Author's response to reviews

Title: The Effect of Functional Splinting on Mild Dysplastic Hips after Walking Onset

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Author's response to reviews: see over
Answer to Reviewer´s report

1.) Page 1, paragraph 1: The authors in referring to pathoanatomy of developmental dysplasia of the hip should provide references such as the article by Ponseti in JBJS.

   The authors agree that fundamental work on understanding the pathology of developmental hip dysplasia has been conducted in North America, particularly by Dr. Ponseti. The corresponding references of Ponseti and Weinstein were included.

2.) Page 1, paragraph 2: Reference number three isn’t really the natural history of the condition. Different references that better support this including those by Wedge and Weinstein provide better support for this statement.

   The authors agree: Two publications of Wedge an one of Weinstein were included instead Sanchez.

3.) Page 1, paragraph 3: Ultrasound playing a pivotal role in early diagnosis depends on what part of the world one practices in. This probably is true in Europe but is not true in the United States.

   To differentiate between different philosophies in US and Europe the sentence was changed to: “Therefore, especially in Europe, ultrasound is considered to play a pivotal role in the early diagnosis of developmental hip diseases [5,6].

4.) Page 1, paragraph 3: The author refers to class IIb hips requiring treatment. What is inter and intrarater reliability? Also the authors refer to reference 15, but this reference came about before the Graf Classification so therefore the recommendation of the use of a device in this article should not referenced, as it doesn’t apply to the Graf Classification.

   See next answer (5.) Reference 15 was erased.

5.) Page 1, paragraph 4: When the authors refer to Graf IIb hips needing treatment, how do we know this for sure? What is the evidence? If there is evidence please provide a reference.

   The authors perception is that there is not much evidence that all Graf IIb hips need treatment. Moreover, the reason for conducting this study is to compare treated and non-treated hips and the results of this study indicate that non-treated hips IIb develop similar to physiologic and treated hips. However, there are numerous references especially from Germany in German language that address the positive effects of treatment of hips IIb. Krämer (1982) has published about the principle of abduction splinting in
later age stages, Casser (1988) described the difficulty to assess the spontaneous healing rate of non-treated hips, but suggested possibly substantial self-healing rates. However, he demonstrated case reports of IIb hips needing abduction treatment after month 7. (Casser 1990). In Europe there is a strong perception from experience of many orthopaedic surgeons that IIb hips need treatment, although this is not deeply supported by studies. To conduct a prospective study in such an environment without further evidence is not possible. We believe that this study is the first since a long time that supports evidence of a self-healing process in IIb hips.

To better address this uncertainty in the text the paragraph was changed to:

While class I hips need no follow up and treatment, class II hips form a group in which the degree of abnormality and the need for treatment are less clear and remain controversial. While some authors treat class II hips showing instability [BERNAU1990], others reported about spontaneous recovery [CASSER1988]. For treatment purposes authors introduced abduction devices such as harnesses providing abduction and flexion [KRAEMER1982, CASSER1990, CASSER1988]

6) Page 1, paragraph 5: When the authors talk about the difficulties with children using the splint, this reviewer agrees with the authors' perceptions, but are there references to document this?

**Sorry, no references were found.**

7) Page 2, paragraph 2: Was the decision for treatment made solely on the parents' preferences? Were any of the patients started in treatment and then discontinued i.e., had a crossover between groups??

**Yes, the decision was based on the parent or custodian. This is not a prospective study. The limitations due to the selection process are stated in the discussion. For both groups there was no crossover between the groups.**

8) Page 2, paragraph 5: The authors state that all patients were treated before 8 months of age, yet in paragraph 1 on this page, some of the patients weren't even diagnosed until 18 months of age. Please explain.

**This is a misunderstanding. The age at diagnosis was 6-18 month. The method of diagnosis was for children between 6 and 8 month Ultrasound, for children over 8 month AC-angle measurement from x-ray.**

**For clarification, the sentence in the results section was changed**
Those hips with treatment start under 8 month were sonographically classified Graf IIb, those over 8 moth were graded by x-ray analysis. (AC-angle).

9.) Page 3, paragraph 2: The authors state that the concept of continuous abduction in growing children with mild dysplastic hip symptoms was introduced previously by whom? Please provide a reference.

An abduction splint was described by Brown (1948), the HD-splint was introduced by Hoffmann-Daimler (1964), the references were included.

For the sentence ending with abduction for cases of late hip dysplasia, please provide a reference.

The reference Buckup (1987) was included.

Another question that arises is why were ultrasounds done in the first place? Were these children in a routine screening or were there physical findings, which suggested that they may have hip dysplasia?

There were no physical findings. The health system in Germany requires newborn hip screening by Ultrasound and every child has a health booklet with documentation of examinations and doctor’s visits. Sooner or later all children need a paediatritian for whatever diseases. At such a visit the paediatrition controls the booklet and recognizes a missing Ultrasound of the hip. Those kids are than referred to an orthopaedic institution checking on their hips. Due to that mechanism there are a few children that come late to the orthoedics doctor without specific clinical signs. Children with symptoms are rather those with true luxation and are not reflected in this study.