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7. Summary

Computerized radiographic measurements of anatomical parameters of the elbow joint of Bernese Mountain Dogs using two different methods

The goal of the here presented study was the comparison of two computer-assisted measuring methods (of VIEHMANN and of MUES) for the collection of anatomical measuring parameters of the canine elbow joint. The correlation between measured values and the ED-grade score by an expert was compared.

The angle OL, the angle PA, the angle RA and the angle UL were measured according to MUES as well as the radius of the humeral condyle, the opening angle beta, the quotient Q, the quotient Ae, the area X, the step 1 and the step 2 between the radius and the ulna according to the method of VIEHMANN.

Altogether 931 radiographs of elbow joints of Bernese Mountain Dogs, which had been evaluated for breeding protocols, were measured. Each digital radiograph was measured three times with each method. The radiographs were also devided due to the angles of flexion of the elbow joint into 5 groups: 0-30°, 31-60°, 61-90°, 91-120° and larger than 120°.

With the method according to MUES the average values of angle OL, angle Pa and angle RA were significantly different in the different flexion angle groups. From the measured values according to VIEHMANN the area X depended on the angle of flexion. The average values of the step 1 and step 2 became significantly smaller the larger the flexion angle was, while the opening angle beta, quotient Q and quotient Ae as well as the radius of the Condylus humeri showed to be independent from the degree of the elbow flexion on the radiograph.

The size of the angle OL, the angle PA and the angle RA correlated significantly with the ED degree, while the angle UL did not exhibit a correlation. The radius of the Condylus humeri, the opening angle beta, the quotient Q, the quotient Ae as well as the step 1 and the step 2 correlated highly significant with the ED degree. The area X correlated in individual degrees of flexion significantly with the ED degree.

The parameters angle OL, PA and RA of the method of MUES showed a significant dependence on the degree of flexion of the elbow joint. The correlation between the measured values and the ED degree was only significant, while the correlation of the parameters according to VIEHMANN was highly significant. The values of the quotient Q, the quotient Ae as well as the opening angle beta were independent from the degree of flexion. They seem to be more suitable for breeding protocols. To decide, if the VIEHMANN-method is suitable for an early breeding protocol, a prospective study using a representative population of young dogs should be accomplished including repetitive radiographs during growth.