



Clinical Evidence Report

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EFFECTS OF DIETARY SUPPLEMENTATION WITH FISH OIL OMEGA-3 FATTY ACIDS ON WEIGHT BEARING IN DOGS WITH OSTEOARTHRITIS.

Roush JK, Cross AR, Renberg WC, et al. *J Am Vet Med Assoc.* 2010. In press.

BACKGROUND

Osteoarthritis (OA) or degenerative joint disease is a chronic, progressive disease characterized by pathological changes of movable joints accompanied by clinical signs of pain and disability. OA is associated with degeneration of articular cartilage and loss of proteoglycan and collagen, proliferation of new bone and a variable inflammatory response. OA has been estimated to affect up to 20% of the canine population over 1 year of age. The goals of managing OA include the following: 1) prevention or risk factor management, 2) managing progression of the disease, and 3) controlling clinical signs. Proper nutrition, weight control, controlled exercise, physical therapy, anti-inflammatory and analgesic medication, and other disease-modifying agents are often incorporated into all three categories to manage OA. A relatively new concept in the management of animals with OA is the use of omega-3 fatty acids. The mechanisms likely for the potential clinical benefits of omega-3 fatty acids include controlling inflammation and reducing the expression and activity of cartilage proteoglycan degrading enzymes. The objective of this study was to determine the effect of food containing high levels of omega-3 fatty acids for ameliorating clinical signs in dogs with OA by using force plate analysis as an objective measurement of the dogs' weight bearing abilities.

STUDY DETAILS

The investigation was conducted as a 90-day prospective, randomized, double-masked, controlled study in two veterinary teaching hospitals in the United States. OA was diagnosed based on compatible history, clinical signs and radiographic evidence of arthritis in one or more joints on the clinically affected limb. To be eligible for inclusion, dogs also had to be at least 1 year of age, weigh 25 pounds or more, consume dry dog food and be free of systemic disease as determined by history, physical examination, complete blood count (CBC), serum biochemistry analysis and urinalysis. Exclusion criteria included acute traumatic injuries, complicating disease conditions, preexisting conditions for which corrective surgery was anticipated during the feeding period and recent intra-articular injection or arthrocentesis. Dogs were randomly assigned to receive either a typical commercial dog food (Purina® Dog Chow®/Pedigree® Choice Cuts®) or a test food (Hill's® Prescription Diet® j/d® Canine) for 90 days. The test food contained a 31-fold increase in total omega-3 fatty acid concentration (3.47 vs. 0.11% on dry matter basis), a 41-fold increase in eicosapentaenoic acid (EPA) concentration (0.38 vs. <0.01% on dry matter basis) and a 97% decrease in the omega-6:omega-3 ratio (0.7:1 vs. 24.3:1) compared to the control food. Pet owners could feed either a dry food or a combination of dry plus canned foods of the control or test formulas.

For baseline purposes, pet owners completed a questionnaire that detailed their dogs' arthritic condition. Baseline assessments included the frequency with which dogs exhibited the following signs: difficulty in rising from a resting position, limping, stiffness, soreness when touched, vocalizing in pain, aggression, lagging behind on walks, reluctance in running, walking, jumping, climbing stairs, playing and general activity level. Variables were assessed at the beginning of the study and at 45 and 90 days after onset of feeding the control or test food. Additionally, veterinary clinical evaluations were conducted at each time interval. These consisted of an orthopedic examination with a specific emphasis on lameness, pain on palpation of the affected joint(s), limitation in weight bearing ability, range of motion of the affected joint(s) and willingness to bear weight on the most affected limb when the contralateral limb was elevated. Samples for CBC, serum biochemistry and serum fatty acid determinations were also obtained at each time interval.



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Gait analyses using a computerized biomechanical force plate were also conducted at the same time intervals. For each dog, five valid force plate trials were obtained during each test period for the most severely affected and ipsilateral limb. Orthogonal ground reaction forces of peak vertical force, vertical impulse, braking and propulsion peak force, and braking and propulsive force were measured and recorded.

All forces were normalized with respect to body weight in kilograms and data from valid trials for each limb were averaged to obtain a mean value at each time period.

Of 44 dogs starting the study, 38 dogs [22 received test food, 16 received control food] completed 90 days of feeding. Baseline mean body weights, mean body condition score, age, gender, overall arthritic condition and frequency of clinical signs were not significantly different between treatment groups. Both groups maintained body weight and condition over the course of the study. Dogs fed the test food had significantly higher serum concentrations of total omega-3 fatty acids, significantly higher serum concentrations of EPA, significantly lower serum concentrations of arachidonic acid and significantly lower omega-6:omega-3 fatty acid ratios at 45 and 90 days.

On clinical orthopedic examination, dogs consuming the test food were reported to have decreased lameness ($p=0.02$) and improved weight bearing ($p=0.001$).

Vertical peak force was the key parameter measured to determine weight bearing of affected limbs. There was no significant change in mean peak force over the duration of the 90-day feeding trial for the control group. The mean vertical peak force increased significantly ($p=0.01$) for the test group over the same time interval. In the study, 82% of dogs in the test group increased weight bearing, compared to 38% of dogs in the control group.

CLINICAL IMPORTANCE

This study indicates that nutritional management using a food with high levels of omega-3 fatty acids helped improve the clinical signs of OA in dogs as measured by clinical orthopedic examination and gait analysis of ground reaction forces.