Reviewer's report

Title: A role for subchondral bone changes in the process of osteoarthritis; a micro-CT study of two canine models.

Version: 1 Date: 7 October 2007

Reviewer: Daniel Henri Manicourt

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General

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Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

Please replace mean by median as you have used non parametric tests
Check that your references fit your statements

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By using micro-CT, the Authors have detected a decrease in the thickness and an increase in the porosity of the subchondral bone plate from the operated OA knees in two models of canine experimental osteoarthritis (OA). However, at both 10-week and 20-week post-surgery, the changes in subchondral bone plate reached statistical significance in the model of anterior cruciate ligament transection (ACLT), but not in the groove model. Likewise, operated knees exhibited changes in their trabecular subchondral bone, but these changes were statistically significant in the ACLT model, and not in the groove model.

In general, the paper could be written better. Sometimes, this version is rather difficult to read for someone who is not involved in the field.

I have several other comments.

Point 1. Since the Authors have used either 4 or 5 dogs for each experimental condition, the differences between operated and non-operated knees within each experimental group as well as the differences between operated knees of the two experimental groups, if any, have to be “big” to be stated as statistically significant by using non-parametric tests. This point should be more clearly stated at the beginning of the discussion. In the abstract and in the manuscript, the Authors should state that bone changes were (not only) “small” (as they state) but also non-statistically significant since changes can be small and statistically significant.

Point 2. In table and text. I guess how the Authors have computed a “relative difference”, but, for the reader, this point should be clearly stated in the section
“Methods”. Likewise, please define “delta” in Table 1.

Point 3. Since you have used non parametric statistical tests, you should refer to “median” and not to “mean”.

Point 4. In the groove model at 20-week post-surgery, and although they did not reach statistical significance, the mean changes in subchondral plate (thickness and porosity) were greater than changes in trabecular subchondral bone. Do you think that these observations might suggest that subchondral plate changes are more relevant than trabecular subchondral bone changes for the progression of post-traumatic OA disease process?

Point 5. Section “Discussion”, the paragraph 4 dealing with osteophytosis could be somewhat rewritten in order to have a greater impact.

Point 6. Section “Discussion”, paragraph 7. You state that the trabecular subchondral changes of the operated OA knee observed in the ACLT model are secondary to disuse. If it so, how do you conciliate your statement with the study of Behets et al (J Bone Miner Res, 2004, 19: 1821-1826) who, by using a pQCT, showed that most of subchondral bone changes were observed in the medial compartment of the tibia? What makes OA in the ACLT model is not disuse, but rather dramatic changes in the joint biomechanics concentrating a lot of biomechanical forces (compression and torsion) on the medial tibial plateau.

Point 7. The Authors should be very careful with cited references as some of their contentions do not always correspond exactly to the findings made in cited papers. In the section “Background”, paragraph 2, line 2, the Authors state: “In human studies, an increase in trabecular bone volume fraction and trabecular thickness was found (3-5), as well as an increase in cortical subchondral plate thickness (6)”. First, the study of Pelletier et al. (ref 6) is not devoted to human OA, but to canine experimental OA where the important subchondral bone resorption can be counteracted by Licofenac. Second, while Bobinac et al. (ref 4) indeed report an increase in the trabecular bone volume fraction in the subchondral bone of human OA knees at very late stages of the disease process, Chappard et al. (ref 5) clearly show that there is a marked difference between, on the one hand, OA bone still covered by its overlying articular cartilage and, on the other hand, OA bone having lost its overlying cartilage tissue, at least for human hip OA. Indeed, for instance, values found for both trabecular bone fraction and trabeculae thickness were higher in subchondral bone from OA femoral heads having lost their overlying articular cartilage than in subchondral bone from OA femoral heads still having their overlying cartilage tissue. However, in subchondral bone from OA femoral heads still having their articular cartilage, values found for trabecular bone volume fraction and trabeculae thickness were similar to values found in osteoporotic femoral heads without OA!!

What next?: Accept after minor essential revisions
Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Needs some language corrections before being published

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests

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