints: Shoulder, Elbow, Knee, Ankle, Inter-vertebral joints, wrist joint, small joints of hand and foot.

Origin, insertion, nerve supply and action of all important muscles related to human movement.

Motion, type of motion, Distance and speed, Displacement and velocity, Acceleration, Angular distance and Angular displacement, Angular Speed, Angular Velocity, Angular Acceleration, Inertia, mass, weight, Newton's Laws of motion, Units in linear and angular motion.

Force and its characteristics, internal and external forces, Classification of force system, Composition and resolution of forces. Friction, impact, elasticity, principles of spin and rebound, Eccentric forces. Couple, moment, Principles of Lever, Rotatory force, Gravity, Methods of finding centre of gravity, Principles of Equilibrium, Fluid mechanics, principles of projectile.
Assessment & Evaluation in Sports Medicine

Importance of assessment & evaluation, Methods of evaluation – Interview, Clinical Examination, Reliability & Validity of the tests, Investigative Procedures, Field Tests.

Evaluation of Physical Fitness:

- Principles of assessment and prescription of exercise programs
- Evaluation of Physical Fitness
- Preliminary Health Screening and Classification of Risk Factors
- Assessment of Body Composition
- Assessment of Flexibility and designing stretching programs
- Assessment of cardio-respiratory fitness
- Assessing and Managing Stress
- Assessing strength and muscular endurance

Assessment of lower limb complex: Pelvis, hip, thigh, knee, leg, ankle and foot

Assessment of upper limb complex: Shoulder girdle, shoulder, arm, elbow, forearm, wrist and hand.

Assessment of spinal column: Cervical, thoracic and lumboscaral, Tests of neural tension.

Assessment of Gait deviations

EMG evaluation, diagnostic and kinesiological

Pre Participation Evaluation of Participants in Sports

Kinanthropometry

Introduction
Significance of kinanthropometric knowledge in sports medicine.

Age determination
  i. Skeletal age
  ii. Dental age

Body measurements
  i. Gross size and mass
  ii. Lengths or heights of body parts
  iii. Circumstances of body parts
  iv. Skinfold thickness
Kinanthropometric study group measurements
i. Planes of the body
ii. Axes of the body
iii. Landmarks on the body

Body proportions
i. Body mass index
ii. The phantom stratagem
iii. The Z – scores
iv. The O – scale system

Body composition

Different Body composition
Various methods to estimate body composition
1. Water displacement method
2. Under water weighing methods
3. Kinanthropometric determination of the body composition (skinfold thickness)
4. Application of surface anthropometry (the body profile)
5. Bioelectrical impedance analysis
6. Ultrasound assessment of fat
7. Arm X-ray assessment of fat
8. Computed tomography (CT) assessment of fat

Somatotyping

Sheldon’s method of somatotyping
Critical evaluation of Sheldon’s method of somatotyping
Heath – Carter method of somatotyping
rating scales
Kinanthropometric measurements
First, Second and Third Components
Somatotyping
Somatotype distribution

Growth, maturation and physical performance
**Biomechanics**

Nature and importance of Biomechanics in Sports Physiotherapy.

Principle of Biomechanics.

Introduction to biomechanical analysis. Recruitment & techniques – Isokinetic dynamometer, kinesiological EMG, electronic goniometer, force platform, videography.

Biomechanics of shoulder and shoulder girdle motion, elbow motion, wrist and hand motion.

Biomechanics of pelvic motion, hip motion, knee motion, ankle & foot motion

Biomechanics of spinal motion.

Gait analysis

Biomechanics of rowing, throwing, swimming, jumping and landing, running and other sports.

**Exercise Physiology and Nutrition.**

**Nutrition**

a. Carbohydrates, Fats, Proteins.
b. Vitamins, Minerals and Water.
c. Optimal Nutrition for exercise.
e. Pre-Game meal, Carbohydrate loading.
f. Alcohol, Mega Vitamin Therapy.
g. Food for various athletes of different disciplines.
h. Fluid and energy replacement in prolonged exercise.

**Energy Transfer for Physical activity:**

b. Energy transfer in exercise.
c. Energy expenditure during various activities.
d. Fatigue.
e. Biochemical responses to endurance training.
Cardio Vascular System and Exercise:

a. Athletes Heart.
b. Cardio Vascular adaptations to sustained aerobic exercises.
c. Lipids and sports, protection from coronary heart disease, exercise and optimization of lipid profile.
d. Sudden cardiac death in sports.
e. Regulation of circulation during exercise.

Exercise and Respiratory System:

a. Air Conditioning.
b. Second Wind.
c. Oxygen Debt.
e. Athletes Lung.
f. Regulation of Respiration during exercise.

Skeletal System:

a. Growth and Exercise.
b. Repair and adaptation during exercise.
c. Pathophysiology of Back.
d. Training for Muscular Strength and Endurance.

Gastrointestinal Tract and Endocrine system:

a. Effect of Sports on GIT and Liver.
b. Hormone regulation of fluid and electrolytes during exercise.
c. Exercise and Menstrual Cycle.
d. Stress Hormones in Exercise.
e. Effects of exercise on various Hormones in the body.
f. Opioids, Runners High.

Applied Exercise Physiology

Body Composition

b. Somatotyping.
c. Techniques of Body Composition Analysis.
Aging and Exercise

a. Aging and Physiological function.
b. Exercise and Longevity.
c. Coronary Heart Disease and Exercise.
d. Exercise Stress Testing for Diagnosis of CHD.
e. Exercise prescription for healthy aged.
f. Exercise prescription for sedentary adults.
g. Cost and benefits of exercise prescription in Osteoporosis.

Temperature Regulation

c. Effects of Climate.
d. Effects of Exercise on Temperature Regulation.
e. Limit of Tolerance of Heat.
f. Acclimatisation.
g. Avoidance in Heat illness during exercise.
h. Exercises in cold.

Misc. Topics

a. High Altitude Training.
b. Sports Diving, Hazards of underwater environment.
c. Special Aids to Athletic Performance:- MORA, Oxygen Inhalation, Sleep.
d. Sex and performance.
e. Assessment of Age.
f. Muscle tissue fibre typing and its significance.
g. Exercise for mood enhancement & anxiety.

Physiological Basis and Principles of Training and Conditioning

Principles of endurance and strength training
1. Recovery training intensities in heart rate
2. Manipulation of training principles
3. Training sub-phases

Fundamentals that aid training and performance
i. Warm up and Cool down
ii. Flexibility and stretching
iii. Missing workouts
iv. Overtraining
Analysis of Training

**Sports Psychology**
*History and current status of Sports Psychology.*

**Personality Assessment and sports personality.**
  a. Theories of personality
  b. Personality assessment

**Attention and perception in sports.**
  a. Attention
  b. Perception

**Concentration training in sports.**
  a. Basic principles of concentration
  b. Concentration training
  c. Concentration awareness exercises

**Motivational orientation in sports.**
  a. Athlete’s needs of motivation
  b. Motivational inhibitors
  c. Motivational techniques

**Pre-competitive anxiety.**
  a. Source of PCA
  b. Effect of PCA on performance

**Relaxation Training.**
  a. Definition
  b. Types of relaxation trainings
    i) Progressive muscle relaxation
    ii) Breathing exercises
    iii) Yognidra
    iv) Transcendental meditation

**Aggression in sports.**
  a. Theories of aggression
  b. Management of aggression

**Role of Psychology in Dealing with injuries.**
Eating disorders.
  a. Etiology of eating disorders
  b. Types of eating disorders
  c. Complications of eating disorders

Goal setting

1. Psychological aspect of doping
   a. Psychological preparation of elite athletes
   b. Concept of psychological preparation
   c. Biofeedback training
   d. Mental imagery
   e. Stress management
      i) Principles of Stress Management
      ii) Stress Management techniques

f. Group Behaviour and leadership
   a. Nature of group behaviour and group.
   b. Types of group.
   c. Educational implication of group behaviour.
   d. Meaning of leadership, types of leadership quality of leadership, training and functioning of leadership.

Emotion
   a. Meaning of emotion.
   b. Characteristics of emotion.
   c. Meaning of controlling and training of emotions and its importance.
   d. Contribution of sports to emotional health.
   e. Meaning of sentiment, its type, importance and formation.

Practicals:
Students will undergo practical training at Sports Psychology Lab, Exercise Physiology Lab, and Kinanthropometry equipment for body composition analysis, somatotyping and age determination and on Biomechanical Principles
Non Traumatic Medical Conditions

Illness, Infections, Hypertension, Urine abnormalities; Venereal Diseases; Exercise induced Asthma; Anemia, Delayed onset muscle soreness (DOMS), Runner’s high & exercise addiction. G.I.T. Diseases, Exercises and congestive heart failure, exercise for post coronary & byepass patients, exercise for diabetics.

Diagnosis and management of skin conditions of Athletes, Bacterial infections, Fungal infections, Viral infections, boils and cellulitis.

Female Specific problems
2. Injury to female reproductive tract.
4. Sex determination.
5. Exercise and pregnancy.

Common Diseases:  Common Cold, Diarrhoea, Dysentery, Typhoid, Cholera, Amoebiasis, Food Poisoning, Tuberculosis, Malaria, Hepatitis etc.

AIDS in sports people.

Rheumatology & Geriatric disorder
1. Rheumatoid arthritis, SLE and Juvenile Rheumatoid Arthritis.
2. Ankylosing Spondylitis.
3. Rheumatology out patient clinic.
4. Osteoarthrosis and other geriatric conditions.

Age Specific Problems
1. Issues in the adolescents and children involved in sports
2. Issues in The Geriatric athletes

Medical Aspects of Sports Medicine

Exercise and Common Pulmonary Conditions
a. Exercise induced bronchial obstruction
b. Exercise in chronic airway obstruction
c. Air pollution and exercise
Exercise and Cardiac Conditions
a. Exercise prescription for heart disease
b. Exercise in primary prevention in ischemic heart disease
c. Exercise for secondary prevention of ischemic heart disease

Doping in Sports
a. List of banned drugs: their effects and side effects
b. Guidelines of sample (urine and blood) collection for dope testing
c. Methods of Drug testing
d. Relevance of Therapeutic use exemption in doping
e. Latest trends in doping
f. Performance enhancing supplements in sports and international regulations

Diabetes and Exercise
a. Exercise in diabetic patients
b. Exercise as a method of control of diabetes

Exercises for special categories
a. Child and adolescent athlete’s problems
b. Special problems of older athletes
c. Special concerns for handicapped athletes

Misc. Conditions
a. Hazards of cold water
b. Exercise for mood enhancement
c. Vitamins and exercise
d. Spinal deformity and sports
e. Time zone shift and sleep deprivation problems
f. Exercise in pregnancy and post partum

Emergency Care and Cardiopulmonary Therapeutics
Cardio pulmonary Resuscitation
1. Shock management
2. Internal and External bleeding
3. Splinting
4. Stretcher use-Handling and transfer
5. Management of Cardiac arrest
6. Acute asthma
7. Epilepsy drowning
8. Burn
9. Heat stroke and Heat illness
Health club & fitness Concept, use and misuse of equipment
1. Group therapy
2. Sauna bath
3. Prevention and rehabilitation of heart attack and diabetes, asthma

Basics of Cardiac Rehab.
1. Administration of gases and gas mixtures
2. Humidity aerosol treatment
3. Oxygen therapy
4. Theory of application of mechanical ventilation
5. Interpretation of Arterial blood gases
6. Description of ventilators and relationship of therapeutic procedures to underlying pathology
7. Cause – effect relationships for acid – base disturbances
8. Basic understanding of invasive monitoring in the intensive care unit setting
9. Knowledge about drugs lowering
   a. Cholesterol
   b. Hypertension
10. Knowledge about sedatives

**Sports Traumatology**

Pre-participation examination
Causes & Mechanism of Sports Injuries, prevention of sports injuries
Common acute and overuse injuries of:
   a. Shoulder girdle, Shoulder, Arm, Elbow, Forearm, Wrist & hand
   b. Pelvis, hip, thigh, knee, leg, ankle & foot
   c. Spine
   d. Head
   e. Sporting emergencies & first aid and pharmacological treatment of injuries in the athletes

Cardio pulmonary Resuscitation; Shock management, Internal and External bleeding, Splinting, Stretcher use-Handling and transfer, Management of Cardiac arrest, Acute asthma, epilepsy, drowning, burn, Medical management of mass participation. Heat stroke and Heat illness.

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: Field & Track
   Team events: Hockey, Cricket, Football
   Contact and Non-contact sports
   Water sports specific injuries

Over Use Training in Sports
Physical Medicine

Rehabilitation and Therapeutic Exercises

1. Define Rehabilitation, Goals and Objectives of Rehabilitation in Sports, Clinical Evaluation phases of rehabilitation. (multidisciplinary approach)
2. Prehabilitation
3. Modern concepts in rehabilitation.
4. Definition, details of effects and uses of therapeutic exercises.
   a. Dynamic Exercises
   b. Plyometric Exercises
   c. Isokinetic Exercises
   d. Manipulative Techniques
   e. Kinetic chain exercises

Mobilization and Strengthening Techniques

1. Factors affecting the joint range of motion prevention of stiffness, methods of joint mobilization.
   a. Testing for tightness and contracture of soft-tissue structures.
   b. Techniques of mobilizing the various joints of the body.

2. Types of Muscle Contractions and Muscle work, Strength of Muscle Contraction in terms of Motor units, Group action of muscles and its implication in designing an exercise program.
   b. Techniques of strengthening with respect to regional consideration.
   c. Various methods of progressive resisted exercise.
   d. Aquatic therapy in sports.

Neuromuscular Training

1. Neuromuscular control, methods for improving neuromuscular control, proprioception and Kinesthetic sensation following different sport injuries.
2. Principles and application of neuromuscular facilitation techniques including PNF in sports.

Health club & fitness: Concept, group therapy
Physical Therapy and law: Medico legal aspects of physiotherapy, liability, negligence, malpractice, licensure, work man compensation
Morale and Ethics: Ethical Analysis of moral problem, ethical issues in physiotherapy

Practicals:

The students will undergo clinical training in Departments Orthopaedics , Cardiology, General Medical and Emergency Care
**Sports Physical Therapy, Current Concepts and Fundamentals of Health Care Management**  
*(SPTCCFH – P IV)*

**Sports Physical Therapy**

**Massage**  
Historical development, Definition and classification of massage techniques, Physiological effects of massage, Description of the techniques of the classical massage. Connective tissue massage, physiological basis of sports massage and various categories, underwater massage, mechanical devices of massage, therapeutic applications and contraindications of massage.

**Heat Therapy**  
Production, Physiological effects, indications, contraindications and specific uses in sports of the following:


**Hydrotherapy**  
History & introduction, Effects of simple baths, raising temperature baths, baths with additives, Aromatic baths, Mineral baths, physical baths, Hydroelectric baths, Stammer baths, whirl pool bath, showers and steam showers.

**Electrotherapy**  
Principles underlying the application of following modalities with reference to their production, biophysical and therapeutic effects, indications and contraindications and the specific uses in Sports Physiotherapy.

a. **Low Frequency Current:** Direct Current, Modified Direct Current, Alternative Current, Diadynamic Current, Iontophoresis TENS, High Voltage, Pulsed Galvanic Stimulation.

b. **Medium Frequency Current:** IFT, Russian Currents.

c. **High Frequency Currents:** SWD, MWD, Ultrasound, Pulsed Electromagnetic Energy.

d. **Radiations:** LASER, UVR

Recent Advancement in Electrotherapy, Electrodiagnosis and its implications to Sports Physiotherapy.
**Functional Bandages & Orthotic Aids**

History and uses of functional bandages, classification according to the time of application, types of bandages, Bandaging techniques and bandaging material, Indications, contraindications athletic shoes and modifications, common orthotic aid and appliances in Sports.

**Cryotherapy**

Physiological effects, Use of cold therapy in acute phase, rehabilitative phase, preventive phase of athletic injury, Methods of application, Indications and contraindications.

**Manual Therapy**

Introduction to manual therapy techniques, joint techniques, manual joint therapy, traction, basic principles of manipulation for various disorders of the spine and extremities.

**Clinical Reasoning and decision making**

**Current Concepts in Sports Medicine**

**Segmental Stabilization Concepts of Spine**

a. Muscle function in spinal stabilization  
b. Contribution of various muscles to spinal stabilization  
c. Local Muscle dysfunction in Low back pain  
d. Principles of clinical management of deep muscle system for segmental stabilization

**Emergency Medical Planning and cover for Sports Events**

**Exercise for growing bones**

**Effect of Physical activity intervention in youth**

**Precision heart rate training**

a. Heart rate monitoring and training  
b. Training in heart zones  
c. Precision heart rate training for specific sports  
d. Multi Activity training  
e. Monitoring of training effects
Current concepts in obesity management
a. Childhood obesity etiology and role of exercise
b. Obesity correlation with lipidogram
c. Intra-abdominal obesity hazards
d. Management of obesity

Electromyography and Rehabilitation
a. Principles of EMG Rehab
b. Muscular tone, fatigue and neural influences
c. EMG in the evaluation of Sports Trauma

Current concepts in comprehensive physical examination for the instabilities of knee.

Current concepts in tendinopathies.

Foundations and Principles of Healthcare Management

Health care management
a. Definition
b. Features
c. Functions
d. Classification of hospitals

Organization
a. Definition
b. Hospital Organization
c. Formal and Informal Organization

Emergency services and disaster management
a. Emergency Services Scope
b. Principles of Planning of emergency services
c. Emergency departments.
d. Problem areas in emergency departments
e. Disaster management
f. Types of hazards / disasters
g. Disaster plan
h. Managerial issues in disaster management.

Technology in health care
Importance and role of modern technology in hospitals and health care systems.
Records management
a. Need and importance of maintaining Medical Records
b. Administration of a Medical Record Department
c. Issues and problems of records management in a hospital

International perspective on health care

Interrelationship between domestic law and policy and international laws and advocacy.

Ethics in medical profession

a. Rights and Duties of Doctors
b. Rights and Duties of Patients
c. Professional conduct of the doctors
d. Codes of conduct
e. Duties of physicians towards each other
f. Medical negligence

Practical: The students will undergo training in Hospital and Field management
MD in Sports Medicine

TEACHING AND LEARNING METHODS

Postgraduate teaching program

General principles

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

Formal teaching sessions

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

- Journal club; Medical audit: Once a week
- Seminar; lecture: Once a week
- Case discussions: Twice a week
- Interdepartmental case or seminar: Once a week
- [Genetic, Biotechnology, Antidoping, Sports Psychology, Physical Education and Rehabilitation]

Attend accredited scientific meetings (CME, symposia, and conferences)

Additional sessions on resuscitation, 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 maybe organised as an institutional activity for all post graduates as Annexure 1

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

Necessary

Attachments in Kinanthropometry, Sports Psychology, Isokinetics, Human Performance, Fitness assessment, Exercise physiology, Anti doping, Neurophysiology, Biomechanics and Rehabilitation laboratories is a must and essential part of clinical training.
MD in Sports Medicine

Practicals
Kinanthropometry and Kinesiology: 80 hours
Biomechanics: 40 hours
Sports Psychology: 40 hours
Exercise Physiology: 80 hours

Practicals/ Clinical attachments
Orthopaedics Department: 180 hours
Cardiology Department: 60 hours
Physical Therapy: 180 hours
General Medicine: 60 hours
Emergency care: 30 hours

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

Thesis
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 & time available
- the study must be ethically appropriate
- 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
- only one student per teacher/thesis guide

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

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<tr>
<th>Time Period</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>End of 6 months</td>
<td>Submission of protocol</td>
</tr>
<tr>
<td>During 2nd yr</td>
<td>Mid-term presentation</td>
</tr>
<tr>
<td>6 months prior to examination</td>
<td>Final presentation; submission</td>
</tr>
</tbody>
</table>

**Evaluation of thesis**

The thesis shall be evaluated by two independent reviewers who shall grant marks out of 50 each. A combined aggregate of 50% is a mandatory precondition for postgraduate student to appear in the final examination.

**General observations**

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

Within 3 months of thesis submission, the candidate should be communicated regarding acceptance or rejection on the thesis

**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.
FORMATIVE ASSESSMENT

Internal assessment

General Principles

Internal Assessment should be valid, objective and reliable; it should cover cognitive, psychomotor and affective domains. The Internal Assessment should be conducted in theory, lab. and clinical examination. The thesis is assessed separately. Feedback from the internal assessment should be given to the students, and contribute towards final evaluation.

Assessment

<table>
<thead>
<tr>
<th>Personal attributes</th>
<th>Ongoing after each clinical/lab. posting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical skills and performance</td>
<td>-do-</td>
</tr>
<tr>
<td>Academic activities</td>
<td>-do-</td>
</tr>
<tr>
<td>Theory assessment</td>
<td>End of 1-yr, 2-yr and at 2-yr 9 months</td>
</tr>
<tr>
<td>Practical assessment</td>
<td>-do-</td>
</tr>
</tbody>
</table>
Syllabus (maximum marks=200)

1-year
Exercise physiology, Kinanthropometry, Neurophysiology, Nutrition, MM= 50

2-year
Sports Psychology, Biomechanics, Rehabilitation, Anti doping, Human performance MM=50

3-yr Whole syllabus MM=100

Practical Assessment (maximum marks=200)

1-yr
OSCE and lab. assessment MM=40
In Exercise physiology Kinanthropometry, Neurophysiology

2-yr
OSCE & Lab Assessment MM=60
Sports Psychology, Biomechanics, Rehabilitation, Anti doping, Human performance

3-yr
OSCE & two cases (like main exam) MM=100
All lab assessment

Clinical and lab. 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. Sample of evaluation proforma is given in Annexures: 2-4
END ASSESSMENT, NAMELY ASSESSMENT AT THE END OF TRAINING

Final postgraduate examination

The postgraduate examination shall be in three parts:

1. Thesis, to be submitted by each candidate at least 6 months before the date of commencement of the theory examination
2. Theory examination: four papers
3. Practical examination

Theory paper and practical examination shall be marked instead of granting grades. The evaluation of theory papers shall be done before commencement of the practical examination. The ratio of marks in theory and practical shall be equal; the minimum percentage required to pass shall be 50%. Candidates need to pass separately in theory and practical examinations.

A. Theory Examination

Each paper should have 10 short essay questions (SEQs)

<table>
<thead>
<tr>
<th>Paper</th>
<th>Paper Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>BMSRM-P1</td>
<td>Basis Medical Sciences and Research Methodology</td>
</tr>
<tr>
<td>2.</td>
<td>ASS - P. II</td>
<td>Basic and Applied Sports Sciences</td>
</tr>
<tr>
<td>3</td>
<td>CSM - P.III</td>
<td>Clinical Sports Medicine</td>
</tr>
</tbody>
</table>

Practical examination

Case I
Case II
Laboratory examination in all Sports Sciences labs.
Objective structured clinical examination
Viva on defined areas by each examiner separately Sample of evaluation Performa as Annexure :5
Objective Structured Clinical Examination (OSCE)

The OSCE shall consist of 10 stations. It shall consist of six observed stations (one by each examiner) & 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/Counseling 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.
Recommended Readings:

2. Burke: Precision Heart rate training, Human Kinetics
10. Reed: Sports Injuries – Assessment and Rehabilitation, W.B. Saunders.
18. Nordin & Frankel - Basic Biomechanics of Muscular Skeletal Systm - Williams & Wilkins.
19. Ostym, Beunen and Simons: Kinanthropometry II, University Park Press, Baltimore
30. Drugs & Doping in sports by O’Leary 2001
32. D. Kulund: The Injured Athlete, Lippincott.
Annexure I-Orientation sessions for Post graduates joining MD in Sports Medicine for all Post graduates

- 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 & 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 & management of data generated by sports sciences lab.
- On field evaluation of sports persons
- Awareness of antidoping 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 couches and sports persons
- Attachment with sports teams both on and off season
Annexure 2-Annual Evaluation of Postgraduate Students

Name of the Student

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
</table>

Unit posted
From __________ to __________

I. Professional Skills

<table>
<thead>
<tr>
<th>Score</th>
<th>Attendance in academic activities</th>
<th>Performance in fitness assessment procedures</th>
<th>Performance in emergency procedure</th>
<th>Performance in on field procedure</th>
<th>Handling of equipment</th>
<th>Performance in laboratory procedures</th>
<th>Decision making/formulation of management plan</th>
<th>Record maintenance</th>
<th>Administration</th>
<th>Leadership qualities</th>
</tr>
</thead>
</table>

Score from 1 to 5 (5: outstanding; 1: below expectation)
II. Personal Attributes

<table>
<thead>
<tr>
<th></th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability (punctual, available in duty, responds promptly to calls, takes proper permission for leave)</td>
<td></td>
</tr>
<tr>
<td>Sincerity &amp; motivation (dependable, honest, admits mistake, exhibits good moral values, loyal to institution, takes initiative &amp; responsibility, keen desire to learn)</td>
<td></td>
</tr>
<tr>
<td>Diligence &amp; performance (dedicated, hard working, does not shirk duties, leaves no pending work, competent in clinical case, skilled in procedure)</td>
<td></td>
</tr>
<tr>
<td>Interpersonal skills (compassionate attitude to patients, gets along well with colleagues, paramedics &amp; mentors)</td>
<td></td>
</tr>
</tbody>
</table>

III. Scientific Excellence

Awards

Publications

Conference paper presentations

Attendance at CME, Workshop, Symposium

IV. Teaching Activities

Health talks for coaches and sports persons

Undergraduate clinical sessions

Classes for nurse & paramedical workers

Signature of the Unit-In-Charge
**Annexure 3-Evaluation Sheet - Journal Club**

Name of the Student __________________________

<table>
<thead>
<tr>
<th></th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choice of article</td>
<td></td>
</tr>
<tr>
<td>Cogency of presentation</td>
<td></td>
</tr>
<tr>
<td>Critical review</td>
<td></td>
</tr>
<tr>
<td>If cross reference and relevant publications consulted</td>
<td></td>
</tr>
<tr>
<td>Audio visual aids</td>
<td></td>
</tr>
<tr>
<td>Interaction</td>
<td></td>
</tr>
</tbody>
</table>

*Score from 1 to 5 (5: outstanding; 1: below expectation)*

Signature of the Consultant In-charge
**Annexure 4 - Evaluation Sheet - Seminar/Review/Protocol/Thesis**

Name of the Student __________________________

<table>
<thead>
<tr>
<th>Date</th>
<th>Presentation</th>
<th>Completeness of preparation</th>
<th>Cogency of presentation</th>
<th>Use of audiovisual aids</th>
<th>Understanding of topic</th>
<th>Ability to answer questions</th>
<th>Time scheduling</th>
<th>Consulted relevant literature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Score from 1 to 5 (5: outstanding; 1: below expectation)*

Signature of the Consultant In-charge
Annexure 5-Evaluation Sheet – Case Presentation

Name of the Student __________________________

<table>
<thead>
<tr>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

Score from 1 to 5 (5: outstanding; 1: below expectation)

Signature of the Consultant In-charge