UDC 636.7: 611: 728 (045)
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ANATOMIC STUDY OF THE COXO-FEMURAL JOINT REGION AND ASSOCIATION WITH HIP DYSPLASIA IN DOGS

The canine hip joint is of major clinical importance, as hip dysplasia is a complex developmental orthopedic disorder characterized by joint laxity and osteoarthritis, extremely common in dogs [5]. As a result, all the literature, conventional, anatomical sources consulted describe the anatomy of the hip joint.

Structurally, it is a typical enarthrosis, synovial, spheroidal joint [1, 4]. The articular surfaces of the hip are formed by the head of the femur (Caput ossis femoris) which presents the acetabular fossa (Fovea capitis); acetabulum (Acetabulum) with the articular surface and acetabular fossa (Fossa acetabuli); the brow of the acetabular cavity with an acetabular fibrocartilaginous spring (Labrum acetabulare), which jumps over the acetabular notch forming the transverse acetabular ligament (Ligamentum transversum acetabuli) [7].

The ligament of the femoral head, designated in the official nomenclature as Ligamentum capitis ossis femoris [7], is unambiguously described and reflects general knowledge. This ligament is located inside the articular capsule, which is very strong, represented by a conoid sleeve with the large insertion base on the coxal and the small base on the femur and connects the acetabular fossa (Fossa acetabuli) with the Fovea capitis ossis femoris [2, 3]. This ligament plays an important role, especially during the growth period, as a «bridge» for blood vessels, and later not only as a support but also as a brake in the movement process. The ligament is quite elastic and can stretch with a potential for rupture [3].

The hip also consists of a muscle mass, these structures being confirmed by a multitude of authors, crossing the coxo-femoral joint, represented by long, voluminous and strong muscle masses [9], adapted to squatting, propulsion and fast movement [10].

Authors such as Coțofan V., et al. (1999), describe 26 muscles acting on the coxo-femoral joint, and Shahar R., and Milgram J., (2001) demonstrate the insertions and action of 29 muscles on the movements of the pelvic limb, of which 26 muscles form directly the thigh with action on the coxo-femoral joint [1, 8].

The muscles of the coxo-femoral region are grouped in layers and systematized in the muscles of the pelvis and the thigh, which ensure both triplanar mobility and joint stability.

Probably this relatively different systematization and grouping of the muscles of the coxo-femoral region, described by different authors, give different numerical results.

The geometry of the canine hip region is represented by three axes, offering the possibility of movement in all directions. The biodynamics of the musculature is strictly dependent on the axial orientation, which is very important in statics and locomotion, having a greater influence on locomotor dynamics than the thoracic limbs [Martín- 2014], and the balance being maintained by the antagonism between the abductor and adductor muscles.

The purpose of the work. Elucidation of the morphofunctional organization of the components of the coxo-femoral joint region in the dog, of the ligamentous, muscular structures and their fixed, mobile insertions.

Material and methods. The scientific research was carried out in the specialized laboratory of the Faculty of Veterinary Medicine of the Technical University of Moldova. In order to specify the anatomical structure of the canine pelvic limb, especially of the coxofemoral joint, 5 half-breed dog cadavers, respectively ten coxo-femoral joints, were subjected to an anatomo-topographical study. The corpses of the dogs were taken from different veterinary clinics of the municipality of Chisinau.

The hindquarters, pelvis, and hindlimbs were dissected using various morphological exploration techniques to highlight the regional topography. The anatomical components were previously fixed in 10% formalin solution for several days. In order to avoid inhalation of dangerous formalin vapors, a few days before preparation, the preservation solution was changed according to the method proposed by B. Berne. In the process of scientific examination, the following were used: anatomical instruments, anatomical magnifying glass.

Anatomical-morphological methods have a significant value for assessing age changes, as well as structural components and dysfunctions.

Results and discussion. Upon receipt of the cadaver, the coxo-femoral joints were examined to determine joint laxity, crepitation and range of motion. The skin and subcutaneous tissues were meticulously removed. All the muscles surrounding the coxo-femoral joint were identified and the source of innervation determined. They were categorized into five groups, depending on the sources of innervation, as follows: group no. one includes the muscles innervated by the cranial and caudal gluteal nerves, group no. two with innervation from the sciatic nerve, group no. three with innervation from the femoral nerve, group no. four with innervation from the obturator nerve and group no. five with innervation from the N.caudal femoral cutaneous.

Conclusions

From a clinical point of view, the canine hip joint (Articulatio coxae) with all adjacent structures is of major importance, since coxo-femoral dysplasia is a common orthopedic disorder in dogs. The detailed knowledge of the anatomy, of

the ligaments associated with the joint, is paramount in the study of the functionality of the joint, and the analysis of the anatomical structures needs to be done according to the spatial orientation in relation to the axes of rotation at the level of the canine articular hip and the fixed insertion sites and mobile of the muscles.

The results of the research confirm that the muscles of the coxo-femoral region are grouped in layers and systematized in the muscles of the pelvis and thigh, being 25 in number. The structures adjacent to the coxofemoral joint are innervated by the following nerves: femoral nerve, obturator nerve, cranial gluteal nerve, caudal gluteal nerve, caudal femoral cutaneous nerve and sciatic nerve.

Research of ligamentous structures indicates that the ligament of the femoral head is not the only structure that attaches only to the acetabular fossa, as is generally accepted, but also attaches to the transverse acetabular ligament and is supplemented by a strong accessory ligament that runs in the direction caudal to attach to the acetabular ridge, and extending on the cranio-ventral surface of the body of the ischium.

From this brief review of the literature we found many erroneous descriptions of ligamentous components, causing contradictions and ambiguity. Unclear data play a primary role that prevents the elucidation of the etiopathogenesis of coxo-femoral joint pathologies in dogs.

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