with histomorphometric parameters such as bone volume fraction ($r = -0.89, p < 0.0001; r = -0.5, p < 0.007$; respectively) and trabecular number ($r = -0.71, p < 0.0001; r = -0.38, p < 0.037$; respectively).

**Conclusions:** These findings demonstrate that the low-dose MIA rat model closely mimics the pathological features of progressive human OA such as cartilage degradation, subchondral bone sclerosis, cyst and osteocyte formation. Moreover, this model demonstrates measurable changes in both the cartilage and the subchondral bone. Monitoring of low-dose MIA-induced OA in rats using in vivo micro-CT enables tracking of structural changes in the tibial subchondral bone for the individual animal over time, and could be used to track changes in bone in preclinical drug intervention studies for treatment of OA.

**Fig. 1.** Coronal section of medial tibial plateau of saline injected knee (A). The MIA-injected knee (B–D) shows loss of proteoglycan, chondrocyte proliferation (B, arrow), chondrocyte cluster (B, arrow head), fibrillation (C, arrow), delamination, subchondral bone sclerosis, and fibrotic bone marrow (D, arrow).

**Fig. 2.** Coronal micro-CT images show osteophytes (A, arrow) and cysts (C, asterisk) in the medial tibia of MIA-injected knee. Histology sections confirmed osteophyte (B, arrow) and cyst (D, asterisk) formation. Note the presence of osteoblasts lining the areas of bone resorption (D, arrow).

**Conclusions:** These findings demonstrate that the low-dose MIA rat model closely mimics the pathological features of progressive human OA such as cartilage degradation, subchondral bone sclerosis, cyst and osteocyte formation. Moreover, this model demonstrates measurable changes in both the cartilage and the subchondral bone. Monitoring of low-dose MIA-induced OA in rats using in vivo micro-CT enables tracking of structural changes in the tibial subchondral bone for the individual animal over time, and could be used to track changes in bone in preclinical drug intervention studies for treatment of OA.