Common Injuries Associated with the Shoulder Joint
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Key Objectives
- Improve physical examination skills and affected limb identification
- Review common diagnostic techniques available for the shoulder joint
- Revisit treatment options, both surgical and medical, for common shoulder joint conditions.

Forelimb lameness can often times be difficult to define and localize the source of pain. Many times, forelimb lameness is met with fear and trepidation when one sees these cases on their schedule. This response is normal and requires one to take a step back and breathe deeply. While this section is meant to deal with shoulder injuries, other joint and long bone disease processes will be touched upon as well.

To begin with, even before evaluating the patient, the signalment of the patient is crucial. Knowledge of the species, sex, breed, and age of the patient is crucial when developing a working problem list. For example, a juvenile patient will likely have a much different differential diagnosis list compared with a geriatric patient. Also, there are more common injuries and disorders associated with certain breeds and sizes of dogs.

The next step in identifying forelimb lameness is to acquire a very thorough history from the owner and/or caregiver. Sometimes this can be very challenging, however the information gained from this step can lead us down the correct path. When questioning owners, I find it key to ask the owner multiple questions exploring the same finding. It is sometimes difficult for us to figure out which leg is the affected limb, let alone the owner. Some key questions to ask the owners would be: which limb is affected, duration of lameness, does the lameness wax/wane, is the lameness worse after activity or rest, is there improvement seen with medication, to name a few. Some of these questions may help us differentiate between orthopedic and neurologic causes.

The first part of the examination (and sometimes the most important) is the gait analysis. Depending on the temperament of the patient, this can be facilitated either by your staff or the owner and should be performed prior to a hands-on evaluation. I prefer to do this in an outdoor environment if weather permits. One, it gets me out of the clinic for a minute and more importantly can decrease the anxiety to the patient and give them something other than you to focus their attention. This evaluation is very important and can guide us to determine which limb is affected and whether this is an orthopedic or neurologic problem. In neurologic issues, one would likely see ataxia and proprioceptive deficits even during a gait. Always be mindful if you hear “scuffing” as the patient walks, as this would indicate a neurologic issue. It is important to watch the patient walk at different speeds as well. I have found it very helpful in harder to assess patients to record the patient walking and replay the footage in slow motion. One trick in identifying forelimb lameness is the old equine saying, “down on sound”. The canine patient will drop the head when advancing and stepping on the “sound” or normal limb. When the patient engages the affected limb, they
will typically raise their head abnormally. While this may sound like an obvious reaction, it can be subtle.

The physical exam portion can be performed in either a standing or laterally recumbent position (or both). Some depends on the comfort level of the evaluator and some on the temperament of the patients. I find that some juvenile dogs fair better in a recumbent position, but this is very case dependent. For evaluation of the shoulder we are limited to cranial and caudal movement of the scapulo-humeral joint and lateral movement, predominantly. It is important to identify if there is pain in extension and/or flexion of the shoulder joint. Evaluation of the medial compartment of the shoulder joint (lateral movement of the shoulder) is best to perform under sedation as we are many times measuring the amount of abduction (moving away from midline) of the shoulder with a goniometer. This technique is particularly useful when assessing for medial instability of the shoulder (MIS).

Other techniques for evaluating the shoulder is direct palpation. Anatomically the more commonly injured structures within the shoulder are in the cranial and medial aspects of the joint. The major palpable structures of the cranial aspect of the joint involve the supraspinatus tendon and biceps tendon. The biceps originate distally at the elbow and courses through the intertubercular groove and attaches at the supraglenoid tubercle on the scapula – it courses medial to the supraspinatus. The supraspinatus tendon originates proximally over the cranial aspect of the scapula and courses distally as it attaches to the greater tubercle (lateral to the biceps tendon) The other main stabilizers of the shoulder joint are both the medial and lateral glenohumeral ligaments. On palpation, with experience, one can begin to isolate the tendons within the cranial joint, especially when pathology is present. The infraspinatus muscle is a much less affected structure; however, this will also attach to the greater tubercle. Many times, the breed type and gait can be pathognomonic for this condition (fibrosis). Sedation is warranted if the clinician suspects medial instability as this will allow for measurement of abduction angles.

Diagnostics tests (after the physical exam) can aid in further delineating the source of the problem in the shoulder. Many tests can help rule out conditions versus giving us a definitive answer. Radiographs are often the first test reached for in veterinary medicine. This is a great cursory evaluation and can either drive our diagnosis or allow us to confidently recommend further testing. Radiographs can many times help identify the shoulder as the problem by showing bone changes, mineralization of tendons, and periarticular osteophytes. If no changes are seen this does not always rule out soft tissue injuries. It is always very helpful if the clinician radiographs the opposite shoulder for comparison. In older patients, this test can be very valuable if neoplasia is suspected such as osteosarcoma, which more commonly occurs at the proximal humerus in the metaphysis.

As radiographs cannot always give us the full picture, there are some variants, such as a contrast arthrogram that can help us identify issues, predominantly with the biceps and/or supraspinatus tendons, however these tests are not performed routinely. Shoulder ultrasound can be a very beneficial diagnostic tool and gives the clinician a very detailed
assessment of the biceps and supraspinatus tendons. The author will typically recommend this test second, depending on the radiographs, when suspecting a tendinous issue. The shortcomings of shoulder ultrasound are its ability to evaluate the medial glenohumeral ligament and it is VERY user dependent.

More advanced imaging of the shoulder would be both an MRI and/or CT scan. As with other regions of the body, MRIs will give us more detail regarding soft tissue structures and a CT will give more detail for osseous structures. In most cases of soft tissue injury, an MRI would be recommended. It is very important to have a good idea of what is potentially the etiology of the discomfort when recommending a diagnostic modality.

The use of an MRI can be very beneficial especially in cases of neurologic impairment. This can be used to image the brachial plexus and cervical spine and gives great detail to these areas. The greatest detail would be given to peripheral nerve sheath tumors, spinal tumors, and intervertebral disc disease. An MRI can also image the soft tissue structures around the shoulder joint, however there will be limited detail when looking at bone changes to the shoulder joint.

Arthroscopy can be very useful in both diagnosing intra-articular pathology and providing treatment in certain cases. In many cases, arthroscopy is performed due to lack of definitive evidence on the above-mentioned diagnostic tests. Arthroscopy will give a detailed look at the cartilage surfaces and intra-articular soft tissue structures such as the medial and lateral glenohumeral ligaments, joint capsule, and biceps tendon. Certain conditions that can be treated via arthroscopy are as follows: biceps tendon tear, osteochondritis dissecans (OCD), medial glenohumeral ligament tears, etc.

**Common Injuries to the Shoulder Joint**

**Osteochondritis Dissecans (OCD)** – This is a congenital disease process that affects mostly large and giant breed dogs between the ages of 6-18 months. There are many times when this occurs bilaterally. Usually the patient has a mild to moderate (weight bearing) lameness that worsens with activity. Many times discomfort improves on medical management, however not entirely and recurs when stopped.

In most cases a diagnosis can be made from radiographs. The best projection for assessment would be a lateral radiograph of the shoulder. OCD lesions occur due failure of the subchondral bone to mineralize during growth. These lesions will occur on the caudal humeral head and will become painful when the cartilage covering the lesion becomes mobile and develops a fracture/flap. This is the difference between osteochondrosis (OC) (subchondral lesion) and OCD (subchondral lesion and cartilage flap). This disease process will cause associated inflammatory changes within the joint which will in turn cause degenerative joint disease changes, including osteoarthritis. Surgery is the recommended treatment for this disease process. The gold standard treatment is arthroscopic evaluation and debridement of the lesion. It is important that all associated cartilage and disease subchondral bone is removed, and bleeding bone is encountered in order for the body to develop fibrocartilage. The prognosis for OCD with surgery management is good and
recovery to normal function is expected when timely intervention is pursued. The “watch and see” approach is not recommended; the more arthritic changes develop the less responsive the patient will be to surgical intervention.

**Biceps Tendon Injuries:** Biceps tendon injuries can occur generally due to repetitive trauma inflicted and is a common injury seen in the active medium and large breed dogs, such as retrievers and other hunting dogs. There are various injuries that can occur from tenosynovitis to tearing of the biceps tendon from its attachment to the supraglenoid tubercle. In cases where damage to the biceps tendon is suspected, I generally recommend starting with a musculoskeletal ultrasound. Based on the severity or injury, various treatment options may be available. Minor injury may respond to exercise restriction, oral administration of Non-Steroidal Anti-inflammatory Drugs (NSAID) and canine rehabilitation (laser therapy, etc.). More severe cases may benefit from intra-tendinous injections (platelet rich plasma and/or stem cells) combined with intra-articular injections. Also with more severe cases arthroscopy and biceps tendon release may be indicated. The overall outlook for biceps tenosynovitis is good, however reinjury may occur. Biceps tendon tears when treated appropriately can also have a favorable outcome for the patient.

**Medial Shoulder Instability (MSI):** This disease process can be a very frustrating issue to encounter and is likely deserving of a full lecture alone. As discussed above, diagnosis alone can be challenging. The physical examination on these patients is important as well as the sedated evaluation of abduction angles. Generally angles greater than 45 degree are thought to be associated with this disease, however there is still much debate. More definitive diagnosis is made either on arthroscopy and/or MRI. It is the authors experience that MRI can be helpful, however not as sensitive as arthroscopy. Case selection is the most important determinant of success with these types of cases. Both rehabilitation with shoulder supports and surgical intervention have been shown to have similar results in the recent literature. That being said there are cases that are better surgical and better non-surgical candidate. Thermal capsulorrhaphy and direct reconstruction of the medial glenohumeral ligament are more of the mainstays of surgical management. The overall prognosis with MSI would be fair to good in regard to return to function.

The above is certainly a cursory review of the diagnosis of shoulder injuries. A brief review of some common injuries was achieved, and this is meant to be a supplement to the lecture. In the end, shoulder injuries can be difficult to ascertain and require practice when diagnosing, as well as availability to advanced imaging modalities.