新编基础医学英语

New Fundamental Medical English

21世纪实用医学英语系列教材

《新编基础医学英语》编写组　编

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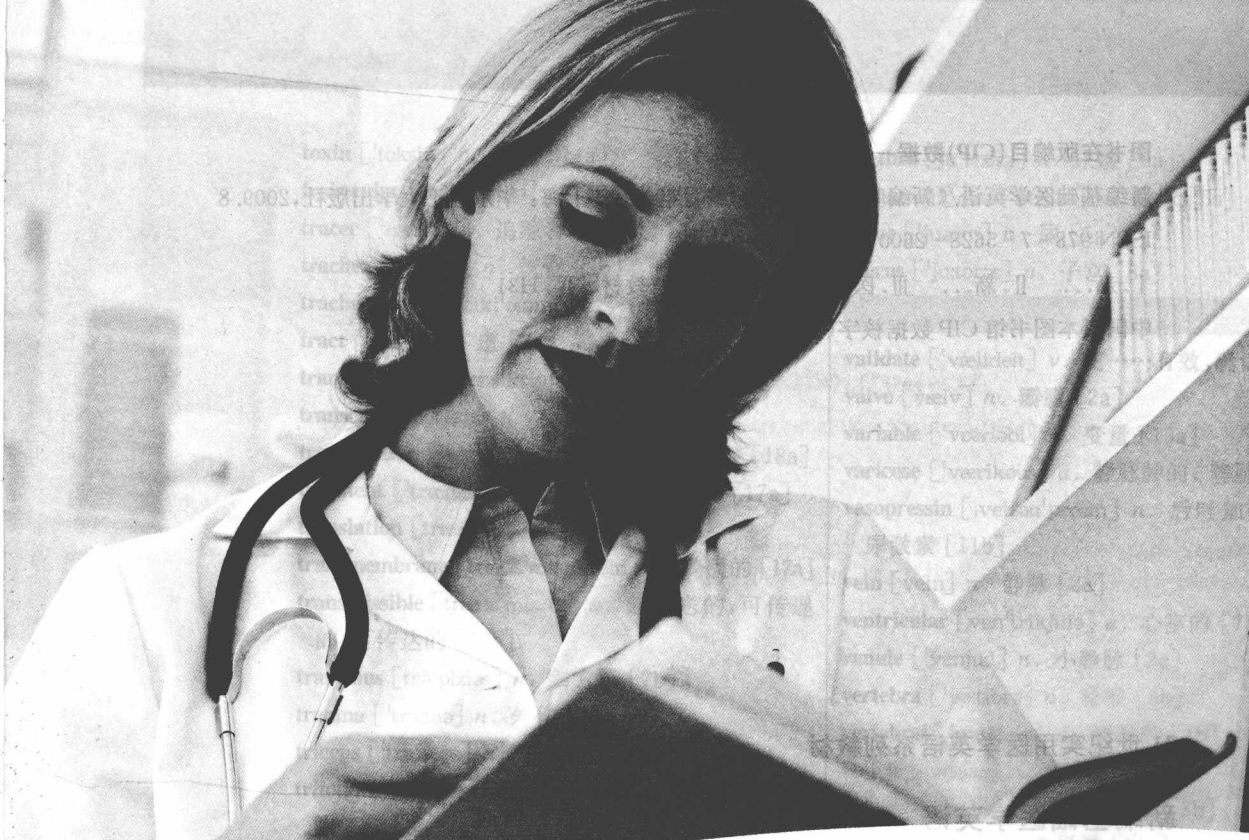

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前　言

当前，我国经济迅猛发展，高等教育也进入一个由精英型教育跨向大众化教育的转型期。同时，国际间的竞争不断加剧。世界竞争的焦点是科技竞争，科技竞争的关键是人才竞争，人才竞争的关键是人才素质的竞争。因此，既有专业知识又有较高英语水平的复合型、应用型人才越来越受到社会的欢迎。这种新形势对专业用途的医学英语(English for Medical Purpose)教学提出了更高的要求。具体而言，就是培养学生既能顺利阅读和翻译各科医学专业文献，又能用英语进行学术交流的能力。为此，根据教育部《大学英语课程教学要求》，结合医学院校英语教学的实际需要，我们组织了英语教学经验丰富、医学功底深厚的专家、教授编写了这套供医学院校本科生、研究生教学使用或医务工作者自修提高使用的《新世纪实用医学英语系列教材》。

本套教材在选材注重知识性、科学性、时代性，既不同于一般英语教材对语言点和语言技巧的强调，也有别于英文原版专业教材对学生相关专业背景知识的要求和限制，在弥补了专业英语的训练相对不足的同时，也避免了学生由于专业背景知识和文化背景知识的差异，不能够理解吃透英文原版教材的苦恼，可满足医学院校专业英语教学的需求。

本套教材分为《新编基础医学英语》和《新编临床医学英语》两册。每册由18个单元组成，每个单元为同一话题，由Passage A和Passage B两篇文章组成。A篇文章编有Pre-reading Activities, New Words and Phrases, Notes, Post-reading Activities。B篇文章编有New Words and Phrases和Post-reading Activities。每册书的最后有总词汇表。

本套教材的显著特点主要体现在以下几个方面：

一、阅读文章均选自国外网站、书刊，基本未作删改，目的是为学生提供地道的医用英语，为语言的输入打下良好的基础。

二、文章内容是基于医学各专业学科的内容，突出课文的实用性。目的有三个：1)和学生的医学专业学习趋于同步，以医学知识带动英语的学习，以英语促进医学知识的获得，可达到专业学习和语言学习相互补充和促进的功效；2)加强学生对医学知识以英语为媒介的储存，促进学生医学英语的语言习得和利用英语进行医学学术交流的能力发展；3)体现以内容为基础的教学思想，有利于医学各科的双语教学。

三、考虑到《大学英语课程教学要求》对专业英语学时和阅读量的要求，内容上分了基础医学和临床医学，并采用了主(A)、副(B)课文制，对主课文从注解和练习两方面进行重点处理，作为教师课内重点讲解的内容，副课文主要供学生课后自学，以便对主课文

从语言和知识两方面起到巩固作用。

四、文章的难度起点基于大学英语四级水平，充分考虑了学生主体已有的英语水平。随着学习的深入，难度逐渐加大，符合学习规律，增强学习的科学性，实现学生由大学英语的学习向医学专业英语学习的平稳过渡。

五、文章的语言特点是生活性和学术性两方面兼顾，目的是既能满足学生的口头交流需要，又能满足书面交流需要，增强课文的可读性，有利于学生的英语语言产出。

六、单元内项目的设计体现了语言教学的先进性。每个单元的开始都有导入活动，目的是激活学生的背景知识，促进学生的口语交流。词汇表中的解释以英语为主，对较难的词汇同时提供简短的汉语翻译，有利于学生用原语理解，避免汉语翻译对英语原文的影响。A篇文章阅读后的前三个题（简答、判断和选择）侧重于学生对课文的阅读理解，而IV和/或V题类型多样，侧重于学生的写、译能力的培养。B篇文章在内容上与A篇密切相关，为补充读物，其阅读后任务侧重于阅读理解，供学有余力或有兴趣的学生阅读，进一步巩固课堂所学知识和开拓视野。

七、由于学科的不同，医学词汇的复用几率本来就低。因此，每册书的词汇选择尽量避免重复，但两册书之间的重复词汇未作处理，目的是增加常用词汇复用的几率。

本册书为《新编基础医学英语》，其主要内容为骨骼肌肉、心脏和循环系统、消化系统、呼吸系统、泌尿系统、生殖系统、神经系统、内分泌、营养、代谢、体内平衡、免疫系统、流行病、病理、肿瘤、遗传、细胞和凝血。在内容的取舍上遵循两个主要原则：1）力图覆盖基础医学各科的主要知识；2）以基本常识为主，兼顾医学文献。

我们希望通过对《新编基础医学英语》和《新编临床医学英语》的学习，学生能在读、说、写、译诸多方面得到持续提高，逐步具备阅读专业医学书刊、利用英语进行专业交流的能力，从而使学生的英语应用能力得到全面提高，达到《大学英语课程教学要求》所规定的最终教学目的。

在本书的编写过程中，我们参考并选用了其他一些资料中的有关内容，在此谨向有关单位和人士表示感谢。由于编者学识所限，书中难免存有纰漏和不足，请读者不吝赐教。

编　者

2009年5月

Contents

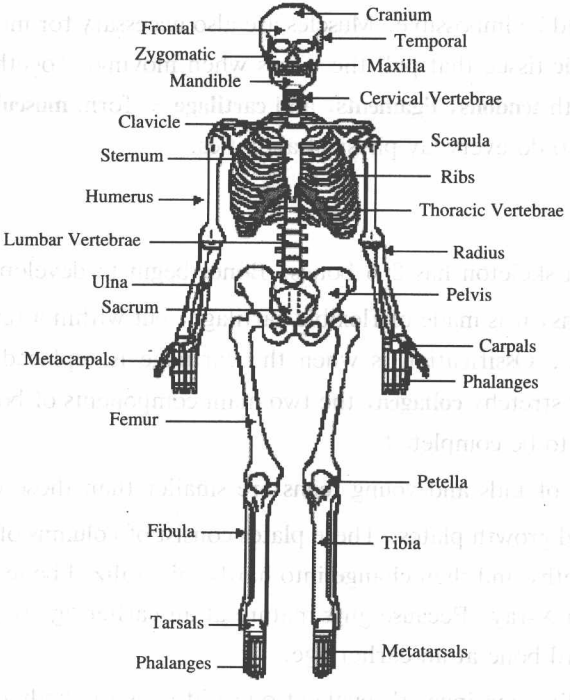
Unit 1

Passage A

Skeleton and Muscles

Pre-reading Activities

I. Look at the diagram below. Try to describe the bones in the human body.



II. Try to understand the following terms before your reading.

skeleton ['skelitən] *n*. the hard structure (bones and cartilages) that provides a frame for the body of an animal

joint [dʒɔint] *n*. the point of connection between two bones or elements of a skeleton

muscle ['mʌsl] *n*. one of the contractile organs of the body

Text

1 From the head to the toes, bones provide support for bodies and help form the shape[1]. The skull protects the brain and forms the shape of the face. The spinal cord, a pathway for messages between the brain and the body, is protected by the backbone, or spinal column. The ribs form a cage that shelters the heart, lungs, liver, and **spleen**, and the **pelvis** helps protect the bladder, **intestines**, and in women, the reproductive organs. Although they're very light, bones are strong enough to support the entire weight.

2 Joints occur where two bones meet. They make the skeleton flexible — without them, movement would be impossible. Muscles are also necessary for movement. They're the masses of tough, **elastic** tissue that pull the bones when moving. Together, bones, muscles, and joints — along with **tendons**, **ligaments**, and **cartilage** — form **musculoskeletal** systems and enable human beings to do everyday physical activities.

Bones

3 The human skeleton has 206 bones. Bones begin to develop before birth. When the skeleton first forms, it is made of flexible cartilage, but within a few weeks it begins the process of **ossification**[2]. Ossification is when the cartilage is replaced by hard deposits of calcium **phosphate** and stretchy **collagen**, the two main components of bone. It takes about 20 years for this process to be completed.

4 The bones of kids and young teens are smaller than those of adults and contain "growing zones" called growth plates. These plates consist of columns of multiplying cartilage cells that grow in length, and then change into hard, mineralized bone. These growth plates are easy to spot on an X-ray. Because girls mature at an earlier age than boys, their growth plates change into hard bone at an earlier age.

5 Bone building continues throughout one's life, as the body constantly renews and reshapes the bones' living tissue. Bone contains three types of cells: **osteoblasts**, which make new bone and help repair damage; **osteocytes**, which carry nutrients and waste products to

and from blood vessels in the bone; and **osteoclasts**, which break down bone and help to sculpt and shape it. Osteoclasts are very active in kids and teens, working on bone as it is remodeled during growth. They also play an important role in the repair of fractures.

6 Bones are made up of calcium, **phosphorus**, **sodium**, and other minerals, as well as the protein collagen. Calcium is needed to make bones hard, which allows them to support your weight. Bones also store calcium and release some into the bloodstream when it's needed by other parts of the body. The amounts of certain vitamins and minerals that one eats, especially vitamin D and calcium, directly affect how much calcium is stored in the bones.

7 The soft bone marrow inside many of the bones is where most of the blood cells flowing through the bodies are made. The bone **marrow** contains special cells called stem cells, which produce the body's red blood cells and **platelets**. Red blood cells carry oxygen to the body's tissues, and platelets help with blood clotting when a person has a cut or wound.

8 Bones are made up of two types of material — compact bone and **cancellous** bone. Compact bone is the solid, hard, outside part of the bone. It looks like ivory and is extremely strong. Holes and channels run through it, carrying blood vessels and nerves from the **periosteum**, the bone's membrane covering, to its inner parts. Cancellous bone, which looks like a sponge, is inside the compact bone. It is made up of a mesh-like network of tiny pieces of bone called trabeculae. The spaces in this network are filled with red marrow, found mainly at the ends of bones, and yellow marrow, which is mostly fat.

9 Bones are fastened to other bones by long, fibrous straps called ligaments. Cartilage, a flexible, rubbery substance in joints, supports bones and protects them where they rub against each other.

Muscles

10 Bones don't work alone — they need help from the muscles and joints[3]. Muscles pull on the joints, allowing a person to move. They also help the body perform other functions so a person can grow and remain strong, such as chewing food and then moving it through the digestive system.

11 The human body has more than 650 muscles, which make up half of a person's body weight. They are connected to bones by tough, cord-like tissues called tendons, which allow the muscles to pull on bones. If a person wiggles the fingers, the person can see the tendons on the back of the hand move as they do their work.

12 Humans have three different kinds of muscles: Skeletal muscle is attached to bone, mostly in the legs, arms, abdomen, chest, neck, and face. Skeletal muscles are called

striated because they are made up of fibers that have horizontal stripes when viewed under a microscope. These muscles hold the skeleton together, give the body shape, and help it with everyday movements (they are known as voluntary muscles because you can control their movement). They can contract (shorten or tighten) quickly and powerfully, but they tire easily and have to rest between workouts. Smooth, or involuntary, muscle is also made of fibers, but this type of muscle looks smooth, not striated. Generally, we can't consciously control our smooth muscles; rather, they're controlled by the nervous system automatically (which is why they are also called involuntary). Examples of smooth muscles are the walls of the stomach and intestines, which help break up food and move it through the digestive system. Smooth muscle is also found in the walls of blood vessels, where it squeezes the stream of blood flowing through the vessels to help maintain blood pressure. Smooth muscles take longer to contract than skeletal muscles do, but they can stay contracted for a long time because they don't tire easily. **Cardiac** muscle is found in the heart. The walls of the heart's chambers are composed almost entirely of muscle fibers. Cardiac muscle is also an involuntary type of muscle. Its rhythmic, powerful contractions force blood out of the heart as it beats.

13 Even when a person sits perfectly still, there are muscles throughout one's body that are constantly moving. Muscles enable the heart to beat, the chest to rise and fall as one breathes, and the blood vessels to help regulate the pressure and flow of blood through the body. When smiling and talking, muscles are helping us communicate, and when exercising, they help us stay physically fit and healthy.

14 The movements muscles make are coordinated and controlled by the brain and nervous system. The involuntary muscles are controlled by structures deep within the brain and the upper part of the spinal cord called the brain stem. The voluntary muscles are regulated by the parts of the brain known as the **cerebral** motor **cortex** and the **cerebellum**.

15 When a person decides to move, the motor cortex sends an electrical signal through the spinal cord and **peripheral** nerves to the muscles, causing them to contract. The motor cortex on the right side of the brain controls the muscles on the left side of the body and vice versa.

16 The cerebellum coordinates the muscle movements ordered by the motor cortex. **Sensors** in the muscles and joints send messages back through peripheral nerves to tell the cerebellum and other parts of the brain where and how the arm or leg is moving and what position it's in. This feedback results in smooth, coordinated motion. If a person wants to lift his arm, the brain sends a message to the muscles in the arm and the person moves it. When running, the messages to the brain are more involved, because many muscles have to

work in rhythm.

17 Muscles move body parts by contracting and then relaxing. Muscles can pull bones, but they can't push them back to the original position. So they work in pairs of **flexors** and **extensors**. The flexor contracts to bend a limb at a joint. Then, when having completed the movement, the flexor relaxes and the extensor contracts to extend or straighten the limb at the same joint. For example, the **biceps** muscle, in the front of the upper arm, is a flexor, and the **triceps**, at the back of the upper arm, is an extensor. When bending at the elbow, the biceps contracts. Then the biceps relaxes and the triceps contracts to straighten the elbow.

New Words and Phrases

spleen [spli:n] *n*. a large dark-red oval organ on the left side of the body between the stomach and the diaphragm which produces cells involved in immune responses 脾脏

pelvis ['pelvis] *n*. the structure of the vertebrate skeleton supporting the lower limbs in humans and the hind limbs or corresponding parts in other vertebrates 骨盆

intestine [in'testin] *n*. the part of the alimentary canal between the stomach and the anus 肠

elastic [i'læstik] *a*. capable of resuming original shape after stretching or compression, springy, able to adjust readily to different conditions 有弹性的,能伸缩的

tendon ['tendən] *n*. a cord or band of inelastic tissue connecting a muscle with its bony attachment 腱

ligament ['ligəmənt] *n*. a sheet or band of tough fibrous tissue connecting bones or cartilages or supporting muscles or organs 韧带

cartilage ['kɑ:tilidʒ] *n*. tough elastic tissue; mostly converted to bone in adults 软骨

musculoskeletal [mʌskjulәu'skelitәl] *a*. relating to muscles and skeleton 肌(与)骨骼的

ossification [ˌɔsifi'keiʃən] *n*. the developmental process of bone formation, the calcification of soft tissue into a bonelike material 成骨,骨化

phosphate ['fɔsfeit] *n*. a salt of phosphoric acid 磷酸盐

collagen ['kɔlәdʒin] *n*. the fibrous protein constituent of bone, cartilage, tendon, and other connective tissue 胶原蛋白

osteoblast ['ɔstiәblæst] *n*. a cell from which bone develops 成骨细胞

osteocyte ['ɔstiәsait] *n*. mature bone cell 骨细胞

osteoclast ['ɔstiәklɑ:st] *n*. cell that functions in the breakdown and resorption of bone tissue 破骨细胞

phosphorus ['fɔsfәrәs] *n*. a multivalent nonmetallic element of the nitrogen family that occurs commonly in inorganic phosphate rocks and as organic phosphates in all living cells 磷

sodium ['səudiəm] *n*. a silvery soft waxy metallic element of the alkali metal group which occurs abundantly in natural compounds (especially in salt water) 钠

marrow ['mærəu] *n*. the fatty network of connective tissue that fills the cavities of bones 骨髓

platelet ['pleitlit] *n*. tiny bits of protoplasm found in vertebrate blood 血小板

cancellous ['kænsiləs] *a*. having an open or latticed or porous structure 网状骨质的

periosteum [peri'ɔstiəm] *n*. a dense fibrous membrane covering the surface of bones 骨膜

cardiac ['kɑ:diæk] *a*. of or relating to the heart 心脏的，贲门的

cerebral ['seribrəl] *a*. of or relating to the cerebrum or brain 脑的

cortex ['kɔ:teks] *n*. the out layer of the cerebrum 皮质，皮层

cerebellum [ˌseri'beləm] *n*. a major division of the vertebrate brain which situates above the medulla oblongata and beneath the cerebrum in human 小脑

peripheral [pə'rifərəl] *a*. on or near an edge or constituting an outer boundary, the outer area, related to the key issue but not of central importance 周边的，周围的

sensor ['sensə] *n*. any device that receives a signal or stimulus (as heat or pressure or light or motion etc.) and responds to it in a distinctive manner 传感器

flexor ['fleksə] *n*. a skeletal muscle whose contraction bends a joint 屈肌

extensor [iks'tensə] *n*. a skeletal muscle whose contraction extends or stretches a body part 伸肌

biceps ['baiseps] *n*. any skeletal muscle having two origins (but especially the muscle that flexes the forearm) 双头肌

triceps ['traiseps] *n*. any skeletal muscle having three origins (but especially the triceps brachii) 三头肌

Notes

1. **the major functions of bones**: providing a strong barrier that protects the inner organs; supporting your body against the constant pull of gravity; producing blood cells (the marrow inside of bones produce blood cells); allowing you to move; storing important mineral
2. **types of ossification**: endochondral ossification, formation of bone from tissue; intramembranous ossification, dissolvent of bone from mesenchyme, esp. round bones found in the pelvis; heterotopic ossification, detachment of bone in extraskeletal hard tissue, esp. in connective tissue or muscle tissue
3. **the classification of joints**: immovable, or fibrous joints that don't move; partially movable, or cartilaginous joints that move a little; freely movable, or synovial joints that

move in many directions

Post-reading Activities

I. Answer the following questions.

1. How many years will the process of ossification last?
2. What factors do the bones of kids and young teens contain which are different from adults?
3. How many types of cells do the human bones contain? What are they?
4. Please simply explain the process of ossification.
5. How many kinds of muscles are there in the human body? What are they?

II. Decide whether the following statements are True or False.

1. The boys and girls' growth plates change into hard bone at the same age.
2. The human body has more than 650 muscles, which make up half of a person's body weight.
3. When a person sits perfectly still, the muscles throughout one's body will not move.
4. The movements which the muscles make are coordinated and controlled by the brain.
5. The motor cortex on the right side of the brain controls the muscles on the left side of the body and vice versa.

III. Choose the best answer.

1. The ribs form a cage that shelters the following organs except _____.
   A. heart B. lungs C. liver D. bladder
2. _____ hold the skeleton together, give the body shape, and help it with everyday movements.
   A. Smooth muscles B. Cardiac muscles
   C. Skeletal muscles D. Joints
3. Stem cell can produce the body's _____.
   A. red blood cells and platelets B. marrow
   C. periosteum D. ligament
4. The voluntary muscles are regulated by the parts of the brain known as _____.
   A. brain stem
   B. the cerebral motor cortex and the cerebellum
   C. peripheral nerves
   D. cerebellum

5. Which of the following is not true according to the passage? _____

A. Skeletal muscles are called striated because they are made up of fibers that have horizontal stripes when viewed under a microscope.

B. Smooth, or involuntary, muscle is not made of fibers, and this type of muscle looks smooth, not striated.

C. Bones are made up of two types of material — compact bone and cancellous bone.

D. Our bones, muscles, and joints — along with tendons, ligaments, and cartilage — form our musculoskeletal systems and enable us to do everyday physical activities.

IV. Choose the correct words or phrases from the box to finish the following sentences.

Osteoclasts,	Osteoblasts,	Osteocytes,	Sensors,	Skeletal muscles

1. _____ make new bone and help repair damage.
2. _____ carry nutrients and waste products to and from blood vessels in the bone.
3. _____ break down bone and help to sculpt and shape it.
4. _____ are attached to bone, mostly in the legs, arms, abdomen, chest, neck, and face.
5. _____ in the muscles and joints send messages back through peripheral nerves to tell the cerebellum and other parts of the brain where and how the arm or leg is moving and what position it is in.

Passage B

Bone Development and Growth

Introduction

1 Growth takes place at the **epiphyseal** growth plate of long bones by a finely balanced cycle of cartilage growth, matrix formation and calcification of cartilage that acts as a scaffold for bone formation. This sequence of cellular events constitutes **endochondral** ossification. Another feature of bone growth is a process of modelling, where bone is being continuously resorbed and replaced by new bone. Modelling is most active during childhood and adolescence, and enables long bones to increase in diameter, to change shape and develop a marrow cavity. Modelling continues throughout adult life with bone resorption equally balanced by bone formation in a healthy skeleton, although in the adult the process is referred to as remodelling. An individual's skeletal growth rate and adult limb bone length have an important genetic determinant, but are influenced by many factors including circulating hormones, nutritional intake, mechanical influences and disease.

Skeletal Morphogenesis and Growth

2 The embryonic primordiae of the **appendicular** skeleton are the limb buds, which are mesodermal structures covered by **ectoderm**. The first visible outline of the embryonic limb follows a condensation of mesenchymal cells which subsequently differentiate into cartilage cells, the **chondrocytes**. These cells secrete a matrix and so produce cartilaginous models of the future bones. Surrounding this cartilage is the **perichondrium**, the outer layer of which becomes a connective tissue sheath while the inner cells remain pluripotential. This cartilage rudiment grows by interstitial and appositional growth, and a vascular system develops to invade the perichondrium. A collar of bone is then laid down around the mid-shaft of the bone. This ossification is a result of the inner **perichondrial** cells differentiating into bone forming cells, the osteoblasts. At the same time the osteoblasts, together with capillaries, invade the centre of the shaft to form a primary or **diaphyseal** ossification centre, at a site where the cartilage cells and matrix have begun to disintegrate. **Trabecular** bone is then deposited on cartilaginous remnants. The embryonic bone increases in width by appositional growth, and the central cancellous bone core gradually becomes resorbed to form a marrow cavity.