aprevo®

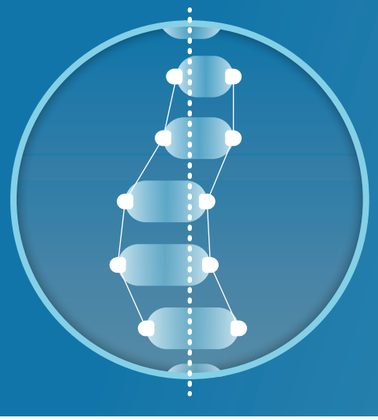
AI-Enabled 3D Surgical Planning and Patient-Specific Devices

carlsmed®

Challenges in Spinal Fusion Today

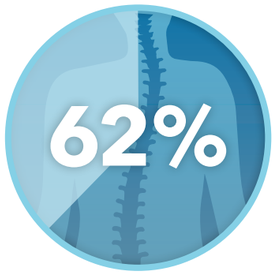
Are Current Lumbar Fusions Sufficient?

Patients have unique anatomical challenges which call for unique solutions.



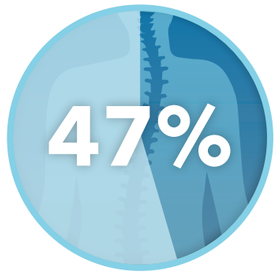
Many patients are left with spinal malalignment, experience complications or require a revision surgery following spinal fusion procedures.[1]

MALALIGNMENT



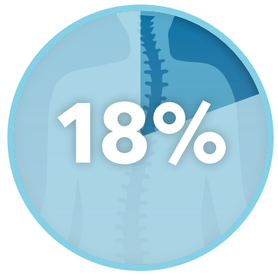
- 62% of patients remained sagittally malaligned after surgery, and 25% of patients remain coronally malaligned after surgery[1]
- For every 1° increase in PI-LL mismatch, the odds of developing adjacent-level disease requiring surgery increased by 40%[2]

COMPLICATIONS



- Implant-related mechanical failure is the most common complication following adult spinal deformity surgery, affecting up to 47% of post-operative patients[3]

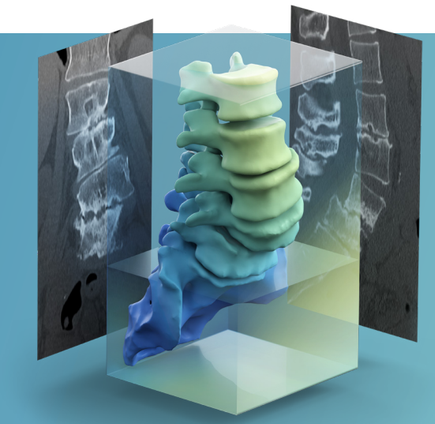
REVISIONS



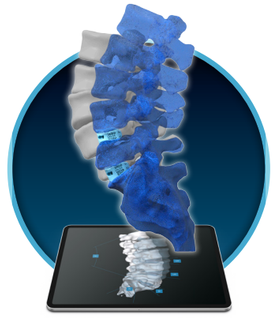
- 18% of patients undergo revision within four years of spinal deformity surgery[4]
- The 11-year revision rate of lumbar fusion surgery for degenerative spine disorders stands at 20%[5]
- There is a 10x higher probability of revision if sagittal alignment is not achieved during the primary surgery for degenerative conditions[6]

The aprevo® Technology Platform

An End-to-End Integrated Platform Designed for Better Surgical Results, Reduced Revisions and Improved Long-Term Outcomes



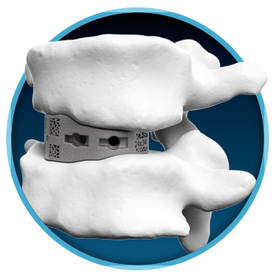
1 PRE-OP



myaprevo™

AI-enabled 3D planning and visualization software provides simple and engaging 3D plan visualizations for surgeons. Each patient's personalized plan and associated patient-specific devices are visualized, reviewed and approved through the myaprevo™ App.

2 INTRA-OP



aprevo®

3D correction is built into each aprevo® Interbody Device to help surgeons attain precise correction and predictably achieve the surgical plan. The device is custom-made to map to the unique contours of each patient's anatomy.

3 POST-OP

aprevo intelligence

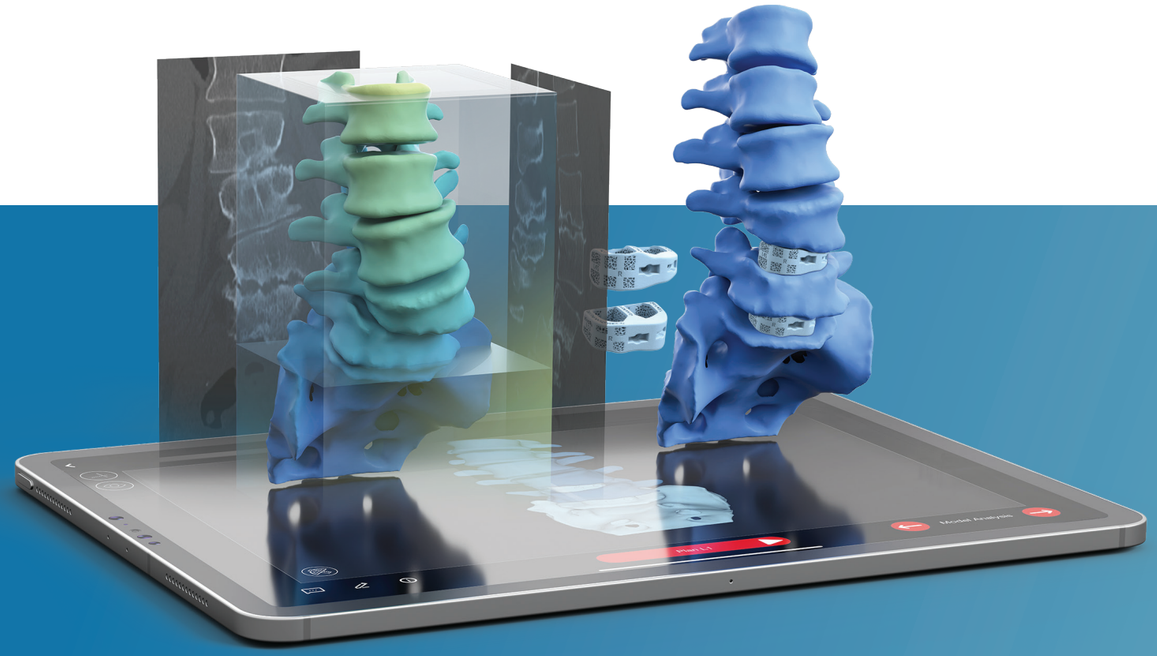
Using personalized analysis, data from each case is used to aid and inform the planning process to enable continuous learning and increased reproducibility.

PRE-OP

Pre-Operative Planning Software

aprevo® Personalized 3D Surgical Planning

The aprevo® Planning Software combines AI-Enabled segmentation and prior outcomes data to develop personalized surgical plans and devices for each patient.

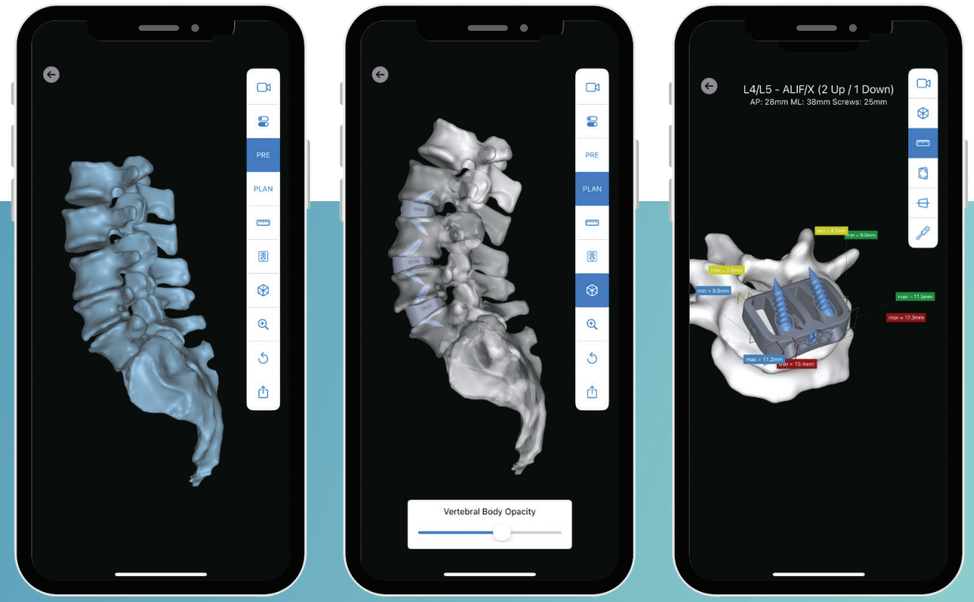


INTRA-OP

Intra-Operative Visualization

Execute Intra-Operative Precision

Access to the surgical plan aids in the ability to attain precise correction and predictably achieve the desired alignment.



Comprehensive Insight-Driven Planning

The aprevo® Pre-Operative Planning Software integrates detailed 3D patient data, the latest spinopelvic parameter classifications, normative range targets and real-world post-operative data to inform and enhance pre-operative plans.

myaprevo™

The myaprevo™ App provides simple and engaging 3D plan visualization for the surgeon. Each patient's personalized plan and associated patient-specific devices are reviewed, visualized and approved through the platform.

Download on the App Store

INTRA-OP Continued

aprevo® Personalized Devices

3D Correction is Built Into Each aprevo® Personalized Interbody Device

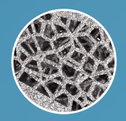
Utilizing patient data and advanced digital technologies, surgical plans are tailored to each surgeon's preferences and each patient's unique needs. Each patient receives a "made for you" device, ensuring that their personalized treatment extends seamlessly into the operating room.

A Precision Fit Designed to Optimize Surgical Outcomes

aprevo® Lateral LLIF

aprevo® Transforaminal TLIF-O | TLIF-C

aprevo® Anterior ALIF | ALIF-X



Porous titanium surface lattice designed to promote bone on-growth and in-growth

Personalized Devices vs. Stock Implants

The aprevo® Platform Offers Surgeons Customized Surgical Planning Solutions and Uniquely Crafted Personalized Devices Designed to Achieve Better Surgical Outcomes Compared to Traditional Stock Devices

aprevo® Personalized Devices deliver a precise fit tailored to each patient's unique anatomy. Data shows that end-plate matched devices significantly increase surface contact area[7] and reduce posterior rod stress.[8] Unlike stock implants, aprevo® Devices correct in all planes, incorporating both coronal and sagittal alignment to help surgeons achieve their planned alignment with greater precision.

aprevo® Clinical Data

Predictable Intervertebral Alignment:
82% of 365 Personalized aprevo® Interbody Levels achieved targeted alignment within 5°[9]

Improved Bone Graft Contact:
94% average aprevo® Device to vertebral endplate contact at 1-year follow-up on CT[10]

Subsidence Mitigation:
96% of Personalized aprevo® Levels with zero subsidence at 1-year follow-up on CT[10]

Improved Alignment Restoration in Degenerative Cases:
52% increase in alignment restoration of preoperatively malaligned patients with degenerative conditions using aprevo®[11]

Improved Alignment in Complex Adult Deformity:
42% improvement in achieving targeted PI-LL within 5° compared to stock implants[12]

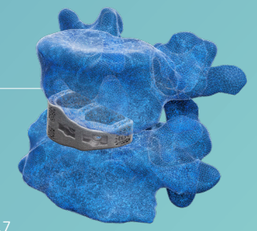
Reduced Rate of Revisions:
<2% rate of revision surgery for mechanical complications in adult spinal deformity patients from the multi-center COMPASS Registry[13]

Endplate-Matched Implants Have Shown:

28% decrease in posterior rod stress[8]

50x increase in contact area[7]

30x reduction in stress concentration on the endplate[7]



POST-OP

aprevo intelligence

Achieve the Plan With aprevo®

aprevo® intelligence provides the surgeon with confirmation of achieved alignment through post-operative analysis and usage reports.

Parameter	Plan	Post-op	Plan Achieved
L34			
Lordosis	13°	14°	✓
Post Height	6 mm	6 mm	✓
L45			
Lordosis	13°	15°	✓
Post Height	6 mm	6 mm	✓
L51			
Lordosis	18°	19°	✓
Post Height	6 mm	5 mm	✓
Lumbar			
Lubar Lordosis	52°	53°	✓

Plan achieved

Driven by Data

Continuous Learning

A continuous feedback loop powered by personalized analysis examines performance to enhance reproducibility and integrated learning. By leveraging post-operative insights, surgeons can utilize outcomes data to achieve greater precision and predictability.

Data Collection 6

Post-operative radiographs are collected by Carlsmed®. This imaging data is analyzed, and a detailed aprevo® intelligence case report is generated, reflecting pre-operative, planned and post-operative alignment parameters.

aprevo® intelligence 7

Ongoing data collection and analysis fuel the planning algorithm by identifying areas for improvement. By leveraging these post-operative insights, surgeon preferences are fine-tuned to streamline the planning process and facilitate precision performance.

The aprevo® Workflow: A Seamless End-to-End Platform

CT Scan

Patient-specific CT scans and imaging are used to create a precise 3D model of the spine, providing a detailed foundation for personalized surgical planning.

3D Plan & Design

aprevo® AI-Enabled Software helps surgeons create surgical plans with precise alignment and desired corrections. Based on the plan, patient-specific devices are designed to fit the patient's unique anatomy.

Manufacture

The patient's aprevo® Devices are 3D-printed after the surgical plan and device designs are approved by the surgeon.

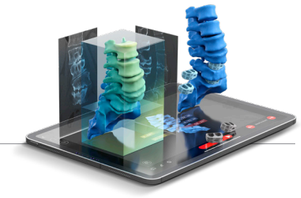
Device Delivery

The patient's personalized devices are delivered sterile and ready for implantation during surgery.

Data Intelligence

The patient's post-operative images are measured and analyzed to refine future surgical plans and improve precision through continuous learning.

aprevo®



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