**Author's response to reviews**

**Title:** The effects of necrotic lesion size and orientation of the femoral component on stress alterations in the proximal femur in hip resurfacing - a finite element simulation

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**Version:** 2  **Date:** 21 June 2014

**Author's response to reviews:** see over
Title: The effect of necrotic lesion size and orientation of femoral component on stress alteration of proximal femur in hip resurfacing- a finite element simulation

Thank you for your editorial work on the manuscript that we submitted to *BMC Musculoskeletal Disorders*. We have extensively revised the manuscript according to the reviewers’ comments, and have incorporated the modifications into the text in the new version. All of the changes in the revised manuscript are highlighted in blue. To correct any remaining grammatical errors, the revised manuscript has been edited by the editorial company American Journal Experts (please see the certificate attached as the last page).
Reviewer's report (#1)

Title: The effect of necrotic lesion size and orientation of femoral component on stress alteration of proximal femur in hip resurfacing- a finite element simulation

Version: 1 Date: 6 April 2014
Reviewer: Weng-Pin Chen

Reviewer's report:

General comments
This paper performed a finite element analysis to investigate the effects of femoral head necrotic sizes and orientations of implant on the stress alteration of proximal femur following hip resurfacing surgery. The results indicated that a larger lesion might induce more severe stress shielding. Furthermore, varus orientation of implant resulted in a larger displacement of the stem tip, which might lead to an increasing risk of implant loosening. Their results effectively explained why neck narrowing was observed from clinical follow-ups after hip resurfacing surgery.

Hip resurfacing surgery is an attractive concept as it preserves proximal femoral bone stock and offers inherent stability and optimal range of movement. Consequently, it has gained interest to treat young and active patients who have femoral head osteonecrosis. Therefore, this paper may provide wide interests to orthopedic surgeons. Overall, the question posed by the authors is well defined. The methodology for the two important requirements of an FE model such as, validation and verification, are well described. The limitations to the study are duly noted and the conclusions are supported by the data presented. However, in several places, the grammar of the manuscript is incorrect and typos still exist. A proper proof-reading should be further conducted. My specific comments are detailed below.

Minor Essential Revisions:
(1) Page 2, Results: “Stress shielding occurred at proximal femur after HRC”.
Shouldn’t it be "HRA" for the word "HRC"?
Please correct “HRC” to “HRA”.
Reply:
We have corrected this error. To correct any remaining grammatical errors, the revised manuscript has been edited by the editorial company American Journal Experts.

(2) Page 4, Para 2, Lines 1-4: The authors state: "Hip resurface arthroplasty (HRA) has several advantages …… and the bone-conserving nature.” Please provide some related references to support this statement.
Reply:
As per the reviewer’s suggestion, the following three references have been added to the revised manuscript. The subsequent references have been renumbered in ascending numerical order.


(3) Page 6, Para 1, Lines 12-13: “Contact was not simulated as in previous studies no contact was found to occur between the stem and bone”

This statement is difficult to understand. Please re-phrase.

Reply: The original statement has been omitted, and the statement below has been added to the revised manuscript.

“The stem was modeled as debonded, simulating no contact between the stem and bone. Full details of the assignments of the bone/cement, cement/implant and stem/bone interfaces are presented by Taylor [14].” (Page 6, Line 13)

(4) Page 15, Legends, Correct the legend regarding “Figure 2 (b)”

Reply: The statement below has been added to the revised manuscript.

“(b) Femora with implants aligned varus 10°, neutral and valgus 10° (from left to right).”

(5) Please make sure that a proper proof-reading is conducted. Please have a native English speaker edit this manuscript.

Reply: See comment #1.

Level of interest: An article of importance in its field
Quality of written English: Needs some language corrections before being published
Statistical review: No, the manuscript does not need to be seen by a statistician.
Declaration of competing interests:
I have no competing interests.
Reviewer's report (#2)

Title: The effect of necrotic lesion size and orientation of femoral component on stress alteration of proximal femur in hip resurfacing- a finite element simulation

Version: 1 Date: 9 May 2014

Reviewer: Kang Li

Reviewer's report:

Major Compulsory Revisions

General Comments:
This study investigated how necrotic lesion size and orientation of femoral component affect stress alteration of proximal femur after hip resurfacing through finite element analysis. Although this study is potentially valuable, the manuscript was poorly written. Grammatical errors and typos can be found throughout the manuscript. In addition, validation and verification of the FE models were weak.

Reply:
(1) In order to achieve a proper proof-reading, the revised manuscript has been edited by the editorial company American Journal Experts (please see the certificate attached as the last page).
(2) We have extensively revised the manuscript according to the reviewer’s comments, and have incorporated the modifications into the text in the new version. All of the changes in the revised manuscript are highlighted in blue.

Introduction

1. Page 4, paragraph 2, “The natural history of the disease is usually progressive, often leads to collapse of the femoral head and…”

   Reply:
   The statement indicated by the reviewer has been revised as follows:
   “The development of ONFH is usually progressive, and it often leads to the collapse of the femoral head and…” (Page 4, Line 3)

2. Page 4, paragraph 2, which includes a reduction of risk of dislocation due to the larger femoral head, lower wear of metal-on-metal interface and the bone-conserving”. What is “lager”?

   Reply:
   The statement the reviewer indicates has been revised as follows:
   “……, including a reduced rate of dislocation due to the larger diameter of femoral head, reduced wear of metal-on-metal interface, a larger range of motion and its bone-conserving nature.” (Page 4, Line 8)
3. Page 4, paragraph 2, “Although promising results have been reported in some short-term follow-up studies [1-2], however”. Please correct all the grammatical errors of the manuscript.

Reply:

The statement the reviewer indicates has been revised as follows:

“Although promising results have been reported in some short-term follow-up studies, aseptic loosening and narrowing of the femoral neck, which may lead to femoral neck fractures have also been reported in long-term follow-up studies.”

(Page 4, Line 11)

Methods

1. Page 5, paragraph 1 “Commercially available synthetic femur ” should be “A commercially available synthetic femur”.

Reply:

This sentence has been changed, as recommended by the reviewer.

(Page 5, Line 3)

2. Page 7, paragraph 2, the validation process has not been described in detail. It the reviewer was wondering why the project was only comparing the displacements at the inferior aspect of the femoral heads. Is this displacement a vertical displacement or a horizontal displacement?

Reply:

(1) The linear displacement of the femoral head can be measured directly using a linear variable differential transducer (LVDT), which is much simpler and more convenient compared with measuring the strain.

(2) Vertical displacement was measured using a LVDT that was located at the inferior aspect of the femoral heads.

3. No description about the data analysis.

Reply:

The authors are not aware of the reviewer’s intention for “data analysis.” Does “data analysis” mean “statistical analysis.” Or is a more detailed discussion of the results required?

(1) To the authors’ understanding, a single result was obtained from a single set of assumptions (e.g. loading condition, material properties) for the finite element analysis. It is not appropriate to conduct a statistical analysis for a single FEM result. This situation is in contrast to the results from experiments or clinical
follow-up studies with numerous data, where the results are frequently expressed as the mean ± SD. In these cases, statistical analysis is required to achieve statistically significant results.

(2) For a more detailed interpretation of our results, extensive modification has been made in “Discussion” section. Two paragraphs have been added to the “Discussion” section. (Paragraph 4 and Paragraph 5)

Results

Will the type of element node affect the stress value?

Reply:

(1) Many factors can impact the stress distribution results, including the element type, loading condition, assigned material properties, and assumption of interfaces. Thus, validation and verification must be performed for finite element analysis.

(2) In the present study, validation and verification of the FE model were conducted, and the FE model met the requirements of the experiment and convergence tests.

(3) These concerns were included in limitation.

Figure 2

Page 15, the caption of Figure 2 is missing the information for (b)

Reply:

(1) Thank you for noting this error.

(2) The following statement has been added to the caption of Figure 2(b):

“(b) Femora with implants aligned varus 10°, neutral and valgus 10° (from left to right).”

Level of interest: An article of limited interest

Quality of written English: Not suitable for publication unless extensively edited

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
EDITORIAL CERTIFICATE

This document certifies that the manuscript listed below was edited for proper English language, grammar, punctuation, spelling, and overall style by one or more of the highly qualified native English speaking editors at American Journal Experts.

Manuscript title:
The effect of necrotic lesion size and orientation of femoral component on stress alteration of proximal femur in hip resurfacing: a finite element simulation

Authors:
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