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## PREVALENCE OF NATURALLY OCCURRING CARTILAGE DEFECTS IN THE OVINE STIFLE (KNEE)

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### Abstract:

**Purpose** - To determine the prevalence, anatomical location and severity of cartilage defects in the stifle (knee) within a population of adult ewes enrolled for research. **Methods** - *Animals*: hind limbs (n= 60) from 30 adult ewes collected within 6 hours of euthanasia. *Gross anatomical observation*: the articular surfaces of the distal femur, proximal tibia and patella were examined by gross observation by two pairs of investigators. They scored the abnormalities of the hyaline cartilage using OARSI recommendations for ovine cartilage: score 0 for intact cartilage surface; score 1 for surface roughening; score 2 for deeper defects (fibrillation, fissures) not involving the subchondral bone; score 3 for small erosions down to subchondral bone (less than 5 mm diameter); score 4 for large erosions down to subchondral bone (more than 5 mm diameter). Scoring of articular surfaces was performed in 26 anatomic areas in each knee. Discrepancies were discussed between investigators and pairs till a consensus was reached. *Histopathology*: for each anatomical location where lesions had been identified, osteochondral slabs were obtained for histopathology. Samples were obtained in several regions with negative findings (score 0) for control. Conventional light microscopy [staining with Toluidine Blue and Safranin O) was performed to characterize structure of cartilage and bone, and confirm the classification of lesions performed by gross observation. *Scoring and grading*: the most severe lesion observed in each of the 26 anatomic regions was used to score the articular surface of that region. Grading of cartilage defects within each knee was obtained by the addition of the scores of all regions. **Results** - There were 23 Texel and 7 Iles de France ewes, aged 3 to 11 years, weighting between 38 and 72 kg, euthanized between May and October 2011. There were anatomical locations where cartilage defects were significantly ( $p < 0.05$ ) more frequently identified than in others: central third of the medial femoral condyle (MFC2), axial aspect of the central third of the medial tibial condyle (AxMTC2), axial aspect of the central third of the lateral tibial condyle (AxLTC2). Score 2 defects were present respectively in 25, 31 and 15 % of all stifles on MFC2, AxMTC2 and AxLTC2 while score 1 surface abnormalities were present in 36, 25 and 5 % respectively. There was no effect of side (left or right), weight or breed on the grade of cartilage defect in the knee. Though not reaching statistical significance, grade increased moderately with age in this population ( $p = 0.08$  and  $b = 0.02$ ). **Conclusions** - This study demonstrated that score 2 cartilage defects can be significantly prevalent in stifles in a population of sheep enrolled for research. It indicates that, in Texel and Iles de France used for research, it is useful to assess cartilage status at baseline before including the animal in the experimentation, and to enroll, for each group of the trial, animals presenting either no cartilage defect or a same grade of defect. This should be assessed by non-invasive imaging modalities at baseline. Further research is required to evaluate the development of those lesions over time and compare imaging modalities in their ability to assess naturally occurring cartilage defects in the ovine stifle.

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