Peer Review File

Article information: https://dx.doi.org/10.21037/jss-21-95

Reviewer A:

Comment 1: It is called Head-Up Display not Heads-Up Display.

Response: We thank the reviewer for this correction, as this was an oversight from our end.

Changes in text: We have changed the 2 instances where HUD was mis-typed.

Comment 2: Line 170 "capabilities of and", there seems to be an error from sentence restructuring.

Response: We meant for this phrase to read as 'capabilities of MIS and indications for MIS. We appreciate, however, that this phrasing can sound awkward and hinders readability.

Changes in text: We have restructured the grammar of this phrase to make it more readable.

Comment 3: Lines 194 to 203: tracking of the anatomy of the spine in MIS cannot be performed by only using the skin and surface tracking with markers and infrared cameras. A CT scan has to be acquired as least once preoperatively to get the location of the underlying anatomy in respect to the skin / the markers.

Response: We would like to thank the reviewer for clarifying this for us. We intended to illustrate that infrared depth sensors can be used to augment the registration process between the actual patient and the pre-operative CT scan. We understand and agree that a pre-operative CT scan is necessary, but new technologies offer the potential to replace intra-operative O-arm spins.

Changes in text: We re-wrote and clarified our discussion of this topic to illustrate that new technologies (such as infrared cameras and skin-based fiducial stickers) may work to improve the intra-operative registration progress but do not replace the need for pre-operative CT scans. We have also added 2 citations to further illustrate and provide contextual examples of the technology we are discussing. These changes can be seen on page 7 lines 11-14.

Comment 4: It would be better to have more pictures of the different visualization technologies and how they evolved over time.

Response: We would like to thank the reviewer for this excellent visualization strategy.

Changes in text: We have amended **Figure 1** to include depictions of different visualization technologies over time.

Comment 5: Figure 2: Can you also add a picture of what the AR visualization looks for the surgeon in this moment? That will help the reader of this article to grasp it better.

Response: We agree that this would help the reader understand what AR visualization looks like today.

Changes in text: We have added images of current AR visualization technology into the timeline in **Figure 1**.

Reviewer B:

Comment 1: 1. Following this, please expand this historical article on literature review and include in a Table the most important studies on wearable loupes/AR/VR applications; please include exoscopes and its application for screws.

Response: We thank the reviewer for their comments on our submission. We agree that a focused summary of this literature would be helpful to readers interested in learning more about different visualization technologies.

Changes in text: We have included this information in **Table 1**. We have also added a discussion on exoscopes on page 3 lines 5-7.

Comment 2: Please include the following articles and discuss: Carl, B., Bopp, M., Saß, B. et al. Augmented reality in intradural spinal tumor surgery. Acta Neurochir 161, 2181–2193 (2019). https://doi.org/10.1007/s00701-019-04005-0.

Response: We thank the reviewer for pointing out this novel use of AR in intra-dural tumor resection. This is important as it demonstrates that AR visualization is useful beyond bony manipulation, as AR can be used to approximate soft tissue margins as well.

Changes in text: We have included a discussion of this article from page 4 line 31 through page 5 line.