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Faculty of Veterinary Medicine
Surgery Anesthesiology and Radiology

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Elbow dysplasia in dogs

Thesis presented by

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(B. V. Sc., 2008)

For The Degree Of M.V.Sc.
(Surgery, Anesthesiology and Radiology)

Under the Supervision of

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Supervision Sheet

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Abstract :

Elbow pathology is a frequent cause of lameness and osteoarthritis in young, rapidly growing, large and giant breed dogs. The term elbow dysplasia refers to ununited anconeal process (UAP), fragmented medial cronoid process (FCP), osteochondrosis of the medial humeral condyle (OCD) and elbow incongruency (EI). A total of 888 dogs were assembled in this study with a history of thoracic limb lameness. All dogs were evaluated through physical, orthopedic and radiographical sceening. Radiographic diagnosis of elbow dysplasia was based on the detection of primary ED lesions (JI, UAP, FCP and OCD) or the detection of secondary osteoarthritic changes. It was revealed that 72 dogs (8%) of the examined dogs had ED. The affected dogs were of different breeds and ages (48 cases<12 months) and (24 cases>12 months). The majority of the recorded dysplastic dogs were of males (53 dogs) (73.6%) and females(19) accounted for (26.4%). Conservative treatment which comprised rest, non-steroidal anti-inflammatory agents and physiotherapy was used in 66 cases in variable outcomes. Surgical intervention was limited to 6 cases with the ununited or fragmented anconeal process.

Key words : canine elbow, elbow dysplasia, ununited anconeal process, fragmented medial cronoid process, osteochondrosis, joint incongruity.

I dedicate this work to
my dear mother, my father spirit,
my lovelly friend Abeer for their
endless love and support.

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Introduction

Elbow pathology is a frequent cause of lameness and osteoarthritis in young, rapidly growing, large and giant breed dogs **(Van Ryssen and Van Bree,1997; Morgan, Wind and Davidson,1999; Gemmill and Clements,2007).**

The most common causes of elbow lameness are incorporated under the term elbow dysplasia (International Elbow Working Group-IEWG Protocol, 1995). The term refers to ununited anconeal process (UAP), fragmented coronoid process (FCP), osteochondritis dissecans (OCD) and elbow incongruency (EI) **(Samoy, Van Vynckt ,Gielen, Van Bree, Duchateau and Van Ryssen,2012).**

All conditions are polygenetic and multifactorial diseases that often occur in young, popular breeds **(Grondalen and Lingaas,1991; Kirberger and Fourie,1998; Janutta, Hamann, Klein, Tellhelm and Distl, 2006).**

Dogs with elbow dysplasia should be eliminated from breeding **(Fossum,1997; Slatter, 2003).** The clinical signs usually start at the age of 8 months and include muscle atrophy, joint pain, joint effusion and a decreased range of motion. **(Kirberger and Fourie,1998).**

Additional imaging techniques such as radiography, CT, MRI or arthroscopy can be performed to diagnose elbow dysplasia. **(Snaps, Balligand, Saunders, Park and Dolinger,1997; Van Ryssen and Van Bree,1997; De Rycke, Gielen, Van Bree, and Simoens,2002).**

The objectives of this study were:

1. To give an overview of the status of elbow dysplasia among different breeds and ages of dogs in some private and governmental clinics.
2. To briefly consider the therapeutic measures to deal with such disorder.

Review of literature

Historical

In the early 1960s the term "elbow dysplasia" was offered as an alternative to the term ununited anconeal process, since it was believed by some to better describe the generalized osteoarthritis that involved the entire elbow joint of animals affected with that disease **(Carlson and Severim,1961).**

For several years the term "elbow dysplasia" was used synonymously with ununited anconeal process in the veterinary literature **(Riser,1962; Van Sickle,1966; Corley, Sutherlalnd and Carlson, 1968).**

In this respect, **(Ljunggren, Cawley, Archibald,1966)** correctly pointed out the misuse of the expression and redefined the syndrome of elbow dysplasia, describing the three causes that supposed to occur during the joint development which were the ununited anconeal process, ununited medial epicondyle, and patella cubiti.

Furthermore, **(Corley et al.,1968)** had refined the terminology by describing elbow dysplasia as "a descriptive term applied to a developmental abnormality of the elbow joint" that is manifested as an early osteoarthritis with or without an ununited anconeal process.

The term canine elbow dysplasia originally referred to generalized osteoarthrosis, regardless of the underlying etiology **(Bingel and Riser,1977).**

Joint incongruity (JI), fragmented coronoid process of the ulna (FCP) and osteochondrosis (OCD) of the medial aspect of humeral condyle were recognized also to be associated with this generalized osteoarthrosis **(Olsson, 1975; Bienz,1985).**

More recently, numerous conditions, both congenital and developmental, have been described that may be incorporated under the heading of elbow dysplasia **(Grondalen,1973; Stevens and Sande,1974; Bingel and Riser,1977).**

The term elbow dysplasia describes a general condition that includes four primary lesions (JI, FCP, OCD, UAP) which leads to elbow osteoarthrosis. The most common causes of elbow lameness are incorporated under the term elbow dysplasia (International Elbow Working Group-IEWG Protocol, 1995).

Anatomical considerations (Fig.1)

The elbow joint is a hinge joint formed by the condyle of the humerus, the head of radius, and the trochlear notch of ulna. Which articulates with each other, forming three joints ; humeroradial, humeroulnar, and the radioulnar **(Komtebedde and Vasseur,1993).**

Each joint has a role in the elbow stability. The humeroulnar joint is responsible for flexion and extension of the elbow, the humeroradial joint provides the major weight bearing function of the elbow, and the rotatory movement is controlled by the proximal radioulnar joint **(Gielen,2011).**

The elbow is enclosed by a fibrous joint capsule extends cranially from the humerus proximal to the radial fossa and ends on the radius after blending with annular ligament. It ends laterally and medially at the lateral and medial collateral ligaments **(Constantinescu and Constantinescu,2009).**

The three bones forming the joint are held together by the medial and lateral collateral ligaments which are considered thickenings of the fibrous joint capsule. They are originating from the medial and lateral condyles of humerus and inserted distally in both radius and ulna after bifurcating into two crura, the crura of lateral collateral ligament blends in the annular ligament and often contain a sesamoid bone. The caudal crura of both ligaments attaches to the ulna **(Gielen, 2011).**

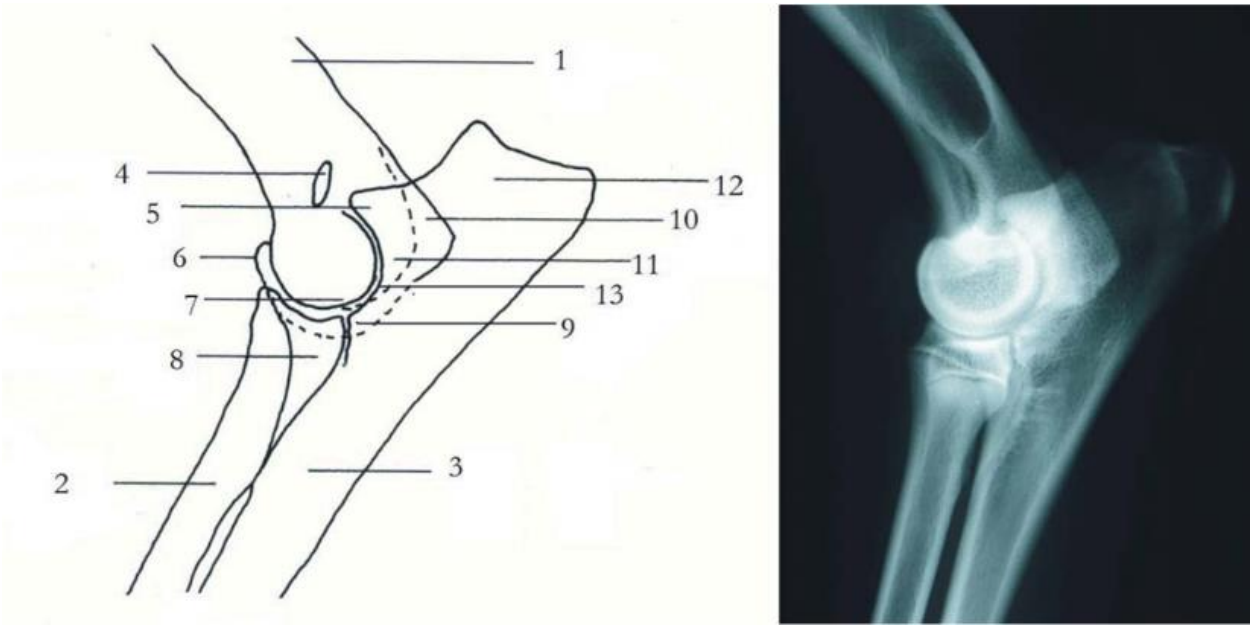

Fig. 1. Schematic drawing and radiographic anatomy of the elbow (lateral position). 1. Humerus, 2. Radius, 3. Ulna, 4. Supratrochlear foramen, 5. Anconeal process, 6. Medial part of the humeral condyle (trochlea), 7. Lateral part of the humeral condyle (capitulum), 8. Medial coronoid process, 9. Lateral coronoid process, 10. Medial epicondyle, 11. Lateral epicondyle, 12. Olecranon, 13. Incisura trochlearis or trochlear notch of the ulna **(Samoy et al, 2006).**

The elbow joint is controlled by other ligaments as, the oblique ligament which is attached proximally to the lateral aspect of the radial fossa and distally to the medial side of radial neck. Its role is to prevent hyperextention of the joint, the olecranon ligament which is a short elastic ligament connecting the olecranon to the medial side of the lateral humeral condyle, and the annular ligament which originated from ulna and inserted in ulna surrounding the radius for maintaining its position against the ulna while rotating **(Gielen, 2011; Samoy, Van Vynckt, Gielen, van Bree, Duchateau, and Van Ryssen, 2012).**

The muscles surround the elbow joint are belonging to the brachial and antebrachial group. From the brachial group, the biceps brachii and brachialis muscle run on the cranial aspect. Laterally, the long and lateral heads of the triceps brachii muscle, the tensor fascia antibrachii muscle and the anconeus muscle . Medially, the medial head of triceps accompanied by the tensor fasciae antebrachii **(Evans and Delahunta, 2004).**

From the antebrachial group, on the cranial and lateral aspect of the forearm ; the extensor carpi radialis M., the common digital extensor M., the lateral digital extensor M., ulnaris lateralis muscle, and the supinator muscle. Caudally and medially; the pronator teres muscle, the flexor carpi radialis muscle, the superficial digital flexor muscle, the flexor carpi ulnaris muscle, the deep digital flexor muscle, and the pronator quadratus muscle, which fills the space between the radius and ulna **(Budras, McCarthy, Fricke, Richter, Horowitz, Berg, Wunsche, Reese, and Gerlach, 2002).**

Between the triceps brachii tendon and the olecranon, there is a subtendinous bursa called tricipital bursa. And another bursa is found between the radius and biceps brachii tendon called bicipitoradial bursa **(Constantinescu, 2009).**