

TRAUMATIC ELBOW LUXATION: KEYS TO SUCCESSFUL CLOSED REDUCTION

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MISHA IS A 4-YEAR-OLD FEMALE INTACT DOMESTIC SHORTHAIR CAT, WHO PRESENTED ON EMERGENCY WITH A HISTORY OF UNKNOWN TRAUMA AND LEFT THORACIC LIMB LAMENESS.

Misha is an outdoor cat, and the owners reported that she had been missing for a couple of days. When Misha returned home, she was non-weight bearing on her left thoracic limb and she had an increased respiratory rate. On presentation, physical exam revealed only orthopedic abnormalities related to her left thoracic limb. Misha was non-weight bearing on the limb, the radius and ulna were palpably laterally displaced, the antebrachium and paw were abducted, and the elbow was maintained in a flexed position. When range of motion was attempted, marked pain and resistance to flexion and extension of the left elbow were noted. Due to the history of unknown trauma, Misha was fully evaluated for any other possible injuries, but none were identified.

Orthogonal radiographs of the left elbow were performed, confirming the clinical suspicion of lateral luxation of the elbow (see images below).



Due to the anatomy of the humerus, radius, and ulna, the vast majority of traumatic elbow luxations are lateral in nature. This is because the medial epicondyle of the humerus is more square-shaped, which prevents the ulna from luxating medially. The lateral humeral epicondyle, on the other hand, is more rounded in shape, thus requiring less force for the ulna to luxate in a lateral direction. While medial elbow luxations do occur, there is usually concurrent severe ligamentous damage.

Treatment of traumatic elbow luxations involves either closed or open (surgical) reduction and stabilization of the joint. Due to the associated ligamentous damage, medial elbow luxations typically require open surgical intervention. Lateral elbow luxations are often amenable to closed reduction, particularly if closed reduction is attempted during the first few days after the initial injury. Cases in which the collateral ligaments are damaged, may however require surgical intervention (see discussion below).

CLOSED REDUCTION OF LATERAL ELBOW LUXATIONS:

When closed reduction is attempted, the animal should be under general anesthesia. The first step in closed reduction is to determine the exact location of the humeral condyles relative to the radius and ulna. This can be determined via palpation and/or radiographs. It is important to differentiate whether the anconeal process of the ulna is medial or lateral to the lateral humeral epicondyle, as this will determine the first step in the closed reduction process. If the anconeal process is medial to the lateral humeral condyle, the elbow should be flexed to approximately 100 degrees while maintaining medial pressure on the olecranon. Next, reduction of the radial head is attempted by abducting the elbow and applying medial pressure to the radial head. If reduction is not achieved with the application of medial pressure on the radial head, the elbow can be extended slightly to lock the anconeal process inside the lateral humeral epicondyle. The anconeal process can now be used as a fulcrum to aid in reduction of the radial head by pronating and adducting the antebrachium while abducting the elbow. For cases in which the anconeal process is lateral to the lateral humeral epicondyle, the first step in closed reduction is to manipulate the anconeal process to lie medial to the lateral epicondyle. To achieve this, the elbow should be flexed to approximately 100 degrees and the antebrachium should be pronated. Medial pressure is then applied to the radial head while the antebrachium is pronated and the elbow is abducted.

Orthogonal radiographs of both elbows should be performed following closed reduction. This allows comparison to evaluate for full reduction and for any potential ligamentous damage.

Closed reduction should not be considered successful until the collateral ligaments of the elbow are evaluated. Assessment is via palpation, and the affected limb should always be palpated and compared to the non-affected limb. To assess the integrity of the collateral



ligaments, both the elbow and the carpus should be flexed to 90 degrees and the paw is rotated medially and laterally. If the ligaments are intact, the paw should rotate medially to approximately 70 degrees and laterally to approximately 45 degrees. The ability to rotate the paw in excess of what is considered normal indicates damage to the collateral ligaments. Animals in which the joint is stable and there is no evidence of collateral ligament injury are good candidates for closed reduction. If collateral ligament injury is suspected, surgical intervention should be considered – particularly in larger, more active, or working animals. In smaller and/or less active animals, fibrous scar tissue formation often provides sufficient stability, and surgical intervention is not always required.

Misha was anesthetized and her left elbow was again palpated. Based on palpation, the anconeal process of the ulna was positioned laterally to the lateral epicondyle. Closed reduction was achieved, and no evidence of collateral ligamentous injury was found radiographically or via palpation of both thoracic limbs.

AFTERCARE FOLLOWING CLOSED REDUCTION

Following closed reduction, the elbow should be stabilized in a normal standing angle (approximately 140 degrees of extension).

In cases where there was no palpable evidence of ligamentous injury, a soft-padded bandage and lateral splint are adequate for immobilization. Immobilization should be maintained for a total of 5 to 7 days, followed by strict activity restriction for an additional 2 weeks.

Patients where there is evidence of ligamentous damage require more rigid and longer immobilization following closed reduction. In these cases, immobilization with a spica splint is indicated, and should be maintained for a total of 2 weeks. After the spica splint is removed, strict activity restriction is necessary for an additional 4 weeks.

In all patients, joint stiffness is a concern, and passive range of motion exercises should be started as soon as external coaptation is removed.

Misha did very well with closed reduction and immobilization. Her splint was removed approximately 10 days following closed reduction. Her elbow joint was stiff, but stable and conformable on palpation. Passive range of motion was implemented, and she has continued to do well and improve at home.

I hope you have found this information helpful. If you have any questions about elbow luxations, or any other surgical topic, please do not hesitate to contact me.

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