Part-I

General Introduction

0

Naming Bones of Limbs

Following bones constitute the upper limb:

1. **Clavicle:** Bone of pectoral region
2. **Scapula:** Bone of scapular region
3. **Humerus:** Bone of arm
4. **Radius:** Lateral bone of forearm
5. **Ulna:** Medial bone of forearm
6. **Corpus:**
   - Eight carpal bones together constitute the corpus
   - These are bones of proximal part of hand
   - These are arranged in two rows, proximal and distal
   - Each row has 4 carpal bones
   - Carpal bones of proximal row are from lateral to medial:
     (i) Scaphoid (ii) Lunate (iii) Triquetral (iv) Pisiform
   - Carpal bones of distal row are from lateral to medial:
     (i) Trapezium (ii) Trapezoid (iii) Capitate (iv) Hamate
7. **Metacarpus:**
   - Five metacarpal bones together constitute the metacarpus
   - These are bones of middle part of the hand
   - These are named from lateral to medial
     (i) First metacarpal bone: It lies in the line of thumb
     (ii) Second metacarpal bone: It lies in the line of index finger
     (iii) Third metacarpal bone: It lies in ths line of central finger
     (iv) Fourth metacarpal bone: It lies in the line of ring finger
     (v) Fifth metacarpal bone: It lies in the line of little finger
8. **Phalanges:**
   - Fourteen phalanges occupy the distal part of the hand i.e. digits
   - There are two phalanges in thumb:

(i) Proximal phalanx (ii) Distal phalanx

- There are three phalanges in each of the rest of the four digits:

(i) Proximal phalanx (ii) Middle phalanx (iii) Distal phalanx

Following bones constitute the lower limb:

1. **Hip bone:** Bone of gluteal region and pelvis
2. **Femur:** Bone of thigh
3. **Patella:** Sesamoid bone in the tendon of quadriceps
4. **Tibia:** Medial bone of leg
5. **Fibula:** Lateral bone of leg
6. **Tarsus:**
   - Seven torsal bones together constitute the tarsus
   - These are the bones of hind-foot
   - These are named as:

   (i) Talus (ii) Calcaneus (iii) Navicular (iv) Cuboid
   (v) Medial cuneiform (vi) Intermediate cuneiform (vii) Lateral cuneiform
7. **Metatarsus:**
   - Five metatarsal bones together constitute metatarsus
   - These are named from medial to lateral:

   (i) First metatarsal: It lies in the line of great toe
   (ii) Second metatarsal: It lies in the line of second toe
   (iii) Third metatarsal: It lies in the line of third toe
   (iv) Fourth metatarsal: It lies in the line of 4th toe
   (v) Fifth metatarsal: It lies in the line of 5th toe
8. **Phalanges:**
   - Fourteen phalanges occupy the toes of the foot
   - Metatarsus and phalanges constitute the skeleton of fore-foot
   - Great toe has got only two phalanges

   (i) Proximal phalanx (ii) Distal phalanx
   - There are three pharanges in each of the rest of the toes:

   (i) Proximal phalanx (ii) Middle phalanx
   (iii) Distal phalanx

Total number of bones in the limbs of both sides are as follows:

(i) Upper limbs – 64 (ii) Lower limbs – 62

1

General Introduction

It is unfortunate that the study of anatomy has to be carried out on the cadavers (dead and preserved bodies) in which the texture and appearance of the organs has been altered. Dissection can become a meaningless exercise unless the student approaches it with an enquiring mind and avoids assuming that it is simply a method of learning a number of dead facts. Dissection is only a means for fuller understanding of function. It deals, for example, with simple concepts such as arrangements of valves in the veins and the more complex structure of the heart, without which normal and abnormal circulation of the blood could not be understood properly.

GENERAL INSTRUCTIONS FOR DISSECTION

Instruments

The dissector requires: one scalpel with solid blade (for cutting skin and dense deep fascia), two pairs of forceps, preferably with rounded points, a strong blunt hook or seeker (for blunt dissection to free the organs from the surrounding connective tissue matrix in which the structures are embedded) and a hand lens to partially bridge the gap between gross and microscopic anatomy.

Removal of the skin

After making appropriate skin incision suitable for particular region the skin and superficial fascia can be removed in one layer or in separate layers. Since small nerves and vessels run together in the superficial fascia, knowledge about cutaneous nerves is important before dissection. This can be achieved through diagrams. Most of the time tracing of small nerves and vessels in the superficial fascia is not a very rewarding task. In certain regions, especially in the limbs, some large veins also run in the superficial fascia. These superficial large veins possess valves to prevent reflux at the sites where they pierce the deep fascia to join the deep veins.

Deep dissection

Identification and removal of deep fascia is important. At places it is easily removed but quite often it is difficult to separate it from the underlying muscles because it is intimately associated with the outer

covering of the muscles and it also sends septa between the muscles. Each muscle must be mobilized from its bed to find out its attachments making the understanding of its functions easy. The neurovascular bundles entering on the surface of the muscles should be identified and traced back to their origins by blunt dissection. So far as the location of nerves and vessels are concerned, the nerves follow most standard course, followed by arteries and then the veins. Deep arteries are commonly associated with multiple interconnecting veins which obscure nerves and vessels and in such situations it advisable to remove such veins to facilitate dissection.

Variations

Like wide variations in the external features among persons there exists variations in the size, position and shapes of various organs of the body in different individuals. Therefore, no single description of the structure of the body exactly fits every individual. Students should avail the opportunity of finding variations among different internal organs by looking into the other bodies being dissected in the dissection room. Some variations especially those of nerves and arteries are of great clinical significance as compared to that of muscles and superficial veins.

Congenital abnormalities arising due to defect in development are less commonly found during dissection. Some milder forms of anomalies which are compatible with life, can be found during dissection. e.g., ectopic kidney and double ureter. For explanation of these structures student should have knowledge about the development of these structures.

2

Terms of Position and Movement

TERMS OF POSITION

Anatomical position. Body standing upright with upper limb hanging by the side and palms of the hands directed forward.

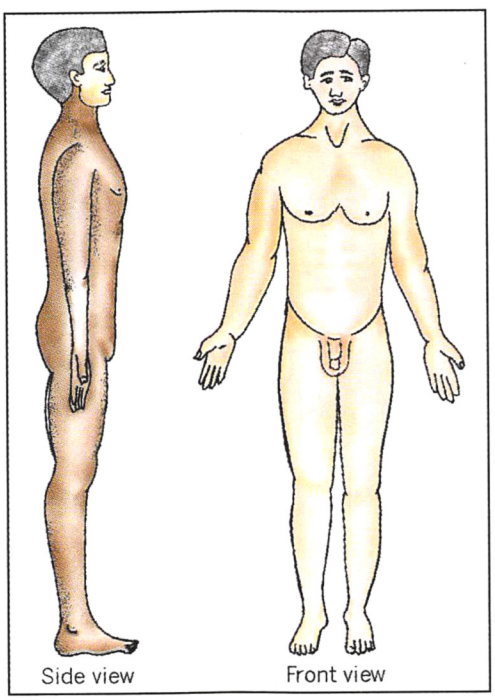

Fig.2.1 Anatomical position

Superior (cephalic) refers to the position of a part nearer the head. **Inferior** (caudal) refers to the position of a part nearer the feet or tail. **Anterior** (ventral): means nearer the front of the body. **Posterior** (dorsal) means nearer the back of the body. **Palmar** and **plantar** replace anterior in hand and foot respectively. **Median** means in the middle. **Median plane** is an imaginary plane that divides the body

into equal halves, right and left. **Median lines** (anterior and posterior) are edges of the median plane on the front and back of the body. **Medial** means nearer the median plane. **Lateral** means further away from the median plane. **Ulnar and tibial**: may replace medial in the forearm and leg respectively. **Radial and fibular** may replace lateral in the forearm and leg respectively. **Inner/internal** and **outer/external** cannot be used in place of medial and lateral respectively. **Superficial** means nearer the skin. **Deep** means further from skin and are used when direction is of no importance. **Sagittal plane** is a plane passing through any part of the body parallel to the median plane. **Coronal plane** a vertical plane at right angle to the median plane. **Proximal** (nearer to) **distal** (further from) indicate the relative distance of structures from the root of that structure. **Middle** (medius): indicates a position between superior and inferior or anterior and posterior. **Intermediate** indicates a position between lateral and medial. **Superolateral, inferomedial, antero-inferior and postero-superior** etc are combination of standard terms used to indicate the intermediate positions much the same way as the points of the compass are described.

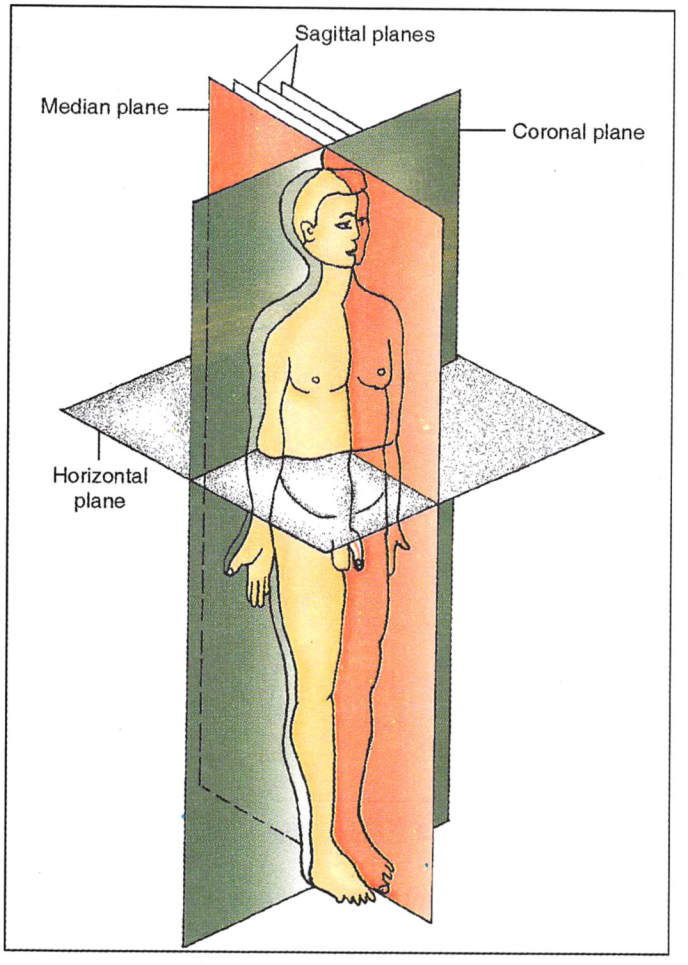

Fig. 2.2 Planes of the body

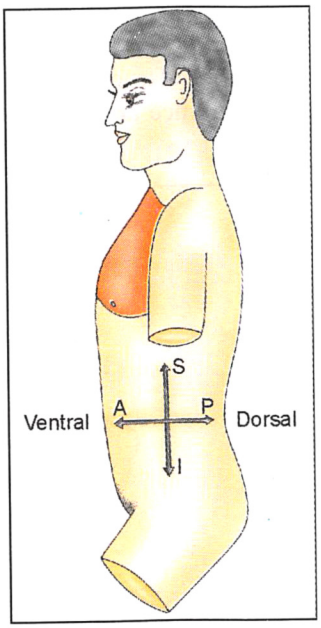

Fig. 2.3 Terms of position (A-Anterior, P-Posterior, S-Superior, I-Inferior)

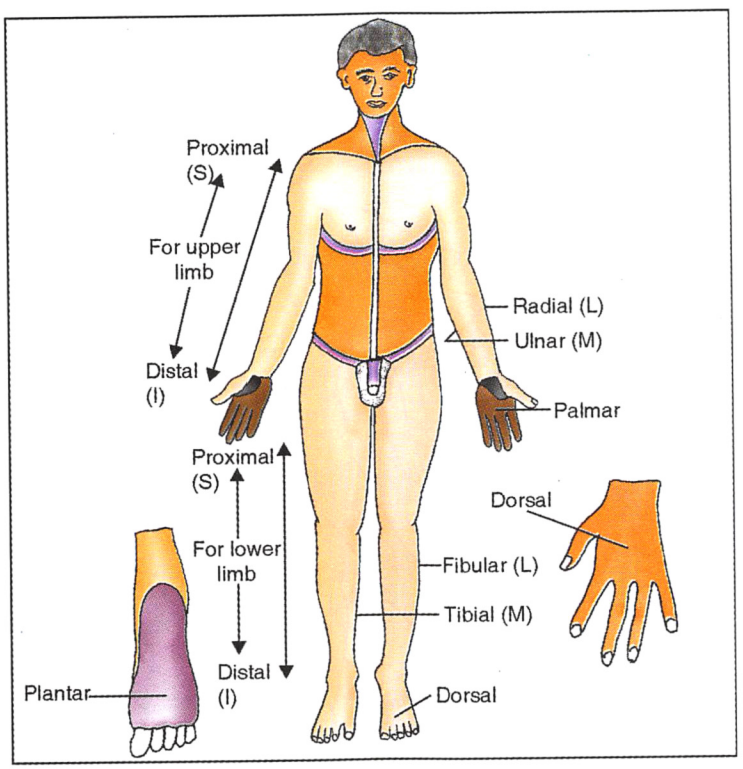

Fig. 2.4 Terms of position (M-Medial, L-Lateral, S-Superior, I-Inferior)

TERMS OF MOVEMENT

Flexion and Extension are the movements of the trunk in the sagittal plane anteriorly and posteriorly respectively. These movements at elbow and knee are angulation and straightening in the same plan respectively.

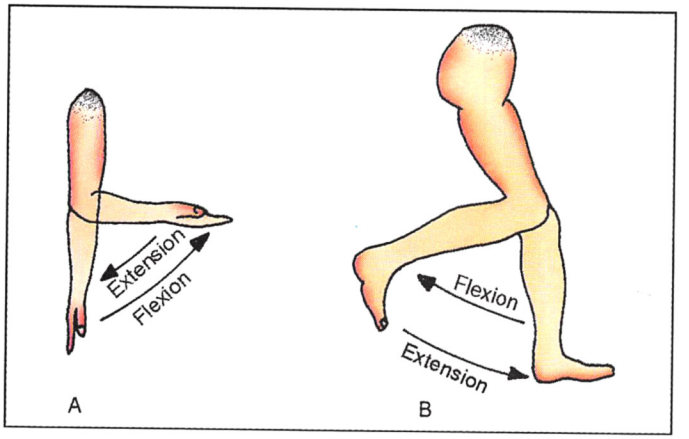

Fig. 2.5 Flexion and extension at elbow (A) and knee (B)

Plantar flexion (movement towards the sole) and **dorsiflexion** (movement towards the dorsum): indicates flexion and extension at the ankle. **Lateral flexion**: movements of the trunk in the coronal plane.

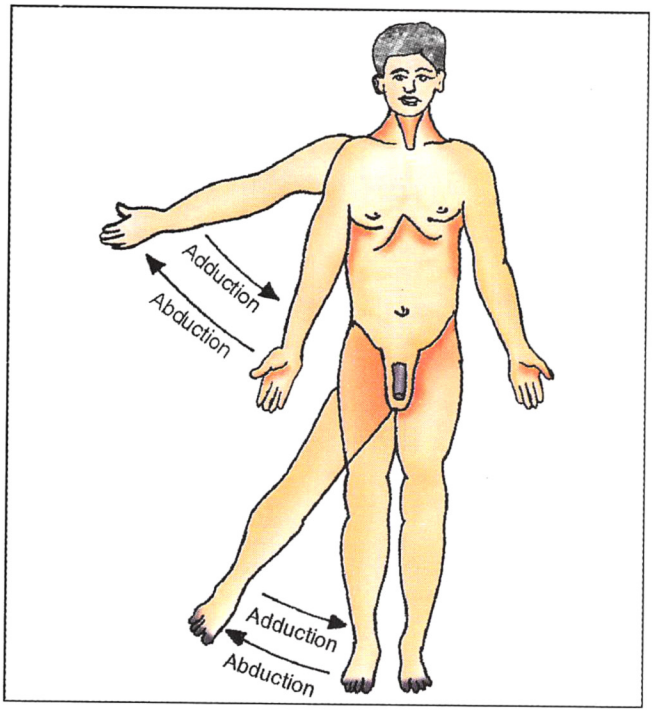

Fig. 2.6 Abduction and adduction

Abduction and adduction are the movements of the limb in the coronal plane taking it away and towards the median plane respectively. **Radial deviation and ulnar deviation**: indicate abduction and adduction at the wrist. Turning of the part of the body around its own longitudinal axis is called **Rotation. Medial and lateral rotations** indicate the direction of the movement of the anterior surface of the limbs.

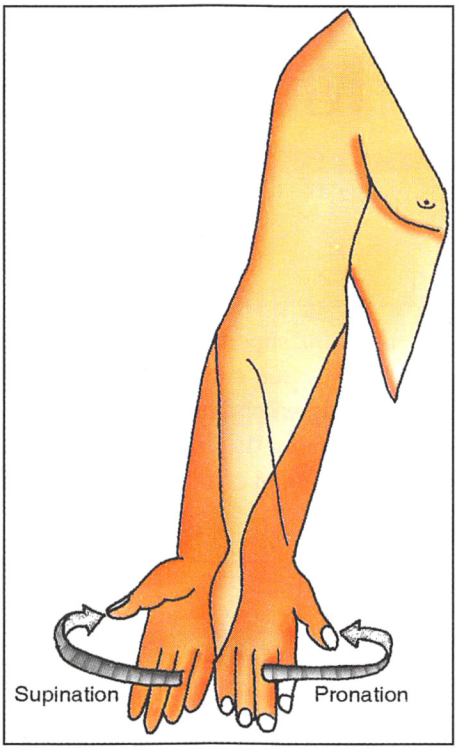

Fig.2.7 Pronation and supination

Pronation (palm facing posteriorly) and **supination** (palm facing anteriorly) indicate medial and lateral rotation of forearm along with the hand.

3

Structures Met in Dissection

SKIN

Skin covers the whole body. It consists of superficial, avascular , stratified epithelial tissue called epidermis and a deep, vascular, fibrous tissue called dermis. Dermis provides both structural and metabolic support to the epidermis. **The superficial fascia** is the fibrous mesh filled with fat, connecting the dermis with underlying deeper structures. It also contains small arteries, veins, lymph vessels, lymph nodes and cutaneous nerves. The amount of fat (adipose tissue) varies with age, sex and region of the body.

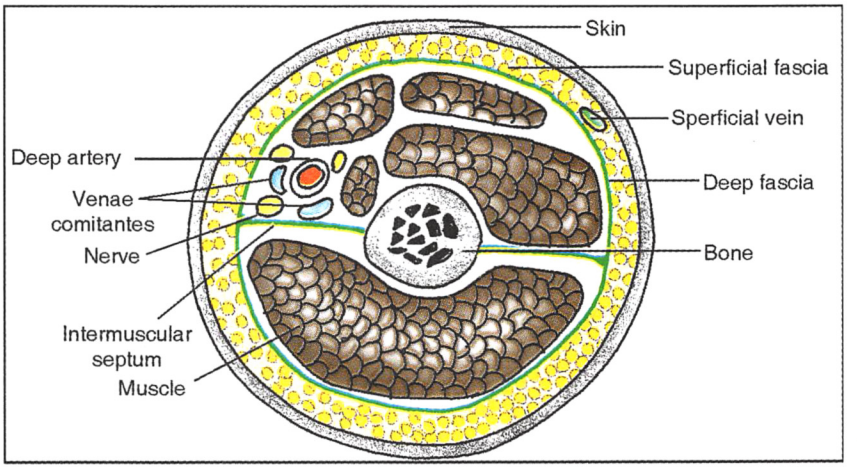

Fig. 3.1 Structures met in dissection

VESSELS

It includes blood vessels and lymph vessels.

Blood vessels

It consists of arteries, capillaries and veins

Arteries

These are tubes that convey blood from heart to the tissues at high pressure.

Elastic/conducting arteries are large arteries like aorta and its main branches. *Muscular* (distributing) arteries are medium sized like brachial and its terminal branches. *Arterioles* (resistance vessels) are smallest muscular arteries (diameter <1mm) that transmit blood into capillaries. *Anastomoses* are tubular loops formed by the union of small arteries. They are important in maintaining the circulation when one of the arteries to the tissue is blocked. It is commonly found around joints, in the gastrointestinal tract and around the base of the brain. *Collateral circulation* is due to enlargement of unblocked vessels in the region of anastomoses. *End arteries* are arteries having such an insufficient degree of anastomoses with the neighbouring vessels that their blockade cannot be compensated by the adjacent vessels resulting into death of the part supplied by the blocked vessel. These are found in the eye, the brain, the lungs, the kidneys and spleen. *Blood capillaries* (exchange vessels) are endothelial cell lined thin-walled narrow tubes (diameter 5-13 micrometer). *Arteriovenous anastomoses* form direct communications between small arteries and veins, thus short-circuiting the capillaries. These vessels are contractile in nature and are located in exposed parts of the skin and some organs like nose and are helpful in greater heat transfer.

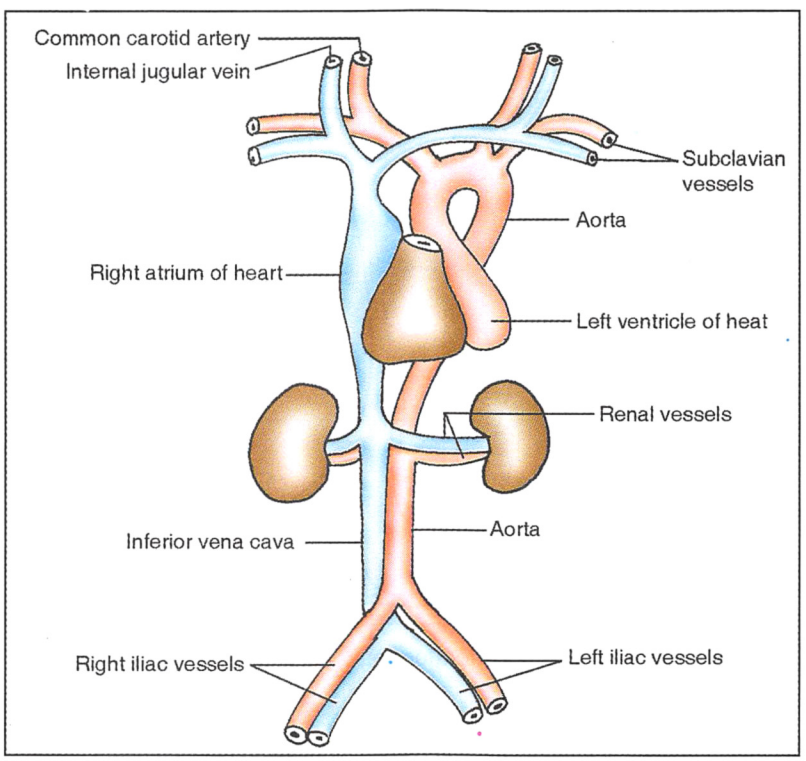

Fig. 3.2 General plan of vascular system

Veins

Veins (*reservoir vessels*) are low pressure, valved vessels with sluggish blood flow. Blood flow is aided by compression produced by the contraction of surrounding muscles and inspiration associated

fall of intrathoracic pressure. Back flow of the blood is prevented by the presence of valves. *Venae comitantes* are the deep veins accompanying arteries, an arrangement for heating the venous blood and helping venous return by the contraction of the surrounding muscles.

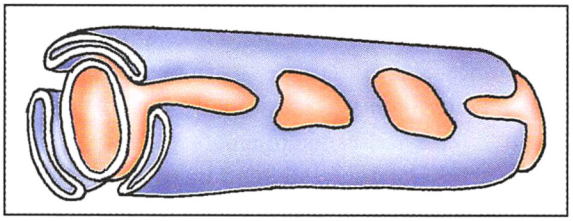

Fig. 3.3 Venae comitantes of an artery

Perforating veins are communications between superficial and deep veins which permit the superficial veins to drain their blood into deep veins.

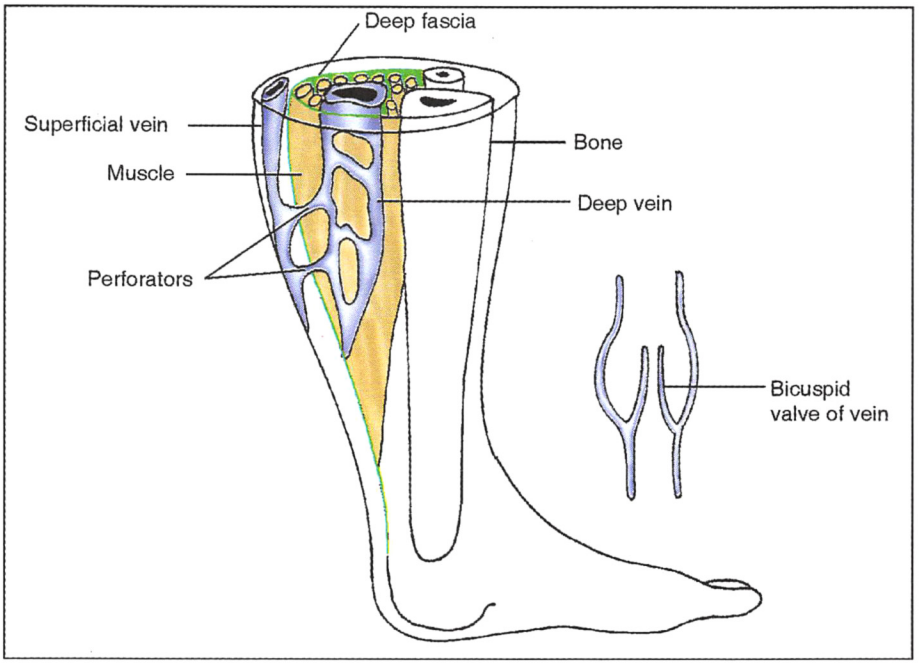

Fig. 3.4 Perforators and venous valves

Lymhatic vessels

These are endothelial lined thin walled tubes filled with clear fluid called lymph. Like veins they possess valves but these are more in number imparting them a beaded appearance. Only the large lymph vessels can be visualized by the naked eye. Their main trunks finally open into veins at the root of the neck. They are numerous near epithelial surface like skin, alimentary canal and respiratory tract but absent in the central nervous system. More lymph is formed in the active tissue and in the inflamed tissues due to excessive permeability of the blood capillary endothelium. *Afferent vessels* carry lymph to a node. *Efferent vessels*

carry the lymph away from the node. *Lymph nodes* are encapsulated, firm, gland-like structures involved in production of lymphocytes. They also act as filter for lymph and harbour the phagocytic cells. They vary in size and usually occur in groups. They are numerous in the armpit and groin and are commonly enlarged in inflammatory and cancerous conditions. Knowledge of the primary groups of the lymph nodes is important as it helps in localizing the primary site of the disease.

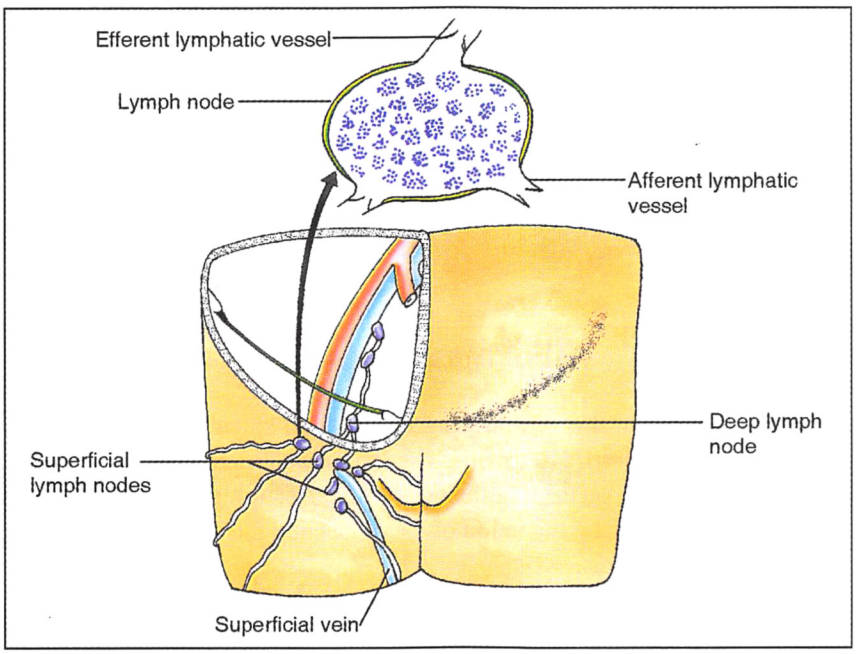

Fig. 3.5 Lymphatic system

NERVES

These are cord-like structures consisting of large number of nerve fibres surrounded by connective tissue sheath. They have considerable tensile strength and can be stretched to a certain degree without damage. **Endoneurium** is delicate connective tissue sheath around each nerve fibre. **Perineurium** is cellular and fibrous connective tissue sheath around individual bundle of nerve fibres. **Epineurium** is dense fibrous sheath binding together many bundles of nerve fibres. **Myelin sheath** consists of a discontinuous, laminated, fatty structure surrounding nerve processes of large diameter, imparting them **white** appearance. Such fibres are called **myelinated** fibres. Thinner nerve fibres devoid of laminated myelin but enclosed only by the sheath cells, **grey** in colour, are called **non-myelinated** nerve fibres.

Efferent (motor) fibres. These carry impulses from the central nervous system to the other parts or organs of the body. **Afferent (sensory) fibres** carry impulses from the different organs to the central nervous system. Most of the peripheral nerves are **mixed** in nature that is they contain both sets of fibres. **Cranial nerves** are attached to the brain and emerge from the cranium. These are 12 pairs. **Spinal nerves** are attached to the spinal medulla and emerge from the intervertebral foramina. They are 31 pairs-8 cervical, 12 thoracic, 5 lumbar, 5 sacral and 1 coccygeal. Spinal nerves are attached to the spinal cord by two roots – ventral and dorsal. **Ventral roots** consist of efferent fibres (axons) arising

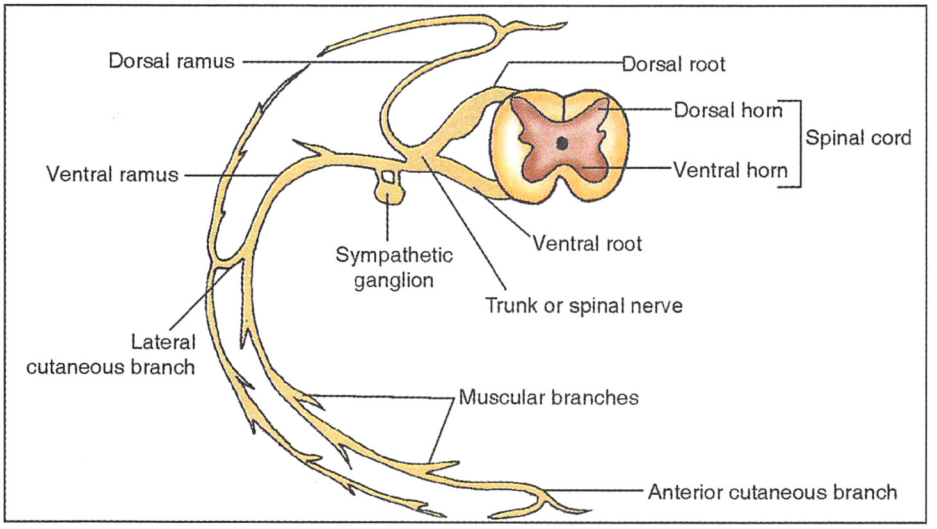

Fig. 3.6 Typical spinal nerve

from the motor neurons located in the ventral grey horn of the spinal cord. **Dorsal roots** consist of bundles of afferent fibres (central processes of the pseudo-unipolar neurons of the dorsal root ganglia or spinal or sensory ganglia located on each of the dorsal root). **Trunk of the spinal nerve** is short and formed in the intervertebral foramen by the union of the dorsal and the ventral roots and thus containing both afferent and efferent nerve fibres.

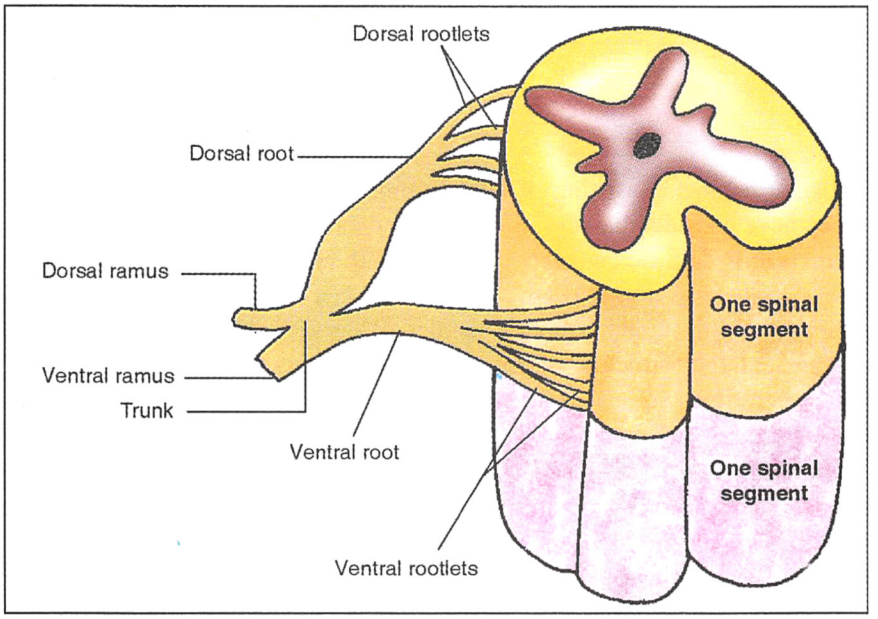

Fig. 3.7 Spinal segment

Ventral and dorsal rami are divisions of the nerve trunk emerging out of the intervertebral foramen. Both rami contain sensory and motor nerve fibres and therefore mixed in nature. The ventral rami of the thoracic region constitute the intercostal and subcostal nerves. **Nerve plexuses.** The ventral rami of cervical, lumbar, sacral and coccygeal nerves (that is except thoracic) unite and divide and thus forming a network.

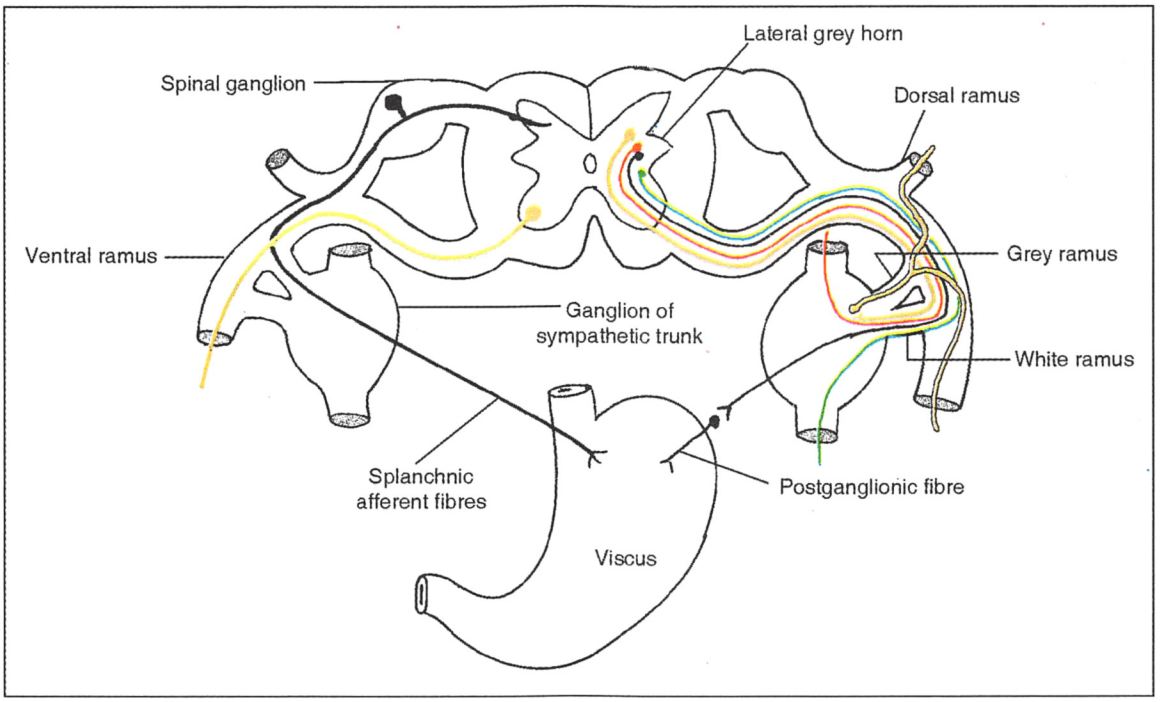

Fig. 3.8 Relation of sympathetic nerve to spinal nerve

Grey rami communicantes. These are slender non-myelinated nerve fibres connecting each ganglion of the sympathetic trunk to the corresponding ventral ramus. Each consists of processes of the neurons in the sympathetic ganglion itself (**post-ganglionic fibres**). Fibres enter both ventral and dorsal rami and their branches. In addition, they also run along vessels (periarterial plexuses) to reach their destination. The sympathetic fibres supply the muscles of the blood vessels, arrector pilorum and sweat glands. **White rami communicantes** are fine, myelinated nerve fibres arising from the thoracic and upper two or three lumbar ventral rami and enter the sympathetic trunk. That is why sympathetic nervous system is also called the thoracolumbar part of the autonomic nervous system. It consists of **pre-ganglionic fibres** having neuronal cell bodies located in the lateral grey horn of the spinal cord. Through these nerve fibres central nervous system controls the activity of all the neurons of the sympathetic trunk. **Ganglion** consists of group of nerve cells outside the central nervous system. **Sympathetic trunk** is a row of ganglia united by nerve fibres, one on each side of the vertebral column and extending from the base of the skull to the coccyx. **Splanchnic or visceral ganglia** are located in close association with the arteries supplying viscera. **Splanchnic nerves** are pre-ganglionic fibres arising from ventral rami and passing through the sympathetic ganglia (without synapse) and apparently emerging as branches

of the ganglia to join the splanchnic ganglia. **Parasympathetic nervous system** (craniosacral part of the autonomic nervous system). Like sympathetic nervous system its preganglionic neurons are located in the central nervous system. Its pre-ganglionic fibres emerge through some of the cranial nerves and second, third and fourth sacral nerves and join peripheral ganglia in small groups or scattered in or near the viscera. They innervate viscera and are not primarily associated with their arterial supply. They affect the smooth muscles and glands. The short **post-ganglionic fibres** are cholinergic in nature.

DERMATOMES

The strip of skin supplied by single spinal nerve (by both rami) is known as dermatome. Usually there is overlap between adjacent dermatomes.

MYOTOMES

The total mass of muscle supplied by single spinal nerve is called myotome. Muscles receive afferent as well as efferent nerve fibres.

DEEP FASCIA

It is dense, inelastic membrane which separates the superficial fascia from the structures lying deep. It surrounds the muscles and sends septa from its deep surface which enclose vessels and nerves in it. It sends intermuscular septa between the adjacent muscles of different functions. It is also helpful in the venous return from the lower limb. **Retinacula** are the restraining bands formed by the thickening of the deep fascia that hold the tendons in position and form pulley within which the tendons slide where they change direction, for example at wrist and ankle. **Aponeurosis** is the thickening of the deep fascia parallel to the force applied by the muscle attached to it. **Ligaments** are strong bands of inelastic, white, fibrous tissue which connect bones. Like tendons they are classified as regular, dense connective tissue but their margins are less well defined.

MUSCLES

Muscles are contractile tissue responsible for movements of different parts of the body. Action of a muscle can be predicted from the knowledge of its attachments. Though most muscles play a key role in some movements they are often used in complex grouping. Muscles are used in a number of different ways. **Concentric action**, muscles shorten and thus produce a movement. **Isometric contraction**, tension generated in the muscle equals the load against which it is acting and thus fixing a part of the body. **Excentric action**, tension generated in the muscle is less than the load against which it is acting, thus lengthening of muscle occurs while it is active. It helps to control the speed and force of movement in the direction opposite to that normally produced the concentric action. It should be remembered, however, that any muscle may act concentrically, isometrically or excentrically.

The origin of muscle is one of the attachments of a muscle, generally fixed during contraction. **The insertion of muscle** is the other site of attachments of a muscle normally considered to move during contraction. Which attachment moves is determined by other forces in action at that time and is not an intrinsic property of the muscle. These terms are interchangeable for the muscles in the lower

limb depending whether the foot is off or on the ground. **Muscle belly** is the fleshy part of a muscle. It is composed of bundles of muscle fibres and is contractile. **Tendons** (sinews) are fibrous, inelastic cords at the ends of a muscle through which it finds attachment to the bone. **Aponeurosis** is a thin, wide, fibrous sheet through which a muscle finds its attachment to the bone. **Sesamoid bone** is cartilage-covered bone that develops in some tendons. It is said to protect the tendon from friction injury, its blood supply from compression and also acts as pulley. **Raphe** is linear, tendinous, stretchable strip where two flat sheet of muscles meet each other, like linea alba of the anterior abdominal wall. **Power of a muscle** depends on the number and diameter of its muscle fibres. In multipennate muscles the obliquity of the fibres reduces the power of each but not proportionately to the increase in number of fibres. The diameter and power of individual muscle fibre is increased by exercise because of an increase in the number of contractile elements (myofibrils) in each fibre. Muscle fibres can only contract to **40%** of their fully stretched length. Thus the short fibres of pinnate muscles are more suitable where power rather than range of contraction is required. The manner in which a muscle acts on a joint depends on its position relative to the joint. Most muscles are attached to the bones close to the joints on which they act. Thus they loose mechanical advantage over the fulcrum (joint) but gain in speed and rage of movement through the levers (bones) on which they act. **Active insufficiency**-Those muscles which act over several joints may be unable to shorten sufficiently to produce full range of movement at all of them simultaneously, e.g., fingers cannot be fully flexed when the wrist is also flexed. **Passive insufficiency**-Here opposing muscles are unable to stretch sufficiently to allow such movements to take place. **Synergists** (fixators) are muscles which fix certain joint so that the other can be moved effectively, e.g. fixation of the wrist during the full flexion of the fingers in clenching the fist.

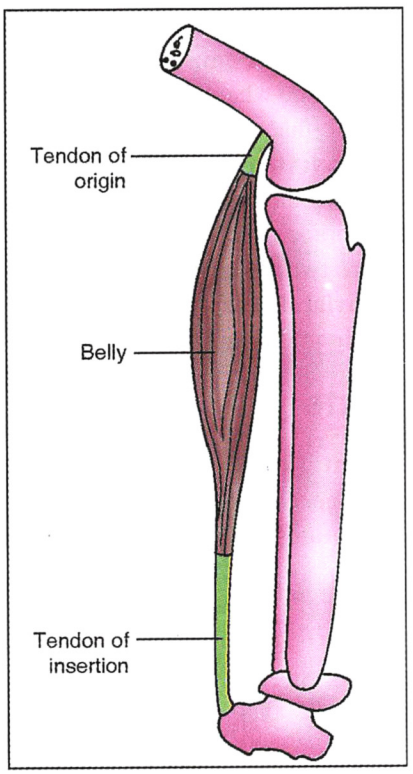

Fig. 3.9 Parts of a muscle

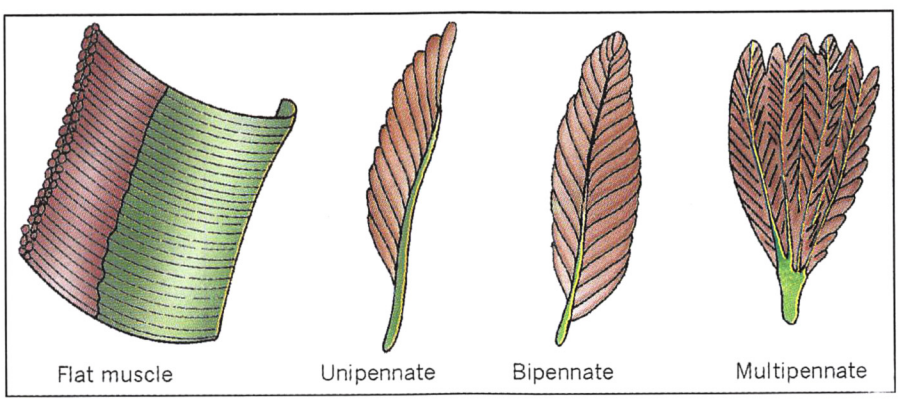

Fig. 3.10 Morpholgical types of muscles

Bipennate muscles have muscle fibres which converge on a central tendon like barbs of a feather. **Multipennate muscles** have a series of intramuscular tendinous sheets. **Neurovascular hilum** is a distinct site where the main artery and nerve enter the most limb muscles. **Flexors** are groups of muscles of limb that develop from ventral sheet of muscle and are supplied by the ventral rami of the spinal nerves. **Extensors** are groups of muscles of the limb that develop from the dorsal sheet of muscle and are innervated by the dorsal rami of the spinal nerves. **Bursa** is a closed sac lined by smooth synovial membrane which secretes small amount of glutinous fluid into the sac. Its presence reduces the friction where two structures slide freely over each other; e.g., muscle, tendon, or skin over bone or fascia. **Synovial sheath** is a closed sac lined by synovial membrane which encloses a long tendon; e.g., tendons sliding in the fingers.

JOINTS

A **joint** is present where two or more bones and or cartilages come together (bone-to-bone, bone-to-cartilage, cartilage-to-cartilage). Joints may or may not allow movements. **Sutures** are immovable joints, e.g., sutures of the skull bones. **Synovial joint** exhibits maximum mobility. Bearing surfaces are covered

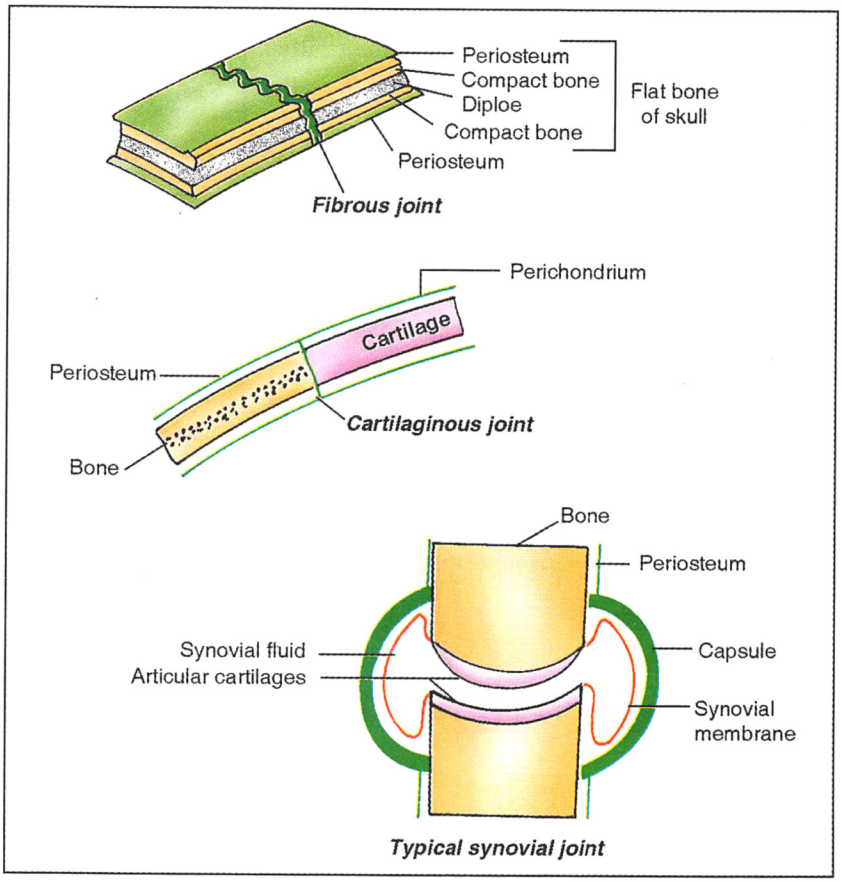

Fig. 3.11 Joints

with firm, slippery **articular cartilages** and slide on each other in a narrow cavity containing lubricant **synovial fluid**. Outside cavity, the bones are held together by fibrous capsule. All structures which immediately surround the joint cavity, except the articular cartilage, are separated from that cavity by **synovial membrane**. **Ligaments of the joint** are in addition to capsular ligament placed suitably around the joint either to strengthen the joint or limit the movement.

Types of synovial joints (depending on the shape of the articulating surfaces). **Plane joint**, articulating surfaces of the bone are flat; permit slight gliding movements; e.g. joints between bones of the hand and foot. **Ball-and-socket type of joint** (multi-axial): articulating surfaces of the bone are curved and permit great number and range of movements; e.g. shoulder joint. **Condyloid joint** (bi-axial), e.g. joint of the knuckles (metacarpo-phalangeal joints). **Ellipsoid joint** (bi-axial), e.g., wrist joint. **Saddle type of joint**: e.g. carpo-metacarpal joint at the base of the thumb. **Hinge joint** (uni-axial): e.g. interphalangeal joints of the fingers and ankle joint. **Pivot joint** (uni-axial), e.g., proximal radio-ulnar joint and atlanto-axial joint. Here only rotational movements are possible. Many joints are used to achieve a single movement and that their combined actions are necessary for normal activity. Therefore, damage of one joint may affect many movements. **Intra-articular disc**, a fibro-cartilaginous disc placed between the articulating bones increasing the stability and complexity of the joint. It acts as shock absorber and helps in spreading the synovial fluid.

BONES

Bone is a specialized and mineralized form of tissue. It is highly vascular. The fibrous tissue imparts resilience to the bone, while the calcium salts resist compression forces. Bones occur in two form.

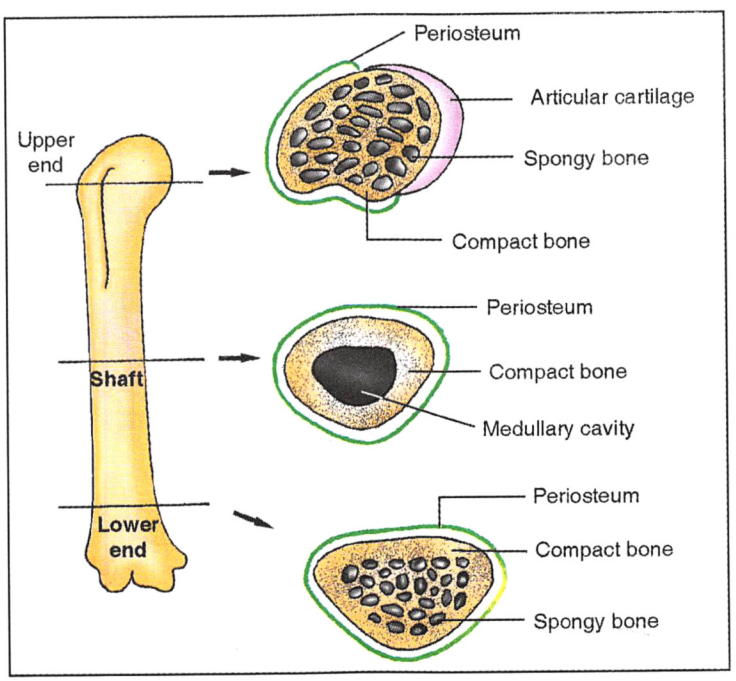

Fig. 3.12 A typical long bone

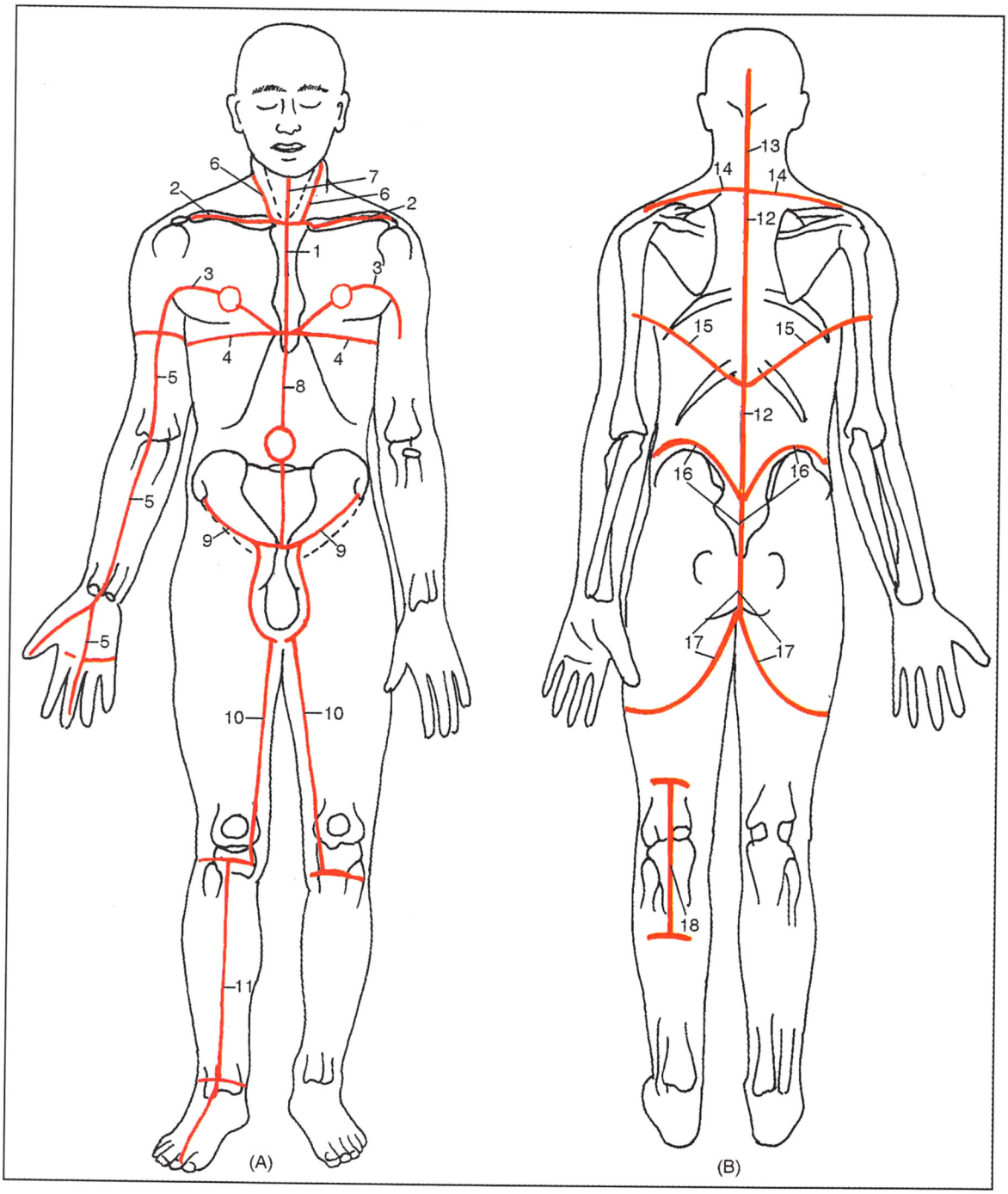

Fig. 3.13 Landmarks and incisions for dissection of human body
(A) Ventral incisions (B) Dorsal incisions

(1) **Compact bone.** It is dense and forms the outer tubular bodies of the long bones. It consists of longitudinal, laminated tubules of bones- Haversian systems. (2) **Cancellous bone.** It is a lattice of bone spicules. It occurs at the ends of the long bones. The spaces between the spicules are filled with highly vascular bone marrow engaged in haemopoiesis.**The periosteum.**, It forms the outer covering of the bones consisting of dense fibrous tissue. It is absent where the bone takes part in the formation of synovial joints. Bones are usually classified according to their shape,

1. The long bones – bones of the limbs e.g., humerus.
2. The short bones – bones of wrist and foot e.g., carpals and tarsals.
3. The flat bones, e.g., sternum and vault of the skull.
4. The irregular bones, e.g., vertebrae.
5. The pneumatic bones, e.g., skull bones with air sinuses.

On the basis of mode of development the bones are of two types,

1. The **cartilage bones**, develop by ossification in the preformed cartilage model, e.g., limb bones.
2. The **membrane bones**, are formed by ossification of connective tissue without intervention of the cartilaginous stage. e.g., vault of the skull.

4

Subdivisions of Human Body into Six Regions

1. Upper limb (right and left)
2. Lower limb (right and left)
3. Head and neck
4. Brain
5. Thorax
6. Abdomen and pelvis

Thorax, abdomen and pelvis together constitute the trunk.

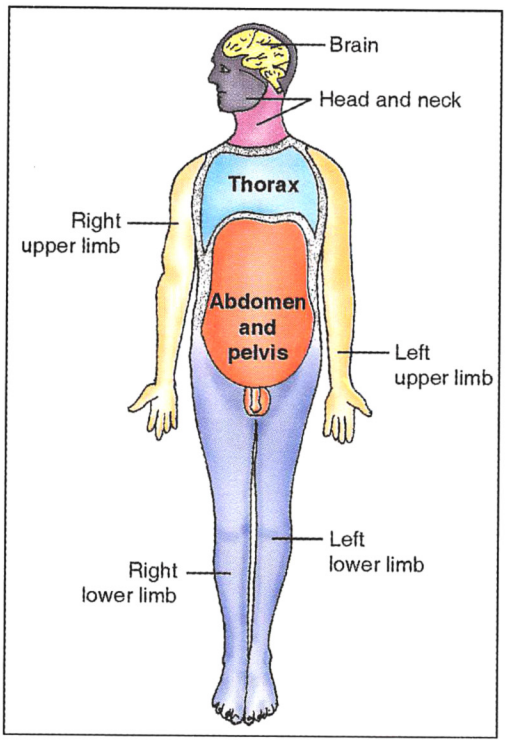

Fig. 4.1 Subdivisions of human body