21世纪高等医学英语系列教材

基础医学英语

Fundamental Medical English

郝长江等 主编

青岛海洋大学出版社

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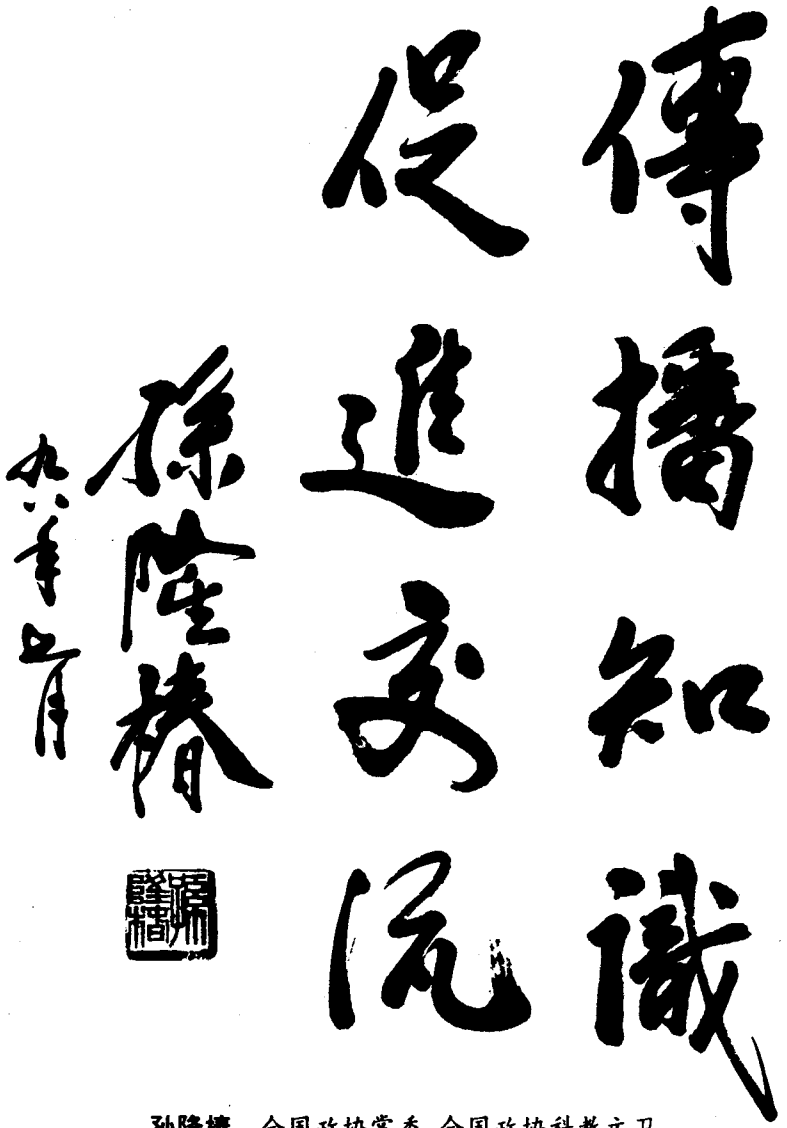

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21世纪高等医学英语系列教材

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前　言

语言是人类知识的载体。英语作为国际上的一种通用语言，不仅是获取信息的有力工具，而且是了解英语民族乃至整个世界的重要窗口。因此，提高大学英语教学水平是一项具有跨时代意义的工作。

大学英语实行四、六级全国统考以来，基础英语阶段教学取得了很大成绩，而专业英语阶段教学则相对薄弱，尤其是专业英语教材与目前的教学需要很不适应。为了深化医学英语的教学改革，使医学院校的大学生、研究生尽快拥有21世纪迫切需要的、具有较高专业水平的英语交际能力，根据全国医学专业英语教学大纲的要求以及山东省高等学校面向21世纪课程体系和课件改革立项精神，结合社会实际需要，我们组织全省六所医学院校大学英语教学专家，经过反复研究，编写了这套“21世纪高等医学英语系列教材”。

在编写过程中，我们十分重视这套教材的系统性和整体性。根据阅读是信息时代使用频率最高的语言活动这一特点，为了使学生实现从基础英语到专业英语的顺利过渡，将阅读部分分为《医学科普英语》、《基础医学英语》、《临床医学英语》三册；为了全面培养学生的语言运用能力，使他们在读、说、听、写、译等方面都得到较好的发展，专门安排了《医学英语听力》和《医学英语会话》各一册；为了提高学生学习英语的积极性，调节学习气氛，增加语言实践机会，专门编写了《趣味英语荟萃》。

本系列教材在选材方面突出了时代感和实用性，因此使用本教材的读者在提高专业英语水平的同时，还会增进对当代医学技术发展状况的了解。

全国政协常委、全国政协科教文卫委员会副主任、卫生部原副部长孙隆椿同志欣然为本系列教材题词，在此表示衷心的感谢。

在编写过程中，我们参阅了大量的有关资料，对这些资料的作者和提供者表示诚挚的谢意。

欢迎广大读者对这套系列教材提出宝贵意见，以使其更加完善。

21世纪高等医学英语编委会

1998年6月

CONTENTS

Unit 1
The Skeletal System

Without the skeletal system we would be unable to perform movements, such as walking or grasping. The slightest jar to the head or chest could damage the brain or heart. It would even be impossible to chew food. The framework of bones and cartilage that protects our organs and allows us to move is called the skeletal system.

Functions

The skeletal system performs several basic functions.

1. *Support*: The skeleton provides a framework for the body and, as such, it supports soft tissues and provides a point of attachment for many muscles.

2. *Protection*: Many internal organs are protected from injury by the skeleton. For example, the brain is protected by the

cranial bones, the spinal cord by the vertebrae, the heart and lungs by the rib cage, and internal reproductive organs by the pelvic bones.

3. *Movement*: Bones serve as levers to which muscles are attached. When the muscles contract, the bones acting as levers to produce movement.

4. *Mineral storage*: Bones store several minerals that can be distributed to other parts of the body on demand. The principal stored minerals are calcium and phosphorus.

5. *Blood cell production*: Red marrow in certain bones is capable of producing blood cells, a process called hematopoiesis or hemopoiesis. Red marrow consists of blood cells in immature stages, fat cells, and macrophages. Red marrow produces red blood cells, some white blood cells, and platelets.

Types of Bones

Almost all the bones of the body may be classified into four principal types on the basis of shape: long, short, flat, and irregular. Long bones have greater length than width and consist of a diaphysis and a variable number of epiphyses. For example, metacarpals, metatarsals, and phalanges have only one epiphysis. The femur actually has four. Other long bones have two. Long bones are slightly curved for strength. A curved bone is structurally designed to absorb the stress of the body weight at several different points so the stress is evenly distributed. If such bones were straight, the weight of the body would be unevenly distributed and the bone would easily fracture. Examples of long bones include bones of the thighs, legs, toes, arms,

forearms, and fingers.

Short bones are somewhat cube-shaped and nearly equal in length and width.

Their texture is spongy except at the surface, where there is a thin layer of compact bone. Examples of short bones are the wrist and ankle bones.

Flat bones are generally thin and composed of two more or less parallel plates of compact bone enclosing a layer of spongy bone. Flat bones afford considerable protection and provide extensive areas for muscle attachment. Examples of flat bones include the cranial bones (which protect the brain), the sternum and ribs (which protect organs in the thorax), and the scapulae.

Irregular bones have complex shapes and cannot be grouped into any of the three categories just described. They also vary in the amount of spongy and compact bone present. Such bones include the vertebrae and certain facial bones.

There are two additional types of bones that are not included in this classification by shape. Sutural or wormian bones are small bones between the joints of certain cranial bones. Their number varies greatly from person to person. Sesamoid bones are small bones in tendons where considerable pressure develops, for instance, in the palm. These, like sutural bones, are also variable in number. Two sesamoid bones, the patellas (kneecaps), are present in all individuals.

Bone Replacement

Bones undergoing either intramembranous or endochondral

ossification are continually remodeled from the time that initial calcification occurs until the final structure appears. Remodeling is the replacement of old bone tissue by new bone tissue. Compact bone is formed by the transformation of spongy bone. The diameter of a long bone is increased by the destruction of the bone closest to the marrow cavity and the construction of new bone around the outside of the diaphysis. However, even after bones have reached their adult shapes and sizes, old bone is perpetually destroyed and new bone tissue is formed in its place. A bone is never metabolically at rest; it constantly remodels and reappropriates its matrix and minerals along lines of mechanical stress.

A bone shares with skin the feature of replacing itself throughout adult life. Remodeling takes place at different rates in various body regions. The distal portion of the femur (thigh bone) is replaced about every 4 months. By contrast, bone in certain areas of the shaft will not be completely replaced during the individual's life. Remodeling allows worn or injured bone to be removed and replaced with new tissue. It also allows bone to serve as the body's storage area for calcium. Many other tissues in the body need calcium in order to perform their functions. For example, a nerve cell needs calcium for nerve impulse conduction, muscle needs calcium to contract, and blood needs calcium to clot. The blood continually trades off calcium with the bones, removing calcium when it and other tissues are not receiving enough of this element and resupplying the bones with dietary calcium to keep them from losing too much bone mass.

The cells believed to be responsible for the resorption (loss

of a substance through a physiological or pathological process) of bone tissue are osteoclasts. In the healthy adult, a delicate homeostasis is maintained between the action of the osteoclasts in removing calcium and the action of the bone-making osteoblasts in depositing calcium. Should too much new tissue be formed, the bones become abnormally thick and heavy. If too much calcium is deposited in the bone, the surplus may form thick bumps, or spurs, on the bone that interfere with movement at joints. A loss of too much tissue or calcium weakens the bones and allows them to break easily or to become very flexible. A greatly accelerated remodeling process results in a condition called Paget's disease.

In the process of resorption, it is believed that osteoclasts send out projections that secrete protein-digesting enzymes released from lysosomes and several acids (lactic and citric). The enzymes may function by digesting the collagen and other organic substances, while the acids may cause the bone salts (minerals) to dissolve. It is also presumed that the osteoclastic projections may phagocytose whole fragments of collagen and bone salts. Magnesium deficiency inhibits the activity of osteoclasts.

Normal bone growth in the young and bone replacement in the adult depend on several factors. First, sufficient quantities of calcium and phosphorus, components of the primary salt that makes bone hard, must be included in the diet. Manganese may also be important in bone growth. It has been shown that manganese deficiency significantly inhibits laying down new bone tissue.

Second, the individual must obtain sufficient amounts of vitamins, particularly vitamin D, which participates in the absorption of calcium from the gastrointestinal tract into the blood, calcium removal from bone, and kidney reabsorption of calcium that might otherwise be lost in urine.

Third, the body must manufacture the proper amounts of the hormones responsible for bone tissue activity. Growth hormone (GH), secreted by the pituitary gland, is responsible for the general growth of bones. Too much or too little of this hormone during childhood makes the adult abnormally tall or short. Other hormones specialize in regulating the osteoclasts. Calcitonin (CT), produced by the thyroid gland, inhibits osteoclastic activity and accelerates calcium absorption by bones, while parathormone (PTH), synthesized by the parathyroid glands, increases the number and activity of osteoclasts. PTH also releases calcium and phosphate from bones into blood, transports calcium from urine into blood, and transports phosphate from blood into urine. And still others, especially the sex hormones, aid osteoblastic activity and thus promote the growth of new bone. The sex hormones act as a double-edged sword. They aid in the growth of new bone, but they also bring about the degeneration of all the cartilage cells in epiphyseal plates. Because of the sex hormones, the typical adolescent experiences a spurt of growth during puberty, when sex hormone levels start to increase. The individual then quickly completes the growth process as the epiphyseal cartilage disappears. Premature puberty can actually prevent one from reaching an average adult height because of the simultaneous premature degeneration of the plates.

Aging and the Skeletal System

There are two principal effects of aging on the skeletal system. The first effect is the loss of calcium from bones. This loss usually begins after age 40 in females and continues thereafter until as much as 30 percent of the calcium in bones is lost by age 70. In males, calcium loss typically does not begin until after age 60. The loss of calcium from bones is one of the factors related to a condition called osteoporosis.

The second principal effect of aging on the skeletal system is a decrease in the rate of protein formation that results in a decreased ability to produce the organic portion of bone matrix. As a consequence, bone matrix accumulates a lesser proportion of organic matrix and a greater proportion of inorganic matrix. In some elderly individuals, this process can cause their bones to become quite brittle and more susceptible to fracture.

New Words

skeleton *n*. 骨骼;骨架
cartilage *n*. 软骨
cranial *a*. 颅的,颅侧的
vertebra (pl. vertebras or vertebrae) *n*. 椎骨,脊椎
phosphorus *n*. 磷
hematopoiesis *n*. 血细胞生成,造血
macrophage *n*. 巨噬细胞
platelet *n*. 血小板
diaphysis (pl. diaphyses) *n*. 骨干
epiphysis (pl. epiphyses) *n*. (骨)骺,松果体
metacarpal *n*. 掌骨; *a*. 掌的
metatarsal *n*. 跖骨; *a*. 跖的
spongy *a*. 海绵状的;多孔的

phalanx (pl. phalanges) *n.* 指骨;趾骨
femur (pl. femurs or femora) *n.* 股骨,股
sternum (pl. sternums or sterna) *n.* 胸骨
scapula (pl. scapulae) *n.* 肩胛(骨)
sutura, suture *n.* 骨缝
sutural *a.* 骨缝的
sesamoid *a.* 籽样的
tendon *n.* 腱
patella *n.* 髌(骨)
intramembranous *a.* 膜内的
endochondral *a.* 软骨内的;软骨内形成的
ossification *n.* 骨化
calcification *n.* 钙化,沉钙(作用)
distal *a.* 远侧的;末梢的
matrix (pl. matrices or matrixes) *n.* 基层,基质
osteoclast *n.* 破骨细胞
homeostasis *n.* 体内平衡,自身稳定(功能)
spur *n.* 骨刺
osteoblast *n.* 成骨细胞
lysosome *n.* 溶酶体
collagen *n.* 胶原(蛋白)
phagocytose *v.* 吞噬
magnesium *n.* 镁
manganese *n.* 锰
gastrointestinal *a.* 胃肠的
pituitary *a.* 垂体的 *n.* 垂体
calcitonin *n.* (甲状腺)调钙素
thyroid *a.* 甲状腺的; *n.* 甲状腺
parathormone *n.* 甲状旁腺激素
parathyroid gland *n.* 甲状旁腺
osteoporosis *n.* 骨质疏松(症)
brittle *a.* 易碎的,脆的

Phrases

as such 照此
be grouped into 把...分类
be responsible for 对...负责
lay down 形成