

medical news for vets

The Benchmark

APRIL - JUNE 2019



Canine Shoulder Injury:
A difficult diagnosis to make



Medical Director's Cut

Dr. Amber Hopkins, DVM, cVMA, DACVAA

“Spring is the time of
plans and projects”

– Leo Tolstoy

Spring is a season of growth for Colorado and VCA Alameda East Veterinary Hospital. As our practice continues to advance, we are actively recruiting new staff, refining our patient and client experience with new technologies and expanding our contributions to the community.

In an effort to promote responsible breeding in the community, Cardiologist, Dr. Christina Bové, recently performed cardiac auscultation screenings at the Terry All Kennel Club Dog Show. Proceeds of the screenings were donated to the Freedom Service Dogs of America. In March, VCA Alameda East Veterinary Hospital was named Partner of the Month by PawsCo animal welfare organization for the generous pet food donations made by our clients. PawsCo partners with Food Bank of the Rockies to provide pet food for families in need. Our Specialists continue to present RACE certified continuing education events for Veterinarians and their Technicians in the Denver area. Our next events will be in June.

Alameda East Veterinary Hospital is working on three new and exciting Initiatives to help support our staff, community, patients, clients and the environment. Included in these initiatives are our Safety Initiative, Green Initiative and Innovation Initiative. We have focused on Wellness and Infectious Disease Awareness as the first part of our Safety Initiative. In our Green Initiative, we continue to make hospital wide changes to help support the environment. And our commitment to technology continued at the Veterinary Innovation Summit at Texas A&M this spring, inspiring the increased use of electronic documents and communications, and exploring the use of Virtual Healthcare Visits.

As always, we look forward to hearing your feedback as we grow, so that we may direct our efforts to best serve you and your patients. Happy spring!

Sincerely,

Amber Hopkins
DVM, cVMA, DACVAA
Medical Director

Canine Shoulder Injury: A Difficult Diagnosis to Make

John Stephan, DVM, MS, DACVS

Part 1 of a 2 part series

"The canine shoulder joint is a remarkable articulation capable of movements in all directions with the greatest range of motion of all canine joints."

Anthropomorphism in pet ownership is evident more than ever today. Without thought, people are quick to personify feelings and other human attributes onto their pets. However, this extension of human "behavior" is less prevalent when dealing with pet injury. Many people have difficulty understanding and describing their own health conditions, limiting their ability to translate these experiences onto a pet and recognizing problems in a timely manner.

Combine this fact with the inherent complexity and often elusive nature of shoulder pathology, forelimb lameness due to shoulder injury can be very difficult to diagnose. The shoulder is rarely implicated by the history and description of clinical signs provided by pet owners. This makes a veterinarian's role that much more important in not only the diagnosis of shoulder disease, but the initial discovery of shoulder involvement.

Anatomy

The canine shoulder (glenohumeral) joint is unique from other appendicular joints in the structural manner of how it is stabilized and its abilities of movement. The humeral head articulates with the smaller glenoid cavity of the scapula. This anatomic conformation does not provide a stable socket. The shoulder relies predominantly on active stabilizers (biceps brachii, supraspinatus, infraspinatus, subscapularis and teres minor muscles and biceps brachii tendon) and less so on passive stabilizers (joint capsule, medial and lateral glenohumeral ligaments [MGL, LGL]) for stability.

The supraspinatus, infraspinatus, subscapularis and teres minor muscles arise from the scapula and connect to the proximal humerus. In the human, the tendons of these muscles, while separate at the muscle bellies, come together and fuse with the joint capsule to form a "cuff" at the level of the shoulder joint. However, in the dog the associated tendons of these four stabilizing muscles remain independent of each other as they cross the shoulder joint.

Biomechanics

The canine shoulder joint is a remarkable articulation capable of movements in all directions with the greatest range of motion of all canine joints. In addition, as in all quadrupedal animals, it provides a crucial weight-bearing function. Despite its capabilities, primary mechanics of the shoulder during ambulation are flexion and extension. Support provided by the humeral head and the glenoid cavity is limited with 62% surface contact during normal weight-bearing. This contact decreases during joint flexion and extension, requiring assistance from active stabilizers during locomotion.

The stabilizing muscles of the shoulder joint perform at their optimum during flexion and extension. Architecturally and biomechanically, the muscles complement each other and maximize stability. The supraspinatus m. extends the shoulder to advance the limb. It also is important preventing collapse of the shoulder joint. It is 65-80% active during standing. The

"Injury to shoulder stabilizing muscles is suspected to result from repetitive activity and/or overuse more so than trauma."

infraspinatus m. helps with external rotation of the shoulder. Along with the teres minor m., it also assists with flexion. The subscapularis m. primarily functions as a medial stabilizer of the shoulder. However, it assists with humeral head movement and stabilization during both flexion and extension. The biceps' primary function is flexion of the elbow. In addition, it extends and stabilizes the shoulder joint during standing and the weight-bearing phase of a dog's gait. Injury to any one of these support structures can result in pathology causing pain and dysfunction.

Pathogenesis

The supporting muscles of the canine shoulder are anatomically independent of each other, rather unique from each other regarding primary functions in maintaining shoulder stability and yet, quite similar in the manner they sustain injury and respond to injury. These muscles and their associated tendons are often subjected to forces that exceed their mechanical properties resulting in muscle strain, most often involving a muscle-tendon junction. Without treatment, a muscle strain undergoes an initial period of inflammation followed by natural formation of scar tissue, even after the most minor of strain injury. Scar tissue is mechanically inferior to healthy tendon tissue. Its formation decreases tendon strength and flexibility; thus, reducing biomechanical performance and predisposing tissue to further injury. Tendon contracture and permanent shortening can occur in chronic situations.

“Ultrasound is the preferred diagnostic imaging tool for evaluating support structures of the canine shoulder joint.”

Injury to shoulder stabilizing muscles is suspected to result from repetitive activity and/or overuse more so than trauma. Tissue degeneration and subsequent loss of strength predispose the muscles and their tendons to fraying, degeneration and eventual breakdown. Injury to individual stabilizing muscles result in clinical conditions unique to each muscle. However, these conditions often present with similar histories and patient problems, making diagnosis challenging. Shoulder pathology requires an accurate diagnosis to select treatments that provide the best chance for an optimal outcome. Part 1 of this article will review bicipital tenosynovitis (BT). Part 2 will review Supraspinatus tendinopathy (ST) and Medial Shoulder Instability.

Bicipital Tenosynovitis

A diagnosis of bicipital tenosynovitis (BT) can be elusive. Bicipital tenosynovitis results from injury and inflammation of the biceps brachii tendon of origin where it crosses the shoulder joint. It has a high occurrence rate in agility dogs resulting from repeated strain injury to the biceps tendon.

Activities involving repetitive contractions and overstretching of the muscle with the shoulder flexed and/or the elbow extended results in micro-tears and subsequent tendon degeneration. It is also possible for a single traumatic event, such as landing forcefully from a fall with forelimbs extended, to result in tendon fiber disruption without complete tendon failure. If a diagnosis of acute BT is delayed, additional strain will contribute to further tendon degeneration and loss of function. Early clinical signs of episodic mild lameness and discomfort advance to persistent lameness and pain.

Clinical Signs

Patients with BT can present without noticeable lameness. However, owners often describe forelimb lameness, varying in duration and intensity, that doesn't always correlate with known episodes of physical exertion. Regardless of lameness severity at presentation, tendon irritation from increased movement during strenuous exercise will almost always exacerbate lameness in patients with BT. Unilateral lameness is most common, although bilateral disease may eventually be diagnosed.

Diagnosis

During gait analysis, dogs with BT often have a unilateral, weight-bearing lameness of variable severity that worsens with activity. Discomfort may be elicited by direct pressure over the biceps tendon. Pain and tendon spasm may also be instigated with flexion of the shoulder while extending the elbow.



Figure 1: Ultrasound exam of the shoulder

Radiographic imaging of the shoulder is of minimal assistance in diagnosing BT. Radiographs are interpreted as normal with acute injuries. In more chronic cases, they may reveal tendon mineralization which supports chronic biceps degeneration. Ultrasound is the preferred diagnostic imaging tool for evaluating support structures of the canine shoulder joint. It is quick, cost-effective, and useful for contralateral limb evaluation and effective in identifying acute and chronic BT (Figure 1). It requires a radiologist experienced in musculoskeletal ultrasonography. MRI is the gold standard imaging modality in human medicine and is equal in its capabilities of evaluating the canine shoulder joint. However, MRI availability, cost and the requirement for general anesthesia limits the clinical applicability of MRI for diagnosis of biceps tendinopathy. Acute BT Treatment

Acute BT is treated with conservative medical management and rehabilitation therapy. Conservative medical management includes controlled activity, NSAIDs and cryotherapy. Occasionally, intra-articular injections of hyaluronic acid or steroids are provided.

Rehabilitation programs for acute BT injury should initiate low load, pain-free, high repetition exercise and range of motion (ROM) movements early in the healing process. However, acute tendon injuries should not be subjected to stretching due to the potential for producing additional micro-tears within the tissue. Pain-free, passive ROM movements are recommended first with progression to active ROM exercises (weight-bearing exercises that cause flexion and extension of the limb).

Implementation of laser therapy as early as one week after injury promotes healing and decreases adhesion formation. A strengthening program consisting of controlled leash walking and stabilizing exercises should follow beginning exercises and ROM movements.

Chronic BT Treatment

Differing from acute BT treatment, chronic conditions of BT require treatment that begins with procedures that instigate inflammation of healed tissue by breaking down its reparative scar tissue. This allows tendon tissue that initially healed with mechanically inferior scar tissue a chance to remodel and be more closely restored to normal tendon anatomy. Appropriate therapies include deep cross-friction massage, heat and ultrasound therapy. Acupuncture and laser therapy to increase circulation and control pain can be beneficial. Because of the

need to reinitiate the inflammatory response, NSAIDs or intra-articular corticosteroids are not recommended for chronic biceps tendinopathy.

“Controlled activity is the most important component of postoperative rehabilitation.”

The recommended progression of rehabilitation exercises and ROM movements for chronic BT is similar to that recommended for acute tendon injuries. Differing from acute conditions, stretching after treatment is advised with chronic BT. Active ROM exercise, such as walking for longer periods, is an integral component of chronic BT rehabilitation. Overall, treatment and rehabilitation of chronic BT conditions is a lengthy process, sometimes extending over four to six months.

Surgical Treatment

It is difficult for pet owners to commit to a lengthy rehabilitation program and succeed with following it through to completion. Thus, many dogs with chronic BT continue to experience pain and lameness following failed attempts to provide appropriate rehabilitation therapy. These cases, along with cases with unsatisfactory response to medical management and rehabilitation therapy, can benefit greatly from surgical treatment. The objective of surgery is to displace the biceps tendon in a manner that its presence within the shoulder joint and along the tubercular groove is eliminated. This is achieved with tendon release from the supraglenoid tubercle with or without concurrent tenodesis of the released tendon. Arthroscopic tendon release is often performed when tenodesis is not included in surgical planning.

Controlled exercise of increasing duration and end-stage eccentric exercises followed by muscle retraining therapy is recommended to promote proper healing and restoration of biceps function. Controlled activity is the most important component of postoperative rehabilitation. Tenodesis patients require a minimum of 10-12 weeks of physical activity restrictions. X



9770 E. Alameda Avenue
Denver, CO 80247

Treatment Options for Atopy



David Beadleston, DVM, DACVD

With warmer days approaching, our atopic patients will soon be experiencing discomfort due to pollen allergies. Several new treatment options have been introduced which are improving our ability to manage our patient's discomfort.

In my patients, after ruling out other common causes of pruritus (i.e. parasitism, food allergy, infections), I offer six options for the treatment of atopy of varying cost, efficacy, hassle factor and side effects.

- 1. Steroids.** Steroids continue to be the most effective treatment for atopy, but side effects usually limit their use to short term therapy. Topical steroids are useful in areas where the animal cannot lick, but other areas require strategies to prevent ingestion (e.g. Elizabethan Collars). With systemic steroid therapy, I warn of increased water consumption and urinary tract infections, increased appetite resulting in weight gain, potential interaction with arthritis medications, increased risk of diabetes mellitus and pancreatitis, poor hair coat and occasionally, aggressiveness.
- 2. Antihistamines + omega 3 fatty acid supplementation + frequent bathing.** I have had poor success with antihistamines and omega 3 fatty acid supplementation, perhaps because these therapies have been attempted prior to referral. I do feel that 50% of my patients improve with bathing. Unfortunately, improvement is usually limited to 1-2 days, necessitating three times weekly bathing for adequate control of pruritus.
- 3. Allergen specific immunotherapy.** Improvement with immunotherapy is seen in approximately 65-70% of animals, although the degree of improvement is variable. Only about 10% of animals have improvement judged to be 90-100%. Oral immunotherapy is available which avoids needle phobias and the stress of subcutaneous injections. Efficacy appears to be similar with sublingual and subcutaneous forms of immunotherapy.
- 4. Cyclosporine.** Atopica, the veterinary version of Cyclosporine modified appears to be effective in 65-70% of cases. Unfortunately, 30% of dogs will vomit the medication if given on an empty stomach, so I initially give the medication with food. Alternatively, freezing the medication decreases vomiting without affecting efficacy. Gingival hyperplasia is seen in less than 5% of my patients but may require discontinuation of this therapy. I have had several animals that deteriorated when switched from Atopica to an equivalent dose of Cyclosporine Modified, so I encourage the owners to begin with Atopica. Unfortunately, even the generic product can be expensive resulting in financial limitations especially for larger breed dogs.
- 5. Apoquel.** Apoquel is a recently introduced medication oral medication that prevents formation of canine Interleukin 31 which binds to nerve endings and incites the itch response. The medication is 80% effective and has fewer side effects than steroid medication. Rarely, I have seen side effects with this medication (papilloma's, histiocytomas, and demodectic mange). Apoquel should only be used in dogs older than 1 year of age. My experience is that the medication is very effective in controlling itch but it appears to be less effective in preventing recurring skin or ear infections.
- 6. Cytopoint.** Cytopoint (Canine Atopic Dermatitis Immunotherapeutic) contains preformed antibodies that bind to and inactivate canine Interleukin 31. This medication has few if any side effects, and I use it instead of Apoquel in dogs less than 1 year of age. Interestingly, this medication sometimes works in animals that have failed Apoquel trials. Like Apoquel, recurring infections can occur in animals receiving Cytopoint injections whose itch appears to be well controlled.

Infections (bacterial, yeast) are common in our patients with allergies, so vigilance is necessary to control secondary infections. Control of infections in conjunction with appropriate allergy relief should improve our patient's quality of life and our client's satisfaction. X