EVALUATION OF RADIOGRAPHIC SIGNS FOR THE DIAGNOSIS OF HIP DYSPLASIA IN DOGS

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Introduction: Developmental disorders of the coxofemoral region, mismatches between the joint surfaces, especially at the femoral head and acetabular fossa, characterized by abnormal functionality and poor biomechanics in the coxofemoral joint, are usually categorized into one group of diseases – hip dysplasia. It results in excessive stretching of the joint capsule, the phenomenon of pain accompanied by lameness and possibly paralysis. In severe cases of dysplasia, with absolute dislocation of the femoral head, the supportive function of the pelvic limb is compromised or even impossible (Бушарова Е. В., 2012; Holloway A. I., 2016; Шерстнев С. В., 2018). Veterinarians are faced with the need to diagnose and determine the severity of the pathology in these patients, using radiographic imaging techniques to diagnose and assess the degree of coxo-femoral dysplasia in dogs.

The purpose of the paper: Qualitative and quantitative measurement of the parameters of the coxofemoral joint in dogs according to the standards published by the international canine organizations FCI, OFA and BVA/KC, evaluation of the degree of severity and establishment of the diagnosis of hip dysplasia.

Material and methods: A total of 39 dogs, of different breeds, sex, ages ranging from 3 months to 3 years, body mass ranging from 3.2 kg to 50 kg, were subjected to imaging examination. The roentgen images were obtained from different authorized clinics, as well as following the radiographic examination performed by us in the University Veterinary Medical Center. In connection with the fact that assessment of

the degree of joint damage is impossible without complete relaxation of the pelvic limb muscles, the radiological investigation was performed under anesthesia.

Results: Measurements of 6 parameters were performed, with a quantitative evaluation expressed in points for each of the following radiologic signs:

The Norberg angle is an angle formed between a straight line connecting the geometric centers of the femoral heads and a line drawn from the center of the femoral head along the anterolateral edge of the joint cavity, its normal value should be equal to or greater than 105^0 (Митин В. Н., 2000; Fluckinger M., 2007; Comhaire F., 2011; Verhoeven G., 2012; FCI, 2024).

Joint laxity is expressed by the Distraction Index (DI) and Compression Index (CI) of the femoral head in the acetabular cavity. It is determined by the ratio of the covered area of the femoral head by the outer edge of the cavity to the radius of the femoral head. The distraction index is the ratio of the distance between the centers of the femoral head and the acetabulum (d) to the radius of the femoral head (r). The closer the score is to 0, the better the fit, i.e. minimal femoral distraction, but a score of 1 indicates severe laxity and associated femoral distraction. Recently, the PennHIP distraction index and OFA scores have been found to have strong correlations with altered articular cartilage microstructure, potentially indicating a relationship between joint laxity measured by this technique and joint surface degeneration (Митин В. Н., 2000; Деркачев Д. Ю., 2018; Шерстнев С. В., 2018, OFA, 2024).

The tangential angle is an angle lying between a horizontal line drawn through the anterolateral border of the acetabular cavity and a tangent line extending the cranial contour of the articular fissure. The tangent normally passes below the horizontal, forming a negative angle, or coincides with it, forming an angle equal to zero. The tangent above the horizontal forms a positive angle characteristic of the pathologic process, in the normal case, the tangent angle is negative, the edge is sharp and covers the femoral head (Halloway I.A. et all., 2016).

Changes in the condition of the acetabular rim articular plate – sclerosis – are reflected on the radiograph as an intensely lighted band along the articular plate of the cotyloid ball. They reflect the uneven distribution of pressure on the joint cavity during loading and are an indirect symptom of hidden subluxation of the hip (Митин В. Н., 2000).

The head shape and architectural changes of the proximal segment of the femur are characterized by the state of the trabecular apparatus. They reflect the regularity of the change in the shape of the femoral head depending on its different positions in the joint (unstable position, subluxation, dislocation), in normal conditions – the head is round, the trabecular system is represented by three systems (Halloway I. A. et al., 2016; Митин В. Н., 2000).

Exostosis – bony or osteo-cartilaginous growth of non-tumorous nature on the bone surface (in the form of linear, spherical and other formations) (Halloway I. A. et al., 2016), normally they are indistinct, the transition from the head to the neck is clearly expressed.

Conclusions: On the basis of the score assigned to each qualitative criterion listed above, it was possible to assess the degree of dysplasia, with interpretation of the results

in the subjects studied. The images were evaluated on the basis of qualitative criteria and then translated into quantitative criteria. The dogs studied were female, 13 %, and male, 13 %. 26 %. Respectively, of the total number of dogs investigated, 43.5 % showed grade 2 dysplasia, 38.4 % – grade 3 and 21.8 % – grade 4, the most severe grade of coxo-femoral dysplasia. 12.9 % of the investigated subjects showed bilateral coxo-femoral dysplasia, 41 % – unilateral on the left and 46.2 % – unilateral on the right.