Reviewer's report

Title: Validation of quantitative magnetic resonance imaging-based apparent bone volume fraction in peri-articular tibial bone of cadaveric knees

Version: 2
Date: 2 January 2014

Reviewer: Ko Chiba

Reviewer's report:

This is an important study which validates MRI based BV/TV of the proximal tibia by comparison with micro CT. There are several points that need to be addressed.

Major Compulsory Revisions

Methods

1) "10% formalin fixation"
   Does this affect the microstructure of the trabecular bones?

2) "MRI signal intensity"
   Does the temperature of the specimen influence signal intensity?
   If so, how was it corrected?

3) "spacial resolution"
   "0.23 mm x 0.23 mm in-plane spatial resolution" (Methods)
   "spatial resolution (1000µm x 230µm x 230µm) of MR" (Discussion)
   "that of microCT (9µm x 9µm x 9µm)"
   These are not spacial resolution but voxel size.

4) "ROIs"
   Do the ROIs in the MRI and micro-CT images correspond accurately?
   Were there any anatomical landmarks?

5) "Threshold: An upper threshold of 255 and a lower threshold of 80 were used."
   How did the authors determine these threshold values?

Results

6) "Table 1"
   MRI based BV/TV was too low.
   Was the threshold value of the MR image determined properly?
   Could you show a binalized image of it?
7) "Figure 2-B"
The reviewer wonders why Figure 2-B is not mentioned in the results and methods section.

Table & Figure
8) "Figure 1"
In Figure 1, the MR image seems to have dense trabecular bone rather than the micro-CT, even though Table 1 shows that the MR images had more bones.
How do the authors explain this?
Which cases (cadavers No. 1-5, right or left) do these images show?
9) "Figure 2-B"
The reviewer cannot understand what Figure 2-B means.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

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

Declaration of competing interests:
There are no competing interests.