7 Summary

Comparison of two computerized methods to evaluate the elbow dysplasia in Rhodesian Ridgeback and Beagle dogs

The elbow joint dysplasia (ED) has gained greater importance in the endeavours of Breeders. The internationally recognized measuring method for ED endangered dogs is the scoring system of the IEWG, which is only based upon dimension and degree of the secondary arthrotic changes. With the methods of Mues (2001) and Viehmann (1998), primary changes of the elbow joint could be obtained. Both methods claim to have a greater objectivity than the current methods that are commonly used.

For measurement with Mues a method is used based upon angle measurement, where the outer joint structures and the size of the joint are compiled by a computer and evaluated based upon five parameters that characterize the joint. With the measuring methods from Viehmann, absolute values are obtained by measuring the parts and areas of the joint. Eight parameters are defined that measure the joint size, steps in the joint, and the surface ulnare joint. With Viehmann skeletal reference points can be set with computer support. Lateral radiographs of the elbow joints of 204 Rhodesian Ridgebacks and 20 Beagles were evaluated and compared in the methods of Mues and Viehmann. The Rhodesian Ridgeback was selected because it is a large breed that in contrast to ED endangered breeds like the Bernese Mountain Dog, German Shepherd, or Rottweiler, is considered to be almost free of ED, and can therefore be seen as a reference point for large breeds. The Beagle is a dog breed of medium size that is not considered to be ED endangered. All 408 elbow joints of the Rhodesian Ridgebacks were already judged according to the parameters of the IEWG and 95.6% were found to be free of ED. The joints of the Beagles were free of ED. The study groups were not of the same age, as the Beagle group was represented by more older animals. With the procedures of Mues and Viehmann, primary joint changes could be objectively obtained with regard to a elbow joint dysplasia. Mues calculates the hereditary risk of ED

from this information. VIEHMANN defines geometric factors that describe the congruence (ED negative) and non-congruence (ED positive).

Both methods demand the largest possible objectivity, with the following results: the measurements according to MUES show a significant difference between Rhodesian Ridgebacks and Beagles in two of the five measured parameters. With the Rhodesian Ridgebacks a correlation with the degree of ED was proved for two of the five parameters (40%). An acceptable repeatability and resulting reproducibility was detected in one parameter (20%). According to the measurements of VIEHMANN, the difference of breed is reflected by two parameters that describe the size of the joint and by one parameter that describes the step in the joint. The degree of ED is significantly differentiated by seven out of eight parameters (87%). However, a repeatability with suitable correlation to the mean degree of ED could only be proven for two out of these seven parameters (25%). In the totality of the statistical evaluation of both measuring methods, only two useful joint size describing parameters remain for the evaluation of the elbow joint of the Rhodesian Ridgeback. These two values show both a significant correlation to the degree of ED of the joint, and enough repeatability, and therefore reliability within a joint.

Both measuring methods for individual evaluation of an elbow joint in regard to an elbow joint dysplasia are, considering their expenditures (digitalization of the visual material, use of special computer systems), limited in everyday implementation.