Bone – Callus

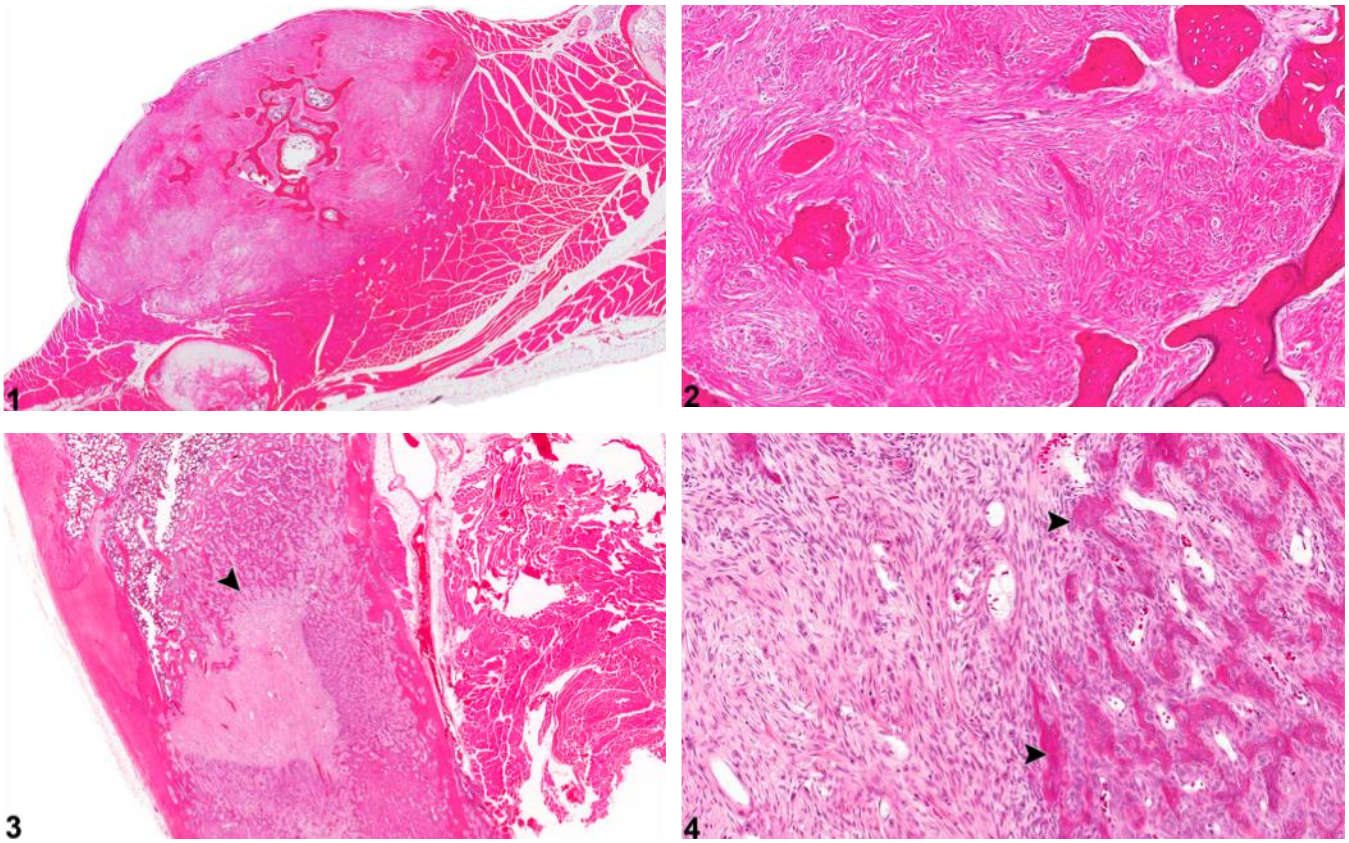
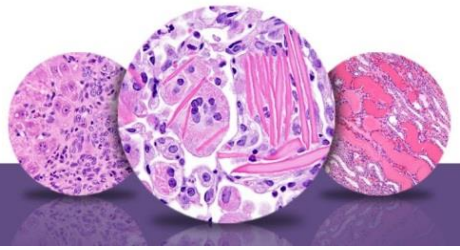


Figure Legend: **Figure 1** Bone - Callus in a male Wistar rat from a chronic study. There is callus formation surrounding a rib, characterized by a marked proliferative fibrous connective tissue response and bony remodeling. **Figure 2** Bone - callus in a male Wistar rat from a chronic study (higher magnification of figure 1). Section of a bone callus, characterized by a marked proliferative fibrous connective tissue response and bony remodeling. **Figure 3** Bone - callus in a male F344/N rat from a chronic study. This section of long bone with a callus is characterized by a focal fibroblastic response (arrowhead). **Figure 4** Bone - callus in a male F344/N rat from a chronic study (higher magnification of figure 3). This bone callus has a focal fibroblastic response and associated osteoid deposition and mineralization (arrowheads).

Comment: Shortly after fracture and resolution of hemorrhage, fibroblasts adjacent to the fracture site begin to replicate and form loose granulation tissue (Figure 1, Figure 2, and Figure 3). Following granulation tissue formation, fibroblasts within the fracture site, as well as along the periosteum,



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differentiate into chondroblasts to form hyaline cartilage, while those distal to the fracture site develop into osteoblasts to form woven bone. As these populations of tissue form a new mass of connective tissue bridging the fracture site, a callus is formed. Following callus formation, hyaline cartilage and fibrous tissue are replaced by trabecular bone through mineralization of existing collagenous matrix (Figure 4). During a remodeling phase, the callus and lamellar bone deposition is contoured to the original bone structure. Generally, fracture callus is incomplete or disordered in cases of secondary fracture due to neoplasia, ongoing inflammatory or infectious disease, or metabolic bone disease.

Recommendation: Bone - callus, when observed, should be diagnosed but not graded. When observed in conjunction with a fracture secondary to neoplasia, ongoing inflammation or infection, or metabolic disease, fracture callus should not be diagnosed but should be discussed in the narrative. Associated lesions, such as inflammation or fibrosis, should not be diagnosed separately unless warranted by their severity.

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