and rapidity of OA that develops in the rabbit ACL-T model is not optimal for piloting pharma-therapeutic treatments, or for investigating interaction of instability with other pathogenic factors. The goal of this study was to develop a rabbit model of controlled knee instability in which OA develops reproducibly at a level amenable to therapeutic interventions. The hypothesis was that, by inducing a more moderate level of instability in rabbit knees with a partial (rather than full) ACL-T, a reproducible, sub-critical level cartilage degeneration would occur.

Methods: With institutional approval, twenty-three New Zealand White rabbits received either total ACL-T (n=8), partial (medial half) ACL-T (n=8), or sham surgery (control, n=7) on their left knees. Eight weeks later, the animals were subjected to a loading test, in which A-P stability of the knee was quantified in terms of anterior drawer stiffness and neutral-zone length. The joints were then prepared for histomorphological evaluation. Femoral and tibial surfaces in both medial and lateral compartments were rated individually by Mankin score (each 14 points max), and the sum of these four scores was defined as the whole-joint score (56 points max).

Results: A-P stability in the partial ACL-T knees was impaired with respect to the control knees, as evidenced by decrease of anterior drawer stiffness and increase of neutral zone length (Figure 1). However, the level of impairment was smaller than in the total ACL-T knees. Whole-joint Mankin scores in the partial ACL-T knees averaged 14.0±2.0 points (Figures 2 and 3); this was higher than in the control knees (7.9±3.3 points), but lower than in the total ACL-T knees (18.0±3.4) (P-values <0.05 for all cases).

Conclusions: Partial ACL-T created modest instability in rabbit knees. The cartilage degeneration that occurred in those knees at 8 weeks was at a sub-critical level. This rabbit knee model of controlled instability appears to be a promising tool for future OA research, especially for studies of multiple interacting influences.

81 THE INFLUENCE OF SUBCHONDRAL BONE LOSS ON ARTICULAR CARTILAGE DEGENERATION IN AN EXPERIMENTAL MODEL OF OSTEOARTHRITIS IN RATS


Purpose: Osteoarthritis (OA) and osteoporosis (OP) are the most prevalent skeletal diseases related to ageing, but the relationship between these two diseases remains unclear. The purpose of this study is to investigate the relationship between OA and OP. Especially, the influence of subchondral bone loss on articular cartilage degeneration was evaluated in an experimental model of OA with ovariectomized (OVX) rats.

Methods: Eighty rats were randomized into two groups, and OP was experimentally induced prior to OA in one group by bilateral ovariectomy and the other was intact. Three months later, OA was experimentally induced by medial meniscectomy (MMX) in the right knee of 24 rats in each group (Week 0). MMX rats were sacrificed at 1−3 weeks after the MMX (n=8 rats/point), and control rats were sacrificed at 0 and 3 weeks in each group. Three-dimensional (3D) structural change of tibial subchondral bone was evaluated using micro-focused X-ray computed tomography (micro-CT), followed by histological scoring (e.g. Scoring with HE/TB staining sections). In this experiment, to minimize the influence of body weight, feeding is strictly controlled, and the body weights were almost equal in these two groups (OVX or intact).

Results: Body weights at week 0 were 339.5±8.6 g for OVX group and 332.7±15.0 g for intact group. In the micro-CT analysis, tibial subchondral bone volume fraction (BV/TV) was significantly (12−16%) decreased in the OVX rats at 0−3 weeks. In the histological scoring system, articular cartilage was graded as normal (score 0) at Week 0 in both intact and OVX groups. The score was increased between 1 and 3 week by the MMX in the both groups, and they were not different between OVX and intact groups. It was reported that subchondral bone remodeling (increased bone turnover and subchondral sclerosis) plays an important role in the pathogenesis of OA (Ref. Arthritis Rheum 2004;50:1193–1206), however, the degree of articular cartilage degeneration by MMX was not different between OVX and intact groups.

Conclusions: In this study, subchondral bone loss was attained by OVX, and body weights were matched between OVX and intact groups. Under these conditions, the degree of articular cartilage degeneration by MMX was not different between OVX and intact groups. Subchondral bone loss did not promote articular cartilage degeneration in this study.

82 LOCAL ENDOCANNABINOID ENHANCEMENT REDUCES NOCICEPTION IN NATURALLY-OCCURRING OSTEOARTHRITIS OF GUINEA PIGS

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Purpose: Dunkin Hartley guinea pigs begin to show signs of osteoarthritis at about 3 month of age which becomes progressively worse with advancing age. A powerful method to directly assess joint nociception without psychosocial and affective aspects of pain is to record the electrophysiological activity of joint nociceptive nerves.