



Prenatal long bone development (endochondral ossification)

- A.** Chondroblasts develop in primitive mesenchyme and form an early perichondrium and cartilage model.
- B.** The developing cartilage model assumes the shape of the bone to be formed, and a surrounding perichondrium becomes identifiable.
- C.** At the midshaft of the diaphysis the perichondrium becomes a periosteum through the development of osteoprogenitor cells and osteoblasts, the osteoblasts producing a collar of bone by intramembranous ossification.
- D.** Blood vessels grow through the periosteum and bone collar, carrying osteoprogenitor cells within them. These establish a primary (or diaphyseal) ossification center in the center of the diaphysis.
- E.** Bony trabeculae spread out from the primary ossification center to occupy the entire diaphysis, linking up with the previously formed bone collar, which now forms the cortical bone of the diaphysis. At this stage the terminal club-shaped epiphyses are still composed of cartilage.
- F.** At about term (*the precise time varies between long bones*), secondary or epiphyseal ossification centers are established in the center of each epiphysis by the ingrowth along with blood vessels of mesenchymal cells which become osteoprogenitor cells and osteoblasts.