Dow University of Health Sciences

LOCOMOTION MODULE 2021

(LCM 1)

First Year MBBS

9 credit hours

FIVE YEAR CURRICULAR ORGANIZATION

<table>
<tr><th>Spiral</th><th>year</th><th colspan="4">Modules</th></tr>
<tr><td rowspan="4">First Spiral</td><td rowspan="4">I</td><td colspan="2">FND1- Foundation
Cell, Genetics & Cell Death
(Basics of Anatomy, Physiology, Biochemistry, Gen. Pathology, Gen. Pharmacology, Community Medicine & Behavioral Sciences,

9 Weeks</td><td colspan="2">HEM1- Blood Module
Immunity, Inflammation, Tissue repair, Antimicrobials & Neoplasia
9Week</td></tr>
<tr><td colspan="2">LCM1- Locomotion
Bones, Joints, Nerves & Muscles, 9weeks</td><td>RSP1- Respiratory System 6 weeks</td><td>CVS1- Cardiovascular System 4 weeks</td></tr>
<tr><td colspan="2">NEU1- Nervous System
8 weeks</td><td>HNN1- Head & Neck & Special
6 weeks</td><td>END1- Endocrinology
5weeks</td></tr>
<tr><td colspan="2">GIL 1-GIT and Liver
8 weeks</td><td>EXC1- Renal and Excretory System
5 weeks</td><td>REP1- Reproductive System 5 weeks</td></tr>
<tr><td rowspan="4">Second Spiral</td><td rowspan="4">II</td><td>IDD 1- Infectious diseases 5 weeks</td><td>HEM2- Hematology
5 weeks</td><td>RSP2- Respiratory System 5 weeks</td><td>CVS2- Cardiovascular System 5 weeks</td></tr>
<tr><td colspan="2">GIL 2-GIT and Liver (including Nutritional Disorders)
8weeks</td><td>EXC2- Renal & Excretory System
5 weeks</td><td>END2- Endocrinology
5 weeks</td></tr>
<tr><td>ORT2- Orthopedics, Rheumatology, Trauma
7 weeks</td><td>REP2- Reproductive System
8 Weeks</td><td colspan="2">PMR-Physical Medicine & Rehabilitation
DPS-Dermatology Plastic Surgery / Burns
GEN-Genetics
6 weeks</td></tr>
<tr><td colspan="2">NEU2- Neurosciences and Psychiatry
8 weeks</td><td>OPH / ENT*
4 weeks</td><td>ENT/OPH *
4 weeks</td></tr>
<tr><td>Third Spiral</td><td>III</td><td colspan="2">Clinical Rotation 9:30 to 3:00 (with Ambulatory, Emergency, Intensive care)
In Medicine, Pediatrics, Cardiology and Neurology units
▪ Lecture on problem based approach, twice a week
▪ Ward tutorial twice a week
▪ Student research presentation once a week</td><td colspan="2">Clinical Rotation 9:30 to 3:00
(Inpatient, Ambulatory, Emergency, Intensive care and Operation Theatres)
In Surgery, Gynecology & Obstetrics, Orthopedics and Neurosurgery.
▪ Lecture on problem based approach, twice a week
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RATIONALE

Timely diagnosis and management of bony, cartilaginous and neuromuscular disorders is essential to prevent disability and morbidity. A sound knowledge of structure and function of locomotor system forms the basis of understanding the rationale of diagnosis and management of the of limb disorders.

TERMINAL OBJECTIVE

By the end of locomotion module, the students should be able to:

- Describe anatomy of upper and lower limbs.
- Explain biochemistry of extracellular matrix related to cartilage and bones.
- Describe histology & embryology of bones, cartilages and muscles.
- Describe the role of calcium, Vit D and other minerals in bone metabolism
- Enlist and interpret various investigations used to diagnose diseases of locomotor system.

MODULE OBJECTIVES:

1. Describe the importance of mesoderm in embryology of skeletal system and related developmental disorders.
2. Identify the congenital anomalies of cartilages by discussing its structure and chemistry.
3. Correlate the types, structure and function of bones with background knowledge of mineral metabolism
4. Identify break in weight transmission from upper limb to axial skeleton due to fractures of bones of pectoral girdle & resulting disabilities
5. Associate the disorders of shoulder region such as winging of scapula and drooping of shoulder with structure of region involved.
6. Describe the structure of axillary and scapular region with associated clinical correlates.
7. Recognize the congenital anomalies of limbs by relating them with their development
8. Identify types of neuropathies due to damage to myelin sheath and axons by applying the knowledge of structure and function of nerves
9. Identify the disorders of neuromuscular transmission by relating them with physiology of neuromuscular junction

10. Relate the lesions of brachial plexus, with the knowledge of its formation and branches
11. Describe the structure of breast with special emphasis on lymphatic drainage of upper limb in carcinoma breast
12. Identify various nerve injuries of upper limb at different levels with the deformities they produce
13. Discuss the importance of brachial, radial and ulnar arteries
14. Describe the effects of humeral, radial and ulnar fractures on the structure and functions of limb
15. Recognize the importance of blood vessels around the elbow joint with localization of ante-cubital veins for drawing blood
16. Relate the actions of muscles with movements at joints of upper limb
17. Mark the surface anatomy of major nerves and vessels of upper limb ,
18. Identify the different landmarks in normal radiographs of upper limb
19. Identify the effects of break in weight transmission from axial skeleton to lower limb due to fractures of bones of pelvic girdle & thigh.
20. Identify the clinical effects of lumbosacral root and nerve compression
21. Recognize the importance of compartments of lower limb & the injuries as a result of wound of thigh.
22. Differentiate femoral from inguinal hernia
23. Discuss the importance of structures in gluteal region with special reference to Sciatica
24. Discuss hip joint & its movements to understand its deformities & dislocation
25. Discuss knee joint & its movements to understand its deformities
26. Discuss musculature and neurovascular supply of foot
27. Identify “flat foot” and its mechanical effects
28. Mark the surface anatomy of major nerves and vessels of lower limb
29. Identify the different landmarks in normal radiographs of lower limb

MODULE CONTENTS:

ANATOMY

Gross Anatomy:

1. LCM 1 Ang 1 Osteology of clavicle (Demo)
2. LCM 1 Ang 2 Osteology of scapula (Demo)
3. LCM 1 Ang 3 Osteology of humerus (Demo)
4. LCM 1 Ang 4 Muscles of pectoral girdle (Demo)
5. LCM 1 Ang 5 Muscles of shoulder region with nerve supply,action + Rotator cuff and scapular anastomosis (Demo)
6. LCM 1 Ang 6 Topographic Anatomy of upper limb Nomenclature
7. LCM 1 Ang 7 Structure of typical spinal nerve
8. LCM 1 Ang 8 Shoulder joint & its movements
9. LCM 1 Ang 9Axilla Boundaries and contents: Axillary Artery & Vein,axillary lymph nodes
10. LCM 1 Ang 10 Formation and relations of Brachial plexus Cutaneous Supply/dermatome of upper limb
11. LCM 1 Ang 11 Muscles and nerves of arm
12. LCM 1 Ang 12 Gross Anatomy of Breast
13. LCM 1 Ang 13 Brachial vessels + scapular anastomosis
14. LCM 1 Ang 14 Osteology of Ulna
15. LCM 1 Ang 15 Osteology of radius and hand
16. LCM 1 Ang 16 Muscles of front of forearm& flexor retinaculum & space of parona
17. LCM 1 Ang 17 Boundaries and contents of cubital fossa
18. LCM 1 Ang 18 Muscles of back of forearm &extensor retinaculum
19. LCM 1 Ang 19 Nerves and blood vessels of forearm
20. LCM 1 Ang 20 Elbow joint & arterial anastomosis around elbow
21. LCM 1 Ang 21 Muscles of hand, movement of thumb, palmar aponeurosis, anatomical snuff box
22. LCM 1 Ang 22 Nerves & vessels of hand
23. LCM 1 Ang 23 Wrist joints, superior and inferior radioulnar joints & small joints of hands
24. LCM 1 Ang 24 Superficial veins, lymphatics & lymph nodes of upper limb
25. LCM 1 Ang 25 Spaces of palm
26. LCM 1 Ang 26 Nerve injuries of upper limb
27. LCM 1 Ang 27 Surface anatomy of Upper Limb
28. LCM 1 Ang 28 Topographic anatomy of lower limb nomenclature
29. LCM 1 Ang 29 Osetology of Hip Bone I
30. LCM 1 Ang 30 Osetology of Hip Bone II
31. LCM 1 Ang 31 Femur I: Gross Features
32. LCM 1 Ang 32 Deep fascia of thigh, iliotibial tract, saphenous opening
33. LCM 1 Ang 33 Formation of lumbosacral plexus, cutaneous supply, dermatomes of

lower limb

34. LCM 1 Ang 34 Femur II: Muscle and ligaments attachments
35. LCM 1 Ang 35 Muscles of anterior compartment of thigh
36. LCM 1 Ang 36 Nerves & vessels of anterior compartment of thigh
37. LCM 1 Ang 37 Hip Joint and movements
38. LCM 1 Ang 38 Femoral Sheath, Femoral ring and femoral canal + femoral triangle & its contents, Adductor canal
39. LCM 1 Ang 39 Gluteal region
40. LCM 1 Ang 40 Medial compartment of thigh
41. LCM 1 Ang 41 Superficial Veins of lower limb; Formation of great & small saphenous veins, Lymphatic Drainage
42. LCM 1 Ang 42 Posterior compartment of thigh
43. LCM 1 Ang 43 Tibia
44. LCM 1 Ang 44 Fibula & bones of foot
45. LCM 1 Ang 45 Knee Joint
46. LCM 1 Ang 46 Anterior & Lateral Compartment of Leg, Dorsum of foot
47. LCM 1 Ang 47 Posterior compartment of leg, muscles, posterior tibial vessels and tibial nerves
48. LCM 1 Ang 48 Popliteal fossa
49. LCM 1 Ang 49 Foot fascia and muscles
50. LCM 1 Ang 50 Ankle and superior and inferior tibiofibular joints and transverse Tarsal joints
51. LCM 1 Ang 51 Neurovascular supply of foot
52. LCM 1 Ang 52 Arches of foot
53. LCM 1 Ang 53 Surface Anatomy of lower limb
54. LCM 1 Ang 54 Nerve injuries of lower limb
55.

Anatomy Histology:

1. LCM 1 Anh 1 Classification& histology of cartilages
2. LCM 1 Anh 2 Histology of cartilage (LAB)
3. LCM 1 Anh 3 Classification & histology of bones
4. LCM 1 Anh 4 Histology of Bone (LAB)
5. LCM 1 Anh 5 Histology of Muscle

Anatomy Embryology:

1. LCM 1 Ane 1 Development of Bone, cartilage & joints
2. LCM 1 Ane 2 Development of Limbs, Congenital Anomalies of limbs
3. LCM 1 Ane 3 Development of mesoderm, Paraxial Mesoderm, Sclero-Myotome and formation of cartilages
4. LCM 1 Ane 4 Development of Muscle
5. LCM 1 Ane 5 Development & histology of mammary gland

PHYSIOLOGY

1. LCM 1 Phy 1 **Electrical Properties of neurons (Resting Membrane Potential)**
2. LCM 1 Phy 2 **Generation and propagation of action potential**
3. LCM 1 Phy 3 **Classification of nerve fibers: degeneration and regeneration**
4. LCM 1 Phy 4 **Properties of Muscle fibres**
5. LCM 1 Phy 5 **Mechanism of skeletal muscle contraction, differential basis of smooth muscle contraction**
6. LCM 1 Phy 6 **Excitation of skeletal muscle, Neuromuscular transmission and Excitation- contraction coupling and its disorders**
7. LCM 1 Phy 7 **Excitation and contraction of smooth muscle**
8. LCM 1 Phy 8 **Introduction to power lab (LAB)**
9. LCM 1 Phy 9 **Simple muscle twitch (LAB)**
10. LCM 1 Phy 10 **Tetanization and Fatigue (LAB)**
11. LCM 1 Phy 11 **Power Lab: EMG recording (LAB)**
12. LCM 1 Phy 12 **Power Lab: Recording of NCV's(LAB)**

BIOCHEMISTRY

1. LCM 1 Bio 1 **Extra Cellular matrix related to Proteoglycans**
2. LCM 1 Bio 2 **Extracellular matrix related to collagen**
3. LCM 1 Bio 3 **Chemistry of Cartilage**
4. LCM 1 Bio 4 **Biochemical Structure of Bone**
5. LCM 1 Bio 5 **Vitamin D Metabolism**
6. LCM 1 Bio 6 **Regulation of Parathyroid hormones (Tutorial)**

RADIOLOGY

1. LCM 1 Rad 1 **Introduction to Radio-Imaging Modalities**
2. LCM 1 Rad 2 **Application to radio imaging modalities with Respect to Skeletal system**
3. LCM 1 Rad 3 **Normal x-ray of Upper & lower limb**
4. LCM 1 Rad 4 **Cross section of Upper &lower limb**

PATHOLOGY

LCM 1 Pth 1 **Overview of basic structure and function of bone with Developmental disorders of bone and cartilage**
LCM 1 Pth 2 **Osteoporosis and Osteopenia**
LCM 1 Pth 3 **Bone disorders due to Vitamin D deficiency**
LCM 1 Pth 4 **Pagets disease and Renal Osteodystrophy**
LCM 1 Pth 5 **Fractures: types and sequential steps in fracture healing**
LCM 1 Pth 6 **Osteomyelitis and Skeletal syphilis COMMUNITY MEDICINE**

1. LCM 1 Com 1 **Health transition**

2. **LCM 1 Com 2 Health promotion and Health education**
3. **LCM 1 Com 3 Disaster Management and control**
4. **LCM 1 Com 4 Health of elderly**
5. **LCM 1 Com 5 Injuries and accidents**
6. **LCM 1 Com 6 Snake Bite**

BEHAVIORAL SCIENCES

1. **LCM 1 Beh 1 Principles of Medical Ethics**
2. **LCM 1 Beh 2 Ethical analysis in clinical work**
3. **LCM 1 Beh3 Duties and responsibilities of doctor**

ORTHOPAEDIC

1. **LCM 1 Ort 1 Trauma to upper limb (Fractures and dislocation)**
2. **LCM 1 Ort 2 Trauma to Lower limb (Fractures and dislocation)**
3. **LCM 1 Ort 2 Soft tissue disorders of limbs**

Integrated Learning (CBL)

1. **LCM 1 Cbl 1 Osteomalacia**
2. **LCM 1 Cbl 2 Myasthenia Gravis**
3. **LCM 1 Cbl 3 Ulnar Nerve Palsy**
4. **LCM 1 Cbl 4 Supra condylar fractures of humerus**
5. **LCM 1 Cbl 5 Breast lump**
6. **LCM 1 Cbl 6 Gun Shot injury**
7. **LCM 1 Cbl 7 Duchennene Muscular Dystrophy**
8. **LCM 1 Cbl 8 S1 Radiculopathy**

CASE BASED LEARNING

1. **CBL 1**
    - Define osteomalacia
    - Describe the pathophysiology of osteomalacia
    - Interpret role of Vit D and Calcium in bone formation
    - Elaborate the effect of Vit D and calcium deficiency
2. **CBL 2**
    - Describe myasthenia gravis.
    - Interpret the signs and symptoms of myasthenia.
    - Understand the pathophysiology of the related disease.
    - Define the management options for the given pathology.
3. **CBL 3**

- Enumerate the normal structures of the elbow region
- Describe the neurovascular relations of the elbow joint
- Describe the common injury patterns of this region
- Differentiate the various neurovascular injuries at the elbow

4. **CBL 4**

- Identify the normal structures related to elbow joint
- Relate the changes that may occur due to fracture in this area
- Identify radiological anatomy of upper limb
- Recognize that injury to one structure is not isolated but also involves other adjacent structures

5. **CBL 5**

- Describe the Anatomy of the axilla.
- Describe the Anatomy of the breast and relationship to the axilla
- Define Clinical importance of axilla in relation to breast diseases.

6. **CBL 6**

- Describe anatomy of major vessels in the thigh.
- Correlate Blood loss which can be associated with gunshot injury.
- Explain clinical assessment of nerves of lower limb.
- Describe that an injury at thigh can damage various tissues locally and can be associated with systemic complications

7. **CBL 7**

- Recognize the causes of weakness in the limb.
- Identify modalities of investigation of muscular disorders.
- Recognize the genetic basis of muscle diseases.
  Understand the finding of Electrophysiology (EMG / NCVs)

8. **CBL 8**

- Describe the motor and sensory distribution of lumbar and sacral nerve roots.
- Recognize the features that occur due to disease of a certain nerve root.
- Correlate the motor and sensory impairment to identify the level of nerve root involved.

LEARNING OBJECTIVE OF SKILL LAB CURRICULUM

❖ **ORTHO 1: Locomotion Module:**

I. VITAL SIGNS:

INTRODUCTION/RATIONALE:

This is one of the first skills that a healthcare professional needs when dealing with patients generally and specially in suspected cases of shock due to injuries. Accurate measurement of vital signs is of prime importance in the decision making process for diagnosis and management. Students will watch demonstration videos and then practice the measurement of five vital signs.

The module is divided into two sub modules and will be taught in two sessions.
Module 2A- Temperature, Pulse, Respiration and Pain
Module 2B- Measuring Blood Pressure

LEARNING OBJECTIVES:

After The Sessions The Student Should Be Able To:

- Demonstrate the correct methods of assessing Vital Signs.
- Demonstrate effective communication skills during and after assessment.

Sub Topic Learning Objectives

TEMPERATURE

1. Identify different types of thermometer
2. List the four sites for assessing temperature and Recognize expected differences between the measurements obtained at different sites.
3. Demonstrate how to take oral temperature and read the thermometer accurately.

PULSE

4. Identify seven sites where pulse may be counted (Superficial Temporal radial, carotid, femoral, popliteal, posterior tibial, dorsalis pedis)
5. Demonstrate correct palpation of radial pulse, count the pulse rate and note its rhythm accurately.
6. Describe method of assessing pulse in infants (heart rate in neonates and brachial pulse in infants)

RESPIRATORY RATE

7. Demonstrate how to count and record respiratory rate accurately

PAIN

8. Demonstrate the ability to use a pain measurement scale (faces pain scale, visual analog scale) to evaluate the intensity of patient's pain.
9. Demonstrate the ability to empathize with the patient in pain

BLOOD PRESSURE:

10. Identify the different parts of the instruments (stethoscope and sphygmomanometer) and their types.
11. Demonstrate proper placement of BP cuff on the arm and thigh.
12. Demonstrate how to measure and record blood pressure accurately
13. Describe and demonstrate the methods used to assess blood pressure in different pediatric age groups.
14. Demonstrate appropriate communication skills before, during and after the procedure.

ASSESMENT PLAN:

SUMMATIVE ASSESMENT	WEIGHTAGE
ANNUAL EXAM	**80%**
MODULE EXAM (INTERNAL EVALUATION)	**20%**

CREDIT HOURS	
Locomotor module	**9**

CONTACT HOURS

Discipline	Contact Hours
Anatomy	57.5
Histology	6.0
Embryology	5.0
Biochemistry	6.5
Physiology	14.5
Pathology	6.0
Community Medicine	6.0
Behavioral Sciences	3.0
Radiology	4.0
Orthopedic	3.0
CBL	10.5
Skill Lab	3.0

BOOKS

ANATOMY

- **CLINICALLY ORIENTED ANATOMY**
  KEITH.L.MOORE, Arthur F. Dalley, Anne M.R. Agur
  7th or Latest EDITION

- **GRAY'S ANATOMY FOR STUDENTS**
  Drake & Vogl & Mitchell
  3rd or Latest EDITION

- **CLINICAL ANATOMY BY REGIONS (REFERENCE BOOK)**
  Richard S. SNELL
  9th EDITION

- **LAST'S ANATOMY: REGIONAL & APPLIED (REFERENCE BOOK)**
  Chummy S. Sinnatamby
  12th or Latest EDITION

- **ATLAS OF HUMAN ANATOMY**
  FRANK H.NETTER
  6th EDITION

EMBRYOLOGY

- **LANGMAN'S MEDICAL EMBRYOLOGY**
  T.W.SADLER
  13th EDITION

- **THE DEVELOPING HUMAN CLINICALLY ORIENTED EMBRYOLOGY (REFERENCE BOOK)**
  MOORE & PERSAUD & TORCHIA
  10th EDITION

HISTOLOGY

- **MEDICAL HISTOLOGY**
  LAIQ HUSSAIN SIDDIQUI
  5TH or Latest EDITION

- **WHEATERS FUNCTIONAL HISTOLOGY**
  BARBARA YOUNG
  5th EDITION

- **BASIC HISTOLOGY(TEXT AND ATLAS) (REFERENCE BOOK)**
  LUIZ JUNQUEIRA, JOSE CARNEIRO
  11th or Latest EDITION

PHYSIOLOGY

- **GUYTON AND HALL TEXTBOOK OF MEDICAL PHYSIOLOGY**
  GUYTON AND HALL
  13th EDITION
- **GANONGS REVIEW OF MEDICAL PHYSIOLOGY**
  25TH EDITION

BIOCHEMISTRY

- **LIPPINCOTT'S ILLUSTRATED REVIEWS SERIES**
  DENISE R. FERRIER
  6th EDITION

- **HARPERS ILLUSTRATED BIOCHEMISTRY (REFERENCE BOOK)**
  VICTOR RODWELL, DAVID BENDER, KATHLEEN M. BOTHAM, PETER J. KENNELLY,
  P. ANTHONY WEIL
  28th EDITION

PATHOLOGY

- **ROBBINS BASIC PATHOLOGY**
  KUMAR & ABBAS
  9TH EDITION

- **ROBBINS & COTRAN PATHOLOGIC BASIS OF DISEASE (REFERENCE BOOK)**
  KUMAR & ABBAS & ASTER
  9th EDITION

COMMUNITY MEDICINE

- **PUBLIC HEALTH AND COMMUNITY MEDICINE**
  SHAH, ILYAS, ANSARI
  7th EDITION

PHARMACOLOGY

- **LIPPINCOTT'S ILLUSTRATED REVIEW PHARMACOLOGY**
  KAREN WHALEN
  6th or Latest Edition

- **BASIC AND CLINICAL PHARMACOLOGY (REFERENCE BOOK)**
  BERTRAM G. KATZUNG
  11th EDITION

MICROBIOLOGY

- **REVIEW OF MEDICAL MICROBIOLOGY AND IMMUNOLOGY**
  WARREN LEWINSON
  14th EDITION

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Approved by:
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