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Closed-Loop Spinal Cord Stimulation Device Market Size, Share & Trends Analysis Report By Lead Type (Percutaneous Leads, Paddle/Surgical Leads), By Technology, By Application (Failed Back Syndrome, Degenerative Disk Disease), By End-use, By Country, And Segment Forecasts, 2026 - 2033

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Abstracts

Closed-Loop Spinal Cord Stimulation Device Market Summary

The closed-loop spinal cord stimulation device market size was estimated at USD 310.0 million in 2025 and is projected to reach USD 889.29 million by 2033, growing at a CAGR of 14.06% from 2026 to 2033. The industry is growing as healthcare systems adopt advanced neuromodulation technologies to manage chronic pain.

The shift toward feedback-driven stimulation systems that can automatically adjust therapy in real time is enhancing treatment precision and consistency, making these solutions more effective than traditional approaches. Rising prevalence of conditions such as chronic back pain, neuropathic pain, and post-surgical pain syndromes is driving demand, alongside a broader preference for minimally invasive and non-pharmacological treatment options aimed at reducing opioid dependence. Continuous technological advancements, including intelligent stimulation algorithms, improved implantable device designs, and longer-lasting batteries, are further strengthening clinical outcomes and patient satisfaction.

The increasing prevalence of chronic pain conditions, particularly lower back pain, is driving significant growth in the industry, as a larger patient population requires effective, long-term pain management solutions. Lower back pain remains one of the

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most common and disabling conditions globally, associated with aging, sedentary lifestyles, obesity, and degenerative spinal disorders, leading to persistent discomfort even after conventional treatments or surgical interventions. This creates a strong demand for advanced therapies that can provide consistent relief. Closed-loop systems meet this need by continuously monitoring neural responses and automatically adjusting stimulation in real time, enabling more precise and personalized therapy. As the burden of chronic pain continues to rise and the focus shifts toward non-pharmacological, long-term treatment options that reduce dependence on opioids, the adoption of these advanced neuromodulation technologies is rising, supporting market growth.

“The societal and economic impact of low back pain is enormous. We see loss of productivity from missed days at work and a reliance on medication to alleviate pain,”- Dr. Jaimie Steinmetz, managing research scientist at IHME.

Failed Back Surgery Syndrome (FBSS) is a significant growth driver of the market, as it leads to a high incidence of persistent or recurrent pain following spinal surgery. A considerable proportion of patients undergoing procedures such as laminectomy or spinal fusion continue to experience chronic pain, creating a strong demand for effective long-term pain management solutions. Closed-loop systems are particularly well-suited for FBSS patients as they provide real-time, adaptive stimulation that responds to changes in spinal cord signals, ensuring consistent pain relief despite variations in body position or activity levels. This level of precision addresses one of the key limitations of traditional therapies, where inconsistent stimulation leads to suboptimal outcomes.

A 2025 study by the NIH indicates that failed back surgery syndrome remains a widely recognized but relatively underexplored condition, affecting approximately 10% to 40% of patients undergoing spinal surgeries. It is a major contributor to ongoing chronic pain and functional disability, placing a considerable burden on both patients and the broader healthcare system.

Advancements in closed-loop technology are driving the growth of the market by significantly improving the precision, consistency, and effectiveness of pain management therapies. Unlike conventional systems, modern closed-loop devices continuously monitor neural responses and automatically adjust stimulation levels in real time, ensuring that patients receive optimal therapy regardless of changes in posture or activity. This has led to more reliable pain relief, reduced instances of under- or over-stimulation, and higher patient satisfaction. In addition, innovations such as advanced sensing capabilities, adaptive algorithms, miniaturized implantable

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components, and longer-lasting rechargeable batteries enhancing device performance and convenience. These improvements not only improve clinical outcomes but also increase physicians' confidence in recommending these therapies. Thus, the growing body of positive clinical evidence and technological differentiation are accelerating adoption across healthcare settings, thereby expanding the market.

In July 2025, Saluda Medical announced the full commercial launch of its EVA sensing technology in the U.S. for use with the Evoke SmartLoop System. The technology received U.S. Food and Drug Administration approval in December 2024 and enabled real-time monitoring of spinal cord activity to support personalized therapy based on neural response signals. As an extension of the Evoke platform, EVA analyzed spinal cord responses with high precision, allowing for more accurate and consistent therapy delivery. The Evoke SmartLoop System further optimized treatment by continuously sensing and adjusting stimulation levels based on each patient’s neural response biomarker, the evoked compound action potential (ECAP), ensuring therapy remained aligned with prescribed settings.

Closed-Loop Spinal Cord Stimulation Device Market Report Segmentation

This report forecasts country-level revenue growth and analyzes the latest industry trends and opportunities across sub-segments from 2021 to 2033. For this study, Grand View Research has segmented the closed-loop spinal cord stimulation devices market report based on lead type, technology, application, end-use, and country:

Lead Type Outlook (Revenue, USD Million, 2021 - 2033)

Percutaneous Leads

Paddle/Surgical Leads

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

ECAP-Sensing Closed-Loop SCS

AI-Adaptive Closed-Loop SCS

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

Failed Back Syndrome

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Complex Regional Pain Syndrome

Degenerative Disk Disease

Unsuccessful Disk Surgery

Others

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

Hospitals

Specialty Clinics

Others

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

U.S.

UK

Germany

France

Italy

Spain

Denmark

Sweden

Norway

Japan

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Australia

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