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AI in Orthopedic Surgery Market Assessment, By Component Type [Software, Hardware, Service], By Technology [Machine Learning, Natural Language Processing, Context Aware Computing, Computer Vision], By Anatomy [Knee, Hip, Spine, Others], By End-user [Hospitals, Orthopedic Clinics, Others], By Region, Opportunities and Forecast, 2018-2032F

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Report description:

Global AI in the orthopedic surgery market is projected to witness a CAGR of 32.03% during the forecast period 2025-2032, growing from USD 307.58 million in 2024 to USD 2,743.5 million in 2032. Growth in the market is driven by factors such as the increasing geriatric population, increasing number of orthopedics surgeries, growing adoption rate of AI-based technologies in healthcare settings, and growing demand for minimally invasive surgeries. The expanding healthcare budget, increasing investments by public and private organizations, government initiatives, and technological advancements are further accelerating the growth of global AI in the orthopedic surgery market.

Also, global AI in the orthopedic surgery market is undergoing significant growth due to the increasing number of orthopedic surgeries globally. The geriatric population is vulnerable to developing bone-related health conditions, such as arthritis, fractures, joint pain, inflammation, and deformities in the spine, due to which there is a growing demand for orthopedics surgeries. To increase efficiency and meet the growing demand for orthopedic surgeries, AI is being integrated into surgical devices, which plays an essential role by assisting surgeons during surgical procedures, leading to less time, improved decision-making, faster recovery time, and reduction in errors during surgeries.

In November 2024, Definition Health Limited, a UK-based Health Tech innovator, raised USD 7.5 million (5.75 million euros) in pre-seed funding. This investment boosts their AI-powered platform, which fits well into healthcare platforms and revolutionizes surgical workflows. The platform provides individualized, data-led care, enhancing efficiency, minimizing complications, and maximizing outcomes. This innovation has dramatically evolved surgical outcomes and strengthened the AI surgical market.

Growing Volume of Orthopedic Surgeries

There has been a surge in demand for AI in orthopedic surgery due to the rising number of orthopedic surgeries such as total joint arthroplasty, total hip arthroplasty, and total knee arthroplasty. The rise in the aging population and the increased prevalence of musculoskeletal conditions, such as osteoarthritis and rheumatoid arthritis, along with the growing demand for minimally invasive surgeries, are the factors contributing to the growth of orthopedic surgeries. According to the world's largest medical association of musculoskeletal specialists, "The American Academy of Orthopaedic Surgeons (AAOS)", by the year 2050, the demand for orthopedic surgeons is going to increase tremendously due to the increasing number of orthopedic surgeries such as total joint arthroplasty. It also states that increasing the number of surgeons by 10% every five years will be crucial to meet the growing demand for surgeons. As the ratio of surgeons concerning the number of surgeries is very low, the demand for AI-based orthopedic surgery is expected to increase to reduce the burden on orthopedic surgeons.

Increasing Adoption of AI-Based Orthopedic Surgeries
With the increased demand for AI-based orthopedic surgeries, the key market players have significantly increased the adoption of AI-based orthopedic surgical software and hardware solutions. The deployment and use of AI in orthopedic surgeries are expected to increase due to the increasing number of orthopedic surgeries and the lack of orthopedic surgeons. Additionally, there has been a surge in investments in AI-based orthopedic surgeries. Brain and Company stated that investments in AI-based orthopedic surgeries have increased in recent years due to improved precision, efficient preoperative planning, and improved decision-making with the help of AI-based navigation systems during surgery.

Moreover, these solutions reduce the risk of complications during surgery and improve patient outcomes, which is why global AI in orthopedic surgery is flourishing. Several leading players, such as Stryker Corporation and Zimmer Biomet Holdings Inc., are continuously involved in bringing innovative AI-based orthopedic surgery solutions, whereas large companies, like Johnson & Johnson, are expanding their market in this industry through mergers & acquisitions and partnerships with the start-ups and medical device companies in this space.

Software Holds the Highest Share in AI Based Orthopedic Surgery Market

Amongst component types, software-based solutions dominate the overall market. AI-based orthopedic software plays a pivotal role in orthopedic surgeries. Software is responsible for preoperative planning and guides surgeons during surgery by providing real-time feedback, which reduces the chances of errors and the possibility of infection on the surgical site. These solutions improve instrument positioning, enhance surgical precision, and increase overall efficiency in orthopedic surgeries. Due to this, key market players are developing AI-based orthopedic software to fulfill the increasing demand for surgeries. In July 2023, Stryker Corporation launched a highly efficient surgical planning and guidance software, named the "Ortho Q Guidance system," for various orthopedic surgeries such as hip and knee surgical procedures. The guiding system uses a smart, streamlined platform to provide surgical planning and intraoperative guidance to improve knee and hip surgical procedures and increase the speed and outcome of the surgery.

Knee Surgeries are Growing at a Rapid Rate

The rise in the number of orthopedic surgeries in the lower extremities, such as partial knee replacement, total knee replacement, and ligament surgeries, along with significant investments by key players in the segment, is driving the demand for knee surgeries in AI-based orthopedic surgeries. Moreover, several leading players are launching AI-based orthopedic surgery for lower extremities in their product portfolio. In October 2023, Johnson & Johnson MedTech launched the "VELYS Robotic-Assisted Solution" from DePuy Synthes for its European market. It is an innovative digital surgery platform specifically designed for total knee arthroplasty. With its launch, DePuy Synthes enhanced its digital surgery platform to manage the growing need for knee surgeries, which are difficult to treat by traditional methods. The supportive regulatory system and increased demand for knee surgeries, along with increasing research and development in this segment, further enable growth in global AI in the orthopedic surgery market.

North America Holds the Largest Share Globally

North America holds the maximum share of global AI in the orthopedic surgery market due to its robust healthcare infrastructure, availability of advanced technologies within healthcare facilities, and high adoption rate of AI-based technologies. The demand for AI-based orthopedic surgery is accelerating to overcome the lack of surgeons and reduce the burden on existing surgeons in North America. In August 2024, Zimmer Biomet Holdings, Inc. acquired OrthoGrid Systems, Inc., a Utah-based company specializing in AI-driven surgical guidance of hip replacements, one of the medical technology companies in North America with a notable market share in the AI orthopedic surgery market. Zimmer Biomet enhances its hip portfolio by meeting the growing need for fluoroscopy-based solutions while improving intraoperative efficiency and patient outcomes. Moreover, the presence of medical device and IT companies such as Intuitive Surgical Inc., Globus Medical, Inc., IBM Corporation, and Microsoft Corporation in North America further facilitates the growth of global AI in orthopedic surgery market.

Future Market Scenario (2025-2032F)

The global AI in orthopedic surgery market is expected to grow in the future due to several factors. The increasing number of orthopedic surgical procedures worldwide has increased the demand for AI in orthopedic surgery, and integration of AI in surgical procedures reduces the burden on surgeons and improves surgical outcomes. The increasing adoption rate of AI-based orthopedic surgeries globally, along with consistent and frequent product launches by key market players, are propelling the growth of this market. Government initiatives play a significant role in integrating artificial intelligence (AI) in orthopedic surgery. These initiatives can support research, development, and implementation of AI technologies in healthcare. Moreover, collaborative ventures and the entry of new market players will drive growth over the forecast period.
Key Players Landscape and Outlook
AI-based orthopedic surgeries play a crucial role in enhancing the quality and improving the success rate of orthopedic surgeries. Several medical device companies and IT companies are establishing strategic partnerships and collaboration, leading to the growth of global AI in orthopedic surgery market. These collaborations enable the firms to gain information regarding the market and latest technologies, enhance diversification, and improve financial strength. Distribution agreements enable companies to access new markets and broaden their market presence at a global level.
For instance, In September 2024, Stryker Corporation completed the acquisition of care.ai, one of the leading AI companies specializing in ambient intelligent solutions and AI-assisted virtual care workflows. This strategic move will help the company expand its wirelessly connected medical devices portfolio and enhance its healthcare IT solutions.
In June 2024, Zimmer Biomet Holdings, Inc. and RevelAi, Inc. entered a multi-year co-marketing partnership to commercialize generative AI-driven engagement solutions that drive value-based orthopedic care. The firms intend to enhance orthopedic care accessibility and ensure the availability of innovative solutions for the efficient fulfillment of evolving clinical needs.

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*Companies mentioned above DO NOT hold any order as per market share and can be changed as per information available during research work.

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