Results: Ossification of lateral meniscus were detected in radiograph. Histologically hypertrophic chondrocyte and chondroplasia or ossification of meniscus were observed. Those changes were observed dominantly in the lateral compartment rather than in the medial. Mean OARSI score in control, 2, 4, 6, and 8 weeks were 0±0, 1.06±0.42, 1.88±0.72, 2.19±0.99, 2.5±0.5 points, respectively. The immunoreactivity of type II collagen in the articular cartilage decreased with the indicated periods of the forced running in both medial and lateral cartilage. Although type X collagen expression was limited to the deep calcified zone below the tidemark in the control knee, it appeared and increased in the superficial and middle zones above the tidemark according to the index periods of the forced running.

Conclusions: This murine knee OA model will allow study of mechanical and genetic interactions in joint health and in OA initiation and progression.

115 ATLAS OF MACROSCOPIC AND MICROSCOPIC LESIONS OF THE KNEE JOINT IN AN OSTEOARTHRITIS CRANIAL CRUCIATE LIGAMENT TRANSECTION DOG MODEL 90 DAYS AFTER SURGERY
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Purpose: The purpose of the study was to create an atlas of the macroscopic and microscopic osteoarthritis lesions in the CCLT (Cranial Cruciate Ligament Transsection) dog model of osteoarthritis (OA).

Method: Twenty one skeletal mature young female beagle dogs with a mean body weight of 10kg were used for the study. Transection of the cranial cruciate ligament (CCL) of the right knee joint was performed. Three months after the surgery the dogs were euthanized and tibial and femoral condyles, femoral trochlea, patella and menisci were examined immediately by three experienced observers. Cross examination of the osteophytes, articular cartilage, synovium and menisci was realized for each of these sites. Histology, histomorphometry and immunohistochemistry were performed.

Results: in all of the operated knees, fibrillation of the cartilage was noted; neither cartilage edema nor more severe lesions were macroscopically observed. Cartilage lesions were reported in decreasing order of frequency: in the medial and the lateral tibial condyle, in the lateral femoral condyle, the femoral trochlea, the medial femoral condyle and the patella. Osteophytes were classified as evident or large on the femoral trochlea, small on the lateral femoral and tibial condyles and on the patella. Medial meniscal damages were observed in 5 of the 21 operated knees. The superficial layer of the cartilage was fibrillated and discontinuous but this change did not extent in the transitional layer or deeper. Most of the cells were rounded and organized tannentially to the surface. In the transitional and deep layers of the cartilage, some chondrocytes were moderately hypertrophic and in the deep layer clusters of chondrocytes were observed. However this varied between dogs. Histological appearance of the cartilage from every control joint was normal. In 50% of the operated knees, collagen type III was present around the chondrocytes in the superficial and transitional layers. No collagen type I and II was seen. In the operated knees, histology revealed a high density of collagen in the synovial membrane. These collagen fibers were slightly wavy fibers and located deeply in the synovial membrane. In the control knees, the density of the collagen fibers was lower and the fibers were highly undulated. Neither in the operated nor in the control knees were inflammatory cells observed. Histomorphometry showed fibers were 10 to 15 fold thicker than the mesothelium in the ACLT knees ninety days following the surgery while they were at least twice thinner in the control knees.

Conclusion This exhaustive atlas could be used as a template in preclinical and clinical studies and could allow future comparisons between studies.

116 A SIMPLIFIED METHOD TO DETERMINE JOINT LOADING AS A SURROGATE MARKER OF PAIN/DISABILITY IN A CANINE MODEL OF OSTEOARTHRITIS, VALIDATED USING FORCE PLATE ANALYSES AS A GOLD STANDARD
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Purpose: In humans, evaluation of tissue structure damage/modification in osteoarthritis (OA) is difficult and can only be performed indirectly by use of surrogate markers, such as imaging and/or biochemical markers. In contrast, pain and disability can be validated, easily and longitudinally by use of questionnaires like WOMAC and VAS. A direct evaluation of tissue structure changes can be performed in detail in animal models of OA by e.g. histochemical and biochemical techniques. On the other hand evaluation of OA pain and disability in animals remains a challenge. For dogs a well described and validated technique used in veterinary clinic and in research settings, is force plate analyses (FFA). This technique provides detailed information of joint loading (forces in 3 degrees of freedom including: propulsion (Fy), stance (Fz) and brake (Fy max) force as surrogate markers of pain and (dis)ability. Unfortunately this technique is time consuming at least 5 weeks/ dogs time point as well as prolonged training. Therefore, a simplified method of studying joint loading was developed. A mobile weighing platform with four individual scales for each leg with parallel digital computer registration was designed. In the present study, this novel method was validated. The loading of the hind legs stifle joints was evaluated during progression of experimentally induced OA and, primarily, compared to Fz by use of FPA.

Methods: In twelve mixed breed (mongrel) dogs experimental OA was induced in the right stifle joint according to the Groove model. The left stifle joint served as a control. Twice at baseline and at every 5 weeks FPA was performed. In the same weeks the animals were put on the 4-plates weighing platform. Five measurements of 10 seconds were performed and analysed (approximately 5 min/dog/ point time). The average of these 5*10 sec measurements were compared to the Fz (as well as Fy max and Fy min) obtained by FPA. In this first analyses baseline values (before surgery) and 10 weeks values (after surgery) were analysed, because the 5 week condition might still include pain/disability due to surgery and not solely to OA.

Results: By use of the 4-plates balance a decrease in loading of the OA right hind leg was found from 2.8±0.2kg at baseline to 2.5±0.2kg at 10 weeks follow-up (p<0.05). A similar pattern was seen for the FPA-Fz from 4.5±0.1N to 4.2±0.1N (p<0.01). A positive linear correlation was found between the delta and needs prolonged training. In loading of the right OA hind leg (10 weeks compared to pre-treatment) for both methods (R=+0.27 and R=+0.33, respectively; both p<0.03). The change in loading between the left control and the right OA leg was baseline 0.6±0.3kg (ns) and increased to 1±0.3kg at 10 weeks follow-up (p<0.003). The same was found for FPA-Fz, from 0±0.1N at baseline (ns) to 0.3±0.1N at 10 weeks (p<0.01). Also for this difference between the control and OA hind joints a positive linear correlation existed between the 4-plates balance and the FPA-Fz (R=+0.22, p<0.02).

Similar, statistically significant relations were found for the 4-plates balance and FPA-Fy max, but not for FPA-Fy min.

Conclusions: Pain/disability, due to OA in the extremities is difficult to measure in animal models, including dogs. FPA (force plate analyses) is the gold standard to evaluate (un)loading/(dis)ability of the extremities in dogs. The present study clearly demonstrates that the use of this novel designed mobile weighing platform with four individual scales with parallel computer controlled registration is a perfect surrogate for FPA as a measure for pain disability due to development of OA. The technique is less expensive, less time-consuming and simpler to accomplish, because it can be performed at any location. Although, FPA is clearly a more elaborated technique and provides more information about gait and different forces and the 4-plates balance is a more static measurement, the latter may be of good value in studies evaluating pain/disability in canine models of OA.