Author's response to reviews

Title: Coracoid Abnormalities and Their Relationship with Glenohumeral Deformities in Children with Obstetric Brachial Plexus Injury

Authors:

   Rahul K Nath (drnath@drnathmedical.com)
   Faiz Mahmooduddin (faiz@drnathmedical.com)
   Xiaomei Liu (xiaomei@drnathmedical.com)
   Melissa J Wentz (melissa@drnathmedical.com)
   Andrea D Humphries (andrea@drnathmedical.com)

Version: 2 Date: 1 July 2010

Author's response to reviews: see over
July 1, 2010

Melissa Norton, M.D.
Editor-in-Chief
*BMC Musculoskeletal Disorders*

Dear Dr. Norton,

Enclosed please find our revised manuscript entitled “Coracoid Abnormalities and Their Relationship with Glenohumeral Deformities in Children with Obstetric Brachial Plexus Injury” for consideration for publication in the *BMC Musculoskeletal Disorders*.

As instructed, here we provide our responses (in red) to the editor’s and reviewers’ concerns, point-by-point:

Editorial comments:

…

Experimental research that is reported in the manuscript must have been performed with the approval of an appropriate ethics committee. Research carried out on humans must be in compliance with the Helsinki Declaration ([http://www.wma.net/e/policy/b3.htm](http://www.wma.net/e/policy/b3.htm)), and any experimental research on animals must follow internationally recognized guidelines. A statement to this effect must appear in the Methods section of the manuscript, including the name of the body which gave approval, with a reference number where appropriate.

*We have now included such a statement in the Methods section of the manuscript.*

We would be grateful if you could address the comments in a revised manuscript and provide a cover letter giving a point-by-point response to the concerns.

*Both are done.*

Please also highlight (with ‘tracked changes’/coloured/underlines/highlighted text) all changes made when revising the manuscript to make it easier for the Editors to give you a prompt decision on your manuscript.

*Done.*

Please also ensure that your revised manuscript conforms to the journal style ([http://www.biomedcentral.com/info/ifora/medicine_journals](http://www.biomedcentral.com/info/ifora/medicine_journals)). It is important that your files are correctly formatted.

*Done.*

…
Reviewer’s report (# 1)

Title: Systematic Study of Coracoid Abnormalities and Their Relationship with Glenohumeral Deformities in Patients with Obstetric Brachial Plexus Injury

Version: 1 Date: 11 January 2010
Reviewer: Yrjänä Nietosvaara

Reviewer’s report:

1. The question posed by the authors is not well defined.
Major Compulsory Revisions: They should present a study hypothesis e.g. coracohumeral distance (or subcoracoid space) diminishes with increasing glenoid deformity.

We hypothesize that coracoscapular angles and distances, as well as coracohumeral distances, diminish with increasing glenohumeral deformity, whereas coracoid overlap will increase.

2. The methods are not appropriate. Inclusion and exclusion criteria to the study are not clearly documented.

Inclusion criteria for patients to be a part of this study was as follows:
1. Age >= 2 years (at which the coracoid ossification center expands and the tip of the coracoid process is clearly identifiable [10])
2. Have deformities secondary to OBPI
4. Surgeries occurred from January 2007 to August 2009
5. Had CT images before any surgical intervention was done.

Exclusion criteria was as follows:
1. Age < 2 years
2. No deformities secondary to OBPI
3. Underwent other operations instead of modified Quad or triangle tilt
4. Surgeries occurred earlier than January 2007 or after August 2009
5. No pre-operative CT images available

Major Compulsory Revisions:
This study should have been performed by MRI which would have allowed direct measurements also on cartilaginous structures. This would have allowed measuring the real distance between the coracoid process and the humeral head. C-HH, C-S and also C-G are now measured from bony structures – this is suboptimal, potentially even misleading especially in small children. This should be at least mentioned in discussion.

The limitations of this study are that all measurements are performed on CT images; therefore, only bony structures and anatomy may be measured. Future studies using MRI, which may allow for more direct measurements of cartilaginous structures as well, are encouraged. Perhaps more accurate and precise measurements can then be made for coracohumeral and coracoscapular distances, as well as coracoid overlap. This may allow for more optimal measurements in small children due to their incomplete ossification of bony structures.
Define better the studied patient population. 39 out of 294 operated children? Was a preoperative CT performed only to 39 of the 294 children? Demographic data of the 294 patients should be included so that a comparing between the study population could be made. The authors should document the number of children in different nerve injury groups. The age of the included patients varied between 2 to 13, median age?

39 children met all of the inclusion criteria (please see above). Median age of patients was 4 yrs.

3. The data are potentially not sound.
   Major Compulsory Revisions:
   Intra- and interrater errors should be included. The measurements using bony outlines are potentially erroneous at least in small children, especially C-HH.

   We have included standard error of means in our study for various parameters. All measurements on bony structures and anatomy was conducted using standardized techniques and scales with accurate and precise conversion of pixels to millimeters and accurate and precise measurements of angles.

5. The discussion and conclusions
   Major Compulsory Revisions:
   Potential errors and limitations of the study should be stated in the discussion.
   The authors have not studied if a deformed coracoid process interferes with repositioning the posteriorly subluxed humeral head – they should not include this statement in conclusions, it is merely a speculation.

   Limitations are now stated in the discussion. In regards to the latter comment, the sentence has been reworded to include the word “potentially”, thereby indicating the speculative nature of the statement.

6. Limitations of the work are not stated at all!
   Major Compulsory Revision: see to earlier comments.
   Limitations are now stated in the work.

8. The title should be shortened and the abstract rewritten:
   Major Compulsory Revision:
   Shorter title.
   Abstract with a study hypothesis and relevant conclusions.

   The title has been shortened and the abstract has been rewritten to include a study hypothesis and relevant conclusions.

9. The writing is acceptable.
   **Level of interest:** An article of limited interest
   **Quality of written English:** Acceptable
   **Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.
**Declaration of competing interests:**
I declare that I have no competing interests

---

**Reviewer’s report (#2)**

**Title:** Systematic Study of Coracoid Abnormalities and Their Relationship with Glenohumeral Deformities in Patients with Obstetric Brachial Plexus Injury

**Version:** 1  **Date:** 28 May 2010

**Reviewer:** Johannes Antonius van der Sluijs

**Reviewer's report:**
Review systematic study of coracoid abnormalities and their relation etc dd
28-5-10

Comments to the authors:
The authors of Systematic Study of Coracoid Abnormalities and Their Relationship with Glenohumeral Deformities in Patients with Obstetric Brachial Plexus Injury should be congratulated on their data. I think however that some changes are necessary to improve the message of this study.

This study is about changes of the coracoid process in children with sequelae of OBPL and secondary deformities of the shoulder. Their data are measurements on CT images in a cohort of 39 children, a subgroup of 294 operated children. The coracoid that is the scapulocoracoid changes, were measured using several methods. They were compared to the normal side and were related to 2 glenohumeral abnormalities: humeral head subluxation and glenoid version. The authors also explored the interrelation between various parameters: with the glenohumeral distance as dependent variable they assessed the influence of the independent parameters age, a coracoid parameter and subluxation. They found changes in the scapulocoracoid parameters and found that these were related to glenohumeral changes. Various parameters were interrelated.

Several problem need to be addressed however, as to the methods, results and discussion.

**Title:**
Major rev: Systematic is not correctly used, should be omitted in the title.
Discret rev: Patients could be better specified by children

**In the Abstract:**

Maj revision:
Comment :in the method section mean age is missing

Mean age (4.7 years) is now provided in the methods section.

Comment : in the results paragraph results must be specific and the line on multilinear regression is not necessary (see comment below)
The results section has been revised to include more specific results. All of the numbers and data are discussed more thoroughly in the results section of the manuscript but had to be summarized concisely to fit under the abstract total word count limit. The line on multilinear regression has been removed.

Comment: in the discussion paragraph: "the coracoid proc protrudes more towards the hum head" is I think incorrect and should be 'more caudally and follows the subluxation head '. (see remark below on distance between)

The advised change has been made.

Discretion revision: methods: 'sec deformities developed from' is this correct or 'caused by.'

The advised change has been made.

Introduction:
Major revision:
Comment: The available literature is insufficiently presented. The results of the Soldado/Kozin study (their reference 6) need to be presented better as this study focuses on the scapulocoracoid changes and shows results paralleling and to some extent similar to the present study (for the corcohumeral and coracoscapular distance and for the relation with glenoid version).

The results of the Soldado/Kozin study are now sufficiently presented discussing the scapulocoracoid changes.

Comment: A hypothesis needs to be formulated

Hypothesis is now formulated.

Comment: clinical relevance needs to be formulated

Clinical relevance is now formulated.

Methods
Major revision:
*On patient selection: Why were ct made of these and not the other 294 patients.
*Mean age is missing
*Please better specify which method is new.

39 patients met all of our inclusion criteria and their data was readily available. Mean age is provided now.

* The glenohumeral distance is adapted from Gerber but this adaptation is less useful: Whereas Gerber deals with the space available ia for the ant cuff (that is the distance coracoid to surface of humeral head) the new measurement (
distance coracoid to calculated centre of the humeral head is a composite of the soft tissue space and the humeral head diameter and is thus less informative. This has consequences for some of the conclusions (see below).

We have adapted the coracohumeral distance from Gerber because we find our modified measurement to be more useful and informative. Theoretically, the distance from the coracoid to the calculated center of the humeral head should not have much variation as the patient ages. If we use Gerber’s measurement (coracoid to surface of humeral head), this would seem to be more variable as the patient ages and ossification occurs. In other words, this distance would decrease as there would be less space between the two bony surfaces as ossification occurs and the surface of the humeral head grows outward and closer towards the coracoid. If we had used Gerber’s measurement, our results of coracohumeral distances would be even shorter. Either way, the main point here is consistency. Since the same technique was used to measure both sides, either method would demonstrate similar and equal results when comparing statistical significance of one side to the other and percent change as well.

* the multilin. model is I think not informative (see comment in results)

This has been removed.

* To assess interrelations for instance use a table with the various R or R^2

We have included a table with R-values to assess the interrelations.

Comment: is the conversion from pixels to distance precise?

Yes, we used standardized scales.

Result section

Clear fig 1, and beautiful fig 2!

Minor revision: in paragrapg summary of the results for....: first sentence contain redundant text as in the methods section the format of the results is already described.

The sentences have been modified.

Major revision:

comment: the SE of the various parameters, for instance but not exclusively, PHHA and glenoid version are rather small. Since a spectrum of clinical abnormalities is usually present I expect larger SE. Is this correct?

Perhaps this may be correct in many cases; however, these are the SE that we got from our data and calculations. Although a spectrum of clinical abnormalities is present, the variation amongst the parameters does not necessarily seem to be as much as anticipated.

Comment: the analysis is interrelation between several parameters should not be done using multilin. regression.
The choice to use the coracohumer distance as dependent parameter of a multilinear regression is I think inappropriate since it is not a useful parameter (see comment in method section). I think the paragraph: the prediction of coracohumeral distance should be removed. In this form it is not informative.

This paragraph has been removed. We no longer include analysis using multilinear regression.

Discussion section
Major revision
Comment: The difference in coracohumeral distance between affected and unaffected side is if I am correct about 2 mm on 26 mm that is 10%. This can be explained by the smaller size of the affected scapula which is also 10% as was described by one of the authors (their ref 14, Nath and Piazi 2007). This means glenohumeral distance as measured in this study is probably not different.
Could not the following scenario be present: normally coracoid and humeral head keep a certain distance. Movements of the humeral head (intern and external rotation and anteflexion abduction) all influence the growth direction of the coracoid. In OBPL these movement are reduced and besides the head migrates dorsally (that is subluxated), the coracoid follows the migrating head keeping more or less the “same” distance.
Using aa a measurement the original coracohumeral distance as defined by Gerber would have addressed this item. As is it the size differences in the humeral head now probably influence the adapted coracohumer measurement (which is a composite of both the soft tissue distance and the humeral head). This makes an adaptation of the discussion necessary.

Our discussion has been revised to include these points.

Comment: Why is the overlap larger?

This is now explained in the discussion.

Comment: In the discussion the section on multilinear regression is too large, too abstract and I feel not relevant. I think it should be omitted.

The section on multilinear regression has now been omitted.

Comment: I think more theorizing on the aetiology of the changes is useful: why is it deviated in this direction.

Our revised manuscript now discusses more theory on the etiology of these changes, including deviations in direction.

In the section starting with “the coracohumeral distance measured as the distance etc” states that the distance this study measured is termed subcoracoid
space by others. This is incorrect. Your adaptation of the method is too large. The subcoracoid space is not measured in this study

We have removed this term from our manuscript. We no longer use this adaptation.

The relevance of the deviation is adequately stated in the last sentence of the discussion which I think the important clinical aspect of this study

Figures and tables
Minor revision: fig 3 I think signif < 0.05 and 0.01 are not present is this fig so they can be removed from the text

We have removed those from the text.

Major revision: I am afraid I feel fig 4 should be removed as not relevant and Table 2 and 3 are not usefull

Figure 4 and Tables 2-3 have been removed.

Level of interest: An article of importance in its field
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’

-----------------------------------------------------------------------------------------

We now hope that you will find our manuscript entitled “Coracoid Abnormalities and Their Relationship with Glenohumeral Deformities in Children with Obstetric Brachial Plexus Injury” suitable for publication in your journal, BMC Musculoskeletal Disorders.

Please do not hesitate to contact us if you have any further questions. Thank you again for your time and consideration.

Sincerely,

Rahul K. Nath, M.D.
Texas Nerve and Paralysis Institute
6400 Fannin Street, Suite 2420
Houston, TX 77030 USA
Email: nath@drnathmedical.com