

## Peer Review File

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### Reviewer A

The authors are to be congratulated on their excellent synopsis, which covers many high yield topics from recent years and ends with a preview of what the future may hold. Well done.

**Response:** Thank you for comments and support of the manuscript.

### Reviewer B

Authors present a review article on update in robotic technology in spinal surgery as a highlight of 7th and 8th annual Seattle science foundation course. Unfortunately, this manuscript is more of a report from the conference, then a science paper written for a medical journal. This is a very superficial overview of robotics in spine surgery and therefore not suitable for publication. I suggest authors to provide a real review- systematic or scoping, on a certain aspect of spine surgery.

**Response:** Thank you for these constructive comments on the manuscript. The manuscript has been modified to represent a scoping review on robotics in spine surgery. Specifically, more references to key studies and overarching concepts within sub-disciplines of robotics in spine surgery. In addition to increasing the references of recent advances in the subtopics of robotics in spine surgery, identification of future areas of research and suggestions of further insights to be explored in the subtopics have been included as well. We thank the reviewers for their insights and hope that the changes were sufficient to represent a scoping review on the topic and be worthy of publication in your journal.

In text changes as highlighted in manuscript revision:

“As robotic assistance has become increasingly prevalent in spinal surgery in recent years, emerging as a tool to increase accuracy and precision and lower complication rates and radiation exposure, an important subject of discussion and investigation has become the extent to which robotic assistance should be relied upon in surgeries and the optimal ways to integrate these new technologies[8, 9].

...

Gradually, novel technologies including navigation, robot-guided approaches, and patient-specific rods have been integrated into the treatment of adult spinal deformity[45]. These technologies have been shown to increase accuracy of screw placement, reduce complications rates, reduce OR and recovery time, decrease radiation exposure, reduce blood loss, and yield fewer mistakes and lower inter-surgeon variability[45, 46]...

The use of robotic assistance in cervical screw placement has been shown to lead to increases in accuracy of screw placement, decreased intraoperative blood loss, and decreased radiation exposure relative to the previously established methods of fluoroscopy and computer-assisted navigation[33, 38]...

[53-57]. Robotic systems have been incorporated into single-position minimally invasive spine surgeries in recent years in response to concerns related to malposition of screws, nerve and vascular injuries, and radiation exposure resulting from intraoperative fluoroscopy[58]. The use of robotic assistance in pedicle screw placement have been shown to decrease the likelihood of inaccurate placement, increase consistency and precision, minimize radiation exposure, and reduce OR time[58]...

Recent years have seen a gradual transition in spinal surgery from conventional open surgery to minimally invasive surgery. In minimally invasive spine surgery, endoscopic spine surgery has become an increasingly important procedure[59, 60]. With the increase in use and breadth of applications of endoscopic spine surgery, novel technologies including navigation and robotics have become integrated into these procedures[59, 60]...

There are certain limitations of incorporating robotic technologies into endoscopic spine surgery. For example, certain robotic systems require the installation of a reference frame, which necessitates additional small incisions, an unfavorable factor in minimally invasive surgery[59]. Additionally, the high initial and maintenance costs of robotic instruments could eventually be reflected in the medical costs of the patient[59]. Very recently, augmented reality (AR) has been introduced as a new emergent technology that can be integrated into endoscopic surgery, allowing the surgeon to view the surgical anatomy through AR eyeglasses. This technology is still in the early stages of development[60, 64, 65]...

Robotic assistance has also been implemented into oncological spinal surgeries, including surgery for the treatment of spine tumors[66]. One study found that the use of robotic assistance in spinal tumor surgeries led to improved surgical complication rates[66]?

## **Reviewer C**

### 1. Abstract

1.1 The structure of the abstract must be followed: Background, Methods, Results, Conclusions.

**Response:** The Abstract has been modified to follow the structure given, with Background, Methods, Result, and Conclusions.

1.2 It is suggested that the length of the Abstract is 200-450 words, adding more related content in this section would be better.

**Response:** The Abstract has been increased in length and is now 262 words, which is within the recommended range. Content has been added on the background and methods.

1.3 Only 3-5 keywords are required.

**Response:** There are now only 5 keywords as one keyword has been removed.

2. The structure of the text must be followed: Introduction, Methods, Results, Discussion, Conclusions.

**Response:** The structure of the text has been modified to now follow the structure provided, including the Introduction, Methods, Results, Discussion, and Conclusions sections. A Methods section has been added, detailing the search strategy, inclusion and exclusion criteria, and data summarization procedure for the scoping review.

3. Regarding the abbreviations in the article, please use their full name when first appear. And please ensure the accuracy of all the abbreviations.

**Response:** The first use of all abbreviations now has their full name in their first usage and abbreviations have been checked for accuracy. Specifically, on page 4, MIS is established as minimally invasive surgery (MIS) techniques, and the word techniques is now outside of the parentheses as it is not part of the abbreviation. On page 5, OR is now established as operating room (OR) in the first usage of this abbreviation. On page 7, TLIF is now established as transforaminal lumbar interbody fusion (TLIF) in the first usage of this abbreviation.

4. Reference

4.1 In the text, cite the references numerically (in round brackets) and consecutively in the order of appearance.

e.g., “The First International Consensus Conference on Laparoscopic Liver Surgery was held in Louisville in 2008 (3).

4.2 In the reference list, the titles of journals should be abbreviated according to the style used in Index Medicus. For reports with up to three authors, all the author names should be listed. However, if a report has more than three authors, the first three authors should be listed followed by “et al.”

- McLeer-Florin A, Lantuéjoul S. Why technical aspects rather than biology explain cellular heterogeneity in ALK-positive nonsmall cell lung cancer. *J Thorac Dis* 2012;4:240-1.
- Lin X, Li W, Lai J, et al. Five-year update on the mouse model of orthotopic lung transplantation: Scientific uses, tricks of the trade, and tips for success. *J Thorac Dis* 2012;4:247-58.

Below are two examples for the management of the reference:

a. If you manage references manually or in another way, you could refer to the reference example below:

Lin X, Li W, Lai J, et al. Five-year update on the mouse model of orthotopic lung transplantation: Scientific uses, tricks of the trade, and tips for success. *J Thorac Dis* 2012;4:247-

58.

b. If you use “Endnote” (a commercial reference management software package produced by Clarivate Analytics, used to manage bibliographies and references when writing essays and articles), the reference style file for AME journals can be directly downloaded here: <https://cdn.amegroups.cn/static/public/reference-style.ens>.

4.3 If available, please update your reference list by including related literatures published within a year. Some of the references are outdated.

**Response:** The references style has been updated by downloading the reference style for AME journals at the link provided below and using this style with Endnote. Citations now include round brackets, correct formatting for listing authors, etc. according to this reference style.