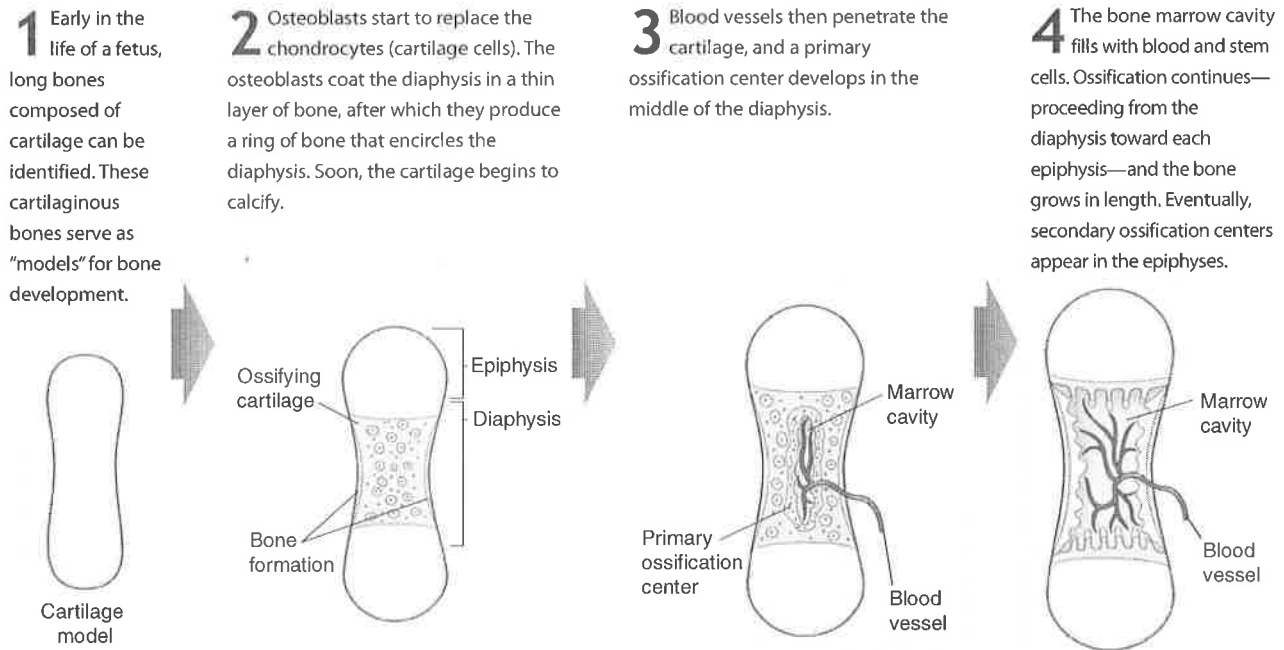


Endochondral Ossification

Most bones evolve from cartilage. After about three months' gestation, the fetus has a skeleton composed mostly of cartilage. At that time, the cartilage begins turning into bone. This process, which begins in long bones, is called **endochondral ossification**. The figure below demonstrates how the process occurs.

ANIMATION



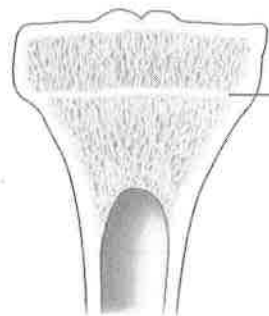
Bone Growth

Bone growth obviously doesn't stop at birth. Bones grow in length, or elongate, for a fixed period. However, bones also widen and thicken throughout the lifespan.

Bone Lengthening



Bone lengthening occurs at the **epiphyseal plate**: a layer of hyaline cartilage at the each end of bone. On the epiphyseal side of the cartilage plate, chondrocytes continue to multiply. As these cells move toward the diaphysis, minerals are deposited and the cartilage becomes calcified. As long as chondrocytes are produced in the epiphyseal plate, the bone continues to elongate.



Sometime between the ages of 16 and 25, all of the cartilage of the epiphyseal plate is replaced with spongy bone. When that occurs, bone lengthening stops, and we say that the epiphyses have "closed." What remains is a line of spongy bone called the **epiphyseal line**.

The Body AT WORK

Several hormones, including growth hormone and the sex hormones estrogen and testosterone, influence bone growth. Growth hormone stimulates chondrocytes in the epiphyseal plate to proliferate, causing bones to grow longer. Sex hormones stimulate a growth spurt during puberty; they're also linked to fusion of the epiphyseal plates (which halts growth).

FAST FACT

When overstressed, the epiphyseal plate can separate from the diaphysis or epiphysis, resulting in an **epiphyseal fracture**. When this occurs, future bone growth can be affected.

Bone Widening and Thickening

Unlike bone lengthening, which stops at a certain point, bone widening and thickening continue throughout the lifespan. A bone widens when osteoblasts in the periosteum lay down new layers of bone around the outside of the bone. As this occurs, osteoclasts on the inner bone tissue work to dissolve bone tissue, widening the marrow cavity.