

CASE STUDY

How Steindler Orthopedic improved joint replacements with digital surgical technologies

Recognizing the opportunity to meet the increasing demand for joint arthroplasty, Steindler Orthopedic Clinic employed a comprehensive evaluation strategy to identify the most suitable digital technology. This rigorous selection process led to the adoption of the VELYS™ Enabling Tech portfolio of technologies (Johnson & Johnson MedTech) across their procedures. As a result, the clinic experienced more consistent and improved patient outcomes, along with greater procedural efficiency.

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Read time – 15 minutes

Audience

- Hospitals and health systems
- Physicians and medical groups

Overview

The challenge

As joint arthroplasty volumes continue to rise, particularly in outpatient settings, orthopaedic leaders are finding innovative ways to maximize efficiency to accommodate new procedural growth. At Steindler Orthopedic Clinic in Iowa City, surgeons saw an opportunity to use digital surgical technology to not only improve procedural safety and patient outcomes but also to increase efficiency. While tools like Bovie cords and intraoperative fluoroscopy have improved precision within manual surgery, Steindler Orthopedic Clinic knew that digitally advanced options could help make their surgeries more precise and standardized. Additionally, the limited availability of specific equipment and the varying skill levels of radiology staff often impacted surgery times and imaging quality. The clinic used digital surgical technology to address these challenges.

The organization

Steindler Orthopedic Clinic, located in Iowa City, Iowa, specializes in diagnosing and treating a wide range of orthopaedic conditions, with services in joint arthroplasty, sports medicine, spine care, and physical therapy. The clinic features a team of orthopaedic surgeons and healthcare professionals that collaborates closely with Mercy Iowa City Hospital.

The approach

In 2019, Steindler Orthopedic Clinic implemented a comprehensive strategy to enhance procedural safety and reduce inefficiencies in joint arthroplasty procedures. Leadership at the clinic convinced hospital executives to integrate enabling technology solutions into their practices. They complemented this technological advancement by optimizing instrument trays and standardizing anesthesia protocols in order to improve precision, improve patient outcomes, and shorten surgery durations.

After reviewing trials of various hip and knee arthroplasty technologies, the clinic selected the VELYS™ Hip Navigation and the VELYS™ Robotic-Assisted Solution. Points of comparison between technologies included implant compatibility and workflow efficiency for VELYS™ Hip Navigation as well as footprint, precision, and imaging for the VELYS™ Robotic-Assisted Solution. To maximize the potential of these technologies, clinic leaders worked closely with surgeons and clinical staff to secure their support and ensure widespread adoption. They aimed to standardize surgical procedures to ensure consistency and high-quality results.

Overview (cont.)

The result

The adoption of VELYS™ Hip Navigation and the VELYS™ Robotic-Assisted Solution at Steindler Orthopedic Clinic has enhanced both surgical precision and operational efficiency. With its seamless implant compatibility, VELYS™ Hip Navigation minimizes the risk of post-surgical complications by improving the accuracy of surgical measurements like leg length and offset. It has also helped contribute to a 13% reduction in average surgery time for hip arthroplasty procedures compared to manual methods with intraoperative fluoroscopy, from 120-125 minutes to 100-105 minutes.

Furthermore, the VELYS™ Robotic-Assisted Solution has led to greater outcome consistency and more predictable recovery trajectories in knee arthroplasty procedures due to the precision of its robotic arm. Its small footprint and need for no post-operative X-rays helps maintain operational efficiency, as well as reduces patient radiation exposure. The VELYS™ Robotic-Assisted Solution has allowed surgeons to achieve time neutrality in cemented knee arthroplasty procedures and increased the number of uncemented knee arthroplasty procedures by 50%, saving 10-12 minutes per case.

Approach

How Steindler Orthopedic Clinic improved joint arthroplasty procedures

To improve precision and efficiency in joint arthroplasty procedures, Steindler Orthopedic Clinic implemented a comprehensive three-step strategy that prioritized in-depth technical training and developed a reproducible process. Steindler's adoption of VELYS™ Hip Navigation and the VELYS™ Robotic-Assisted Solution has led to more predictable surgical outcomes, more favorable recovery trajectories, and more efficient procedures.

The three steps

01 Evaluate potential technologies and secure hospital buy-in

02 Train surgeons and clinical staff in new technology

03 Implement a phased rollout to create a reproducible process

01 Evaluate potential technologies and secure hospital buy-in

Surgeons at Steindler Orthopedic Clinic recognized the potential of enabling technology platforms to standardize surgical procedures and enhance the usability of data collected during surgeries. Aware of the industry's shift towards enabling technologies, they anticipated that embracing this technology as an early adopter would position the organization as a leader in the market, providing a competitive edge.

To establish the clinic as a regional authority on this technology, Dr. Taylor Dennison, the physician champion, took several steps:



Presented a compelling investment case to hospital leadership, aligning the enabling technology's benefits with the hospital's financial, strategic, and operational goals



Demonstrated the surgical value of the technology, addressing both hospital success in financial performance and regulatory compliance and surgeon concerns with patient recovery rates and efficiency



Identified competitive advantage, hypothesizing that the technology would draw more patients and increase market share due to its clinical benefits previously unavailable in the community

The clinic first adopted VELYS™ Hip Navigation in 2019, and later the VELYS™ Robotic-Assisted Solution in 2021. While Dr. Dennison took similar steps to gain leadership buy-in for the business case for both technology platforms, the evaluation process for the two looked different. In the initial vendor selection and implementation phase, he favored the VELYS™ Hip Navigation for its compatibility with the organization's implants and ease of integration into existing workflows.

For knee arthroplasty procedures, five of the clinic's surgeons tested several enabling technology platforms in a lab setting before gravitating toward the VELYS™ Robotic-Assisted Solution. They chose this platform for three reasons: 1) It had a minimal footprint and an ability to be moved from room to room. 2) Its philosophy of utilizing the robotic arm as a cutting device was more precise. 3) It aligned with the clinic's commitment to an imageless solution.

Thus, for both knee and hip arthroplasty procedures, clinic leadership saw more enhanced and efficient outcomes.

02 Train surgeons and clinical staff in new technology

To ensure a successful transition to the VELYST™ Enabling Tech portfolio, clinical leadership developed a comprehensive training program for both surgeons and operating room staff. The training aimed to secure buy-in and minimize the learning curve by sharing personal experiences and data with surgeons who were previously unfamiliar with the technology. The training also highlighted the benefits to patients by providing examples of how to talk about improved precision, predictability, and efficiency in patient-friendly language to stakeholders outside the operating room. Practical exercises, such as rehearsals before actual surgical cases, built familiarity and confidence.

The training sessions tailored specific instructions for different roles within the surgical team, including circulators and technicians, to ensure everyone understood their role in using the new technology effectively. Surgeons shared best practices with each other, fostering a collaborative environment for knowledge exchange. Adoption of the new technology was successful for two reasons: Surgeons provided support to each other, and physician assistants shared best practices with the surgeons they assisted. This collaborative effort smoothed the transition and integration of the technology into routine surgical procedures.

Lastly, manufacturer support played a crucial role in ensuring staff felt adequately trained in using the technology. Johnson & Johnson representatives helped troubleshoot and optimize the technology during surgeries, ensuring the clinic team could fully leverage the new technology to enhance surgical outcomes.

In addition to the structured training sessions, the transition to the VELYST™ Enabling Tech portfolio was supported by a robust feedback mechanism. Regular evaluations were held after initial surgeries to gather insights and address any challenges faced by the surgical team. This iterative process allowed for real-time adjustments and continuous improvement in the use of the technology. Furthermore, the involvement of multidisciplinary teams ensured a holistic approach to patient care. This comprehensive strategy not only facilitated a smoother adoption of the new technology but also reinforced a culture of teamwork and shared responsibility in achieving optimal surgical outcomes.

03 Implement a phased rollout to create a reproducible process

Clinic leadership adopted the VELYST™ Enabling Tech portfolio in part to help them create standardized, reproducible processes for both hip and knee arthroplasty procedures. For hip arthroplasties, the manual surgical tools they used sometimes led to variability in precision and outcomes, which negatively impacted patient satisfaction and increased the risk of postoperative complications, such as incorrect leg length or offset. Additionally, the clinic's traditional process for hip procedures relied more heavily on pre-op X-rays, meaning the duration and outcomes of a procedure were partially contingent on the radiology staff's expertise and equipment availability.

For knee arthroplasty procedures, the manual alignment techniques used during surgery could lead to inconsistencies in implant positioning, which affected the overall alignment and function of the knee joint. This variability often resulted in suboptimal patient outcomes, including persistent pain, limited mobility, and the need for revision surgeries. Additionally, the reliance on conventional surgical instruments and techniques meant that the precision of the procedure heavily depended on the surgeon's experience and skill, leading to a steep learning curve for less experienced surgeons and making it difficult to achieve reproducible results across different surgical teams.

Clinical leadership wanted to create more reproducible processes to minimize prolonged surgery times and ensure uniform and predictable surgical outcomes. The physician champion knew he could not implement new, reproducible processes overnight. Instead, Steindler Orthopedic Clinic took a phased approach to introduce both VELYST™ Hip Navigation and the VELYST™ Robotic-Assisted Solution. "You're never as efficient right out of the gate on a new technology," Dr. Dennison acknowledged, which meant rightsizing the learning curve for interested surgeons was key. "We had to balance the phase-in approach, so the new platform wasn't railroading their day, but that they got enough exposure quickly to see progress over the first few cases."

At the beginning of the VELYST™ Hip Navigation rollout in 2019, Dr. Dennison was the only surgeon in the clinic utilizing it on a case-by-case basis to demonstrate its value. This way, he could control the path to a reproducible process, eventually adopting the technology across most of his cases. While there wasn't a large technological learning curve, there was a period where Dr. Dennison overlapped techniques to confirm the data they collected using VELYST™ Hip Navigation was correct. For about 10-15 cases, he used VELYST™ Hip Navigation and then compared the results using a past technique to reduce data redundancies and ensure the process was as streamlined as possible. Since adoption, Dr. Dennison has seen annual volume growth from 150 cases to 200 cases using VELYST™ Hip Navigation and expanded the number of sites where the technology is used.

03 Implement a phased rollout to create a reproducible process

This phased approach proved important for the clinic’s adoption of the VELYST™ Robotic-Assisted Solution. When it was introduced in the fall of 2021, surgeons were piloting a variety of other robotic systems. However, when more clinic members began utilizing the VELYST™ Robotic-Assisted Solution, it provided an opportunity to compile actionable data over time and analyze the results. Surgeons faced a learning curve in using the technology; a traditional knee arthroplasty would take 30-35 minutes, but a knee arthroplasty using the VELYST™ Robotic-Assisted Solution would take 50 minutes in the beginning. There was also a learning curve on the frontend procedure set up as opposed to a manual case. The staff had to learn how to position and calibrate the robot before the case.

Over time, this leveled out to achieve time neutrality and even time savings for some cases. The technology demonstrated a high level of reliability and consistency in outcomes, which naturally led surgeons to favor the VELYST™ Enabling Tech portfolio over alternative platforms. Now, the clinic uses the VELYST™ Robotic-Assisted Solution for every case and is looking toward acquiring a second robot for the next phase of their rollout: in their new ambulatory surgical center.

Results

How we know it's working

Enhanced surgical outcomes

- Improvement in measurement precision
 - VELYST™ Hip Navigation technology provides actionable data that reduces the likelihood of postoperative complications, specifically with improvements in surgical measurements such as leg length and offset.
- Consistency with predictable outcomes
 - VELYST™ Robotic-Assisted Solution technology has ensured consistent application of surgical plans in knee arthroplasty. This consistency has led to fewer outliers and revisions as well as more predictable recovery trajectories for patients.

Quantitative impact and improved patient awareness

- Growth in cases
 - At Steindler, over 1,500 cases have been performed using VELYST™ Hip Navigation since 2019 and approximately 800 cases using the VELYST™ Robotic-Assisted Solution since 2021, demonstrating the effectiveness and widespread adoption of the technology.
 - The VELYST™ Robotic-Assisted Solution was used in 150 cases in its first year, growing to 300 per year.
 - The physician champion has used VELYST™ Hip Navigation in all his hip arthroplasty procedures since its implementation in the clinic in 2019. He performed about 150 cases per year with the technology initially; since then, volumes have grown to about 200 annually with swelling demand for hip arthroplasty procedures.
- Greater patient interest
 - Patients in need of joint arthroplasty are well-informed due to Steindler's efforts to increase patient education about the technology in collaboration with Johnson & Johnson. Patient-driven word-of-mouth interest may reflect a strong community buy-in and patient satisfaction.
 - The technology reassures patients about expected results, particularly those concerned with precise issues like equal leg length, ensuring surgeries meet their specific expectations without surprises.

Results

Operational efficiency gains

➤ Time savings:

- The integration of the VELYS™ Enabling Tech portfolio has decreased the average surgery time from approximately two hours using intraoperative fluoroscopy to about one hour and 45 minutes. This reduction has enabled the scheduling of additional surgical cases.
- For example, in the 1,500 VELYS™ Hip Navigation cases to date, the technology implementation has resulted in 15–20 minutes of time saved per case, totaling 375–500 extra hours of OR/surgeon time. This translates to the capacity for an additional 214–285 hip cases.
- The VELYS™ Robotic-Assisted Solution has allowed surgeons to achieve time neutrality in cemented cases and increased the number of uncemented cases by 50%, saving 10-12 minutes per case.

➤ Decrease in X-ray usage:

- There is a significant reduction in the clinic's use of X-rays per surgery, decreasing radiation exposure for patients and contributing to quicker procedures.
- Prior to using VELYS™ Hip Navigation, surgeons used fluoroscopy intraoperatively. Since its adoption, there has been about a 50% reduction in fluoroscopy time.
- For the VELYS™ Robotic-Assisted Solution, the practice has evolved from an X-ray after every case to zero X-rays, avoiding a few hundred X-rays per year.

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