INTRODUCTION TO ANATOMY & TERMINOLOGY IN ANATOMY

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SOURCES USED

Definition of anatomy

Etymology: “Cutting through” in Ancient Greek and Latin. Anatomy deals with parts of the human body and investigates the body by the naked eye.

Types of anatomy

1. Regional (topographical) anatomy
2. Systematic anatomy
3. Clinical (applied) anatomy

In systematic anatomy, various structures may be separately considered. On the other hand, in topographical or regional anatomy, the organs and tissues may be studied in relation to one another. Surface anatomy is an essential part of the study of regional anatomy. Clinical (applied) anatomy emphasizes aspects of bodily structure and function important in the practice of medicine, dentistry, and the allied health sciences. It incorporates the regional and systemic approaches to studying anatomy and stresses clinical application.

The ways of learning anatomy

Cadaver
Dissection
Prosection

Other materials of learning human anatomy: anatomy models, anatomy atlases, videos, textbooks, charts, medical dictionaries, etc.

The field of Human Anatomy has a prestigious history, and is considered to be the most prominent of the biological sciences of the 19th and early 20th centuries. The final major anatomist of ancient times was Galen (of Bergama), active in the 2nd century. His collection of drawings, based mostly on dog anatomy, became the anatomy textbook for 1500 years. Andreas Vesalius is the first modern anatomist who wrote the first anatomy textbook of the modern times; De humani corporis fabrica (On the Fabric of the Human Body).

Anatomical position

All anatomical descriptions are expressed in relation to one consistent position, ensuring that descriptions are not ambiguous.

Head, gaze (eyes), and toes directed anteriorly (forward), arms adjacent to the sides with the palms facing anteriorly, and lower limbs close together with the feet parallel

Variations: Occasionally a particular structure demonstrates so much variation within the normal range that the most common pattern is found less than half the time!

Terminology in anatomy

Anatomical planes

Sagittal, frontal/coronal, and transverse/axial planes that intersect the body in the anatomical position. The sagittal plane, like an arrow, divides the body into right and left, coronal anterior to posterior, and axial superior to inferior parts.

With reference to the anatomical planes

Superior inferior anterior posterior medial lateral

Relating primarily to the body's surface

Superficial, intermediate, and deep (Lat. profundus, profunda) external internal proximal distal

Terms of laterality

Unilateral and bilateral, ipsilateral and contralateral

Positions of the body

The supine position of the body is lying on the back. The prone position is lying face downward
1. Introduction to Anatomy

Anatomy is the study of the structure of the human body.

1.1. Definition of Anatomy

Anatomy, as a word, has a Latin and Ancient Greek origin [ana= up, tome= cut]. Anatomy means “cutting up, cutting through”. The name of the technique has become the name of the discipline. Anatomy forms the basis for the practice of medicine.

The term human anatomy is about the consideration of the the structures of the human body. It deals with the parts which form the fully developed human. This observation is evident to the naked eye. If we are talking about cells and tissues, observed under the microscope it is another discipline. It is Histology. Both histology and anatomy are named as morphology (morpho-form, shape; logos: science). Physiology is another medical discipline about the structures of the body. It deals with the functions of the body.

1.2. Types of Anatomy

There are three main ways of studying anatomy. These are regional, systemic, and clinical anatomy. These ways rely on priorities and purposes for studying the body’s organization.

In systemic anatomy, the structures are studied under systems. Regional anatomy is also called as topographical anatomy. The structures of the body are studied in regions.

Surface anatomy is an essential part of the regional anatomy. The surface anatomy is about the anatomy of the structures under the surface. Surface anatomy provides knowledge of what lies under the skin. It is about structures perceptible to touch (palpable) in the living body at rest and in action. Physical examination is the clinical application of surface anatomy.

Clinical anatomy is also named as applied anatomy. It is about the features of structures and functions important in the practice of health sciences. The regional and systemic approaches are united for studying anatomy. Clinical anatomy stresses clinical application.

1.3. Ways of Learning Anatomy

Cadaver: A dead body for dissection.

Dissection: The action of dissecting a body to study its internal parts.

Prosection: is the dissection of a cadaver (human or animal) or part of a cadaver by an experienced anatomist. Here the cadaver is prepared for studying beforehand. In a dissection, students learn by doing.

In prosection, students learn by observing. They observe the dissected body or body parts.

Other materials of learning human anatomy are:

✓ Anatomy models
✓ Anatomy atlases (Pictures, drawings)
✓ Videos
✓ Textbooks
✓ Charts
✓ Medical dictionaries, etc.

1.4. History of Anatomy

The field of Human Anatomy has a prestigious history. It is the most prominent of the biological sciences of the 19th and early 20th centuries. The history started with the earliest examinations of sacrificial victims. We now have the sophisticated technology to observe the human body. Methods have improved dramatically. These methods advanced from examination of animals through dissection of cadavers to technologically complex techniques developed in the 20th century.

The study of anatomy begins at least as early as 1600 BCE, the date of the Edwin Smith Surgical Papyrus. The final major anatomist of ancient times was Galen (of Bergama) was active in the 2nd century. He compiled much of the knowledge obtained by previous writers. He furthered the inquiry into the function of organs. He did that by performing dissection on animals. There were no available human specimens that time. So, discoveries by animal dissection were broadly applied to human anatomy. His collection of drawings was based mostly on dog anatomy. The anatomy textbooks have used his works for 1500 years.

The works of Galen and Avicenna (Ibn-I Sina), especially The Canon of Medicine was translated into Latin. The Canon remained the most important text on anatomy in European medical education until the 16th century.

http://www.youtube.com/yeditepeanatomy
Andreas Vesalius is the first modern anatomist. He wrote the first anatomy textbook of the modern times. It is the “De Humani Corporis Fabrica” (On the Fabric of the Human Body).

In our land, anatomy education started as a distinct course at “Tibhane-i Cerrahhane-i Amire”. It is the first medical school. It was founded by Sultan Mahmut II on March 14th, 1827. Sultan Abdülmecid signed the imperial edict on dissections with the purpose of education. The practical applications on cadavers began in 1841.

1.5. ANATOMICAL POSITION

All anatomical descriptions are expressed in relation to one consistent position. As a result; the descriptions are clear. The anatomical position is the standard reference position of the body used to describe the location of structures.

When you are describing a patient or the cadaver you have to keep the anatomical position in mind. By using this position and appropriate terminology, you can relate any part of the body precisely to any other part.

The patient is lying on one side; we still use the anatomical position. He is in supine position or prone; again the anatomical position is the guide. [In supine position, one lies on the back, face up. In prone position the person lies on the abdomen; face down].

You should know that gravity causes a downward shift of internal organs (viscera) when then upright position is assumed. People are typically examined in the supine position. So, it is often necessary to describe the position of the affected organs when supine. We make specific note of this exception to the anatomical position.

So what is this “famous” anatomical position?

The anatomical position is about the body position while the person is standing upright. His (or her) head, eyes and toes are directed anteriorly (forward). The arms are near the sides. The mouth is closed and the facial expression is neutral. The palms of the hands face forward (anteriorly) with the fingers straight and together and with the pad of the thumb turned 90 ° to the pads of the fingers. The lower limbs are close to each other. The feet are parallel.

1.6. ANATOMICAL VARIATIONS

Anatomy books describe (initially, at least) the structure of the body as it is usually observed in people: the most common pattern. However, occasionally a particular structure demonstrates so much variation within the normal range. The most common pattern might be found less than half the time!

2. TERMINOLOGY IN ANATOMY

It is important for health sciences staff to have a sound knowledge and understanding of the basic anatomical terms. With the help of a medical dictionary, you can understand anatomical terminology. A dictionary will greatly help you in the learning process.

By using accurate use of anatomical terms health sciences staff can communicate with their colleagues. They do that both nationally and internationally. Without anatomical terms, one cannot discuss or record the abnormal functions of joints. One can’t talk about the actions of muscles properly. One can not imagine the alteration of position of organs without using these terms. You can’t tell the exact location of tumors if you don’t know the anatomical terminology well.

Anatomical terms are descriptive terms. They are standardized in an international reference guide. This guide is called Terminologia Anatomica. These terms can be in English or Latin, or Greek. They are used worldwide. Many anatomical terms have both Latin and Greek equivalents. An example is the tongue. The tongue is lingua in Latin and glossa in ancient Greek. For the artery we use lingual artery. For the nerve it is glossopharyngeal nerve.

Various adjectives are arranged as pairs of opposites. They describe the relationships between the parts of the body. They also are for comparing the position of two structures relative to each other. Anatomical directional terms are based on the body in the anatomical position.

2.1. TERMS RELATED TO POSITION

All descriptions of the human body are based on the anatomical position. The various parts of the body are then described in relation to certain imaginary planes. Three anatomical planes divide the body.
2.1.1. ANATOMICAL PLANES

Three imaginary planes pass through the body in the anatomical position.

**Sagittal, coronal, and axial planes**

**Sagittal planes** are vertical planes. They pass through the body parallel to the median plane. Parasagittal is commonly used. It, however, is unnecessary as any plane parallel to and on either side of the median plane is sagittal by definition. A plane parallel and near to the median plane may be referred to as a paramedian plane. The plane that passes through the center of the body is the **median sagittal plane**. It divides the body into equal right and left halves.

**Frontal (coronal) planes** are vertical planes. They pass through the body at right angles to the median plane. They divide the body into anterior (front) and posterior (back) parts.

**Transverse (axial) planes** are horizontal planes. They pass through the body at right angles to the median and frontal planes. They divide the body into upper and lower parts. Radiologists refer to transverse planes as transaxial. This is commonly shortened as “axial planes”.

Anatomists create sections of the body and its parts anatomically. Clinicians create them by planar imaging technologies, such as computerized tomography (CT), to describe and display internal structures.

2.1.2. Anatomical terms specific for comparisons made in the anatomical position, or with reference to the anatomical planes:

- **Superior** refers to a structure nearer the vertex. Vertex is the topmost point of the **skull**. The head is superior to shoulders.
- **Craniol** relates to the cranium. It means toward the head or cranium (skull).
- **Inferior** means a structure situated nearer the **sole** of the foot.
- **Caudal (1) (L. tail)** means toward the feet or tail region. It is represented in humans by the coccyx (tail bone). The **coccyx** is the small bone at the inferior (caudal) end of the vertebral column (**spine**).
- **Posterior (dorsal)** means the back surface of the body (or the structure) or nearer to the back.
- **Anterior (ventral)** means the front surface of the body or the structure. We’re talking about the concept of “relative to each other” again. The nose’s an anterior (ventral) structure; the spine is a posterior structure.
- **Medial** indicates that a structure is nearer to the median plane of the body. For example, the little finger is medial to the others. On the contrary, **lateral** means a structure is away from the median plane. The thumb is lateral to the other fingers.
- **Dorsum** means the superior aspect of any part that protrudes anteriorly from the body. Examples are: dorsum of the tongue, nose, penis, or foot.

Combined terms describe intermediate positional arrangements. “Inferomedial” means nearer to the feet and median plane. The anterior parts of the ribs run inferomedially. “Superolateral” means nearer to the head and far from the median plane.

2.1.3. Terms, independent of the anatomical position or the anatomical planes, relating primarily to the body’s surface or its central core:

- **Superficial, intermediate,** and **deep (Lat. profundus)** describe the position of structures relative to the surface of the body. They also might tell you the relation of one structure to another underlying or overlying structure.
- **External** means outside of or farther from the center of an organ or cavity. **Internal** means inside or closer to the center.
- **Proximal and distal** are used when contrasting positions nearer to or farther from the attachment of a limb or the central aspect of a linear structure. Proximal means close to the body relatively. Distal means away from the body. For example, the arm is proximal to the forearm. The hand is distal to the forearm.

2.2. TERMS OF LATERALITY

Paired structures having right and left members (e.g., the kidneys) are **bilateral**. Those on one side only (e.g., the spleen) are **unilateral**. Something occurring on the same side of the body as another structure is **ipsilateral**. The right thumb and right big toe are ipsilateral. **Contralateral** means occurring on the opposite side of the body relative to another structure.

2.3. POSITIONS OF THE BODY

The **supine position** of the body is lying on the back. The **prone position** is lying face downward.

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