

(Note: Like many other pathologists, I believe that my interpretation of bone is one of my weakest areas. Here is my good faith attempt – but if you have access to a pathologist with bone experience, you may want to consult them on these slides as well. Bhw)

WSC 2009-2010, Conference 22, Case 1.

Tissue from a horse.

MICROSCOPIC DESCRIPTION: Bone: Extending to the margins of the submitted tissue, expanding the medulla, and infiltrating overlying cortical bone **(1 pt.)** is an unencapsulated, infiltrative, well-demarcated, moderately cellular neoplasm **(2 pt.)** composed of spindle to stellate cells **(1 pt.)** arranged in haphazard streams on a moderately edematous fibromyxomatous matrix **(1 pt.)**. Scattered throughout the neoplasm are fine often interconnecting spicules of woven bone **(1 pt.)** which are lined by a continuous single or double layer of plump, hypertrophic osteoblasts **(1 pt.)**. Spindle cells have indistinct cell borders with scant eosinophilic cytoplasm **(1 pt.)**. Nuclei are oval to elongate with finely-stippled chromatin and 1-2 indistinct nucleoli **(1 pt.)**. Mitoses are rare (less than 1 per ten 40X HPF) **(1 pt.)**. Scattered throughout the matrix, there are rare aggregates of pre-existent marrow elements **(1 pt.)**, low numbers of lymphocytes and plasma cells **(1 pt.)**, and rare hemosiderin-laden macrophages **(1 pt.)**. At the edges of the neoplasm, there are spicules of woven bone which have scalloped edges, prominent reversal lines, osteocytes in lacunae, and are intermittently lined by osteoblasts and occasionally osteoclasts in Howship's lacunae **(1 pt.)**. In the overlying skeletal muscle, myocytes are pale, hyalinized, swollen, or vacuolated (degeneration) **(1 pt.)**, or are shrunken, and fragmented, with formation of contraction bands (necrosis) **(1 pt.)**.

MICROSCOPIC DIAGNOSIS: Bone: Ossifying fibroma **(3 pt.)**

O/C: (1 pt.)

WSC 2009-2010. Conference 22, Case 2

Tissue from a cat. (NOTE: either distal radius and ulna, or proximal humerus are present on the slide. I got distal radius and ulna.)

MICROSCOPIC DESCRIPTION: Distal radius and ulna, tangential section: There is diffuse marked osteopenia as compact cortical bone is not evident (**1 pt.**). Cortices of the distal radius and ulna are markedly thinned and in some areas is replaced by fibrous connective tissue containing small amounts of woven bone and islands of chondroid matrix (**1 pt.**). The medullary cavity of the epiphysis is markedly expanded with fibrous connective tissue with only rare, small trabeculae of woven bone remaining (**1 pt.**); the cavity contains sparse marrow elements and abundant adipose tissue. There is mild elongation of cartilage columns within the growth plate, and both primary and secondary spongiosa contains increased amounts of cartilage (**1 pt.**). The spongiosa is intermittently lined by small, quiescent osteoblasts; osteoclasts are not evident (**1 pt.**). The bony spicules comprising the secondary spongiosa are separated by edematous fibrous connective tissue lacking marrow elements, there is scattered minimal to mild hemorrhage (**1 pt.**). Within the distal radial metaphysis, there is a focally extensive disordered proliferation of dense fibrous connective tissue containing numerous active fibroblasts, large areas of woven bone (**1 pt.**), and multiple nodules of cartilage which effaces the medullary cavity, replaces woven bone of the marrow cavity, and expands the cortex (**1 pt.**) (fracture callus) (**1 pt.**). (A similar, but less extensive process is occurring at the same level in the non-weightbearing distal ulna.) In this area, the cortex is thickened with an undulating surface, and the periosteum is thickened by a thick band of collagen overlying a cortex composed primarily of woven bone (**1 pt.**). The articular surface of the distal radius is bordered by large osteophytes (**1 pt.**), and the articular cartilage is mildly thinned, pink in color (loss of cartilage glycosaminoglycans), and there is a focally extensive proliferation of collagen and fibrocytes extending from the synovium partially across the articular cartilage surface (pannus) (**1 pt.**).

MORPHOLOGIC DIAGNOSIS: 1. Bone, distal radius and ulna: Osteopenia, diffuse, severe with marked loss of cortical lamellar bone and epiphyseal woven bone. (**2 pt.**)

2. Bone, distal radius and ulna, metaphysis: Fracture callus, focally extensive. (**2 pt.**)

3. Articular cartilage, distal radius: Synovial hyperplasia, focally extensive, mild with pannus. (**1 pt.**)

NAME THE CONDITION: Osteogenesis imperfecta (**2 pt.**)

O/C – (**1 pt.**)

WSC 2009-2010, Conference 20, Case 3.

Tissue from a mouse.

MICROSCOPIC DESCRIPTION: Vertebral body with spinal cord and epaxial musculature: Assymmetrically expanding the vertebral body (**1pt.**), multifocally effacing the periosteum and endosteum (**1pt.**), filling the marrow cavity and compressing the spinal cord (**1pt.**), there is an unencapsulated, moderately cellular, poorly demarcated, infiltrative neoplasm composed of spindle cells on a scant collagenous matrix (**1pt.**). Neoplastic cells have indistinct cell borders and a moderate amount of a finely vacuolated eosinophilic cytoplasm (**1pt.**). Nuclei are irregularly round, with finely stippled chromatin and 1-2 small basophilic nucleoli (**1pt.**). Anisokaryosis is marked (**1pt.**). In cellular areas, mitotic figures average one per hpf (**1pt.**). There is multifocal and often transmural loss of compact bone (**1pt.**) within vertebral body and arch, which is replaced by disorganized trabeculae of neoplastic woven bone (**1pt.**). Neoplastic bone has irregular reversal lines and neoplastic cells are entrapped in irregularly spaced lacunae. Many lacunae are empty. The neoplastic bone is lined by spindle cells (**1pt.**) which are often separated by fine wisps of densely eosinophilic matrix (osteoid) (**1pt.**); osteoblasts and osteoclasts are absent. The vertebral canal is decreased in diameter by approximately 50% by the neoplasm (**1pt.**), and the spinal cord is transversely compressed. There are low numbers of dilated axons sheaths in the cord and adjacent nerve roots (**1pt.**). Adjacent to the expanded vertebral body and periosteum, skeletal muscle fibers are pale, shrunken, and vacuolated, and there is rare hypertrophy of satellite nuclei (degeneration) (**1pt.**).

MORPHOLOGIC DIAGNOSIS: Vertebral body: Osteosarcoma, with spinal cord compression. (**4pt.**)

O/C - (**1pt.**)

WSC 2009-2010, Conference 22, Case 4.

Tissue from a rat.

MICROSCOPIC DESCRIPTION: Femorotibial joint (**1 pt.**): The primary spongiosa of the tibial growth plate is markedly elongated (**3 pt.**), up to four or five times the length of the physal cartilage in some areas (**2 pt.**) (decreased remodeling). Primary spongiosa contains thick cores of cartilage covered by abundant osteoid. Osteoclasts are rare (**3 pt.**) within both the primary and secondary spongiosa. The tibial growth plate is thin (**2pt.**) with mild disorganization of the zones of proliferation and hypertrophy. There is moderate congestion within the metaphysis (**2 pt.**).

MORPHOLOGIC DIAGNOSIS: Tibia, metaphysis: Osteosclerosis, diffuse, moderate, with lack of primary spongiosa remodeling. (**5 pt.**).

O/C: (**2 pt.**)