

PREDICTABILITY.
PRECISION.
VISIBILITY.



Mazor™ Core Technology
for Robotic-Guided Spine Surgery

Medtronic
Further. Together

Pedicle screw placement is a common spinal surgical procedure but it remains technically demanding. The anatomical proximity to the central nervous system and main blood vessel structures means that inaccuracy of pedicle screws may result in serious morbidity, complications, and revision surgery.¹ Mazor X Stealth Edition™ delivers predictability of planning, precision of robotics-guidance, and the visibility of navigation in open, minimally invasive, or percutaneous procedures. Mazor Core Technology delivers high rates of pedicle screw accuracy and enables a minimally invasive approach to spine surgery, which has well-established benefits including less tissue trauma, blood loss, postoperative pain, and convalescence.^{2,4-6}

MIS and Mazor Core Technology Benefits

SURGEON

- Improved Patient Outcomes^{†2,10}
- Optimized Screw Placement Accuracy^{‡2,7-9}
- Predictability and Consistency of Spinal Surgery Through Planning^{‡3}

HOSPITALS

- Improved Outcomes,^{††} Including Length of Stay,^{2,10} and a Lower Rate of Infection^{†6}
- Patients Report High Levels of Satisfaction with the Procedure^{†11}

PATIENTS

- Promotes Faster Recovery^{†2,10}
- Reduces Postoperative Pain^{†11}
- Significant Improvement from Preoperative Status^{†‡4,5,11}

† Demonstrated benefit of MIS

‡ Demonstrated benefit of Mazor Core Technology

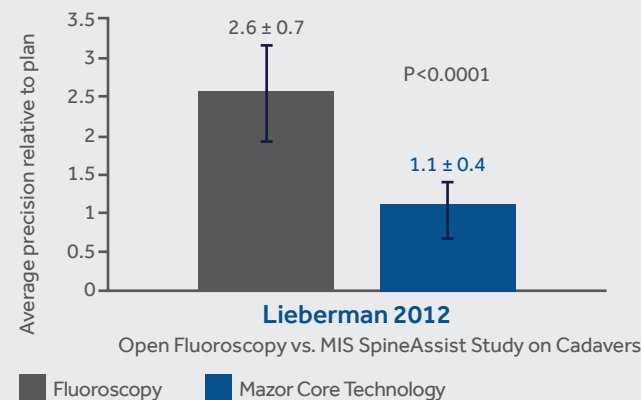
ROBOTIC WORKFLOW



ROBOTIC-GUIDED SPINAL INSTRUMENTATION HAS A HIGH LEVEL OF ACCURACY WITH ENHANCED REPRODUCIBILITY AND PREDICTABILITY.

A significant reduction in deviation from preoperative planning was seen with Mazor Core Technology as compared to fluoroscopy.³

Better spinal instrumentation accuracy and consistency with Mazor Core Technology.³



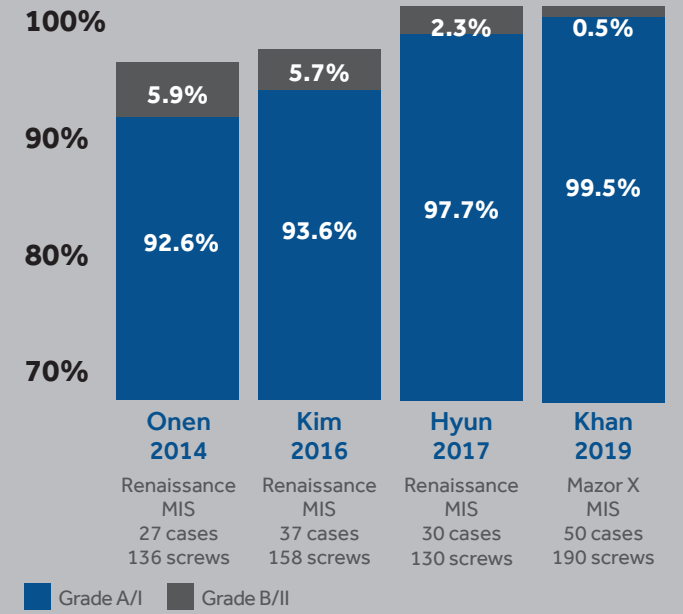
Achieving Accurate Screw Placement

Up to **100%** screw placement accuracy.^{2,7-9}

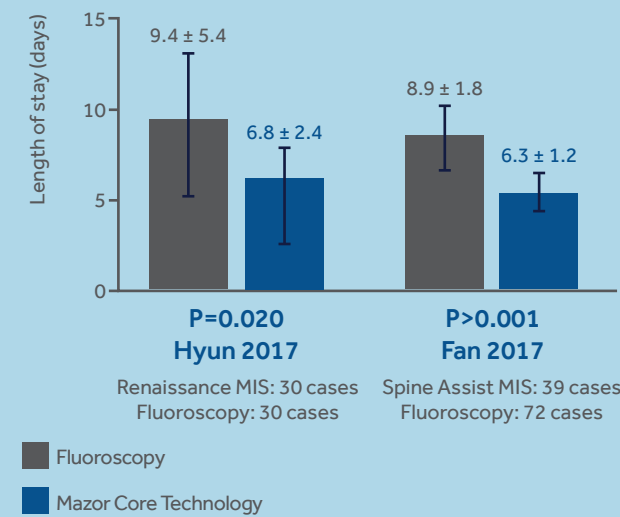
LESS FACET JOINT VIOLATION⁷

0/74 screws violated the proximal facet joint in PLIF with Renaissance™ Guidance System vs. 13/82 in open PLIF.⁷

High level of screw placement accuracy achieved with Mazor Core Technology using Gertzbein-Robbins Grade A + B or Ravi Grade I + II classifications.^{2,7-9}



Shorter length of stay with Mazor Core Technology^{2,10}



Length of Stay

Shorter length of stay for MIS enabled by Mazor Core Technology

2.6 days less

than open freehand procedures enabled by fluoroscopy.^{2,10}

SIGNIFICANT REDUCTION IN TIME SPENT PLACING PEDICLE SCREWS⁸

Time to place screws was significantly reduced from a mean of 6.7 ± 0.9 minutes in navigated procedures to 3.7 ± 1.8 minutes with Mazor X System.⁸

MINIMALLY INVASIVE PLIF PATIENT-REPORTED OUTCOMES WITH MAZOR CORE TECHNOLOGY

- Significant improvement of leg and back pain at the final follow-up¹¹
- Mean ODI improved from severe to minimal disability after surgery¹¹
- 89.1% of patients would choose to undergo the same treatment again¹¹
- 78.2% of patients reported the ability to work at the final follow-up¹¹

REFERENCES

1. Marcus HJ, Cundy TP, Nandi D, Yang GZ, Darzi A. Robot-assisted and fluoroscopy-guided pedicle screw placement: A systematic review. *Eur Spine J* 2014;23(2):291–7.
2. Hyun SJ, Kim KJ, Jahng TA, Kim HJ. Minimally invasive robotic versus open fluoroscopic-guided spinal instrumented fusions. *Spine (Phila Pa 1976)* 2017;42(6):353–8.
3. Lieberman IH, Hardenbrook MA, Wang JC, Guyer RD. Assessment of pedicle screw placement accuracy, procedure time, and radiation exposure using a miniature robotic guidance system. *J Spinal Disord Tech* 2012;25(5):241–8.
4. Goldstein CL, Macwan K, Sundararajan K, & Rampersaud YR. Perioperative outcomes and adverse events of minimally invasive versus open posterior lumbar fusion: meta-analysis and systematic review. *Journal of Neurosurgery: Spine*, 2016; 24(3), 416-427.
5. Khan NR, Clark AJ, Lee SL, Venable GT, Rossi NB, & Foley KT. Surgical outcomes for minimally invasive vs open transforaminal lumbar interbody fusion: an updated systematic review and meta-analysis. *Neurosurgery*, 2015; 77(6), 847-874.
6. Parker SL, Adogwa O, Witham TF, Aaronson OS, Cheng J, & McGirt MJ. Post-operative infection after minimally invasive versus open transforaminal lumbar interbody fusion (TLIF): literature review and cost analysis. *Minim Invas Neurosurg* 2011; 54: 33 – 37.
7. Kim HJ, Jung WI, Chang BS, Lee CK, Kang KT, & Yeom JS. A prospective, randomized, controlled trial of robot-assisted vs freehand pedicle screw fixation in spine surgery. *Int J Med Robotics Comput Assist Surg*. 2016 13(3), e1779.
8. Khan A, Meyers JE, Yavorek S, et al. Comparing Next-Generation Robotic Technology with 3-Dimensional Computed Tomography Navigation Technology for the Insertion of Posterior Pedicle Screws. *World Neurosurg* 2019; 123, e474-e481.
9. Onen MR, Simsek M, & Nader S. Robotic spine surgery: a preliminary report. *Turk Neurosurg*, 2014 24(4), 512-518.
10. Fan Y, Du J, Zhang J, Liu S, Xue X, Huang Y, Zhang J, Hao D. Comparison of Accuracy of Pedicle Screw Insertion Among 4 Guided Technologies in Spine Surgery. *Med Sci Monit*. 2017 Dec 16;23:5960–5968.
11. Schröder ML, Staartjes VE. Revisions for screw malposition and clinical outcomes after robot-guided lumbar fusion for spondylolisthesis. *Neurosurg Focus*. 2017 May;42(5):E12.

The evidence reported here refers to various Mazor robot generations that share Mazor Core Technology.

Medtronic

Medtronic
Spinal and Biologics Business
Worldwide Headquarters

2600 Sofamor Danek Drive
Memphis, TN 38132



Medtronic Sofamor Danek USA, Inc.
1800 Pyramid Place
Memphis, TN 38132

(901) 396-3133
(800) 876-3133
Customer Service: (800) 933-2635

Please see the package insert for the complete list of indications, warnings, precautions, and other important medical information.

Rx Only. For information on indication, safety, and warnings visit medtronic.com/mazorx



Consult instructions for use at this website www.medtronic.com/manuals.

Note: Manuals can be viewed using a current version of any major internet browser. For best results, use Adobe Acrobat® Reader with the browser.

© 2020 Medtronic. All rights reserved. Medtronic, Medtronic logo and Further, Together are trademarks of Medtronic. All other brands are trademarks of a Medtronic company. UC202001711 EN PMD022793-2.0

medtronic.com