Reviewer's report

Title: Factors affecting bone mineral mass loss after lower limb fractures in teenagers

Version: 3 Date: 23 August 2013

Reviewer: Vanessa Yingling

Reviewer's report:

- Major Compulsory Revisions

1. The aim of this paper seems to be extremely similar to that of a previously published paper by the authors. [J Bone Joint Surg Am. 2012 Feb 1;94(3):208-16. doi: 10.2106/JBJS.K.00420. Effects of cast-mediated immobilization on bone mineral mass at various sites in adolescents with lower-extremity fracture. Ceroni D, Martin X, Delhumeau C, Rizzoli R, Kaelin A, Farpour-Lambert N.] Based on the introduction, purpose statement and results it is not clear how these data are different from those already presented. If this was intended to look at the source of the decreased bone mass the argument was not presented or argued well.

2. There are also 2 other publications which seem to use these data further necessitating a clear picture of how this manuscript differs in its purpose.

Decrease of physical activity level in adolescents with limb fractures: an accelerometry-based activity monitor study.
Ceroni D, Martin X, Delhumeau C, Farpour-Lambert N.


Recovery of physical activity levels in adolescents after lower limb fractures: a longitudinal, accelerometry-based activity monitor study.
Ceroni D, Martin X, Lamah L, Delhumeau C, Farpour-Lambert N, De Coulon G, Ferrière VD.

3. All bone mass data are based on DEXA measurements with no structural measurements. The limitations of using DEXA should be considered especially in a teen population. In addition, the data set includes both genders with no discussion of the possibility of gender differences and both pre and post pubertal adolescents seem to be in the sample with no discussion of how puberty affects bone development especially the effect of pubertal status on bone accrual and exercise.

Methods:
4. 1st PP: What is the difference between the length of the casting period and duration of the non weight bearing period? Are these data presented anywhere?

Statistical analysis

5. Why not give variables that were correlated?

6. A paired-t test was stated but in Table 1 it states that significance was determined from an ANOVA, please clarify.

Results

Effects of length of cast immobilization, duration of non weight bearing and decrease of VPA on changes of BMD/BMC

7. All data is not included in Table 1. BMD, BMC and Area values should be included for all sites. There was a correlation with casting length and BMD in the calcaneus but a correlation with BMC in the lower limb, could this be due to the type of bone in each region. Some discussion of BMD and BMC values in trabecular and cortical regions is needed.

8. Graphs of the correlations would be helpful to visualize the data and the relationships.

Multiple linear regressions analysis

9. For the .22% daily bone loss was that for all sites combined?

Discussion

10. Pp1: It was stated “On the other end, we observed that duration of non weight bearing and decrease of VPA did not alter bone mineral mass/content of the lower limb” but there was a significant negative correlation reported in Table 1 for duration of non-weight bearing and calcaneal BMD.

11. “We observed that bone mineral loss is significant, and not only occurs at the level of the fracture, but also at adjacent lower limb sites, both proximal and distal to the fracture.”

Were these data reported in this manuscript?

12. Final pp: The decrease in VPA was sited as a reason for bone loss but these data were not emphasized or presented in a manner to support these conclusions.

13. Finally, the predictive model developed in this study could enable us to estimate the bone mineral loss considering the length of cast immobilization, and duration of non weight bearing period.

I am unclear as to the predictive model that the statement refers.

Conclusion

14. The conclusions do not seem to conclude the meaning of the data presented.
The bone values for the proximal and distal sites was not presented or highlighted in the discussion and the focus on the non affected limb and lack of loss of bone mass was not mentioned in the discussion.

- Minor Essential Revisions

Methods
Subjects and Study Design
1. Use specific measurements bmd and bmc not bone mineral mass.

Medical History
2. results ox X-rays investigations.

Bone mineral variables
3. Why not use calcaneus throughout for clarity?
4. Check boxes after company names Lunar Pixi#, Lunar Prodigy#
5. An image to clarify where the Total hip BMD (g/cm2) and total lower limb BMC (g) regions were taken would be helpful.

Recorded Data
6. Due to fractured lower limb immobilization in a plaster?? (clarify sentence)
7. How many missing data?
8. Why not do bilateral post cast?

**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