Reviewer's report

Title: Time-course of Exercise and its Association with 12-Month Bone Changes

Version: 2 Date: 19 May 2009

Reviewer: Robin Daly

Reviewer's report:

The authors have addressed most of the questions raised in my initial comments, but there remain a number of queries that require further comments/clarification.

Major Compulsory Revisions

In their responses to my initial comments the authors state ‘The cortical attenuation results of premenopausal women are now discussed’. However I was unable to find this new discussion in the revised manuscript. Please specify exactly what new information was included. This is important because the findings indicate that increased loading (0-3 mo) was associated with increased cortical vBMD but had no effect on cortical geometry. Even for the 0-12 month impact data the correlation coefficient appear stronger for cortical attenuation than any of the other bone geometry measures. This is interesting and warrant further discussion. Is it possible that exercise is having a greater effect on bone material properties (increased mineralization or reduced porosity) rather than geometry (or could the threshold level for adaptation differ for material vs structural properties)? However I note that cortical attenuation decreased in both the Ex and Con groups in their previous intervention paper so perhaps the higher number of impacts helped prevent the loss in vBMD (rather than increase it)?

The authors report the average number of impacts at different acceleration levels from 0-3 and 0-6 months. Clearly the 0-6 data is going to be influenced by the 0-3 data so why not report the average impacts from 3-6 months and assess whether this was related to the changes in BMD, bone structure and strength?

What was the rationale for only plotting trochanter BMD changes with the average daily number of impacts from 0-6 months. This figure is really not necessary.

On P11 the authors state on several occasions that many of the results disappeared after adjusting for impacts at later months – but did this analysis also include all the other covariates listed in the statistical analysis section? In other words, was there a significant association between bone changes and impact loads for 0-3 and 0-6 month after adjusting for all covariates (except impacts at later months) that then disappeared after including impacts at later months. This is not clear in the results.

P14, line 1-2. Further discussion is needed as to why there were no relationships between the impact loads and the tibial bone changes. It is not enough to simply
say that ‘..these associations were site-specific..’ when referring to the mid femur. One could argue that the peak forces (loads) on the tibia would be greater than those imparted to the femur and so it seem odd that there was no effect at the tibia. It would be worth a sentence or two in the Discussion to explain these contrasting results.

Minor Essential Revisions

P4, last line. ‘Despite of objective..’ should be ‘Despite the objective…’

P13, para 2, line 2-3. This sentence is not clear ‘… to a mechanically appropriate…’

P13, para 2, line 5. Should this read ‘… achieved by reduced endocortical resorption and/or greater periosteal apposition’.

P14, para 2. I would argue that there was very little difference in the DXA and pQCT results in this study. In fact contrary to the authors’ discussion (and the findings that there were no significant correlations with the pQCT tibial measures), it could be argued that perhaps the pQCT (at the tibial site at least) is not sensitive to detect changes in bone in response to loading?

P15, line 6. ‘.. not able not…’ should be ‘.. not able to..’

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:

I declare that I have no competing interests