18. Blood Vascular System Part-II (General Anatomy)

19. Blood Vascular System Part-III (General Anatomy)

20. Blood Vascular System Part-IV (General Anatomy)

21. Nervous System Part-I (General Anatomy)

22. Nervous System Part-II (General Anatomy)

23. Nervous System Part-III (General Anatomy)

24. Nervous System Part-IV (General Anatomy)

25.Joints 1

26.Joints2

27.Joints 3

28.Joints 4

29.Cartilage

30.Lymphatic system I

31.Lymphatic system II

32.Unilateral, Bilateral etc

33.Inversion eversion, pronation supination, dorsiflexion plantar flexion

34.Ossification I

35.Ossification II

36.Ossification III

1. Introduction Of Human Anatomy (General Anatomy)

Introduction lecture is meant for newly admitted student in medical colleges. Anatomy will just tell you how our body is constituted what is the structure of our body. Biochemistry and biochemistry will deal with the functions of the human body that is very important to the body. All three subjects are also known as the basic medical sciences. To know whether any structure of the body and organ is normal or not you have to learn anatomy. To understand the function and disease you will have to understand anatomy physiology and biochemistry now then we now concentrate only on the subject of anatomy okay so just for the time being we will just deal with the human anatomy subject. There are four branches of human anatomy which you are supposed to learn in the first year of medical science. The gross anatomy means the structure which you can see by the naked eye without the help of the microscope. The categoric anatomy is the most important will be the cadaver.

The categoric anatomy is the anatomy learned by the dead body but the living anatomy is learned by a living person. The gross anatomy can be very well seen by the naked eye but at the same time you will also learn living anatomy. The histology is the microscopic anatomy and embryology are the developmental anatomy. Grass anatomy is defined as the study of the structure that can be seen with the naked eye. The various structure of body and their inter relationship can very easily be studied by the diff by the dissection method that was our definition of the anatomy. Most of the dead bodies which we receive in the anatomy for the dissections they are donated bodies and because of that now more and more people have started donating their dead bodies. If you are learning the gross anatomy that has two different methods of learning the first method is systemic anatomy that means where your teacher can teach you system after system that means first cardiovascular circular and circulatory system. The second method is called as regional anatomy which means you study the human body structure from region to region for example.

Most of the departments in India teach you the x-rays after the completion of that region say for example head and neck region. The knowledge of anatomy when it is used in your clinical practice on your patient that is called as the clinical or applied anatomy both living and clinical anatomy will be taught to you along with the cadaveric anatomy. Human gross anatomy or categoric anatomy concept can only be learned very well if you learn the general anatomy first. The general anatomy provides the basic concept of the gross anatomy without understanding the general aspect of the grass anatomy which will be taught in this 10 to 12 Lectures in the beginning. The medical council of India according to the new curriculum the concept-based medical education they have included the electron microscopy to the of various systems of the body now histology is taught. The embryology deals with the development of an individual from conception to adult form that is up to the you become adult.

When a person or a patient is brought to you which is having congenital anomalies you should be able to diagnose it as a congenital anomaly. When you learn the Embryology you can't learn many of the structure of the human body because you are learning it right from the beginning how these structures are formed which are present in my credible okay in my dead body. The human anatomy has four sub disciplines including gross anatomy, microscopic anatomy, embryology and genetics. In the next 10 to 12 Lectures you will learn the structure of human body with the help of the microscope and embryology. The molecular genetics and chromosomal chromosome can be seen by light microscope but genes can't be seen with any method you have to just depend on indirect method.

2. Anatomical Position & Planes (General Anatomy)

16. Muscles Part-III (General Anatomy)

This is the fourth lecture in the series of General Anatomy that is on muscle okay and just similar to the last lecture Where I have shown you some facts about the contraction of the skeletal muscle. a desire movement in at a particular joint is not only produced by a single muscle as for flex and biceps and extension for extension. I told you it is triceps. There are many more muscle involved in production of a movement. These are called as a group of muscle, and they are classified as prime mover that means those muscles which are mainly responsible are major muscle in producing and measure muscle. For this movement of flexion and extension at elbow. for flexion is biceps and for extension is the tricep.. Other muscles involved in this simple act of drinking water are called antagonist muscles. the movement of flexion or bending moment. at elbow joint is also assisted by the movement called as the extensor muscles. the speed of contraction is equal to the speed of relaxation, so that the movements become smooth. So indirectly. The flexion is not only produced by the bicep. At the same time it is helped by the triceps, which is a extensor muscle.

The big question is that why one muscle is contracting and at the same time other muscle is relaxing with the same speed is determined by the higher centers at this level by the interneuron. This is how the wiring of the brain through the spinal cord ultimately control the two muscles which are required for a particular particular muscle. movements takes place with one contraction and other relaxation and with the same speed and it is controlled by the nervous system okay, so this is called as rashi protocol innervation. movements are taking place at distal end of the humerus and which is forming a joint that is albujoid with alna. Here, there are many more muscles involved in producing just a simple movement of the flexion and extension right. I hope you have understood the flexator. Now I am moving to the next slide and will tell you. about the synergist muscle, which are sometimes also called as fixator because their function is something like that of the fixator.

The movement is due to contraction of the muscles which are going and getting attachment to the digits and they are crossing in front of the finger. When this muscles of the forearm will contract. The first movement which will takes place is the flexion of the disease. the muscles which fixes in one way although all I mean say to the wrist joint and in slightly extended position so that your fixed is very strong. fist. many more muscles are involved in the producing a desire movement which are those muscle beside the prime mover. They are antagonists. They are fixators and the synergist thus remember that everything is controlled by our brain. Our nervous system and the movements are not simple okay. movements are much more complicated as we think thank you very much.

25.Joints 1

A joint is a meeting point between two or more bones. There may be multiple bones forming a single joint. Joints may also be between a bone and a cartilage. These are the vertebrae of our vertebral column. This structure is the intervertebral disc which is not the bone. Joints may be either between the two walls or it may be between a cartilage and that of the bone. Joints are classified on the basis of the function of the joint. A joint absolutely does not move, so this is an example of the immovable joint or synard process. Here, the connecting media between the two boards is a minimal quantity of the fibrous tissue which are joining to the margins of the bone. Second category in the functional classification where there is a slight movable joint. So those are a classification giant, like music. This kind of joint is called as mp arthrosis.
The synovial joint is a type of joint that connects the bones of the body. The connecting media between the bones may be a cartilage or the synovial membrane. This classification is based on the synovial membrane, which is seen in the last diagram. The synovial joint is based upon the sutures of the skull, coronal sagittal and lambda suture. Connecting medium between the two bone is cartilage and connecting medium is fibrous. There are two different types of cartilaginous joint that are the primary joint, which has no movement, called as synchondrosis, and the secondary joint, which is connected by the cartilage high line but is connected by fibro cartilage. There is presence of a cavity called as the synovial cavity where the two ends of the bones are there. This kind of joints are also known as diarthroses. While movements are taking place they will be always covered by the cartilage.

Functional Classification of Joints

Joints can be classified based on their functions, including:

- **Synarthrosis:** immovable joints, such as sutures in the skull
- **Amphiarthrosis:** slightly movable joints, such as joints between cartilage and bone
- **Diarthrosis:** freely movable joints, such as synovial joints

Structural Classification of Joints

Joints can also be classified based on their anatomical structure, including:

- **Fibrous:** joints held together by fibrous tissue, such as sutures in the skull
- **Cartilaginous:** joints held together by cartilage, such as joints between vertebrae
- **Synovial:** joints with a cavity between articulating bones, allowing for free movement, such as the knee joint

Classification of Joints

There are three connecting media between two bones forming a joint:

- Fibrous tissue
- Cartilage tissue
- Synovial membrane

29.Cartilage

Types of Cartilage in the Human Body

Cartilage is a specialized connective tissue that has three main components: cells, fibers, and ground substance. There are three types of cartilage found in the human body: hyaline cartilage, elastic cartilage, and fibrocartilage.

Hyaline Cartilage

Hyaline cartilage is the most common type of cartilage in the body. It is found in the joints, rib cage, and trachea. Hyaline cartilage is characterized by its fine collagen fibers embedded in the ground substance. The chondrocytes, or cartilage cells, are spaced apart from each other. Hyaline cartilage is covered by the perichondrium, a fibrous membrane that provides nutrients to the cartilage.

Elastic Cartilage

Elastic cartilage is found in structures that require elasticity, such as the external ear, epiglottis, and auditory tube. Elastic cartilage has elastic fibers embedded in the ground substance, which allows it to bend and return to its normal shape. The number of chondrocytes in elastic cartilage is greater than in hyaline cartilage, and the fibers are more visible under a microscope. Elastic cartilage is covered by the perichondrium.

Fibrocartilage

Fibrocartilage is found in structures that require strength, such as the intervertebral discs and pubic symphysis. Fibrocartilage is made up of collagen fibers that are bundled together. There are few chondrocytes in fibrocartilage, and it is not covered by the perichondrium.

Summary of Cartilage Types

- Hyaline cartilage: fine collagen fibers, spaced chondrocytes, covered by perichondrium
- Elastic cartilage: elastic fibers, numerous chondrocytes, covered by perichondrium
- Fibrocartilage: collagen fiber bundles, few chondrocytes, not covered by perichondrium

35.Ossification II

Formation of Humerus Bone

The formation of the humerus bone begins with the appearance of the primary center in the middle of the cartilaginous model. This center forms a spongy bone in the middle of the humerus cartilaginous model.

- The periosteal collar forms a compact bone deep to the periosteum.
- The periosteal collar forms along with the spongy bone.

Once the bone has started forming, the periosteum covers the compact bone deep to the perichondrium. The spongy bone forms on both ends of the model, and the cartilages grow by the division of the chondrocyte towards the proximal and distal direction. The length of the developing bone increases, and the circumference of the bone also increases.

After a certain time, after birth, there will be the appearance of another center of ossification called the secondary center of ossification. This center forms a spongy bone at the end of the bone. The spongy bone formed at the ends is called the epiphysis, and the bone formed by the primary center is called the diaphysis.

- The epiphyseal plate lies between the diaphysis and the epiphysis.
- The bone keeps growing in the proximal and distal direction and increasing in circumference.

The bone will keep on growing until the birth, and after that the growth will continue in the proximal and distal direction, as well as in circumference. The bone marrow cavity will keep increasing as the spongy bone disappears from the proximal and distal direction.

As the bone continues to grow, the length will increase due to the epiphyseal plate. The cartilage on the diaphysis side will be replaced by new bone, and the calcified cartilage will be replaced by new bone in both hands. This area is called the metaphysis, and it takes place in both ends. The circumference of the bone will increase due to the position of the bone and the periosteum. A little part of the cartilage at the end will still remain cartilage, called the articular cartilage, which forms the joint at the ends of the bones.

The parts of the bone that are still developing and have not completed their development are the diaphysis, the epiphyseal plate, and the epiphysis. The diaphysis has two types of ossification, and it forms the compact bone that surrounds and is deep to the periosteum. The marrow cavity of the diaphysis is filled with bone marrow, and the ends may be little spongy. The epiphyseal cartilage is responsible for the growth in the proximal and distal directions. The epiphyseal plate of cartilage is growing, and the bone is called the epiphysis.

The bone will continue to grow until a certain age (about 16 to 20 years for a long bone), and then the growth will stop. The next video will discuss the arrest of bone growth.

- No further growth in length of bone after fusion

37.Ossification V Blood supply of developing bone

Ossification and Blood Supply of Developing Bones

In this video, we will discuss the blood supply of a developing bone and compare it to that of an adult long bone. We will learn about the blood supply in two steps: first, we will examine the blood supply of a developing long bone, and then we will move on to the blood supply of an adult long bone.

Parts of a Developing Long Bone

A developing long bone includes the following parts:

- Articular cartilage: hyaline cartilage located at the ends of long bones that helps form joints
- Spongy bone: located just beneath the articular cartilage
- Epiphyseal cartilage: hyaline cartilage located between the epiphysis and the diaphysis
- Metaphysis: the site of actual bone formation
- Diaphysis: the shaft of the bone
- Periosteum: a fibrous membrane surrounding the shaft of the bone

Blood Supply of Developing Long Bones

The epiphysis and diaphysis of a developing long bone are supplied by two separate sets of blood vessels. The diaphysis is supplied by the nutrient artery, which passes through the nutrient foramina and divides into ascending and descending branches that supply the compact bone of the diaphysis. The metaphyseal artery supplies the area of the developing bone just beneath the epiphyseal cartilage.

The periosteal artery supplies the fibrous membrane surrounding the shaft of the bone and penetrates the compact bone of the diaphysis for a short distance. The metaphyseal artery forms a hairpin bend and does not touch the epiphyseal cartilage.

Blood Supply of Bones

In the metaphysis, hairpin bands in the form of dilated space are formed by the arteries, which are called as end arteries. These arteries form sinusoids in the metaphysis, from where the blood goes to the developing bone. The metaphysical artery does not penetrate the epiphyseal cartilage, which is an avascular structure. In a developing bone, there are two sets of arteries: the epiphyseal arteries and the metaphysical arteries. The epiphyseal arteries supply the ends of the spongy bone of the epiphysis, while the metaphysical and perichondrial arteries supply the part of the diaphysis. There is no anastomosis between epiphyseal and diaphysical or metaphysical artery. In an adult bone, the epiphyseal cartilage disappears, and the blood vessel can penetrate from the metaphysical side towards the epiphyseal side and from the epiphyseal side towards the metaphysical side. The arteries anastomose freely with each other, and there is no hairpin band in an adult bone.

42.General anatomy- venous return

The Venus Return is due to the following factors: -The presence of valves in veins is very important. -The blood coming from the lower part of the trunk can not go against the antigravity direction. -There is a mechanism in the lower limb especially in our calf muscle that helps with venous return towards the heart. -While you are at rest your muscles are not contracting, so you should not sit for long time at one single place. -Okay in between you should get up and move your legs or walk for short distance to help with contraction of muscles and achieve venus return.
The five factors that contribute to blood flow are: the presence of a vena commitment, the blood pool in the capillaries, the multiple wells in the capillaries, the pressure of the blood in the capillaries, and the velocity of the blood. Vena commitment is found in most of the deeper arteries in the limbs, and is also common in the upper limb. The fifth factor that contributes to blood flow is the blood pool in the capillaries. Once it has gone above the multiple wells which are present, it can not come back.

44.General Anatomy Structure of Synovial joint

The synovial joint is the joint which is most commonly found in our bodies. The articular cartilage is high line in nature and this cartilage which covers the end of the bones which will come in contact with each other is called as the articular cartilage. The articular capsule connects the ends of the two articular bones to the synovial joint. The articular capsule is made up of the collagen fibrous tissue and that is collagen. It is supplied by the nerves very rich in no supply so pain is felt from the joints through this articular caps. The synovial membrane is very vascular that means it is richly supplied and it is supplied by the blood vessels which were piercing to this articular capsule. It lines the articular capsules the inner surface I am just drawing with the red color. The membrane is a lubricating fluid which is helpful in the just to minimize the friction between the two articular surfaces.

Synovial joints are characterized by the presence of a cavity and then there is a articular cartilage which is covering to the ends of the bones. A fibrous capsule is binding the two ends of long bone which is a thin inelastic collision. The fibrous membrane which is called as the articular capsule acts as a sleeve surrounding to the end of the bone.

47.How Muscles Produce a Desired Movement?

Each and every movement at any specific joint is not produced by a single muscle but it is produced by many many muscles. The prime movers are the main muscles that produce the specific movements at a joint-specific moments are produced by the prime mover muscles. Prime movers are the muscles responsible for production of a movement at a joint and can be called as prime movers. The opposite movement of flexion is the extension movement and this is called as antagonist. The role of the primer and antagonist muscle keeps on changing with the opposite movement thus the prime mover for a movement may also act as antagonist for opposite movement. The speed of contraction of prime movers should match to the speed of the relaxation of antagonist muscle so the movements will be smooth and not a jerky movement.
In one muscle primavera it is contracts in the opposite muscle that is antagonist. This kind of the innervation where both the muscles are simultaneously supplied with the opposite role in one excitatory and in another inhibitory is called as the reciprocal innervation. Third group of muscle are also helping inflection at the elbow join and these are the fixator muscle which are attached at the other end of the bone when in keeping this joint fixed which is a shoulder joint. Fixator muscle is a stabilizer it is kept fixed so that the movements which are taking place at the distill act can takes place efficiently. Four group of muscles responsible for production of a desired movement at a particular joint are called a synergist muscle. If a muscle is very long the muscle means it is crossing to the many joint. If you want to contract the if you want the flexion of the fingers then these muscles are active but they are coming from from forearm so they will be having the action at many other joint.
synergists are muscles that work in opposition to each other, which makes them very effective at performing certain movements. The synergists at the joints of the fingers and wrists are antagonists, which means they help to flex the finger and extend the wrist at the same time. Additionally, they are fixators, meaning they stabilize the joint.