



STUDY GUIDE	
PROGRAM	MBBS
MODULE TITLE	Locomotor- II
ACADEMIC YEAR	3rd year -2024
INTRODUCTION	<p>Locomotor-2 module is designed to integrate the students' knowledge of pathology, pharmacology, community medicine, and forensic medicine, with the basic science knowledge acquired during the Locomotor-1 module in Spiral-1.</p> <p>It revolves around the diagnosis, treatment, and prevention of conditions afflicting the musculoskeletal system, ranging from common disorders of bone and cartilages to severely disabling limb trauma, accidents, and disasters.</p>
RATIONALE	<p>In order to understand the basis of locomotors -related disorders which the students of 3rd year MBBS will come across in their clinical postings, it is imperative that they have a firm grasp on the underlying mechanisms of the diseases and their treatment and prevention aspects</p>
OUTCOMES	<p>By the end of the module, students should be able to justify initial plans of management and prevention of common Locomotor system-related conditions based on knowledge of relevant basic and clinical sciences</p>
DEPARTMENTS INVOLVED	<ol style="list-style-type: none">1. Community Medicine,2. Forensic Medicine & Toxicology3. Internal Medicine4. Orthopedics

	<p>5. Pathology & Microbiology</p> <p>6. Pharmacology</p> <p>7. Radiology</p>
<p>MODULE OBJECTIVES</p>	<p>By the end of the module, students will be able to:</p>
<p>LECTURES</p> <p>COMMUNITY MEDICINE</p>	<p>1. Accidents, Injury and its Prevention</p> <ul style="list-style-type: none"> • Describe accidents • Describe epidemiology of accidents and injury • Explain the risk factors for different types of injuries • Discuss measures in prevention and control of accidents and injury <p>2. Disaster management</p> <ul style="list-style-type: none"> • Describe disaster • Enumerate the steps in planning disaster management • Describe the steps of surveillance cycle <p>3. Sports medicine</p> <ul style="list-style-type: none"> • Describe sport medicine • Explain the role of sports physician in the practice of sports medicine • Discuss the female triad • Describe the pharmacological & legal aspects of Ergogenic aids in athletes <p>4. Travel Medicine</p> <ul style="list-style-type: none"> • Describe travel medicine • Describe epidemiology in travel medicine • Explain the risk for travelers • List the pathogens causing common travelers diseases

- Discuss the control measures for disease prevention among travelers
- Discuss the role of international health regulation for travelers

5. Ergonomics

- Describe concept of Ergonomics in Occupational Health
- Describe the role of ergonomics science in work place

**FORENSIC
MEDICINE**

1. Personal Identity-I

- Define complete and partial identification
- Briefly explain the role of objective and subjective methods of identification in forensic and medical settings
- Discuss the cases in which identification of living and dead bodies is required
- Describe the parameters of identification
- List the criteria of determination of race

2. Personal identity-II

- Briefly explain the importance of odontological and radiological data in determination of age.
- Describe the types of evidence of Sex determination (appearance and nuclear sexing) in normal and doubtful cases.
- Explain the variations of normal sex
- Describe the role of Dactylography in identification

3. Personal identity- III

- Describe the molecular basis of DNA
- Explain the DNA Typing techniques (RFLP, PCR, STR, MT DNA, Y Chromosome Analysis)
- Discuss the methods of collection and uses of DNA evidence
- Justify the use of DNA in forensic sciences

4. Personal identity-IV

	<ul style="list-style-type: none"> • Explain the identification of dead and decomposed bodies • Discuss the medico legal importance of scars, acquired and congenital deformities, tattoo marks and hair in identification <p>5. Mass disasters</p> <ul style="list-style-type: none"> • Define Mass disasters according to World Health Organization • Describe Triage and its types i.e. Simple, Advance and Reverse • Explain the methods of identification of decomposed bodies, mutilated & burnt bodies, skeletal & fragmentary remains • Describe Super-imposition photography <p>6. Firearm Injuries lecture –I</p> <ul style="list-style-type: none"> • Describe basic terms related to ballistics & its types, types of cartridges/projectiles, and parts of a firearm weapon • List the types of gun powder • Explain the mechanism of fire in firearm weapons <p>7. Firearm injuries lecture – II</p> <ul style="list-style-type: none"> • Describe characteristic features of wound of entry and exit of firearms • Estimate distance of fire • List the features of fabricated firearm injuries • Explain the postmortem findings in cases of firearm injuries
<p>INTERNAL MEDICINE</p>	<p>1. OsteoArthritis</p> <ul style="list-style-type: none"> • Describe the clinical features, differential diagnoses and investigations for Osteoarthritis • Discuss the outline of management plan for the condition <p>2. Osteoporosis, Rickets and Osteomalacia</p> <ul style="list-style-type: none"> • Describe the etiology, clinical features, differential diagnoses and investigations for each of the conditions • Discuss the outline of management plan for the conditions

	<p>3. Musculoskeletal diseases (Inflammatory Arthritis)</p> <ul style="list-style-type: none"> • Describe the clinical features, laboratory tests, and imaging of the following musculoskeletal diseases: <ol style="list-style-type: none"> i. Rheumatoid Arthritis ii. Seronegative Spondylo-arthropathies
<p>ORTHOPEDICS</p>	<p>1. Presenting problems and investigations of Musculoskeletal diseases</p> <ul style="list-style-type: none"> • Describe the presenting problems and investigations of Musculoskeletal diseases <p>2. Fractures</p> <ul style="list-style-type: none"> • Classify the different types of fractures • Describe the specific types of fractures (hip, Colles', and pelvic fractures) • Discuss the general principles of management of fractures • Describe the therapeutic measures for different fractures, the principles of fracture treatment in children and common complications of fractures • Discuss the principles of fracture fixation
<p>PATHOLOGY AND MICROBIOLOGY</p>	<p>1. Overview of bone disease</p> <ul style="list-style-type: none"> • Briefly discuss matrix and cellular components of bone • Summarize development, homeostasis and remodeling of bone. <p>2. Developmental Disorders of Bone and Cartilage</p> <ul style="list-style-type: none"> • Discuss: <ol style="list-style-type: none"> i. Defects in nuclear proteins &

transcription factors

(Brachydactyly Cleidocranial dysplasia)

- ii. Defects in hormones & signal transducing Proteins (Achondroplasia)
- iii. Defects in extracellular structural proteins (Osteogenesis Imperfecta) diseases associated with mutations of Types II, IX, X, and XI collagen)
- iv. Defect in metabolic pathways (Osteopetrosis).

3. Acquired disorders of bone & cartilage I

- Define osteopenia & osteoporosis
- Categorize generalized osteoporosis
- Discuss the pathophysiology of postmenopausal & senile osteoporosis
- Describe the clinical & morphological features of osteoporosis
- Define Paget disease (osteitis deformans)
- List the three phases of Paget disease
- Discuss the pathogenesis of Paget disease
- Describe the clinical & morphological features of Paget disease

4. Acquired disorders of bone & cartilage II

- Define rickets & osteomalacia.
- Discuss the morphology & clinical features of rickets & osteomalacia.
- Discuss the role of parathyroid hormone in calcium homeostasis.
- Describe the morphological features of hyperparathyroidism.
- Define renal osteodystrophy.

Discuss the pathogenesis of renal dystrophy

5. Fractures & osteonecrosis

- Define fractures & Osteonecrosis
- List the types of fractures & the conditions causing Osteonecrosis
- Describe the mechanism of bone repair after fractures
- Discuss the morphology & clinical course of osteonecrosis

6. Osteomyelitis

- Define Osteomyelitis
- List the organisms causing Osteomyelitis with various predisposing factors.
- Discuss the route, causes, morphological & clinical features of Pyogenic Osteomyelitis.
- Briefly discuss Mycobacterium Osteomyelitis & Skeletal Syphilis

7 Degenerative and autoimmune joint disease

- Define Osteoarthritis and Rheumatoid Arthritis (RA)
- Describe pathogenesis & morphological features of Osteoarthritis and RA
- Discuss clinical & specific laboratory diagnostic features of Osteoarthritis and RA
- Discuss treatment & complications of RA

8. Juvenile idiopathic arthritis (JIA), Seronegative spondyloarthropathies, Infectious arthritis

- Define juvenile idiopathic arthritis (JIA)
- Compare JIA with Rheumatoid arthritis.
- Briefly discuss its risk factors & classification
- Explain the features of seronegative spondyloarthritis
- Briefly discuss ankylosing spondylitis, reactive arthritis, enteritis associated arthritis & psoriatic arthritis
- Discuss the causative agents & presentation of supportive, mycobacterial, Lyme & viral arthritis

	<p>9. Crystal-induced arthritis (Gout & pseudogout) and Joint tumors & tumors like conditions</p> <ul style="list-style-type: none"> • Classify gout • Describe the pathogenesis, morphology & clinical features of gout & pseudo-gout • Briefly discuss ganglion & synovial cyst • Discuss pathogenesis, morphology & clinical features of tenosynovial giant cell tumor <p>10. Bone Tumors and Tumor-Like Lesions I</p> <ul style="list-style-type: none"> • Briefly discuss Osteoid Osteoma and Osteoblastoma • Describe pathogenesis, morphology, clinical course of Osteosarcoma, Osteochondroma, Chondromas, and Chondrosarcoma <p>11. Bone Tumors and Tumor-Like Lesions II</p> <ul style="list-style-type: none"> • Describe pathogenesis, morphology, clinical course of Ewing Sarcoma, Giant Cell Tumor, and Aneurysmal Bone Cyst. • Discuss Fibrous Cortical Defect, Non-Ossifying Fibroma, Fibrous Dysplasia, and Metastatic Tumors.
<p>PHARMACOLOGY</p>	<p>1. Pharmacology of Eicosanoids</p> <ul style="list-style-type: none"> • Classify eicosanoids • Discuss the synthesis, receptor mechanisms and organ system effects of eicosanoids <p>2. Pain Management/Non-Steroidal Anti-Inflammatory Drugs(NSAIDs)-1</p> <ul style="list-style-type: none"> • Discuss the rationale of pain management • Classify NSAIDs • Describe their basic and clinical pharmacology <p>3. Pain Management-II (Opioid Analgesics)</p>

	<ul style="list-style-type: none"> • Discuss the role of opioids in the management of moderate to severe pain • Classify narcotic analgesics • Describe the basic and clinical pharmacology of narcotic analgesics <p>4. Anti-Rheumatic Agents-I & II</p> <ul style="list-style-type: none"> • Classify the drugs used in the treatment of rheumatoid arthritis and osteoarthritis • Discuss their basic and clinical pharmacology <p>5. Drug Used in Osteoporosis and Osteomalacia</p> <ul style="list-style-type: none"> • Describe the rationale of management of osteoporosis & osteomalacia • Classify the drugs used in the treatment of osteoporosis and osteomalacia • Discuss their basic and clinical pharmacology <p>6. Drugs Used in Gout</p> <ul style="list-style-type: none"> • Describe the rationale of management of gout • Describe the drugs used in the treatment of gout • Discuss their mode of action, pharmacokinetics, dynamics and adverse effects.
RADIOLOGY	<p>Imaging of musculo-skeletal system</p> <ul style="list-style-type: none"> • Explain the role of radiologic imaging in musculo-skeletal system diseases

	<ul style="list-style-type: none"> Describe the principles of MRI, isotope bone scans and CT scans
<p>TUTORIALS</p> <p>FORENSIC MEDICINE</p>	<p>1. Personal identity I (Forensic odontology)</p> <ul style="list-style-type: none"> Determine age from odontological data and x-rays <p>2. Personal identity II (Age estimation by Radiology)</p> <ul style="list-style-type: none"> Describe the medico legal importance of age Explain the medico legal importance of general examination and ossification data in age determination Determine age in at least 3 x-rays of long bones <p>3. Personal identity III (Sex determination from bones)</p> <ul style="list-style-type: none"> Discuss the features of male vs female skeleton Determine sex from the following bones: <ol style="list-style-type: none"> i. Skull ii. Mandible iii. Thorax iv. Pelvis Describe the determination of sex in intersex states <p>4. Personal identity IV (Osteometric indices)</p> <ul style="list-style-type: none"> Describe the role of Osteometric indices of bones in determination of age, sex, and race
<p>PATHOLOGY</p>	<p>1. Histopathology of bone tumors</p> <ul style="list-style-type: none"> Discuss the morphological features of cartilage forming, bone forming tumors and tumors of unknown origin. <p>2. Clinical implication of synovial fluid analysis</p> <ul style="list-style-type: none"> Correlate synovial fluid analysis with their representative diseases

PHARMACOLOGY	<p>1. Pain Management</p> <ul style="list-style-type: none"> • Discuss the basic and clinical pharmacology of NSAIDs and Opioids used in pain management <p>2. Treatment of Rheumatic Arthritis and Osteoarthritis</p> <ul style="list-style-type: none"> • Classify the drugs used in the management of rheumatoid Arthuro and osteoarthritis • Discuss the basic and clinical pharmacology of drugs used in OA <p>3. Drug Management in Osteoporosis & Osteomalacia</p> <ul style="list-style-type: none"> • Classify the drugs used in the management of Osteoporosis and Osteomalacia • Discuss the basic and clinical pharmacology of drugs used in Osteoporosis and Osteomalacia <p>4. Treatment of Gout</p> <ul style="list-style-type: none"> • Classify the drug used in the management of Gout • Discuss the pharmacokinetics and dynamics of drugs used in Gout
INTERNAL ASSESSMENT	<ul style="list-style-type: none"> • Internal assessment will be according to JSMU policy. The details of internal assessment will be determined by the respective institutions. Internal assessment carries 20% weightage in the final, end-of-year examination
ANNUAL EXAMINATION	<ul style="list-style-type: none"> • MCQs and OSPE/ OSCE
Module Evaluation	<ul style="list-style-type: none"> • Course will be evaluated through a feedback form which will be posted on the JSMU website