Author's response to reviews

Title: Pattern of fractures across pediatric age groups: Analysis of individual and lifestyle factors

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Author's response to reviews: see over
Reviewer: Georg Singer

Major revision

1) the manuscript has been reviewed by a native speaker
2) children < 2 years of age were excluded since we were interested in analyzing lifestyle determinants of fractures, and these issues are not applicable in so young children. This explanation was added in the discussion, too.
3) None of the children sustained a fracture of the skull, since the setting of our study was the outpatient clinics and consequently all the forms of severe trauma were excluded. This information was added in the Methods section since it was not well stated in the previous version.
4) The term school was inappropriate for preschoolers, therefore we added kindergarten/school.

We agreed with all the minor essential revisions, and amended the paper as it follows:

1) Abstract:
   a) Results: …progressively increasing with age…rephrased

2) Background:
   a) Omit the statement about osteoporosis in the elderly. omitted
   b) Second Paragraph, first sentence: This sentence is confusing and incorrect. Please rephrase to something like: “The majority of childhood fractures affect the upper limb. While fractures more often occur in males, girls usually sustain fractures at a younger age compared to boys.” rephrased
   c) Second Paragraph, second sentence: I agree that illnesses influencing bone metabolism may influence the occurrence of fractures, but the statement that fractures also may affect healthy children is too weak since the majority of children with fractures are otherwise healthy.

   This statement was rephrased: Despite several genetic, endocrine or systemic illnesses that affect bone metabolism may cause fractures, the majority of children with fractures are otherwise healthy.
   d) Second paragraph, last sentence: rephrase to “…that a first fracture at a young age is associated with an increasing risk of sustaining subsequent fractures.” rephrased
   e) Third paragraph: Studying the epidemiology….. rephrased
   f) Fourth paragraph, first sentence: this is not a large sample, but a series of children and adolescents sustaining fractures. The authors should omit “large sample”. omitted

3) Methods:
   a) …fractures were classified to their anatomic location, place…. rephrased
   b) The study also included questionnaire… rephrased
   c) That a p value < 0.05 was considered significant does not have to be mentioned twice. amended

4) Results:
   a) Please rephrase the sentence “With regard to anatomic location, upper and lower limb fractures….”

   The sentence was rephrased: Except for two cases of clavicle fractures, the near totality of injuries involved the upper limb (84.1% cases) or the lower limb (15.9%).
   b) Same paragraph, next sentence: Change to: “The upper limb was more frequently involved than the lower limb (…) independently of age class. Rephrased: The net prevalence of the upper limb over the lower limb was found independently of age class.
   c) The distinction in arm, wrist/forearm and hand is a bit confusing. I would change it to humerus or upper arm, forearm/wrist and hand. It was changed into: upper arm, forearm/wrist and hand fractures, as suggested.
   d) Last paragraph, first sentence: change “referred” to “sustained”. done

5) Discussion:
   a) Second page: “In order to identify preventive strategies…”: In the study the authors did not identify preventive strategies but describe the location, pattern or fractures…. in children sustaining a fracture, but do not deal with preventive strategies. This would be the next step. We omitted this sentence.
   b) Third page: “It would be expected that sedentary …”. Sedentary behavior does not cause inactivity, but is a form of inactivity. The sentence was changed into: It would be expected that sedentary behaviours would reduce the levels of physical activity
   c) Fourth page: …was almost totally involved, please rephrase and omit totally.

   The sentence was changed into: In preschool children the upper limb was involved in 92% cases in boys and 74% cases in girls, despite the dynamics did not differ among genders.
d) Fifth page: ..emerged in a large number of children, please change to were found in a large number…. Changed
e) Fifth page: bone mineral density at all sites. Which sites do the authors mean? The sites were specified: *Children sustaining repeated fractures had total body and lumbar spine bone size and mass significantly lower than controls;*
6) Tables: Please include a caption for Table 1. **Included** but the table is **now # 2**

**Reviewer:** Thomas F Beattie
**Reviewer’s report:**

My own preference would be to have a much longer review….

*We agree with this remark and amended the paper accordingly, explaining why we enrolled for only six months:*

> “Seasonal variation in the incidence of pediatric fractures has been reported in several studies, with the highest peak found in the warmer months [22, 34]. Subjects in our investigation were enrolled in the first 6 months of the year. A full year review would have been valuable in order to exclude a possible enrollment bias. However, the mitigate weather in our region does not substantially influence behaviours in the leisure time; moreover the admissions for fracture were equally distributed in the first and second semester of the year according to the hospital report. “*

The authors have also failed to mention work by Rennie L, et al. (Injury 2007). This latter paper has a substantial amount of information on the patterns of childhood fracture by age and sex and would be an important source of information for comparison.

*We wonder how could we have missed this very important source of information and thank the reviewer for underlining it. The paper has been mentioned in our manuscript.*

The authors have defined minor trauma as that of falling from <0.5 m or standing height, etc. Some justification for this (e.g. Hansotti B, et al. 2005, Chalmers 1996). **These references were added in the Method section.**

One of the main issues in recurrent childhood fractures is non-accidental injury and this is not mentioned anywhere within the paper. To my mind this is a significant omission.

*We agree with the reviewer that non accidental injury could have been suspected in recurrent childhood fractures, however parents always reported that previous fracture occurred after accidental trauma. No patient included in the study was suspected to be victim of abuse. This observation was added in the discussion.*

The other details about behavioural issues and sports participation are very relevant and as I have suggested might be referenced to other papers on behaviours in children. **Done**

The results are very difficult to follow in that they are presented in a very densely packed text. **This section was re-written, moreover subheadings and a new table suggested by another reviewer, dr. Hildebrand, were added to make reading and understanding easier.**

There is good literature on injury in children indicating that pre-school children (who spend most of their time at home) get injud at home (Kirsty MacInnes; David H Stone Posted: 06/13/2008; BMC Public Health © 2008) and with school injuries are common (Stark, et al 1997). The socioeconomic status and adolescent injuries has been reported by Williams, et al 1997 and unintentional home injury in pre-school children has been related to the main carer’s educational attainment (Ramsay, et al 2003).

**Most of these references have been added in order to improve the discussion. The paper by Stark et al was not mentioned since a more specific reference regarding the epidemiology of school fractures (Rockwood CA, Wilkins KE. Fractures in children. Philadelphia: Lippincott Williams and Wilkins. 2006.) was already mentioned in the text.**
Finally there is no mention of the incidence of injury in children with ADHD (DiScala, et al 1998). **Injured children with ADHD are more likely to sustain severe injuries than are children without ADHD,** unfortunately this condition was not sought in our study that was focused on slight/moderate trauma.

Surprisingly there is no mention of non-accidental injury in those with repeated fracture (see above).

Table 1 is over complicated and could possibly be trimmed considerably. **We tried to simplify table 1 (now Table 2), in particular data regarding calcium intake, sports participation and sedentary behaviours were withdrawn from the table and described directly in the text.**

Figures 1 and 2 don’t really contribute much to the overall paper. **withdrawn**

Reviewer: Frank Hildebrand

- Major Compulsory Revisions

Abstract: Overall the abstract is poorly written and needs to be completely reconstructed. **rewritten**

1. Fractures are not extremely common in children. Or: How is “frequently” defined? **The lifetime risk of sustaining a fracture in childhood is approximately 42-64% in boys and 27-40% in girls. We reported several papers in the literature sustaining this statement.**

2. What do you mean with: “a higher prevalence of boys was found”? It was specified that a **higher prevalence of boys than girls was found among the fractured subjects**

3. Low energy dynamics: low energy trauma? **Changed**

4. No demographics are provided. Continuous data is presented without SEM. **This remark is unclear to me.**

Background section: The authors need to reconstruct this section and describe the problem. What do you want to explore exactly? Could you imagine to give or to evaluate some advice for parents out of your data? **The aim was better defined.**

5. First sentence is repeated out of the abstract. **The repetition was omitted.**

6. You can not compare the socioeconomic impact of fractures in children and those of fractures in the elderly due to ICU stay and co-morbidities of the elderly. **Reference to the elderly was omitted.**

Methods:

7. Fractures mostly occur in children without significant co-morbidities, please clarify. We specified in the text that “Despite several genetic, endocrine or systemic illnesses that affect bone metabolism may cause fractures, the majority of children with fractures are otherwise healthy”.

What do you mean with slight or moderate trauma? It was specified that: “**The distinction between slight or moderate trauma was based on a modified Landin’s description and examples of mechanisms were indicted in a new table(table 1), as this reviewer suggested.** Please provide exclusion criteria. **Provided**

8. Did your inclusion criteria result to excluded patients? **what does the reviewer mean? it is unclear to me.**

Results:

9. The authors discuss the incidence and regions of injuries in the study population. These data needs to be integrated in the results section e.g. as a table with corresponding p-values. Additionally, this has to be discussed in the discussion section. **A new table (n 3) was added and the discussion was improved.**

10. There are no statements about possible preventive procedures out of the results of this study. **This has been done in the conclusions.**

11. Please provide exact inclusion/exclusion criteria for the methods section. **Provided**

Additionally, please explain group building in regards to age and integrate this in your methods section (now in results). **Done**

12. The authors state that there is no association of BMD-SDS and parents’ educational level. However, are there significant correlations between the education level of the parents and incidence of fractures? **We**
analyzed only the population of fractured subjects, therefore no control group was available to search for any correlation between parent’s educational level and incidence of fracture. However, this association has been commented in the discussion by mentioning several papers in the literature.

- Minor Essential Revisions
1. Typing error within the title. **Amended**
2. English spelling and grammar errors need to be addressed. **the manuscript has been reviewed by a native speaker**

Methods section: This part is poorly structured and needs to be reconstructed and revised before resubmission. **Revised**

1. Please provide level of trauma care. **DONE treatment in outpatient clinic**
2. Pre-study power calculation belongs to the statistics part. **It was moved to the statistical methods**
3. Age: results section. **Done**
4. The authors were able to recruit nearly 400 patients with fractures in a 5 month period. This seems to be a very short time to include that many children with fractures. Please clarify. **The hospital were the study was performed is the largest children hospital in the Campania region, covering inpatient/outpatient services in Emergency and Traumatology in children under 14 years of age within the metropolitan area of Napoli. In 2008 this area encompassed 767,082 subjects under 14 years, therefore it was no surprising to recruit 400 patients in a 6 month period.**
5. Fractures were determined at time of admission and not at time of injury. Circumstances of the injury were taken from the medical records at the time of admission, which was practically the same of the time of injury.
6. Please indicate the height in falls out of beds e.g. <X meter were determined as low energy trauma. **Done in table 1**
7. Please provide a table for Landin’s description **The table has been included** (table 1)
8. Written informed consent: This should be described at the beginning of methods. **Done**
9. Sedentary behaviours: please specify what you mean. **It was specified in the Method section that sedentary behaviours were considered as the sum of daily hours spent in television viewing, computer and video games.**
10. p-values: repetetion at the end of the paragraph **Removed**

Results:
1. Age: This is not SD, this is range in case of median calculation. **Included**
2. Please unify your tables: **what does the reviewer mean? it is unclear to me.**
3. Please specify significant results in all of your figures. **According to dr Singer’ suggestion (reviewer 1), figures 1 and 2 were withdrawn.**
4. Please extend the paragraph (data) about the injury location and specify (see majorrev. point 10). It is interesting to evaluate the site of injury also in this paper. this data might lead to an increased awareness in the attending trauma surgeon. Please provide data in a table to give the additional information. What did you do in multiple injuries/fractures? **Table 3 was provided with the data required.**
5. “The percentage of recurrent fractures increased from preschoolers to adolescents”. This has to be critically discussed as age is increasing in these patients. **Discussed**

Discussion: Needs to be **restructured** according to the most relevant results.
1. There are no limitations described (e.g. no trauma center) it was specified that was an outpatient setting
2. At the beginning, please provide a short summary of your results to improve the structure. **Done. Then discuss your main findings accordingly. Done**