

Robotic Screw Placement

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Does Robotic Guidance Confer an Advantage over Fluoroscopy in Pedicle Screw Placement?



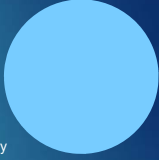
Roser; Neurosurgery 2013

- ▶ RCT
- ▶ Early generation robot
- ▶ Compared accuracy of robotically vs. fluoroscopically guided pedicle screws
- ▶ No statistical difference in accuracy
- ▶ Cases involving robot tended towards decreased radiation




Marcus; Eur Spine J 2014

- ▶ Database review/meta-analysis
- ▶ 5 articles met criteria
- ▶ 1,308 screws
 - ▶ 729 robot
 - ▶ 579 fluoro
- ▶ Inconclusive results regarding accuracy and duration of surgery
- ▶ Trend toward reduced radiation in robot cases




Schalto; J Nsurg Spine, 2014

- ▶ Retrospective review
- ▶ 163 fluoro screws vs. 244 robot
- ▶ Robot used was Mazor Spine Assist
- ▶ Rampersaud Group A+B screws not statistically different
- ▶ EBL lower in robot group
- ▶ Surgery duration and LOS not statistically different




Archavalis; J Neurol Surg, 2018

- ▶ Retrospective review
- ▶ Looked at rates of upper facet violation
- ▶ 3 groups: Robot, Perc Fluoro, Open Midline
- ▶ 60-70 patients/group
- ▶ Superior segment facet violation
 - ▶ Robot 2 (7%)
 - ▶ Perc Fluoro 22 (34%)
 - ▶ Open 6 (8%)




Fan, et.al; Medical Science Monitor 2017

- ▶ Compared Accuracy of pedicle screw insertion among 4 groups
- ▶ Retrospective review
- ▶ Spine Assist robot
- ▶ Rampersaud A+B results
 - ▶ Robot 94%
 - ▶ Navigation template 95%
 - ▶ O-arm 91%
 - ▶ Freehand fluoro 78%



Laudato; Spine 2018

- ▶ Retrospective review
- ▶ Pedicle screw insertion accuracy: Robotic, O-arm, Fluoro
- ▶ Single surgeon
- ▶ CT/Rampersaud criteria
- ▶ No statistically significant difference in Rampersaud A or C+D



Conclusion

- ▶ Robotic guidance is probably more accurate
 - ▶ Some conflicting data
 - ▶ No data yet on newer generation robots
- ▶ Other advantages may exist
 - ▶ Reduced radiation to surgeon/team
 - ▶ Reduced radiation to patient
 - ▶ Reduced duration of surgery
 - ▶ Reduced blood loss
 - ▶ Reduced violation of superior facet
- ▶ Further investigation is needed
- ▶ Robotic systems likely will continue to improve on speed and accuracy

