

January 30, 2014

Dear Editor,

Please find enclosed the edited manuscript in Word format (file name: 2429-review.doc).

Title: Techniques and Accuracy of Thoracolumbar Pedicle Screw Placement

Author: Varun Puvanesarajah BS, Jason A. Liauw MD, Sheng-fu L. Lo MD,
Ioan A. Lina BS, Timothy F. Witham MD

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Revision has been made according to the suggestions of the following reviewers:

Reviewer 1:

The is a well-written review paper, which would be valuable to be documented in the literature. The only comment is that it would need minor language editing before publication

Response to Reviewer 1:

Thank you for your comments. We have reviewed the text and made necessary edits.

Reviewer 2:

This is a well-written review paper presenting a good overview of pedicle screw placement techniques including studies reporting accuracy rates using the different techniques. The paper will be of interest to readers of the WJO. I have only minor revisions and comments for the authors.

1) p 5, Paragraph 1: The 'C' in 'class III' and 'class II' should be capitalised. Also, elsewhere in the paper where a class or grade is used e.g. p 8 'Grade 0'.

2) p 6, Paragraph 1: Can the authors please change 'navigation' to stereotactic navigation.'

3) The authors state that in the Gertzbein scale (p 8) the breach distance grades are assigned in multiples of 2 mm. From where is this distance measured from?

4) Throughout the paper the authors of the manuscript have made reference to previous papers e.g. Youkilis et al. (p 8). It would be better to say 'Youkilis and colleagues' or something similar so it does not appear that both Harvard and Oxford referencing styles are being used in the paper.

- 5) p 11, Paragraph 3: Do the authors mean 'pedicle axis' where they say 'pedicle vector'?
- 6) p 12, last paragraph: The 65% and 95.1% do not match with the percentages in Table 3. The authors also state that the lowest accuracies were associated with the mid-thoracic spine; however, this is not clear from the data Table 3 e.g. the first two studies with the lowest accuracy involve the lower and mid-to-lower T-spine, but some of the other studies with high percentages include the mid T-spine. Is the year of any significance e.g. improved techniques in the free-hand method?
- 7) p 12, Paragraph 3: In the previous studies using the free-hand technique, was the experience of the surgeon reported? If so, it would be useful to include this information in Table 3.
- 8) p 13, Paragraph 2: For the radiation exposure in the free-hand technique, are the authors referring to the pre-surgical CT scans?
- 9) p 14, Paragraph 2: The word 'However' or similar would be better than the phrase 'In truth'. Also, the section 'In the most recent study, the study's authors...' is confusing.
- 10) p 23, last paragraph: On Line 5, please remove the comma after 'patient-by-patient basis'.
- 11) Figures 2 and 3: The labels are difficult to read; can the authors please re-annotate them to make them clearer and change the figure captions accordingly i.e. 'modified from...' Also, do the authors have copyright permission to use these figures?

Response to Reviewer 2:

Thank you for your critical reading of our manuscript. The changes you have suggested have all been made. Specific responses to questions 6, 7, 8, 9, and 11 are below:

6. Furthermore, Table 3 is not the best reference for determining accuracy at specific sections within the thoracolumbar spine. Each study included in Table 1 involves different proportions of screws from each section of the spine. These proportions can skew accuracies one way or the other, making it almost impossible to use this Table to compare accuracies at the mid-thoracic spine. Additionally, it should be noted that many of these studies did not explicitly comment on accuracies encountered at different sections of the thoracic spine. As such, only studies that explicitly commented on this specific detail were mentioned within the manuscript when discussing mid-thoracic spine accuracy.

The year may be of some significance. However, it is difficult to control with this variable considering that these studies come from different institutions with varying physician skillsets. Furthermore, it remains difficult to study trends in accuracy when institutions have such varied metrics for successful screw placement.

7. In a minority of publications, surgeon skill was reported. It was thought to not be

significant enough to merit inclusion, as in many of these studies cases from multiple surgeons were included.

8. No, we are referring to radiation exposure encountered in the other discussed techniques (stereotactic navigation and fluoroscopy).

9. We apologize for how the sentence was phrased initially. We have edited it to be more coherent.

11. Higher quality images will be provided. These exact images have been previously published, so we foresee that the text will be easily readable. However, if this is not the case after re-submission, we would be happy to make appropriate changes. Permission for use of these images has been given via email by a representative for *Neurosurgery*, the journal where the images were originally published. He stated that they can be reproduced with appropriate citation and reference of the original manuscript (which has been done in our review article). Permission from the artist who rendered the images has also been acquired.

Reviewer 3:

The authors present a review concerning accuracy of pedicle screw placement in thoracolumbar spine surgery. Congrats to this well written and structured article, I recommend for publication. In my opinion only a remark towards transcutaneous pedicle screw placement and minimal invasive techniques is missing.

Response to Reviewer 3:

Thank you for your comments. Minimally invasive techniques and transcutaneous screw placement have been addressed in both the fluoroscopy and navigation sections of the review.

Thank you again for publishing our manuscript in the *World Journal of Orthopedics*.

Sincerely yours,

Timothy Witham

Timothy F. Witham, M.D.
Department of Neurosurgery
The Johns Hopkins Hospital
600 North Wolfe Street
Meyer 7-109
Baltimore, MD 21287
Tel: +1 4105022383
Fax: + 1 4105023399
Email: twitham2@jhmi.edu