Anatomy of limbs-MED 1104

Year 1 Semester I
Credits: 4

Module coordinator: Dr. Himani Amaratunga

Concept	Objective	Duration	T/L activity	Comments
1. Overview				
1.1Introduction to limbs and their movements	Student should be able to; 1. Explain the evolutionary changes that have taken place when quadruped became a biped 2. Explain how the general plan of the upper limb is built for prehension and lower limb is built for support and propulsion 3. Describe the general arrangement of the human skeleton (axial/appendicular skeleton and their component parts) and its functions	1hr	Lecture	
1.2 Nerve supply of the body wall and limbs	1. Describe the segmental supply of the body wall 2. Describe the arrangement of a typical spinal nerve 3. Explain the segmental innervations of skin and muscles 4. Describe the neurovascular plane 5. Explain how the limb plexuses form			Covered in introduction to nervous system in foundation module
1.3Structure of bone and cartilage and 1.4 Ossification	1. Classify bones and cartilages 2. Describe the parts of a long bone 3. Describe the microscopic structure of bone and cartilage and how they are adapted to perform their function. 4. Explain the structural and functional differences between the different types of cartilage 5. Explain the processes of ossification giving examples and the time of appearance of ossification centres	2hrs	Lecture	Histology practical will be combined with the muscle practical

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1.5Classification of joints and joint movements	1. Describe the classification of joints 2. Describe the structure of synovial joints and explain how it is adapted to perform movements 3. Describe the classification of synovial joints and explain how the shape of the joint surface decides the degree of movement 4. Explain the basic concepts of biomechanics of the limbs	1hr	Lecture	
1.6 Structure of muscle, tendon, ligament and synovium	1. Describe the microscopic structure of the skeletal muscle, heart muscle and smooth muscle including the distribution of cellular organelles in each and their function. 2. Describe the ultra-structural components of a skeletal muscle cell (sarcoplasmic reticulum, t-tubules, terminal cisternae and actin and myosin filaments) 3. Describe microscopic structure of tendon, ligament and synovium and its functional relevance 4. Describe the different macroscopic types of tendons and arrangement of raphes 5. Describe arrangement of synovial sheaths, membranes and bursae	1hr 3hrs	Lecture Practical	3x3hrs This practical will include structure of bone and cartilage
1.7 Form, mechanics and coordinated activity of muscle	1. Describe the form and mechanics of muscle (fiber disposition, pennation and mechanics of contraction) 2. Explain the coordinated activity of muscles and how they produce movement (prime movers, antagonists, synergist and fixators)	1hr	Lecture	
1.8.Development of the limbs	1. Describe the development of the limbs 2. Explain the concept of dermatomes and myotomes and their functional significance 3. State the genes that control the limb bud development 4. State the common congenital defects of limb development and Explain their embryological basis	1 hr	Lecture	
2 Upper limb				
2.1Introduction to dissections	1. Describe the importance of cadaveric dissections in learning anatomy 2. take care of the cadaver during dissections	1hr 3hrs	Lecture Practical	

	3. carry out pre-dissection activities such as studying the bones and surface anatomy in order to facilitate the dissection and revelation of structures and their arrangement 4. Apply proper method of dissection, engaging in group studies, using the cadaver, text books, atlases, skeleton, and radiographs in learning the structure of the body 5. Identify the tissues encountered in dissection of the human body and their arrangement			
2.2 osteology and surface anatomy 2.3 Superficial veins and cutaneous innervations of the upper limb	1. Identify the bones that form the pectoral girdle and the upper limb 2. Name their parts and general features 3. Describe how the basic organization of the upper limb skeleton correlates to its function 4. Demonstrate the surface projections, bony landmarks, muscles and other soft tissues of the pectoral girdle and the upper limb 5. Describe the cutaneous innervations of the upper limb and locate the dermatomes of the upper limb	1hr 6hrs	Lecture/ demonstration Practical	Interactive lecture using bones
2.4Pectoral and scapular regions 2.5 Axilla and brachial plexus	1. Describe the general layout of the regions 2. Describe the compartments, attachments, actions and nerve supply of the muscles of the regions 3. Describe the nerves and blood vessels of the region- scapular anastomosis 4. Describe the boundaries and contents of the axilla and its continuity to neck and upper limb 5. Describe the brachial plexus and its relations in the axilla	1hr 6hrs	Lecture Practical	The lecture includes pre-dissection instructions
2.6 Clinical correlations of the pectoral and scapular regions axilla and brachial plexus	1. Explain the anatomical basis of common clinical conditions (e.g. clavicular and scapular fractures, pulsatile and winged scapula etc) 2. Explain the anatomical basis for brachial plexus injuries and related clinical anatomy of the region	1hr 6hrs	Lectures Practical	Lecture to discuss the clinical aspects of both regions after the dissections of these regions
2.7Arm and cubital fossa	1. Describe the general layout of the regions 2. Describe the muscle compartments, attachments and actions 3. Describe the nerves and blood vessels of the region 4. Describe the extent and contents of the cubital fossa	1hr 3hrs	Lecture Practical	Includes pre-dissection instructions

2.8Forearm and hand	1. Describe the muscle groups/ compartments, attachments and actions 2. Describe the nerves and blood vessels of the region 3. Describe the arrangement of the structure of the hand, palmar spaces and fibrous flexor sheaths and explain their clinical importance	1hr 6hrs	Lecture Practical	Includes pre-dissection instructions.
2.9Clinical correlations of the arm, cubital fossa forearm and hand	1. Explain the anatomical basis of common clinical conditions in arm and cubital fossa region (e.g. fractures- distal radial fracture, scaphoid fracture, neurovascular injuries-nerve compressions and spread of infection in fascial compartments, tennis elbow, golf elbow etc) 2. Explain the anatomical basis of clinical conditions of the forearm and hand region (e.g. fractures of the humerus and related neurovascular injuries, supracondylar fracture etc.) 3. Describe the radiological features including the cross sectional anatomy of the region	1hr	Lectures	Lecture to discuss the clinical aspects after the dissections.
2.10Joints of the upper limb and their movements	1. Describe the structure, movements and stabilizing factors of the shoulder, elbow and wrist joints. 2. Describe the movements of the small joints of the hand. 3. State the spinal segments for each joint movement. 4. Describe/recall the anatomical basis of shoulder dislocation, elbow dislocation, distal radial fracture and lunate dislocation, rotater cuff and supraspinatus tendinitis	1hr 3hrs	Lecture Practical	
2.11Arterial supply of upper limb	1. Recall the arterial supply of the upper limb 2. Describe the clinical significance of the collateral supply (arterial) of the upper limb 3. Describe the anatomical basis of common clinical conditions affecting the arteries of the upper limb			To be done with blood supply (arterial /venous) and lymphatic drainage of limbs
2.12 verview of the upper limb	1. Describe the structural arrangement of the upper limb in relation to its functions 2. Describe the interrelationship of the components of the upper limb in producing movement 3. Solve clinical problems using Anatomy knowledge	1hr	SGD Tutorial	Questions to be displayed in moodle and be discussed at SGs

3.Lower limb	1.			
3.1Osteology and surface anatomy of the lower limb 3.2Superficial veins and cutaneous innervations of the lower limb	2. Identify the bones that form the pelvic girdle and the lower limb 3. Name their parts and general features 4. Describe how the basic organization of the lower limb skeleton correlates to its function 6. Demonstrate the surface projections, bony landmarks, muscles and other soft tissues of the pelvic girdle and the lower limb 5. Describe the cutaneous innervations of the lower limb and locate the dermatomes of the lower limb	1hr 6hrs	Lecture demonstration Practical	Interactive lecture using bones and students' own bodies.
3.4Gluteal region Thigh and popliteal fossa	1. Describe the general layout of the region 2. Describe the attachments, action, innervation and blood supply of the muscles of the region 3. Describe the attachments, action, innervation and blood supply of the muscles of the front medial and posterior aspect of the thigh 4. Describe the boundaries of the femoral triangle and its contents 5. Describe the boundaries and contents of the popliteal region	1hr 9hrs	Lecture Practical	Includes pre-dissection instructions.
3.5Clinical correlations of the gluteal region thigh and popliteal fossa	1. Describe the general layout of the region 2. Explain the anatomical basis of safe intramuscular injection to buttocks, and superior gluteal nerve injury/waddling gait/positive Trendelenburg test 3. Explain the anatomical basis of clinical conditions and procedures performed in the thigh and popliteal region (e.g. femoral puncture/catheterization, femoral hernia, sapheno-femoral/ perforator incompetence, spread of psoas abscess, popliteal pulse, Baker's cyst)	1hr	Lecture	Lecture to discuss the clinical aspects of both regions after the dissections.
3.5Leg and foot	1. Describe the general layout of the region 2. Describe the attachments, actions and innervation of the muscles of the leg and foot 3. Describe the nerves and blood vessels of the region 4. Describe the ligaments of the ankle 5. Describe the structure of the arches of the foot and explain the factors which stabilize them	1hr 6hrs	Lecture Practical	First lecture to introduce the region.
3.6Clinical correlations of the leg and foot	Explain the anatomical basis of clinical conditions (compartment syndrome, fibular neck fracture and clinical manifestations, ankle sprain, plantar fasciitis, deep vein thrombosis, fracture of neck of talus, fracture metatarsal)	1hr	Lecture	Second lecture to discuss the clinical aspects after the dissections.

3.7Joints of the lower limb and their movements	1. Describe the structure movements and stabilizing factors of the hip, knee and ankle joint. 2. Describe the joints and the movements of the foot 3. State the spinal segments for joint movements. 4. Describe the anatomical basis of common clinical conditions (femoral neck fracture and its complications, hip dislocation, cruciate ligament injury, coxavera and coxavalgaetc)	1hr 3hrs	Lecture Practical	
3.8Gait	1. Describe the weight bearing function of the lower limb including foot arches and weight distribution in the foot 2. Describe the walking cycle and adaptations of the lower limb to walking, running and landing 3. Describe the anatomical basis for common gait abnormalities	1 hr	Lecture	Clinical anatomy lecture
3.9Overview of lower limb	1. Describe the structural arrangement of lower limb in relation to its functions 2. Describe the interrelationship of the components of the lower limb in producing movements 3. Compare and contrast the upper and lower limbs in relation to structure and function 4. Solve clinical problems using Anatomy knowledge	1hr	Tutorial	
3.10Arterial supply, Venous drainage and lymphatic drainage of the limbs	1. Recall the arterial supply of the lower limb 2. Describe the clinical significance of the collateral supply (arterial) of the lower limb 3. Describe the anatomical basis of common clinical conditions affecting the arteries of the lower limb 4. Describe the venous drainage of the limbs 5. Describe the factors which help venous drainage of the lower limb 6. Describe the anatomical basis of common clinical conditions affecting the venous system of the limbs e.g. varicose veins of the lower limb 7. Describe the lymphatic drainage of the limbs 8. Describe the anatomical basis of common clinical conditions affecting the lymphatic system of the limbs e.g. lymphadenopathy, lymphoedema	2 hr	Lecture	Blood supply, venous drainage and lymphatic drainage of upper limb are also covered
4.Clinical correlations and radiology				
4. 1Nerve injuries of limbs	1. Describe the origin course and distribution of the nerves of the upper and lower limb 2. Describe and demonstrate steps/points in neurological examination of limbs and peripheral nerves (spinal segments of muscles, groups of muscles, tendon reflexes and dermatome map dermatome areas of key peripheral nerves) 3. Describe the common clinical correlations of nerve injuries of upper and lower limbs	2hrs	Lecture	

4.2Overall clinical correlation of limbs	Describe relevant clinical correlates of limbs	2 hrs	Lecture	Done by a clinician
4.3Radiology of limbs	1. Describe the radiological features of the limbs 2. Recall the cross sectional anatomy of the limbs	2hrs	Lecture	
4.5 Overview of upper limb and lower limb	Be able to identify the structures of the limbs and answer clinically related questions	6 hrs	Practical	Body side tutorial