



Response to comment from Dr. Yassari *et al.*

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Response to: De la Garza Ramos R, Schulz JF, Gomez JA, *et al.* Editorial on “Increased radiation but no benefits in pedicle screw accuracy with navigation versus a freehand technique in scoliosis surgery”. *J Spine Surg* 2018;4:660-2.

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We appreciate for the thoughtful insight of Dr. Yassari *et al.* We would like to stress that we are not against navigation, on the contrary, we believe that it has important place in spinal surgery. We completely agree that there are excellent indications for navigation; “advanced degenerative disease, revision procedures, patients with complicated and severe deformity, minimally invasive spine surgery, and complicated spinal tumours” as it was very well put in the comment. In fact, in our institution we frequently use 3D image-based navigation to insert cervical pedicle screws or for the percutaneous procedures. Nevertheless, the idea of our paper was to present series of patients, which were neither complex nor challenging. Moderate scoliosis cases included to the study, one might call “routine”, “everyday cases”. Results of our studies suggest that in this group of patients’ applications of navigation is not beneficial and in view of significantly increased radiation it does not seem to be justified.

In response to raised concerns by Dr. Yassari: according to the literature, the size of the pedicles in adolescent population is smaller, however the differences are minor. Following measurements performed by Mughir *et al.*, the average transverse diameter of the pedicle in adolescent was 8.9 mm and in adults 9.8 mm—so less than 1 mm difference (1). The difference we believe does not influence the accuracy of screw positioning. Moreover, it has been shown by Ledonio *et al.* in excellent meta-analysis that the accuracy of screw positioning in paediatric population is superior to adult patients (2). In our series, we compared

overall accuracy in both age groups and noticed 95.3% properly positioned pedicle screws in adolescents *vs.* 96.2% in adults—the results showing low potential for bias. The issue of reduced accuracy may occur in small paediatric patients below age of 10 years, however the evidence for the statement is not strong (3). We would like to also point out that in our paper the distribution of adults and adolescents were comparable in both groups.

Cited papers in the comment (4,5) showing superiority of screw positioning with navigation, contain mixed cases—revisions, tumour, complex and operations in different anatomic areas including cervical. Our work shows homogeneous group of patients with moderate scoliosis, treated in institution routinely taking care of scoliosis patients, by two surgeons only. Therefore, trying to match the results of those studies with ours seem to be unjustified. Rajasekaran *et al.* reported accuracy, which was similar to our results (6). Concluding, there are also available reports showing similar or inferior accuracy of placed screws with navigation (7,8).

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None.

Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

References

1. Mughir AM, Yusof MI, Abdullah S, et al. Morphological comparison between adolescent and adult lumbar pedicles using computerised tomography scanning. *Surg Radiol Anat* 2010;32:587-92.
2. Ledonio CG, Polly DW Jr, Vitale MG, et al. Pediatric pedicle screws: comparative effectiveness and safety: a systematic literature review from the Scoliosis Research Society and the Pediatric Orthopaedic Society of North America task force. *J Bone Joint Surg Am* 2011;93:1227-34.
3. Fujimori T, Yaszay B, Bartley CE, et al. Safety of pedicle screws and spinal instrumentation for pediatric patients: comparative analysis between 0- and 5-year-old, 5- and 10-year-old, and 10- and 15-year-old patients. *Spine (Phila Pa 1976)* 2014;39:541-9.
4. Shin BJ, James AR, Njoku IU, et al. Pedicle screw navigation: a systematic review and meta-analysis of perforation risk for computer-navigated versus freehand insertion. *J Neurosurg Spine* 2012;17:113-22.
5. Verma R, Krishan S, Haendlmayer K, et al. Functional outcome of computer-assisted spinal pedicle screw placement: a systematic review and meta-analysis of 23 studies including 5,992 pedicle screws. *Eur Spine J* 2010;19:370-5.
6. Rajasekaran S, Bhushan M, Aiyer S, et al. Accuracy of pedicle screw insertion by AIRO® intraoperative CT in complex spinal deformity assessed by a new classification based on technical complexity of screw insertion. *Eur Spine J* 2018;27:2339-47.
7. Gelalis ID, Paschos NK, Pakos EE, et al. Accuracy of pedicle screw placement: a systematic review of prospective in vivo studies comparing free hand, fluoroscopy guidance and navigation techniques. *Eur Spine J* 2012;21:247-55.
8. Kraus M, Weiskopf J, Dreyhaupt J, et al. Computer-aided surgery does not increase the accuracy of dorsal pedicle screw placement in the thoracic and lumbar spine: a retrospective analysis of 2,003 pedicle screws in a level I trauma center. *Global Spine J* 2015;5:93-101.

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