Author's response to reviews

Title: Decrease of Physical Activity Level in Adolescents with Limb Fractures: An Accelerometry-Based Activity Monitor Study

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Author's response to reviews:

ANSWERS TO THE REVIEWERS

Reviewer's report
Title: Decrease of Activities Generating High Impact Forces in Adolescents with Limb Fractures: An Accelerometry-Based Activity Monitor Study
Version: 2 Date: 12 January 2011
Reviewer 1: Diego Moliner-Urdiales
Reviewer's report:
Major Compulsory Revisions
This is a descriptive well written manuscript analysing the influence of limb fractures on physical activity. Authors have objectively assessed physical activity levels in a sample of adolescents with limb fractures and have compared with healthy controls.
Descriptive analysis about the association between physical activity levels and some pathology could be of interest, especially with pathologies that imply long periods of inactivity capable of alter bone composition. Limb fractures in adolescents cause a period of inactivity around 25 days and I am not sure whether this short period of time is enough to cause any effect on bone composition. Therefore, in my opinion the interest of the data remains unclear and authors should clarify this issue before continuing the revision process. We do not agree with this assumption for the following reasons.
MacIntyre et al. (Canadian J Physiol Pharmacol 2001) have previsouly demonstrated significantly reduced bone size and muscle strength in young adults after a 6-week forearm immobilization period and full recovery at 1 year after casting. In a recently submitted study publication, we demonstrated that
bone mineral density and content were decreased after cast removal at the injured limb when compared with the contralateral limb. Bone loss did not only occur at the level of the fracture, but was also observed at adjacent sites, both proximal and distal to the fracture, such as the ipsilateral hip or calcaneum. Bone loss due to cast immobilization reached between -5.2% and -31.7% depending of the site at the fractured lower limb.

It is well known that high impact and weight-bearing exercises have direct and positive consequences on bone mineral mass aquisition. Recent studies showed that high-intensity forces, especially if imposed rapidly, produce greater gains in bone mineral mass than low- to moderate-intensity forces. Our study is the first to examine the time spent in vigorous PA, which reflects high-intensity forces beneficial to skeletal health, and demonstrated a -41.4% and an -84.4% decrease, respectively, in adolescents with upper limb and lower limb fractures. This significant reduction in brings a valid explanation for disuse osteopenia.

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

The modification has been made

Reviewer’s report
Title: Decrease of Activities Generating High Impact Forces in Adolescents with Limb Fractures: An Accelerometry-Based Activity Monitor Study
Version: 2 Date: 24 January 2011
Reviewer: Line Brinch B. Christensen

Reviewer’s report:
Comments to the editors and authors
Though the results in this manuscript are not surprising the data are new and interesting and deserves publication. The manuscript is in general clear, well written and answers the posed questions.
I do however have a few comments that may be taken into account by the authors, e.g. adding a few references. Please see below.

Minor issues not for publication are marked by a *
• Major Compulsory Revisions
  - Not applicable
• Minor Essential Revisions
  - Not applicable
• Discretionary Revisions

Title: The title focuses on High impact forces only, while the article seems to have a broader focus on PA reduction. High impact forces in specific are not mentioned in the conclusion, and only briefly in the abstract. Consider rephrasing either title or smaller parts of the abstract/main text.

The title has been rephrased as suggested

Abstract:
* Background section: The abbreviation PA is not introduced at first appearance
The modification has been made
- Methods section: Consider clarifying what you mean by "each level of intensity"
This sentence has been clarified as suggested
- Results section: Consider if four digits after the decimal point is necessary, and if p<0.0001 is sufficient
The modification has been made

Introduction
- Last section: You should add a reference or two in the sentence "In adolescents, loss of bone ... of reduced PA, such as cast immobilization"
A reference has been added as suggested
* In the last paragraph it is stated that "The objective of our study was ALSO to ..." It appear that this purpose is the main and only purpose, so "also" could be deleted.
The term “also” has been removed as suggested

Methods
- subjects section: How is it possible to recruit healthy cases in a hospital?
We easily recruited healthy cases amongst patient’s visitors.
* subjects section: Double use of the word "for" in the sentence mentioning exclusion criteria
The term has been removed as suggested
- anthropometric section: To what degree of precision did the scale and the stadiometer measure?
This information has been added as suggested. Standing height was assessed in bare or stocking feet to the nearest 1mm using a precision mechanical stadiometer (Holtain Ltd, Dyfed, UK). Weight was measured to the nearest 0.1kg using a mechanical calibrated beam scale (seca®, Reinach, Switzerland). Body mass index (BMI) was calculated as weight (kg)/height squared (m²).
- PA section: The description of the starting time of data collection is a bit
unclear. Should it be rephrased to "starting the data collection on the following DAY" or to "starting the data collection one of the following days"?
Modified as suggested. PA was measured during cast immobilization, starting the data collection the following day after the discharge from the hospital.
- PA section: How was the accelerometers attached?
The monitors were attached above the iliac crest of the right hip with an elastic belt and adjustable buckle, and were oriented vertically in the same direction.
- PA section: was accelerometers also worn at night?
Yes. This information has been added in the text. We asked the participants to wear the accelerometers during the night, in order to ensure that the accelerometer would not be forgotten the next morning.
- PA section: consider rephrasing the sentence describing the starting day of measurement. Did you want to ensure AT LEAST / NO MORE THAN / EXACTLY two weekend days? Unclear phrasing as it is.
This sentence has been rephrased. Recordings of physical activity started on Monday, Tuesday or Wednesday to ensure measurement of at least two weekend days
* PA data interpretation: You should use another figure for multiplication than a period (.). Something like "•", "#", or "#" would be better. This accounts for all data presentation.
Changes have been made.
* statistics section: Are the brackets around SD needed?
No, they have been removed.
* statistics section: The two lines describing funding, should be separated from the statistics section - unless the funding was only used on statistics.
The modification has been made.
* statistics section: There seem to be missing a word in the last part of the sentence. Maybe "...the funding source did not HAVE any role .." Correction of the sentence has been realized
Results
- Consider explaining why seasonal variation is an important match criteria. Different PA levels?, Vit D levels? Fracture risk?
Seasonal variation was considered as important match criteria, as this factor may have an impact over the PA levels (less sports activities during the winter months).
- Consider rephrasing the two sentences "A statistical difference between patients with lower ... , p=0.028)" and "This difference was even more marked ...
for time spent in moderate to vigorous PA"
Changes have been made as suggested.
Discussion
- Second part: "The reduction of PA in adolescents with fractures results in a
decrease of energy expenditure … may be the starting point for children and
adolescents to become overweight". I think you should add a reference.
There is unfortunately no paper in the literature that explore this subject, however
several studies demonstrated the relationship between objective measures of
physical activity and overweight (J. Reilly et al. 2010). It is a fact that we often
observe in orthopedic practice.
Background / discussion
- Consider mentioning briefly how quick or slow bone mineral are being lost and
restored during recovery after a fracture, to give an idea of the consequences of
wearing a cast for a certain time period.
MacIntyre et al. (Canadian J Physiol Pharmacol 2001) have previsouly
demonstrated significantly reduced bone size and muscle strength in young
adults after a 6-week forearm immobilization period and full recovery at 1 year
after casting. In a recently submitted study publication, we demonstrated that
bone mineral density and content were decreased after cast removal at the
injured limb when compared with the contralateral limb. Bone loss did not only
occur at the level of the fracture, but was also observed at adjacent sites, both
proximal and distal to the fracture, such as the ipsilateral hip or calcaneum. Bone
loss due to cast immobilization reached between -5.2% and -31.7% depending of
the site at the fractured lower limb.
It is well known that high impact and weight-bearing exercises have direct and
positive consequences on bone mineral mass aquisition. Recent studies showed
that high-intensity forces, especially if imposed rapidly, produce greater gains in
bone mineral mass than low- to moderate-intensity forces. Our study is the first to
examine the time spent in vigorous PA, which reflects high-intensity forces
beneficial to skeletal health, and demonstrated a -41.4% and an -84.4%
decrease, respectively, in adolescents with upper limb and lower limb fractures.
This significant reduction in brings a valid explanation for disuse osteopenia.
Authors contributions:
- It appears you have performed bone analysis - that would be very interesting to
include!
As said before, we have submitted another paper including the bone analysis
only.
Tables
General:
* Are all digits necessary? I think one decimal would be enough in most cases.
Changes have been made.
1:
* You should add "mean +/- SD" in the table. It is only mentioned in the methods section.
This has been added as suggested
2 & 3
- as 1 + mention the test performed.
* the unit of "time spent in ... activity" is not presented in the same way "min/day" vs "min.day (-1)"
Changes have been made.
* Consider adding the text "Time spent in" to the other intensity categories.
The modification has be done as suggested.
- Is it necessary to present both moderate, vigorous and "moderate to vigorous". It is the same information/numbers?
This information has been removed as suggested..
* 3 digits are presented for the BMI p-value, but four for all the others (table 2)
The last digit for the BMI p-value was 0.
* The p-value for number of valid days appears to be valid and should have a star
(table 3)
Changed as suggested. The star was forgotten.
- The % data should be clarified - I suppose it is "% of total daily wearing time"?
Yes, this point has been clarified in the table
You could consider to present (some of) the PA differences between the two groups graphically instead of (only?) in the tables.
We performed as suggested a graph about change in PA levels in order to improve the visibility of the phenomenon.
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
Changed as suggested