Medtronic

Alleviating Pain · Restoring Health · Extending Life

ORTHOPAEDIC NAVIGATION SOLUTIONS

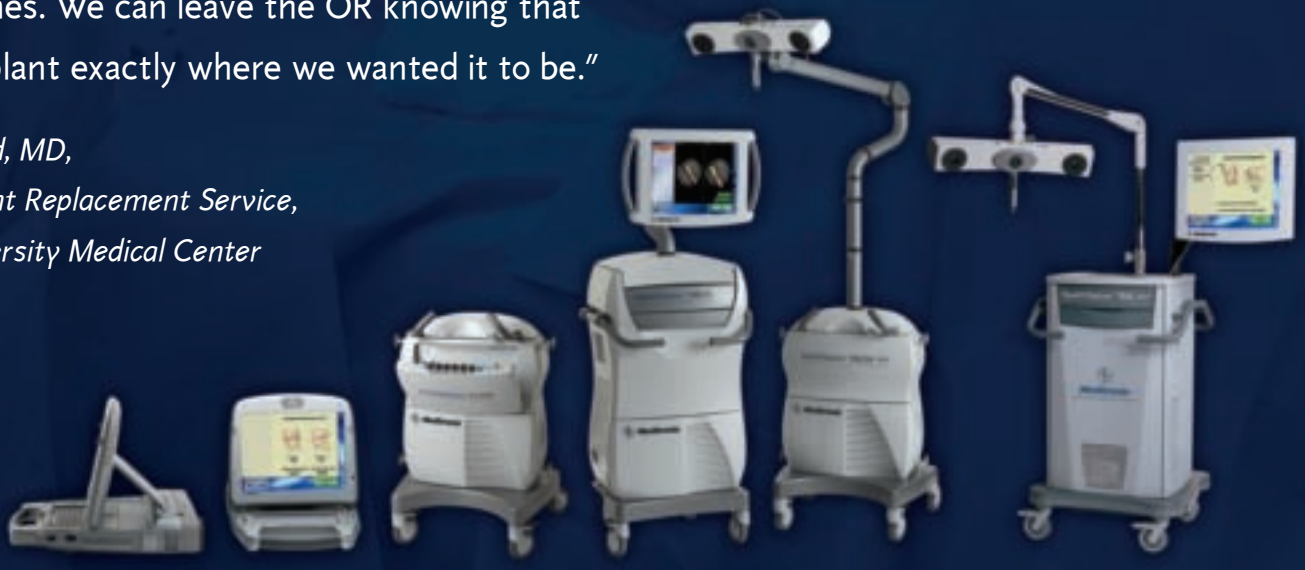
Computer-Assisted Surgery

Providing clinical value through surgical navigation solutions for knee reconstruction, hip reconstruction and trauma procedures.

Small Incision. Big Precision.

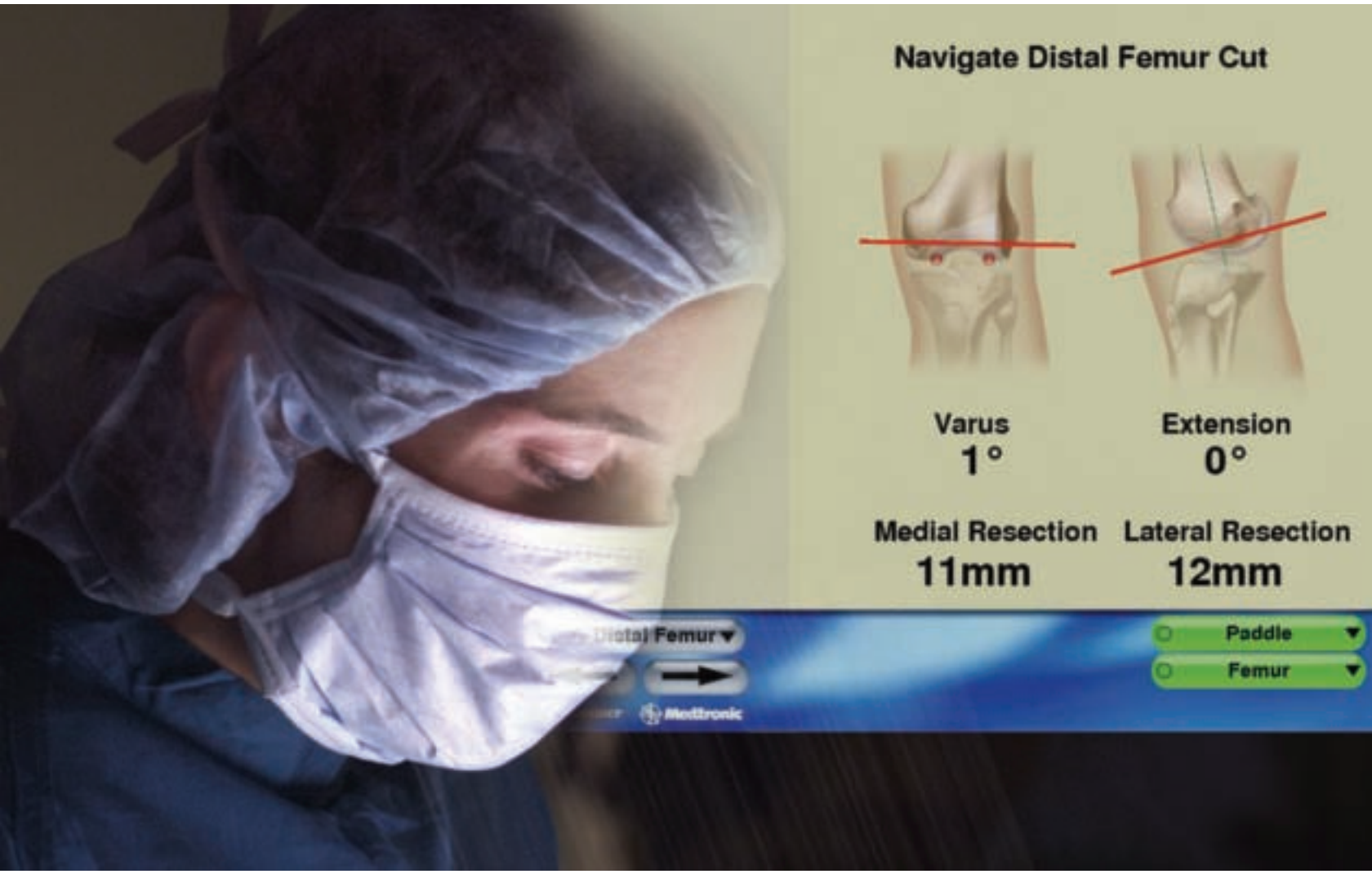
"We can be confident that navigation helps us to improve patient outcomes. We can leave the OR knowing that we put the implant exactly where we wanted it to be."

—Mark Hartzband, MD,
Director, Total Joint Replacement Service,
Hackensack University Medical Center



iNAV™ AxiEM™ StealthStation® TREON® StealthStation® TRIA™

When Surgery Depends on Accuracy.



Medtronic Navigation

World leader in Computer-Assisted Surgery (CAS)

Navigation is viewed by many as the standard of care in Cranial, Spinal and ENT surgeries due to the technology's potential to reduce surgical trauma, allow for smaller incisions, and shorten recovery times.

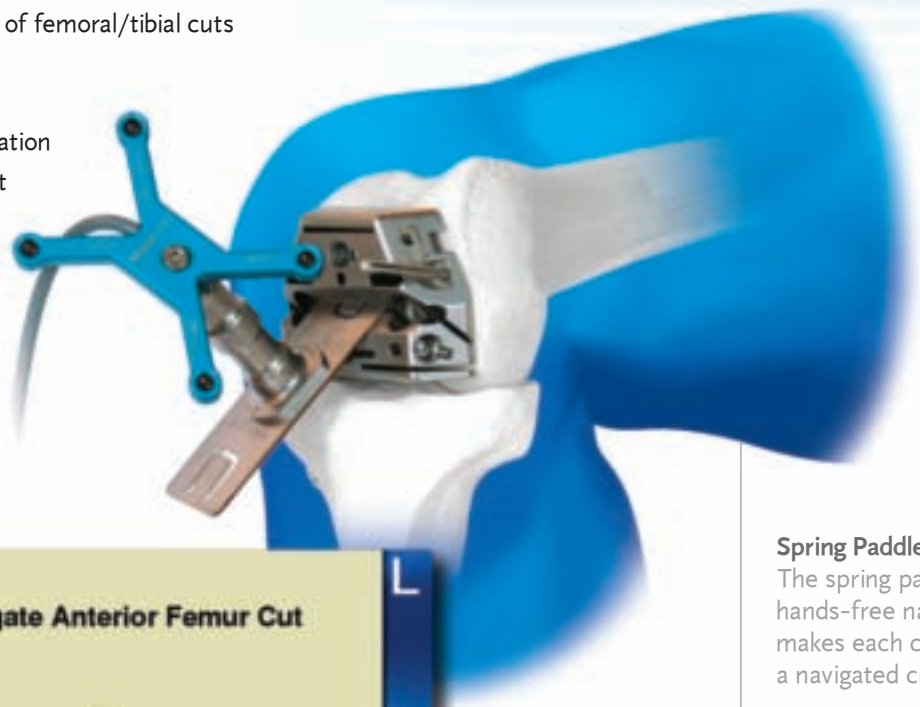
Medtronic Navigation has applied its technology pedigree, clinical expertise, and nearly 15 years of CAS innovation to include the specialty of Orthopaedics for adult joint reconstruction and trauma.

Navigation for Total Knee Replacement

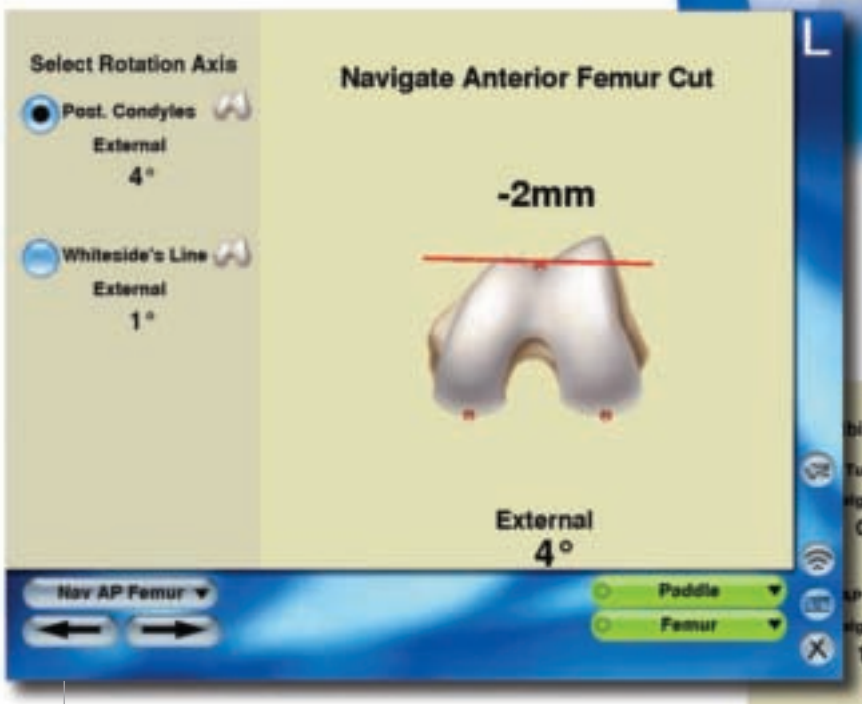
Knee replacement surgeons are increasingly interested in whether computer-assisted navigation can improve their surgical outcomes and, in turn, their volume of patient referrals. Medtronic Navigation provides accurate, real-time data that builds confidence during knee replacement surgery in crucial areas such as location and orientation of femoral/tibial cuts and soft-tissue balancing.

87% of outliers are eliminated by using navigation.[1]

Knee applications by Medtronic Navigation provide highly reliable information that allows the surgeon to select the traditional or minimally invasive surgical technique of his choice.



Spring Paddle Probe
The spring paddle enables hands-free navigation and makes each cutting block a navigated cutting block.



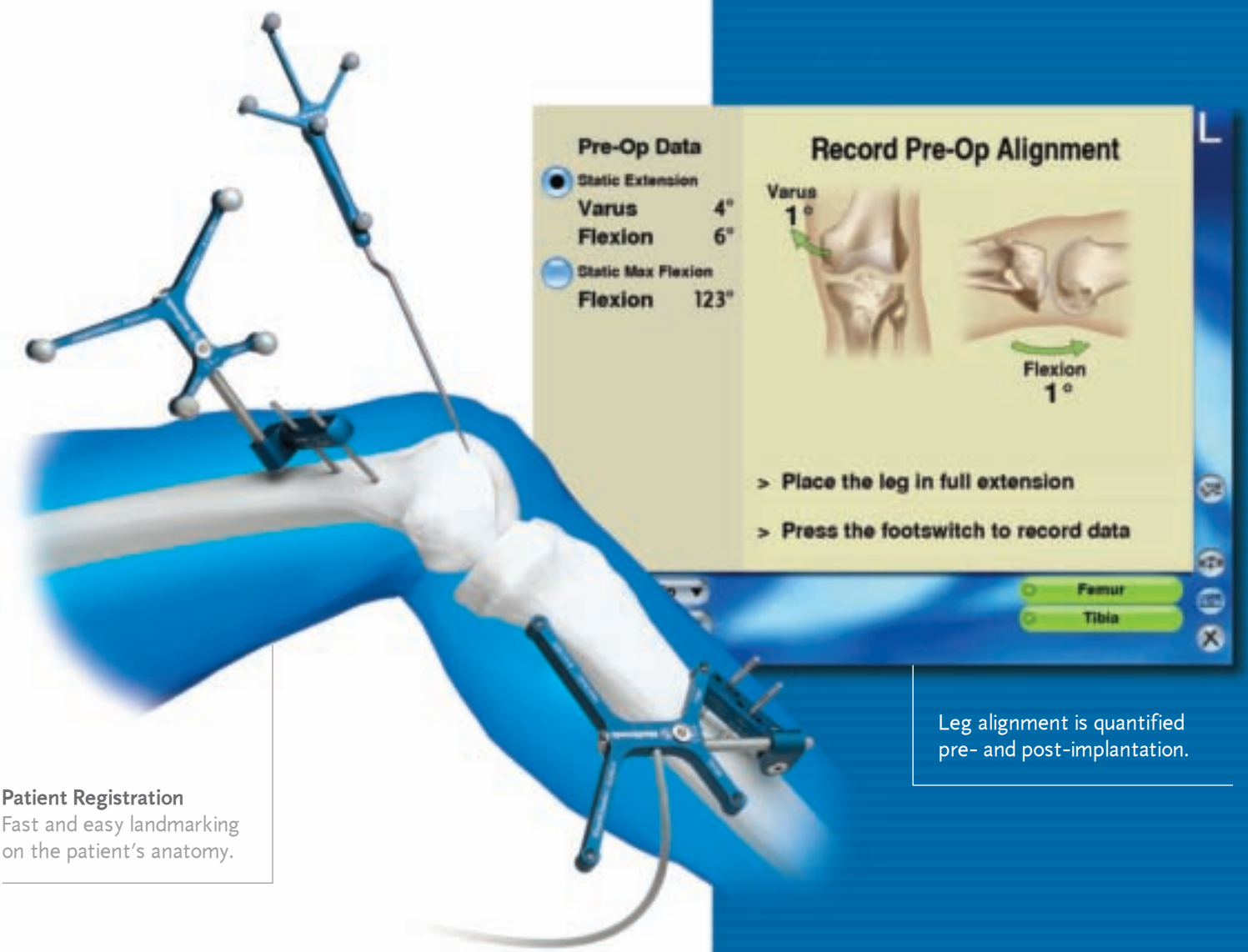
Computer advises surgeon of potential for anterior notching.

How does it work?

- A quick series of anatomical landmarks is captured for patient registration.
- This enables dynamic tracking of surgical instruments relative to the patient's anatomical position.
- Real-time, digital feedback is provided on the angle and resection depth for the femoral and tibial cuts.
- Measurements are provided on soft-tissue balancing and range of motion—both pre- and post-implantation.

Powerful, Real-Time Visualization and Verification:

- Provides real-time data on femoral and tibial cuts: depth and angles
- Feedback on soft-tissue analysis: flexion/extension, varus/valgus stress test, degrees of laxity
- Hands-free cut block alignment
- Accommodates surgeon's preference for implant manufacturer



Patient Registration
Fast and easy landmarking on the patient's anatomy.

Leg alignment is quantified pre- and post-implantation.

Navigation for Total Hip Replacement

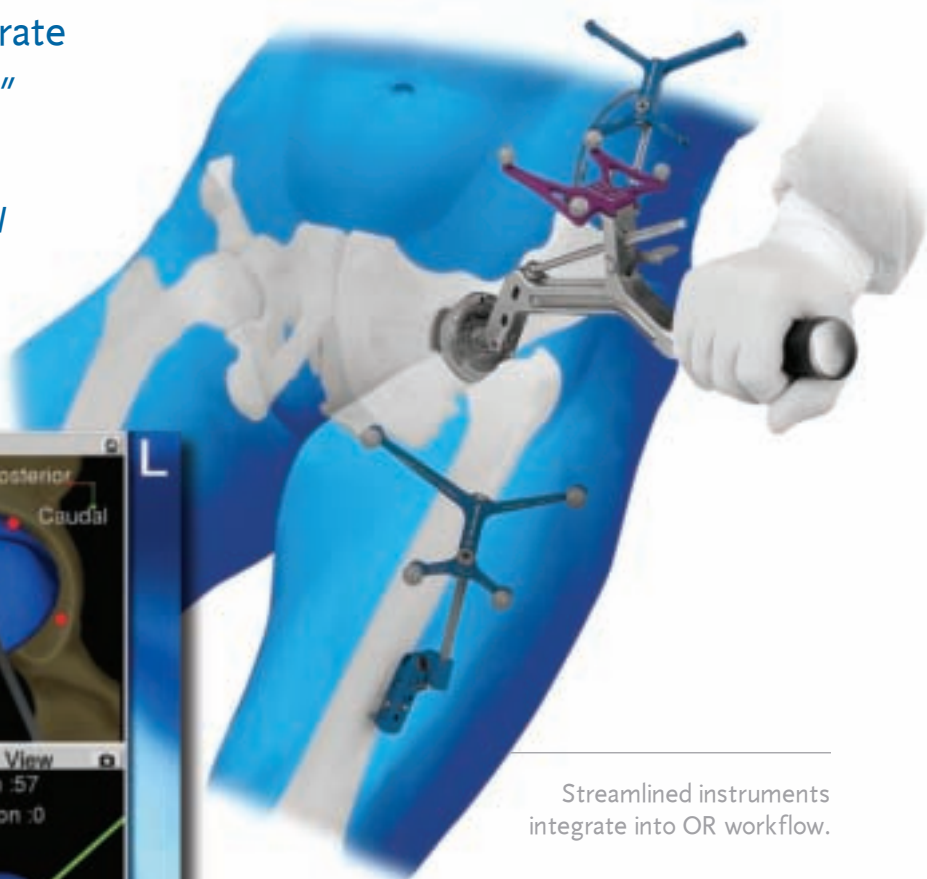
Hip replacement surgeons are increasingly interested in whether computer-assisted navigation can improve their surgical results and, in turn, their volume of patient referrals. Medtronic Navigation provides accurate, real-time data that builds confidence during hip replacement surgery in crucial areas such as acetabular cup position, leg length, and offset.

How does it work?

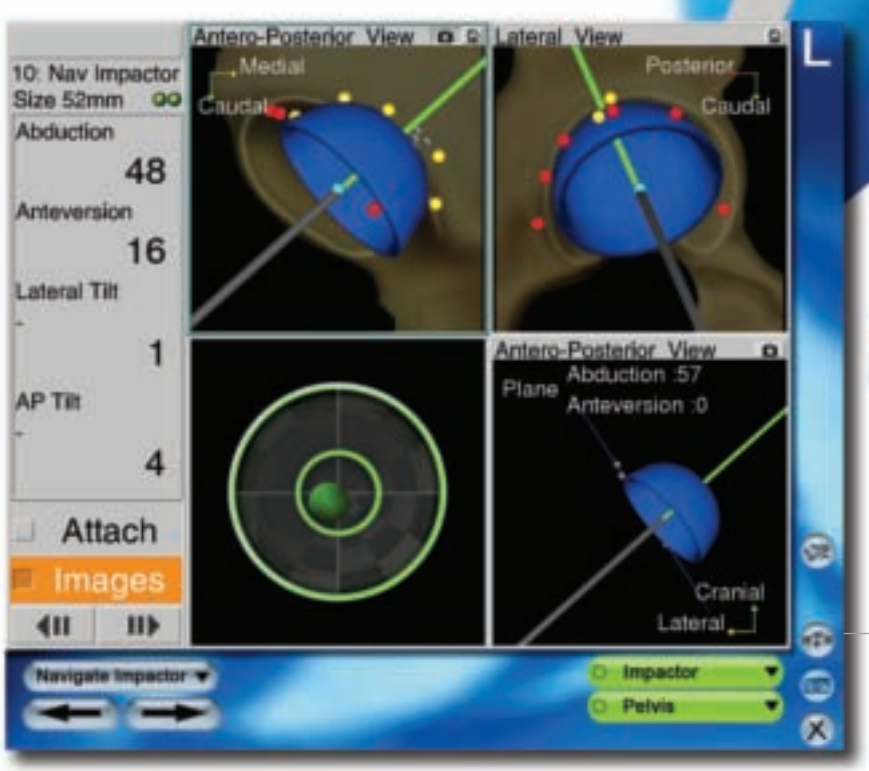
- A quick series of anatomical landmarks is captured for patient registration (only four landmarks).
- This enables dynamic tracking of surgical instruments relative to the patient's anatomical position.
- Real-time, digital feedback is provided on the abduction and anteversion angles of the cup reamer and cup impactor.
- Measurements are provided on leg length and offset—both pre- and post-implantation.

"The ability to measure leg length while in the OR is the key factor that convinced me to try and then incorporate computer navigation into my practice."

—James B. Stiehl, MD, orthopaedic surgeon, Columbia St. Mary's Hospital, Milwaukee, WI



Streamlined instruments integrate into OR workflow.

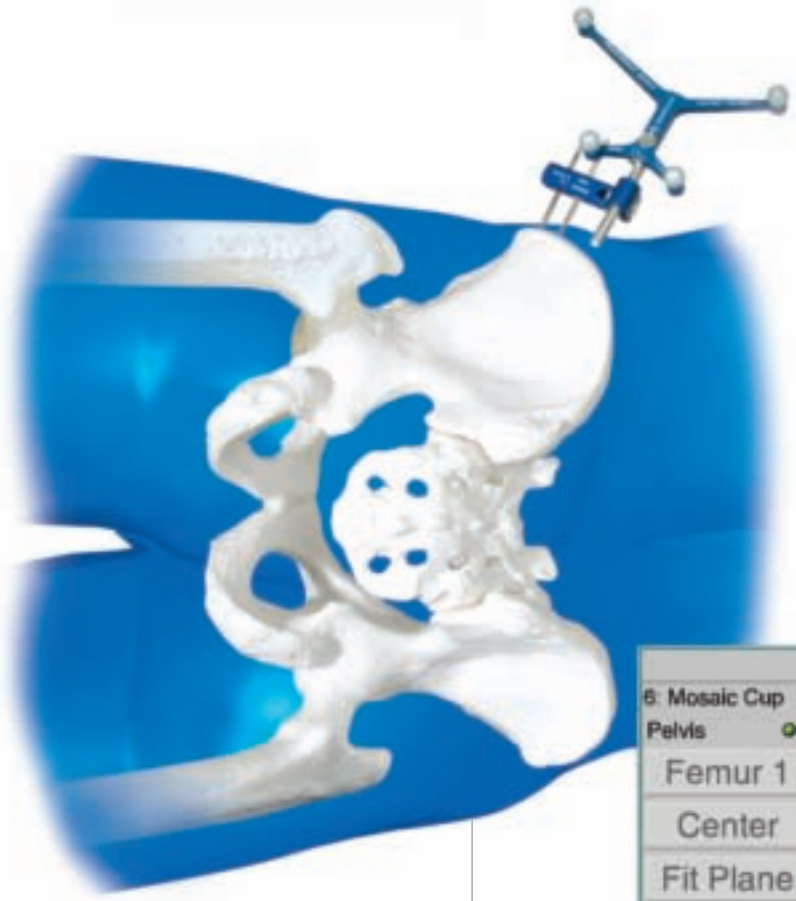


The cup impactor is navigated to the exact abduction and anteversion values desired by the surgeon.

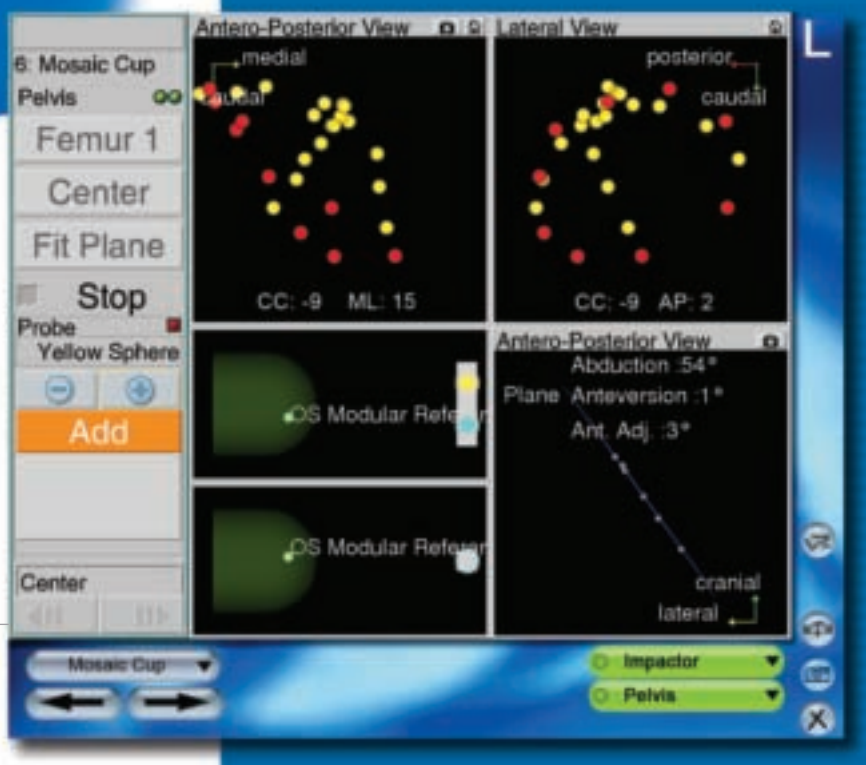
With just four landmarks and 10 minutes, you gain valuable implant alignment.

Powerful, Real-Time Visualization & Verification:

- Provides real-time data on acetabular cup positioning for cup reaming and insertion
- Outline of cup size and depth is patient-specific
- Adjusts for patient's pelvic tilt
- Includes leg length and offset information
- Accommodates surgeon's preference for implant manufacturer



Real-time reamer depth and translation information.



Patient-specific data increases surgeon's ability to deliver successful outcomes.

Differentiate Your Practice with AxiEM™ Electromagnetic Navigation

Competitive Advantage

Breakthrough

The Innovation

For years, electromagnetic tracking had been an elusive goal for the medical world. What was the key to harvesting this millimeter-accuracy technology used in the military and other industries in a way that enhances patient care? Many companies had attempted—without success—to resolve metal interference issues that warped the electromagnetic waves. **Until now.**

*More than 1,000 successful patient cases conducted using AxiEM navigation technology.**

"The advent of electromagnetic technology in navigation allows surgeons to conduct minimally invasive surgeries with great confidence...we are visually guided so that we can accurately place a large prosthesis through a small incision."

—David Lionberger, MD,
Methodist Hospital, Houston, TX

AxiEM solutions are available on the portable iNAV™ and the StealthStation® TREON®.

* Cranial, Spinal, ENT, and Orthopaedic procedures.

How does it work?

- Small trackers are affixed to the patient's anatomy subcutaneously to track location.
- An electromagnetic field is generated by a hand-held localizer.
- Position sensors on smart instruments localize within the magnetic field in relation to landmarks on the patient.
- The technology is similar to satellite navigation where a satellite emits time signals and a target position is triangulated.

Medtronic Navigation is leading the industry with the first available AxiEM™ electromagnetic system for total knee replacement.

Accurate and reproducible limb and implant alignment.

Miniaturized AxiEM patient tracker is about the size of a dime.

Medtronic and Zimmer, Your Partners in Technology.

Powerful Visualization Tool

- Simple patient registration using physical landmarks and kinematics
- Real-time data on femoral and tibial cuts with Zimmer guides: location, slope, depth, angles
- Quantified soft-tissue analysis: flexion/extension, varus/valgus stress test, degrees of laxity

With trials in place, surgeons can compare patient's soft tissues for quantitative analysis.

AxiEM navigation for Zimmer MIS™ techniques provides real-time data of key steps such as tibial resection.

Reference trackers are placed subcutaneously within Zimmer MIS™ incisions and enable continual localization and data to the surgeon.

Easy to Use

- Hands-free cut block alignment
- Small reference frames fit easily into Zimmer MIS™ incisions
- Integrated instrumentation and software for existing Zimmer MIS™ knee techniques
- Seamless integration into OR

Medtronic Navigation's AxiEM Electromagnetic Intellectual Property:

5,592,939	EM Navigation
5,913,820	Position Localization System
6,104,944	System & Method for Navigating a Multiple Electrode Catheter
6,235,038	Translation EM to Localization
6,347,240	Disarticulating Tracking
6,374,134	Simultaneous Display During Surgical Navigation
6,381,485	EM Registration
6,402,762	Translation EM to Localization
6,434,415	Disarticulating Tracking
6,474,341	Wireless EM Sensors
6,493,573	Immunizing Electromagnetic Localization
6,499,488	Reference Frame for EM
6,516,212	Three Dimensional Mapping of Anatomical Structures
6,522,907	Surgical Navigation
6,636,757	Method and Apparatus for EM Navigation of a Surgical Procedure Near Metal Object
6,701,179	Navigation Coil Structure
6,747,539	Patient-Shielding and Coil System
6,757,557	Position Location System

More patents pending.

World's First

Miniaturized
Instrumentation

Clinical Benefit

CASES for MIS

Medtronic and Zimmer, Your Partners in Technology

Surgeons and institutions that use Zimmer implants can be confident that Medtronic Navigation solutions provide unique value to Zimmer surgical techniques. Whether surgeons are performing conventional, mini-incision, or minimally invasive procedures, the Medtronic Navigation/Zimmer partnership ensures that an optimal navigation solution is available.

Key benefits for Zimmer-specific knee navigation include:

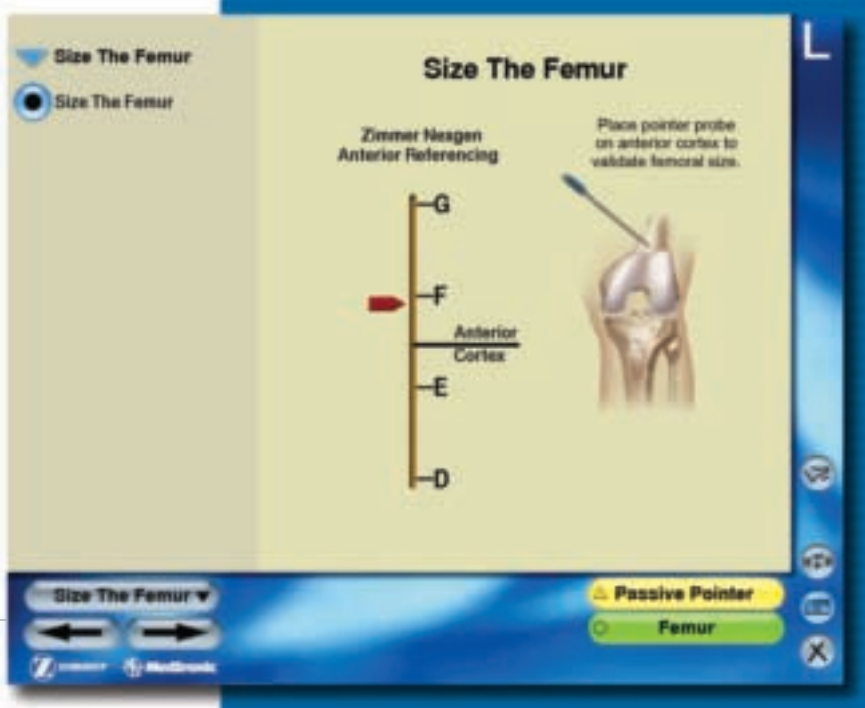
- Establishes anatomic registration using physical landmarks
- Enables intra-operative planning for implant size
- Provides real-time data on femoral and tibial cuts: depth and angles
- Provides feedback on soft-tissue analysis: flexion/extension range, varus/valgus stress test
- Includes navigated tibial sizing tray
- Offers hands-free cut block alignment

Customized and fully integrated navigation solutions for Zimmer knee implant users:

- NexGen™ Knee
- Natural Knee II™
- Innex/Omnia Knee™
- AxiEM™ for Zimmer MIS™ Knee

Don't wait for the x-ray. Know you're accurate in the OR.

Navigated Tibial Size Plate
Navigating the Zimmer tibial size plate provides key rotational data to the surgeon for placement of the tibial component.



Zimmer® NexGen Imageless Knee Navigation

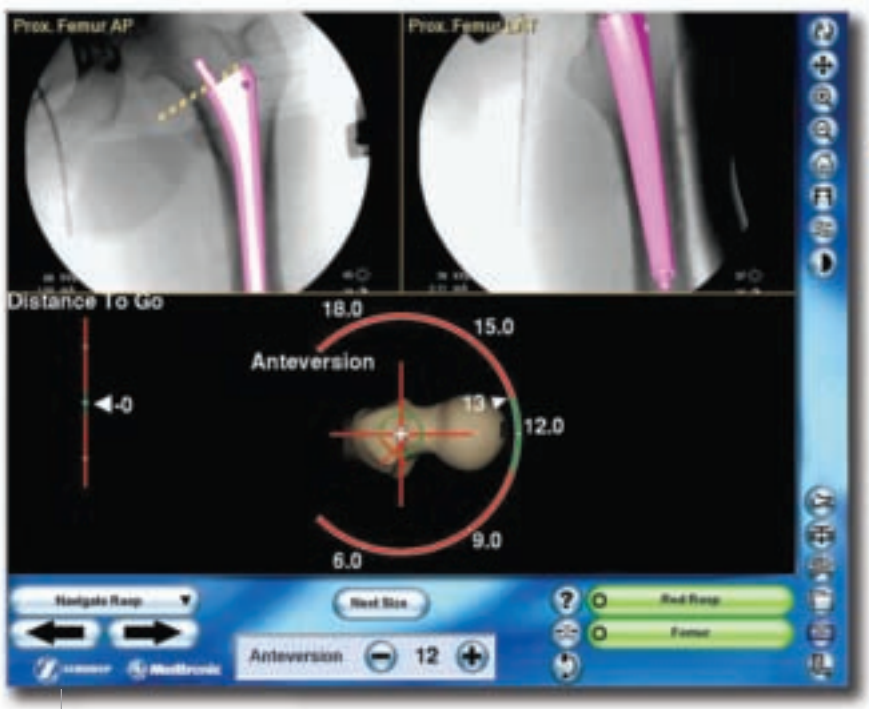
Zimmer MIS™ surgical techniques are complemented by navigation solutions from Medtronic with real-time visualization and verification.

Key benefits for Zimmer-specific hip navigation include:

- Establishes kinematic registration using physical landmarks
- Provides real-time data on acetabular cup positioning for cup reaming and insertion
- Provides outline of cup size and depth is patient-specific
- Adjusts for patient's pelvic tilt
- Includes leg length and offset information
- Stem navigation—depth, version, fit and fill

Customized and fully integrated navigation solutions for Zimmer hip implant users:

- Trilogy®
- Versys®
- Converge®
- Alloclassic®
- Pressfit™, Fitmore®
- ACA™, CLS™
- MIS™ 2-incision™ Hip surgical technique



Zimmer® MIS™ 2-incision™ Hip Navigation

Zimmer® custom miniaturized instruments to perform an AxiEM-navigated MIS™ knee.

The OrthoNav™ Trauma Suite

Medtronic Navigation offers an advanced alternative specifically designed for orthopaedic trauma surgeons. The Medtronic Navigation Trauma solution:

- Achieves fast, first-pass accuracy for screw placement with real-time manipulation of optimal tool angle and distance alignment
- Provides surgeons with quantified navigation data for the treatment of fracture reductions and stabilizations
- Captures precise measurements through navigation of virtual tool tip for display of length and diameters and eliminates the need to estimate or template implants and screws

Decrease radiation exposure

Image-Guided positioning of distal locking nail

Real time location of bone segments to aid in fracture reductions

The OrthoNav Trauma solution covers an array of procedures:

- Complex pelvic fracture
- Femoral neck fractures
- Long-bone fracture reduction
- IM nailing

"The addition of navigation to my trauma workflow optimizes instrument visualization and precision, while decreasing the radiation exposure to my patients, my staff and myself." [2,3]

—Prof. Meir Liebergall, MD, Hebrew University, Hadassah, Israel

Navigation On-Demand

The StealthNavigator℠ on-demand program was designed to enable the delivery of CAS technology to all patients and reduce logistical barriers for sites needing fast access to the technology. The procedure-based program provides you with:

Fee Per Use:

- The ability to pay as you go
- Elimination of time-consuming capital equipment appropriation approvals

Simplicity:

- An on-site CAS Specialist to support OR staff and surgeons
- Complete Service Package provides the ability to simplify logistics for OR staff and improve OR throughput
- Full procedure assistance including technical support, training, installation and service

Reduction of Risk and Costs:

- Provides the ability to obtain advanced CAS solutions at minimal upfront cost
- Typically reduces the risk and cost associated with technology obsolescence and equipment wear and tear
- The latest technology and software features are always available to the surgeon
- Maintains highest level of support to offset OR staff turnover

"As surgeons, we strive each and every day to achieve optimal surgical outcomes to increase the probability that our patients can golf, dance, and push their grandchildren around on bicycles."

—James B. Stiehl, MD, orthopaedic surgeon, Columbia St. Mary's Hospital, Milwaukee, WI

Promote Your Business

By choosing Medtronic, you're gaining a business partner.

You're backed by our market presence, financial stability, investment in research and development, diversity of product portfolio, and innovation leadership.

We understand the reality of today's healthcare environment where clinical value must translate into profitability.

Hospitals and surgeons are feeling the competitive and financial pressures to:

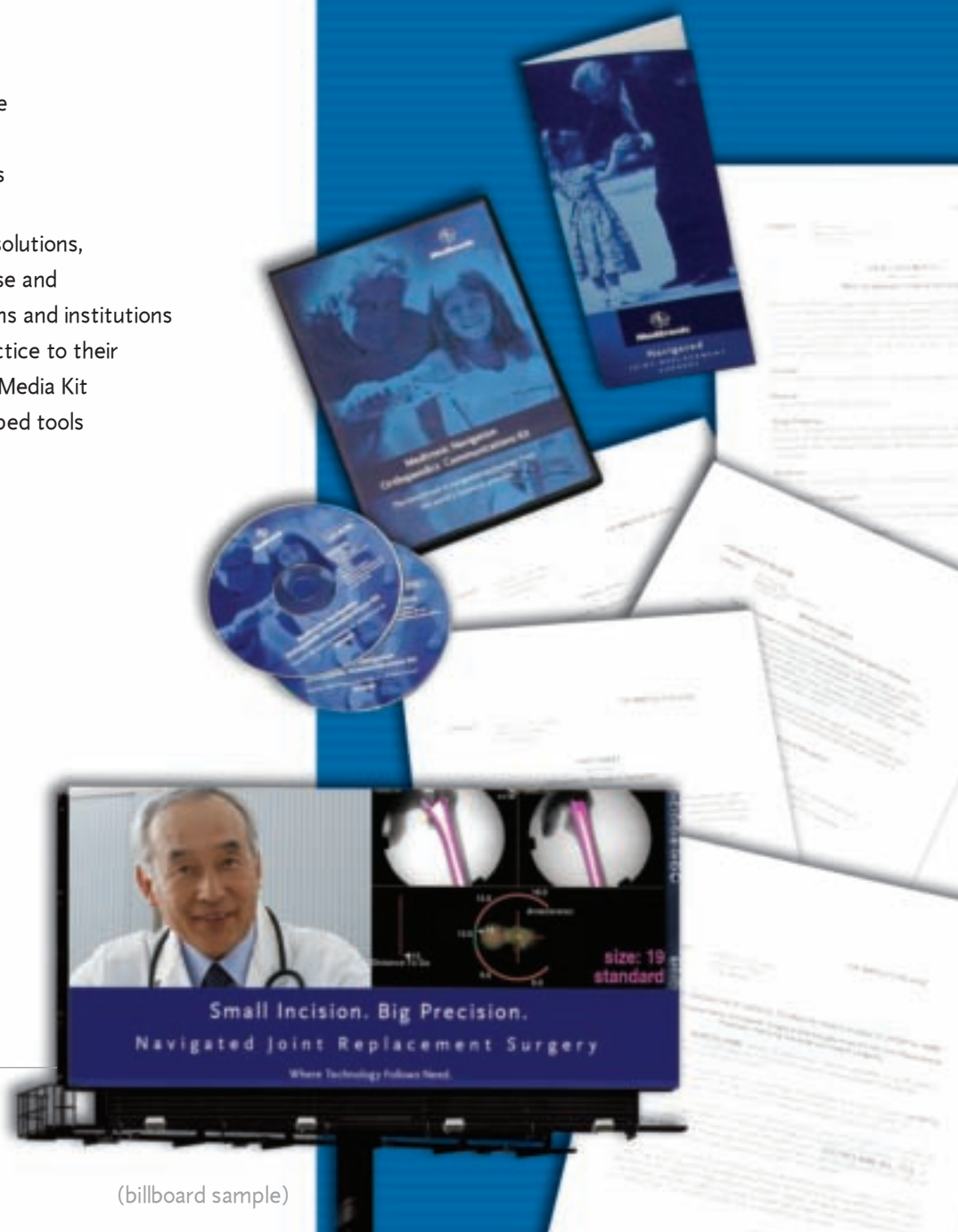
- Increase referrals and grow patient base
- Enhance image and be a community resource
- Maximize patient throughput
- Expand effective communications campaigns

In addition to providing clinically relevant CAS solutions, Medtronic Navigation offers marketing expertise and communications tools designed to help surgeons and institutions promote their navigated joint replacement practice to their target markets. We offer a Hospital Marketing Media Kit that contains a variety of professionally developed tools to help institutions realize their business goals:

- A step-by-step Communications Guide
- Patient education/PCP referral brochures
- Templates for press releases
- Advertising concepts
- Web site copy and imagery
- B-roll for television or video productions

The innovation doesn't stop here...Please contact your local Medtronic representative to learn about additional surgical solutions in development, including:

- ACL reconstruction
- Hip re-surfacing



Hospital Marketing Media Kit

(billboard sample)

"We have patients now that come in who have explored this topic on the Internet. So the public is becoming much more aware of the accuracy the computer can provide...it is actually bringing patients into our practice looking for this type of technology."

—Alfred Tria, MD,
St. Peter's Hospital, New Jersey

References:

1. *Image-Based Computer-Assisted Total Knee Arthroplasty Leads to Lower Variability in Coronal Alignment.* J. Victor, MD, D. Hoste, MD, Clinical Orthopaedics and Related Research Number 428, pp. 131-139

2. *First generation of fluoroscopic navigation in percutaneous pelvic surgery.* Mosheiff R., Khoury A., Weil Y., Liebergall M. (2004), J Orthop Trauma. 18(2):106-111.

3. *Using computerized fluoroscopic navigation to remove pelvic screws.* Weil Y., Liebergall M., Khoury A., Mosheiff R. (2004), Am J Orthop. ;33(8):384-385.

STEALTHSTATION®
Treatment Guidance System

Rx only

Medtronic
Alleviating Pain · Restoring Health · Extending Life

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