

新世纪全国高等中医药院校创新教材



人体解剖学

HUMAN ANATOMY

(供中医类五年制 七年制用)

主编 严振国 李伊为

中国中医药出版社

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Preface

New Centurial Advanced Textbooks for nationwide colleges of TCM (first edition) are listed in the first class of national textbook plan. The textbooks compiled by the Anatomy Committee, plan and guideline made by the TCM Bureau, who is entrusted by Ministry of Education of PRC. The textbooks are written for students major in TCM, acupuncture and moxibustion, massage, trauma and orthopaedics and nursing, etc.

As TCM is acknowledged in all of the world increasingly, in recent years some TCM colleges in China have practised bilingual teaching to meet the need of opening to outside world better. Therefore we compiled and amended the General Anatomy of English edition which is based on the materials edited by professor Li Yiwei. The illustrations in the textbook are plotted by professor Yan Zhengguo and further edited by Shao Shuijin and He Mingsen. The manuscripts are also amended by members of the Anatomy Committee, finalized by the editor – in – charge.

Sincerely thanks for many supports from other TCM colleges related.

We are looking forward to the valuable advices from readers.

Editor – in – charge: Yan Zhengguo (lifelong professor), Shanghai University of TCM
Li Yiwei (professor), Guangzhou University of TCM

July 15th, 2003

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CHAPTER ONE INTRODUCTION

SCOPE OF ANATOMY

ANATOMY, which is a word of Greek origin, and which like its Latin equivalent dissection means 'cutting up', originally implied the study of the disposition of the different parts of the body. The information thus obtained constituted gross or macroscopic anatomy, sometimes known as topographical anatomy, if the emphasis was more especially on topography. Modern anatomy is much wider in scope, for it deals both with the make-up of the body and with the factors on which its development and maintenance depend. It therefore comprises not only gross topographical features such as the arrangement of muscles, nerves and veins, but also microscopic anatomy or histology, which includes cytology, the name given to the specialized branch of study which deals with the organization of the individual cell. The subject also includes developmental anatomy or embryology. A further division is comparative anatomy, which is concerned with the way all living things are made. It is through comparative study that the underlying pattern of all organic structure is revealed, and in this field anatomy becomes the science of morphology.

If the primary technique of anatomy is dissection, in its modern form the subject depends on any technique that can be used to enlarge the boundaries of anatomical knowledge. The instruments of anatomy thus range from the scalpel, which is used in straightforward dissection, to the Geiger counter which measures the rate of turnover of calcium ions in bone, or the electron microscope which is used to reveal the minute structure of the fibrils that make up a tendon. Intricate experiments on living tissues on one hand, and straightforward observation of the dead body on the other, combine, in the hands of the anatomist, to keep all aspects of

the study of structural organization alive and growing.

A medical student who commences the study of anatomy for the first time inherits knowledge which is thus based on a rich array of techniques. He is also entering a field whose margins overlap with those of physiology, biochemistry and other related subjects. Structure and function therefore must invariably be studied in conjunction with each other; what is the preoccupation of anatomy today may tomorrow become a central problem of physiology, and vice versa. But however up-to-date and modern the techniques which the anatomist uses in his attempts to advance his subject, its fundamental and enduring basis remains the knowledge of structural organization. Without this, there could be no science of morphology and no foundation for the medical student on which to base his studies of the normal and abnormal working of the body.

The interest of the medical student in anatomy is, therefore, in the first instance necessarily, and essentially, observational and descriptive. Since the arrangement of the structure of the body is very complex, his first task is that of learning the conventions by which the spatial relations of different structures are described. These, fortunately, are fairly simple.

BODY ORGANIZATION

The cell is the basic structural and functional component of life. Human is multicellular organism composed of between 60 and 100 trillion cells. It is at the cellular level that such vital functions of life as metabolism, growth, irritability and adaptability, repair, and reproduction are carried out.

Tissues are layers or aggregations of similar cells that perform specific functions. The tissues of the body are classified into four princi-

pal kinds on the basis of structures and function; ①epithelial tissues cover body and organ surfaces, line body and lumen cavities, and form glands; ②connective tissues bind, support, and protect body parts; ③muscle tissues contract to produce movement; ④nervous tissues initiate and transmit nerve impulses from one body part to another.

An organ is an aggregate of two or more tissues, integrated to perform a particular function. Organs occur throughout the body and vary greatly in size and function.

The systems of the body constitute the next level of structural organization. A body system consists of various organs that have similar or related functions. Examples of systems are the circulatory system, nervous system, digestive system, and endocrine system. Certain organs may serve several systems. For example, the pancreas functions with both the endocrine and digestive systems and the pharynx serves both the respiratory and digestive systems.

ANATOMICAL POSITION AND DESCRIPTIVE TERMINOLOGY

ANATOMICAL POSITION

All terms of direction that describe the relationship of one body part to another are made in reference to the anatomical position. In the anatomical position, the body is erect, the eyes are directed forward, the feet are parallel to one another and flat on the floor, the arms are at the sides of the body with the palms of the hands turned forward and the fingers are pointed straight down. The anatomical position is the 'standardized' position of the body from which any part may be related to any other part through the use of defined descriptive terms. It is used throughout clinical medicine and the student can best learn this position by assuming it himself.

DIRECTIONAL TERMS

Directional terms are used to locate the position

of structures, surfaces, and regions of the body (Fig. 1-1). These terms are always relative to the specimen positioned in the anatomical position.

Superior and Inferior

Superior or cephalic refers to the position of a part that is nearer the head of a supposedly upright body, while inferior or caudal means nearer the feet.

Anterior and Posterior

Anterior means nearer the front of the body and posterior means nearer the back. Ventral and dorsal may be used instead of anterior and posterior in the trunk. In the hand, dorsal commonly replaces posterior, and palmar replaces anterior. In the foot, the corresponding surfaces are superior and inferior in the anatomical position, but these terms are usually replaced by dorsal and plantar.

Medial and Lateral

Median means in the middle. Thus the median plane is an imaginary plane that divides the body into two apparently equal halves, right and left. Medial means nearer the median plane, and lateral means further away from that plane. The presence of two bones, one lateral and the other medial, in the forearm and leg allows the use of the adjectival forms of the names of these bones as synonyms of medial and lateral, i. e., ulnar side and radial side in the forearm, and tibial and fibular sides in the leg.

Internal and External

The words inner and outer, or their equivalents internal and external, are used only in the sense of nearer the interior and further away from the interior in any direction; they are not synonymous with medial and lateral, unless applied strictly at right angles to the median plane, and should not be used in place of these terms.

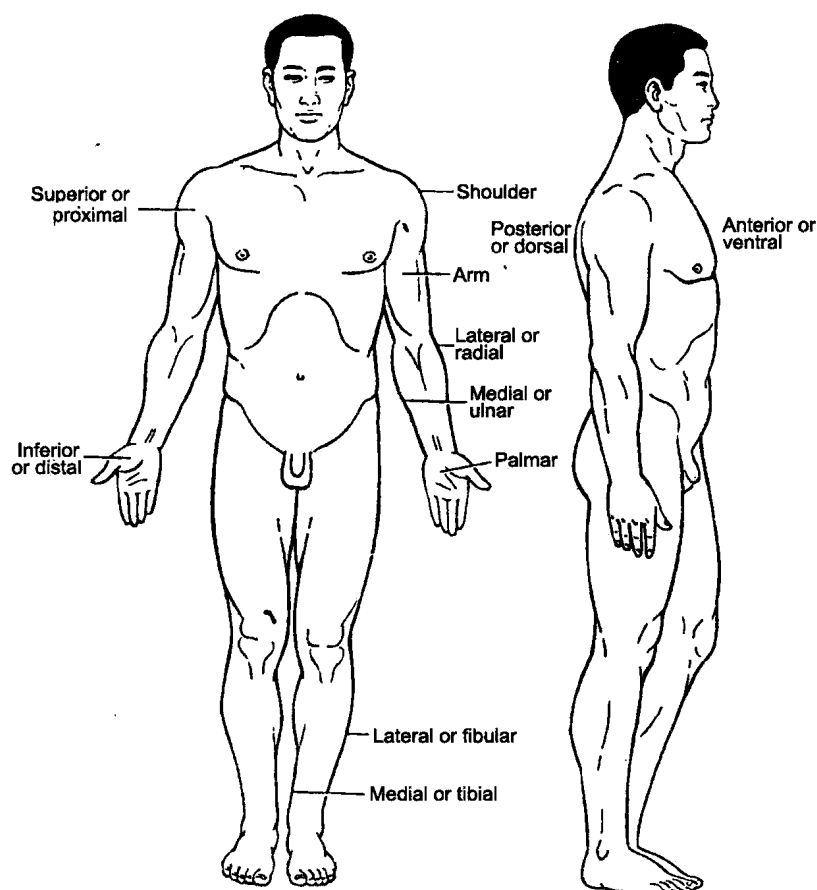


Fig. 1-1 The erecting human body to show common directional terms

Superficial and Deep

Superficial, meaning nearer the skin, and deep, meaning further from it, are the terms most usually used when direction is of no importance.

Proximal and Distal

Proximal (nearer to) and distal (further from) indicate the relative distances of structures from the root of that structure, e. g. , the root of the limb.

PLANES OF REFERENCE

In order to visualize and study the structural arrangements of various organs, the body may be sectioned and diagrammed according to planes of reference (Fig. 1-2). Three fundamental

planes, midsagittal, coronal and transverse, are frequently used to depict structural arrangement.

Sagittal Plane

As applied to the body, a midsagittal plane passes lengthwise through the midplane, dividing it into right and left halves. Sagittal planes also extend vertically and divide the body into unequal right and left portions.

Coronal Plane

Coronal, also called frontal, planes are any vertical plane at right angles to the median plane and divide the body into front and back portions.

Transverse Plane

Transverse planes, also called horizontal, or cross-sectional, planes, divide the body into superior (upper) and inferior (lower) portions.

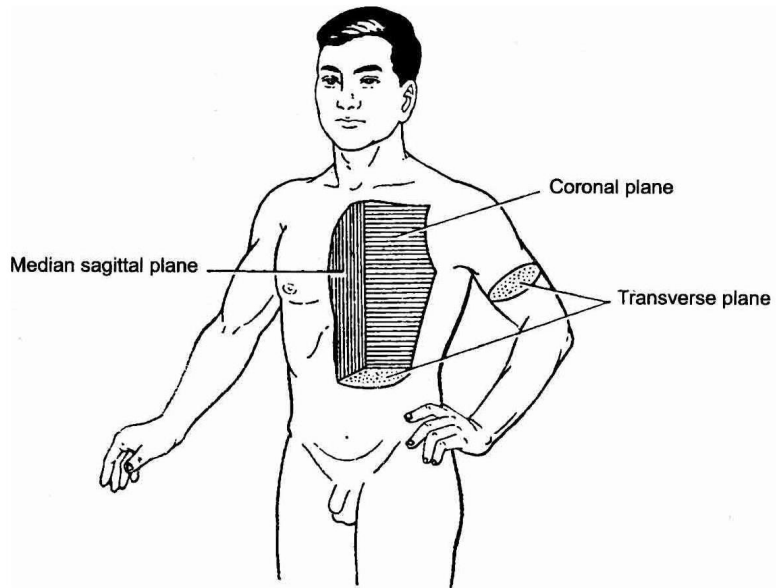


Fig. 1-2 Planes of reference through the body

CHAPTER TWO LOCOMOTOR SYSTEM

The locomotor system consists of bones, bony joints and skeletal muscles. They perform

mainly the functions of body movement, support and protection.

SECTION 1 OSTEOLOGY

GENERAL

Osteology is the science concerned with the study of bones. Each bone is an organ that

plays a part in the total functioning of the skeletal system. The skeletal system of an adult human is composed of approximately 206 bones.

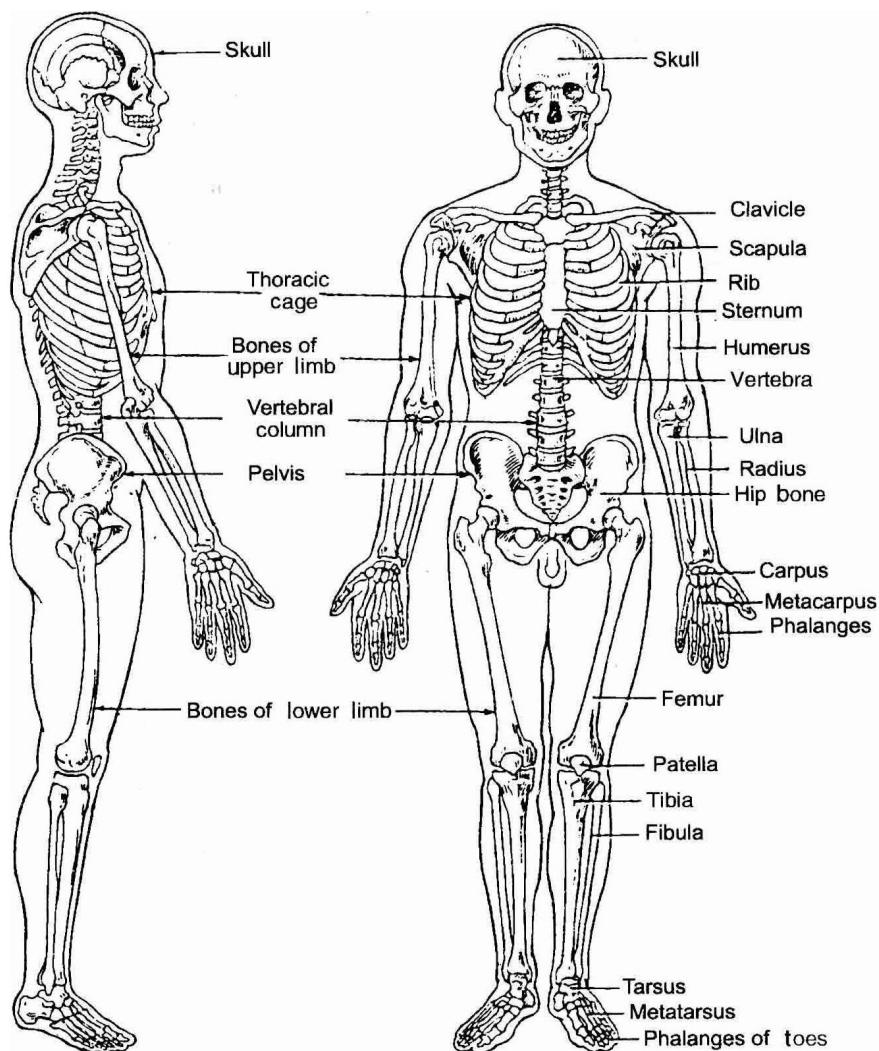


Fig. 2-1 The human skeleton

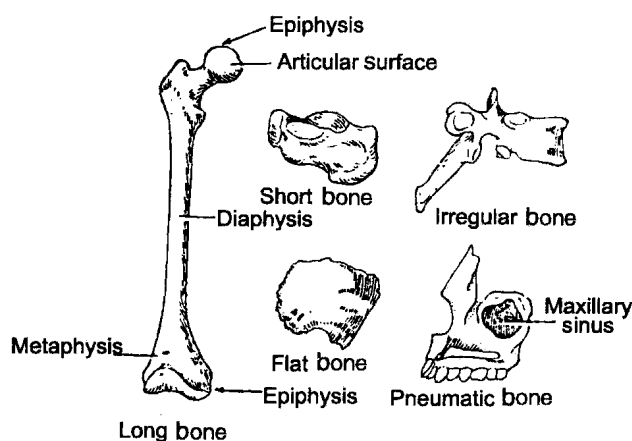


Fig. 2-2 Shapes of bones

es. Actually, the number of bones differs from person to person depending on age and genetic variations. At birth, the skeleton consists of approximately 270 bones. As further bone development occurs during infancy, the number increases. During adolescence, however, the number of bones decreases, as there is a gradual fusion of separate bones. Some adults have extra bones within the sutures of the skull called sutural bones. Additional bones may develop in tendons in response to stress as the tendons repeatedly move across a joint. Bones formed this way are called sesamoid bones. Sesamoid bones, like the sutural bones, vary in number. The patellae are two sesamoid bones all people have.

For the convenience of study, the bones are divided into the skull, bones of trunk, bones of upper limb and bones of lower limb according to their location (Fig. 2-1).

SHAPES OF BONES

The bones of the skeleton are classified into four principal types on the basis of shape rather than size. The four classes are long bones, short bones, flat bones, and irregular bones (Fig. 2-2).

Long Bones

Long bones have a body and two ends. Most of

the bones of the upper and lower limbs are of this type. On the bone shaft, or diaphysis, of a long bone, there is a central cavity called the medullary cavity. Along the diaphysis are nutrient foramina, small openings into the bone that allow for passage of nutrient vessels into the bone for nourishment of the living tissue. On each end of the diaphysis is an epiphysis. Between the diaphysis and epiphysis is a plate of cartilage called epiphyseal cartilage. As bone growth is completed, an epiphyseal line replaces the plate and ossification occurs between the epiphysis and the diaphysis.

Short Bones

Short bones are somewhat cube-shaped and are found in confined spaces where they transfer forces (e. g. , the wrist and ankle).

Flat Bones

Flat bones have a broad and dense surface for muscle attachment or protection of underlying organs. They are seen in skull and the thorax.

Irregular Bones

Irregular bones are irregular in shape and can not be placed in above three groups, such as the vertebrae and certain bones of the skull. Some irregular bones that contain the air-filled spaces can be called the pneumatic bones.