

Osteoarthritis – Canine

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Definition

Osteoarthritis is a progressive joint disease with loss of cartilage integrity resulting in the production of new bone at the articular surface margins, in an increase in thickness of the joint capsule, and in pain.

Key Diagnostic Tools and Measures

- Changes in willingness or ability to exercise or play
- Pain response to joint manipulation, decrease in joint motion, or crepitus
- Lameness or weight shifting diagnosed using a force plate

Pathophysiology

Joint subluxation, excessive impact loading, articular fractures, or other causes trigger osteoarthritis. These triggering factors activate the division and multiplication of chondrocytes. Initially, the production of quantitatively and qualitatively abnormal proteoglycan and collagen is increased. Eventually, proteoglycan content is decreased, the collagen matrix structure is altered, and normal cartilage structure and function is lost. Osteophytes form around the joint.

Signalment

Osteoarthritis is common in dogs. It is primarily the consequence of hip dysplasia, elbow dysplasia, and the rupture of cranial cruciate ligaments. Larger dogs and dogs with lower ratio of muscle mass/subcutaneous tissue mass (Saint Bernards, for example) are predisposed. Overweight, older, and chondrodystrophic dogs are also predisposed.

Key Nutrient Modifications

Body condition is the factor that has most impact on the progression of osteoarthritis.¹ It is therefore critically important to maintain dogs with known or potential osteoarthritis at an optimal body condition score (BCS; see Appendix I) of 4 or 5 out of 9, by limiting caloric intake.⁶

An increase in the concentration of proteoglycan building blocks (glucosamine and chondroitin sulfate) led to a decrease in clinical signs in several large studies of people with moderate to severe osteoarthritis.^{2,3} The evidence supporting its use in dogs is more scant. An increase in the concentration of n3 polyunsaturated fatty acids, particularly eicosapentaenoic acid, led to a decrease in the lameness of dogs with osteoarthritis in one clinical trial.⁴ Several herbs have been shown to decrease the clinical signs of arthritic people but their safety and efficacy is not documented in dogs.⁵

Recommended Ranges of Key Nutrients

Nutrient	% DM	mg/100 kcal	% DM	mg/100 kcal
	Recommended dietary level		Minimum dietary requirement*	
Total n3 (from fish oil)	1.0–2.0	240–300	n/a	n/a
EPA	0.5–1.0	100–200	n/a	n/a

Modified intake of these nutrients may help address metabolic alterations induced by disease states. The recommended dietary composition is shown as percent of dietary dry matter (DM) and as g or mg per 100 kcal metabolizable energy. All other essential nutrients should meet normal requirements adjusted for life stage, lifestyle, and energy intake.

*Nutrient requirement for adult animals as determined by the Association of American Feed Control Officials

Caloric intake should be controlled to keep arthritic dogs in a lean body condition. Dietary protein intake should not be restricted.

Therapeutic Feeding Principles

The first priority for the management of dogs with osteoarthritis is achieving and maintaining a lean body condition. Other priorities include the administration of compounds that may decrease joint pain through their anti-inflammatory properties. These include glucosamine sulfate or hydrochloride, chondroitin sulfate, and omega-3 fatty acids, particularly eicosapentaenoic acid.

■ **Treats** – Treats for dogs with osteoarthritis should be highly palatable and have a low caloric and low fat content to avoid weight gain.

■ **Tips for Increasing Palatability** – The fat content of food for dogs with osteoarthritis is not severely restricted, and thus palatability seems to be high overall.

■ **Diet Recommendations** – A diet designed for the dietary management of dogs with osteoarthritis contains omega-3 fatty acids and glucosamine, and has a moderate fat content (12.0% min of dry content), a high protein content (30% min of dry content), and a moderate fiber content (4.0% min of dry content). Obese dogs with osteoarthritis may be fed a diet that has a low fat content (4.0% to 8.5% of dry content), a moderate protein content (26.0% min of dry content), and a high fiber content (16.0% min of dry content).

Client Education Points

- Osteoarthritis negatively impacts the mobility of dogs and decreases their lifespan.⁷
- Osteoarthritis progresses more rapidly in overweight dogs than in fit dogs.¹
- The clinical signs of osteoarthritis decrease in overweight dogs who lose weight.⁸
- The signs of osteoarthritis may decrease after administration of nutritional supplements.⁴
- Low-impact activities may be beneficial to patients with osteoarthritis.^{4,9}
- Rapid changes in temperature may increase the pain perceived from arthritic joints.⁴

Common Comorbidities

Osteoarthritis can lead to chronic joint pain. The pain perceived from arthritic joints is variable among joints (the elbow joint is less *forgiving* than the hip joint), dog sizes (clinical signs are more severe in small and giant dogs compared with medium-sized dogs), and individuals. As a consequence of chronic joint pain, an affected joint may lose motion in specific directions, affected limbs become weaker, and affected patients lose muscle and cardiovascular fitness. The combination of painful, less mobile joints, weaker limbs, and unfit dogs lead to a loss of mobility and potential weight gain.

Interacting Medical Management Strategies

Osteoarthritis is not automatically associated with systemic diseases but, because the signs of osteoarthritis are amplified in older patients, osteoarthritis and other chronic diseases (for example, chronic renal insufficiency, heart failure, hyperadrenocorticism) are often managed simultaneously. The medical and nutritional management of chronic cardiac, renal, gastrointestinal, or other systemic diseases has priority over the medical and nutritional management of osteoarthritis. Other strategies, including therapeutic exercises, cold therapy, or stretching, may also be

implemented based on specific patient needs. Therapeutic exercises may be used to strengthen, increase endurance, and stretch. The recommended weight loss rate in overweight, arthritic patients with systemic diseases is approximately 1% body weight per week. This is lower than the recommended weight loss rate of 1% to 2% body weight per week in overweight, arthritic patients free of systemic diseases.

Monitoring

Monitoring of the clinical signs and response to medical and nutritional

management of arthritic patients may be done at re-evaluations that include the assessment of locomotion (stance, gait at a walk and trot), and the pain response to joint palpation. The frequency of monitoring is linked to the severity of clinical signs. Younger, less severely affected patients may be re-evaluated intermittently (every 6 months, for example). Older, severely affected patients may be evaluated monthly. Weight loss should be assessed often (every 2 to 4 weeks). Patient monitoring should also include phone communication with the owner every week. Adjustments to medical, nutritional, and exercise programs can be made at that time.

Algorithm – Nutritional Management of Symptomatic Canine Osteoarthritis

