Reviewer’s report

**Title:** Time-course of Exercise and Bone Changes in a 12-Month Exercise Trial

**Version:** 1  **Date:** 24 February 2009

**Reviewer:** Jose A L Calbet

**Reviewer’s report:**

This study examines the effects of a jumping training program on bone mass and geometry in premenopausal women (35 to 40 years old). The impacts sustained by the subject’s skeleton were recorded with a mono-axial accelerometer. The authors are congratulated for the tremendous amount of work performed. However, I have two serious criticisms. First, the main outcome variable of this study in bone mass (aBMD) and geometrical parameters, but no information is given regarding the effects of the training program on these variables. This information must be included in this manuscript in for example a table with the corresponding data at 0 and 12 months and the (“P” values). Second, the study lacks of control group, what is incomprehensible in a study of this magnitude. This is a serious limitation that must be commented in the discussion. Some of the changes in bone mass may just be seasonal, particularly in Finland where vitamin D levels are expected to be markedly lower in winter time.

The aim of the study is a little confusing: with the intervals used there is always a carry over effect. Was there a progressive increase in bone mass with the duration of the program? Or there is stabilization after six month? These critical question can not be responded because bone mass was only assessed at 0 and 12 months.

**METHODS**

Additional information should be given regarding the study population:

1) Inclusion and exclusion criteria. Was there any dropout? Why?
2) Previous exercise history: where all the subjects sedentaries previous to enrollment? Had some subjects been athletes during their infancy, adolescence or adult life?
3) What was the menstrual status: was any subject oligo- or amenorrheic?
4) Oral contraceptives: was any subject using oral contraceptives
5) Was calcium intake assessed?
6) Explain how was the trochanteric region defined for the DXA analysis.
7) Smoking?

The exercise program can not be reproduced with the information currently included in the manuscript. The authors must report as precisely as possible, how many jumps were performed per session and the number of training session per week since the start of the program. This information could be incorporated
into a figure. In addition, it should be reported at what intensity were the subjects running and how was the running intensity monitored. How many km were covered by running and walking per week? How much is running expected to contribute to the increase in bone mass in adult women if performed alone?

The threshold or minimal acceleration recorded by the accelerometer as well as the procedures used to filter, pre-analyze and classify should be reported with enough detail to allow reproduction of the study by other groups. What was the interval for the 33 level histogram: 0.3 g? How were the five levels that describe exercise intensity established?

It is said that “The acceleration values were also significantly correlated with the ground reaction force (R = 0.735 for the peak acceleration, R = 0.937 for the area under the acceleration peaks; n = 462 recordings), when the acceleration values were multiplied by body weight” You need to be more precise: are you referring to the peak ground reaction force? How ground reaction force was measured (force plate?). What does “R” represents here: the Pearson correlation coefficient?

What statistical test are you using to say that a given “R” value is statistically higher that another? The correlation observed between jump from 0 to 3 months and bone mass changes 0-12 months is biased by the training performed from month 3 to month 12 or other factors (seasonal changes in vitamin D status, to mention one).

DISCUSSION

Part of the discussion is devoted to compare the bone changes observed in this study with previous studies, however no information is given in the present study on the magnitude of the changes elicited by the training program in bone variables.

The study can not establish which impacts are more osteogenic based only on the “R” values.

CONCLUSION

This is the weakest part of the manuscript. The conclusions are not supported at all by the study. You can not conclude about the minimal time need to elicit bone adaptations when bone changes were only determined at the 12 month point.

REFERENCES

A recent study has shown osteogenic effects with a short training program in women after strength training + jumps compared to a control group (Guadalupe-Grau Journal of Applied Physiology 2009; online). This study should be commented in the context of jumping and bone mass in young premenopausal women.

MINOR COMMENTS

P5, L7: Can “running and walking” be considered high impact exercise? The
strain elicit by running depends on running velocity, which in turn is determined by the ground reaction force…

P11, First PARA: a reference is needed to support these statements

P12, L3: avoid reiteration “increased incrementally”

P12, L4: The reference to Cullen et al (2000) must be formatted according to the style of the journal. Please report in the methods section how many jumps and from which altitude were performed during the training (as I suggested above). I would like to see a graph with the 52 weeks of the year in the “x” axis and impacts in the “Y” axis you can use different line-points to distinguish between the five impact levels, as in figure 1. In addition, in the same figure (use another graph) report the number of jumps (“Y” axis) per week (52 weeks, “x” axis). It seems that progression is not that critical as speculated by Cullen or the accelerometer was not able to detect a real progression. As described in the manuscript, subjects performed more jumps and from a higher altitude as the training progressed? Thus why is this not reflected in the accelerometer?

Dividing the discussion into 2-3 sections will improve the flow of the discussion which

Why N= 34 in Figure 1 and not 35?

Level of interest: An article of limited interest

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