Kinematic Gait Analysis of the Hind Limb after Tibial Plateau Levelling Osteotomy and Cranial Tibial Wedge Osteotomy in Ten Dogs

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Abstract:

Summary

This study identifies and compares the kinematic gait changes occurring in tibial plateau levelling osteotomy (TPLO) and cranial tibial wedge osteotomy (CTWO) limbs after transection of the cranial cruciate ligament (CrCL). Ten, healthy, adult beagle dogs were assigned to TPLO (five dogs) and CTWO (five dogs) groups. Hind limb kinematics were assessed, while dogs were trotted at speeds ranging from 2.0 to 2.3 m/s. The animals were evaluated preoperatively (prior to TPLO and CTWO surgery) and at both 8 and 12 weeks after surgery. Two-dimensional evaluation was synchronized to obtain the three-dimensional coordinates using the APAS motion analysis software. Gait patterns were assessed by measuring stifle, tibiotarsal joint angles and stifle joints angular velocity. Stifle and tibiotarsal joint functions were not affected by TPLO surgery, but stifle and tibiotarsal joint angles were changed, following CTWO surgery, compared with their preoperative values. The angular velocity patterns of CTWO were characterized by increased stifle joint extension velocity from the middle to end swing phase and decrease in the peak velocities (flexion) during swing phase. None of these changes was observed in the stance phase after the CTWO surgery. These kinematic results showed that dogs that underwent a CTWO procedure were more likely to have significantly hyperextended gait patterns of the swing phase postoperatively than the dogs that had a TPLO procedure for repair of a ruptured CrCL.

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