

# U.S. AI In Spine Surgery Market Size, Share & Trends Analysis Report By Functionality (Pre-op Planning & Personalization, Diagnostic Decision Support), By Application (Spinal Fusion, Microdiscectomy), By End Use, And Segment Forecasts, 2026 - 2033

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## Abstracts

The U.S. AI in spine surgery market size was estimated at USD 243.34 million in 2025 and is projected to reach USD 752.13 million by 2033, growing at a CAGR of 15.18% from 2026 to 2033. The increasing prevalence of degenerative spine conditions, the need for greater surgical precision, fewer revision surgeries, better implant positioning, and the widespread adoption of robotic-assisted surgical platforms and advanced navigation systems are significant factors contributing to market growth.

The U.S. has a high prevalence of degenerative spine conditions, such as spinal stenosis, spondylolisthesis, disc degeneration, and scoliosis. An aging population and high obesity rates have increased the need for spinal fusion and decompression procedures. Each year, the country performs over 900,000 spine surgeries, ranging from minimally invasive decompression and spinal cord stimulator placements to complex spinal deformity corrections and spinal cord tumor resections, according to data published in the PubMed Central Journal in August 2025. This large procedural volume supports the integration of AI technologies in spine surgery.

Moreover, the need for greater surgical precision, fewer revision surgeries, and better implant positioning is driving the adoption of AI-enabled robotic and navigation platforms in U.S. hospitals and ambulatory surgery centers. In addition, spine surgeons in the U.S. are early adopters of image-guided and data-driven technologies. AI enhances preoperative planning, intraoperative accuracy, and predictive analytics for patient selection. Hospitals leverage AI-enabled spine platforms to reduce complications,

improve screw placement accuracy, and shorten operative times.

Moreover, the U.S. healthcare system has widespread adoption of robotic-assisted surgical platforms and advanced navigation systems. Major academic medical centers and large health systems actively invest in AI-integrated surgical technologies to enhance clinical outcomes and institutional competitiveness. For instance, in February 2026, Carlsmed announced the first aprevo Bilateral Posterior Lumbar Interbody Fusion (PLIF) procedure performed at the University of Colorado Hospital in Denver. The AI-planned, 3D-printed patient-specific implants expand the aprevo platform's versatility across lumbar approaches.

Healthcare systems are increasingly leveraging big data and predictive analytics to personalize treatment pathways. AI tools in spine surgery enable preoperative simulation, implant selection optimization, and prediction of complication risk based on patient-specific anatomical and clinical data. Precision medicine initiatives and integration with electronic health records enhance AI model performance. Surgeons use AI-generated insights to improve procedural planning and alignment strategies. The growing emphasis on data-driven clinical decision-making supports widespread integration of AI technologies into spine surgery workflows. For instance, in November 2025, Proprio, an AI-powered surgical intelligence company, partnered with the Harms Study Group to create a research collaborative linking real-time intraoperative data from Proprio's Paradigm platform with HSG's global spine deformity outcomes registry. The integrated dataset is likely to automate data capture, enhance registry quality, and support multicenter AI-driven studies to optimize pediatric spine surgery.

## U.S. AI in Spine Surgery Market Report Segmentation

This report forecasts revenue growth at the country level and provides an analysis of the latest industry trends in each of the sub-segments from 2021 to 2033. For this study, Grand View Research has segmented the U.S. AI in spine surgery market report based on functionality, application, and end use:

Functionality Outlook (Revenue, USD Million, 2021 - 2033)

Pre-op planning & personalization (alignment/planning, patient-specific constructs)

Intraoperation guidance / navigation / AR / digital execution

Diagnostic decision support

Application Outlook (Revenue, USD Million, 2021 - 2033)

Spinal Fusion

Microdiscectomy

Laminectomy

Laminotomy

Lumbar decompression (non-fusion)

Other

End Use Outlook (Revenue, USD Million, 2021 - 2033)

Hospitals

Ambulatory Surgery Centers (ASCs)

Orthopedic Centers

Others

**This report can be delivered to the clients within 3 Business Days**

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