

Using Play-Doh® to Demonstrate the Development of Endochondral Bone

The development of bone from a hyaline cartilaginous model is a difficult concept for my anatomy students. I try to use manipulatives as much as possible and Play-Doh® is a favorite. I first have students shape a solid long bone using Play-Doh®. Next, I have them hollow out the inside of the diaphysis. While they do this I point out that their hands are acting as osteoclasts and they are working at the primary ossification center. I ask them to identify the name of the hollow opening they created. They should call it the medullary cavity. (I will also ask what is found in the cavity of an adult (answer = yellow marrow) and then an infant (answer = red marrow). I then have students add Play-Doh® to the exterior of the diaphysis thus making it thicker. I tell them that there is no periosteum present for simplicity's sake and ask which cells deposit bone underneath the periosteum. The answer should be osteoblasts. As their bone thickens, I ask them to continue to hollow out the medullary cavity.

While this is an over-simplification, I believe that it gives my students an idea of what is happening. I really don't differentiate at this point when spongy bone is deposited and when compact bone is deposited. Depending on the group, I will have students "make" an epiphyseal disk and we will "shape" the bone at the secondary ossification centers.

Sources:

- Shier, David *et. al.* (2000). *Hole's Essentials of Human Anatomy and Physiology*, 7th edition. McGraw-Hill.
- Marieb, Elaine N. (2006). *Essentials of Human Anatomy and Physiology*, 8th edition. San Francisco: Pearson Benjamin Cummings.