

Osteochondrosis

(Abnormal Bone Formation in Growing Dogs)

Basics

OVERVIEW

- Long bones (such as the humerus, radius and ulna in the foreleg and the femur and tibia in the rear leg) have three sections: the end of the bone, known as the “epiphysis”; the shaft or long portion of the bone, known as the “diaphysis”; and the area that connects the end and the shaft of the bone, known as the “metaphysis”
- The metaphysis is the area where bone growth occurs in puppies; the long bones in the body grow in length at specific areas known as “growth plates”; these areas usually continue to produce bone until the bones are fully developed, at which time, no further growth is needed; the growth plates then “close” and become part of the hard bone
- Bone is formed by the replacement of calcified cartilage at the growth plates; the bone-forming cells (known as “osteoblasts”) form bone on the cartilage structure; this process is known as “endochondral ossification”
- “Osteochondrosis” is a disorder of bone formation in the growth plates (areas where bone grows in length in the young pet) of the bone; it is a disease process in growing cartilage, primarily characterized by a disturbance of the change from cartilage to bone (known as “endochondral ossification”) during bone development that leads to excessive retention of cartilage



GENETICS

- Multiple genes are involved (known as “polygenetic transmission”)—expression determined by an interaction of genetic and environmental factors
- Heritability index—depends on breed

SIGNALMENT/DESCRIPTION OF PET

Species

- Dogs
- Demonstrated clinically—horses, pigs, broiler chickens, turkeys, people

Breed Predispositions

- Frequent and serious problem in many dog breeds
- Large- and giant-breed dogs—Great Danes, Labrador retrievers, Newfoundlands, rottweilers, Bernese mountain dogs, English setters, Old English sheepdogs

Mean Age and Range

- Onset of clinical signs—typically 4–8 months of age
- Diagnosis—generally 4–18 months of age
- Signs of secondary degenerative joint disease (progressive and permanent deterioration of joint cartilage)—any

age

Predominant Sex

- Shoulder osteochondrosis—males are twice as likely to develop shoulder osteochondrosis than females
- Osteochondrosis of the elbow, stifle, or hock—none

SIGNS/OBSERVED CHANGES IN THE PET

- Depend on the affected joint(s) and coexistent degenerative joint disease (progressive and permanent deterioration of joint cartilage)
- Lameness—most common sign; sudden or subtle onset; slight, moderate, or severe; one or more limbs may be involved; becomes worse after exercise; duration of several weeks to months; pet may support little weight on the affected limb
- Pain—usually elicited on feeling the limb by flexing, extending, or rotating the involved joint
- Generally a weight-bearing lameness
- Fluid buildup in the joint (known as “joint effusion”)—common with osteochondrosis of the elbow, stifle, and hock
- Decrease in muscle mass (known as “muscle atrophy”)—consistent finding with long-term (chronic) lameness

CAUSES

- Developmental disorder
- Nutritional disorder

RISK FACTORS

- Rapid growth and weight gain
- Diet containing three times the recommended calcium levels

Treatment

HEALTH CARE

- Ice packing (known as “cryotherapy”) of affected joint—immediately following surgery; 5–10 minutes three times a day for 3–5 days, or as directed by your pet's veterinarian
- Range-of-motion exercises—initiated as soon as the pet can tolerate joint movement

ACTIVITY

- Restricted
- Avoid hard, concussive activities (such as running on concrete)
- Following surgery for osteochondritis dissecans or OCD (abnormal development of bone and cartilage, leading to a flap of cartilage within the joint)—limit activity for 4–6 weeks; encourage early, active movement of the affected joint(s)

DIET

- Weight control—decreases stress placed on affected joint(s)

SURGERY

- Osteochondrosis is a non-surgical condition, unless a related bone fragment moves into an area that causes clinical signs, then surgical removal of the bone fragment is indicated
- May progress to osteochondritis dissecans (abnormal development of bone and cartilage, leading to a flap of cartilage within the joint) as the pet grows
- Surgical procedure cutting into or entering a joint (known as an “arthrotomy”) or using a special lighted instrument called an “arthroscope” (general term for procedure is “arthroscopy”) to allow the surgeon to see inside the joint—indicated for most dogs with osteochondritis dissecans (abnormal development of bone and cartilage, leading to a flap of cartilage within the joint)
- Shoulder—surgery indicated for all osteochondritis dissecans (abnormal development of bone and cartilage, leading to a flap of cartilage within the joint) lesions; exploratory procedure indicated for pain and lameness with x-ray (radiographic) evidence of osteochondrosis
- Elbow—surgery indicated for all osteochondritis dissecans (abnormal development of bone and cartilage,

leading to a flap of cartilage within the joint) lesions; indicated to assess for other bone conditions

- Stifle—surgery is controversial; pets develop degenerative joint disease (progressive and permanent deterioration of joint cartilage) even with surgical procedure; using a special lighted instrument called an “arthroscope” (general term for procedure is “arthroscopy”) to allow the surgeon to see inside the joint may improve the recovery rate and long-term function
- Hock—remove osteochondral flap; surgery is controversial; all pets develop severe degenerative joint disease (progressive and permanent deterioration of joint cartilage) even with surgical procedure; may attempt to reattach the flap to the underlying subchondral bone
- Sacrum—surgically remove bone fragment, if impinging on the cauda equina; at this level of the spine, spinal nerves are located in the spinal canal (rather than spinal cord)—these spinal nerves within the spinal canal are known as the “cauda equina”

Medications

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive

- Nonsteroidal anti-inflammatory drugs (NSAIDs) and pain relievers (known as “analgesics”)—may be used to symptomatically treat degenerative joint disease (progressive and permanent deterioration of joint cartilage) associated with osteochondritis dissecans (abnormal development of bone and cartilage, leading to a flap of cartilage within the joint); does not promote healing of the cartilage flap (thus surgery still is indicated)
- Medications intended to slow the progression of arthritic changes and protect joint cartilage (known as “chondroprotective drugs”), such as polysulfated glycosaminoglycans, glucosamine, and chondroitin sulfate—may help limit cartilage damage and degeneration; may help alleviate pain and inflammation

Follow-Up Care

PATIENT MONITORING

- Periodic monitoring until pet's skeleton has developed fully and matured—recommended to assess progression to osteochondritis dissecans (abnormal development of bone and cartilage, leading to a flap of cartilage within the joint)
- Yearly examinations—recommended to assess progression of degenerative joint disease (progressive and permanent deterioration of joint cartilage)

PREVENTIONS AND AVOIDANCE

- Discourage breeding of affected dogs
- Do not repeat dam–sire breedings that resulted in affected offspring
- Restricted weight gain and growth in young dogs—may decrease incidence

POSSIBLE COMPLICATIONS

- Degenerative joint disease (progressive and permanent deterioration of joint cartilage)

EXPECTED COURSE AND PROGNOSIS

- Shoulder—good-to-excellent prognosis for return to full function; minimal osteoarthritis (form of joint inflammation [arthritis] characterized by chronic deterioration or degeneration of the joint cartilage) with osteochondrosis and after surgery for osteochondritis dissecans (abnormal development of bone and cartilage, leading to a flap of cartilage within the joint)
- Elbow, stifle, and hock—fair prognosis for osteochondrosis, guarded for osteochondritis dissecans (abnormal development of bone and cartilage, leading to a flap of cartilage within the joint); depends on size of lesion (most important), degenerative joint disease (progressive and permanent deterioration of joint cartilage), and age at diagnosis and treatment; progressive osteoarthritis (form of joint inflammation [arthritis] characterized by chronic deterioration or degeneration of the joint cartilage) development, even after surgery
- Sacrum—good after bone fragment removal

Key Points

- Osteochondrosis has a genetic basis
- Degenerative joint disease (progressive and permanent deterioration of joint cartilage) may develop
- Excessive intake of nutrients that promote rapid growth has an influence on the development of osteochondrosis; therefore, restricted weight gain and growth in young dogs may decrease the incidence of osteochondrosis