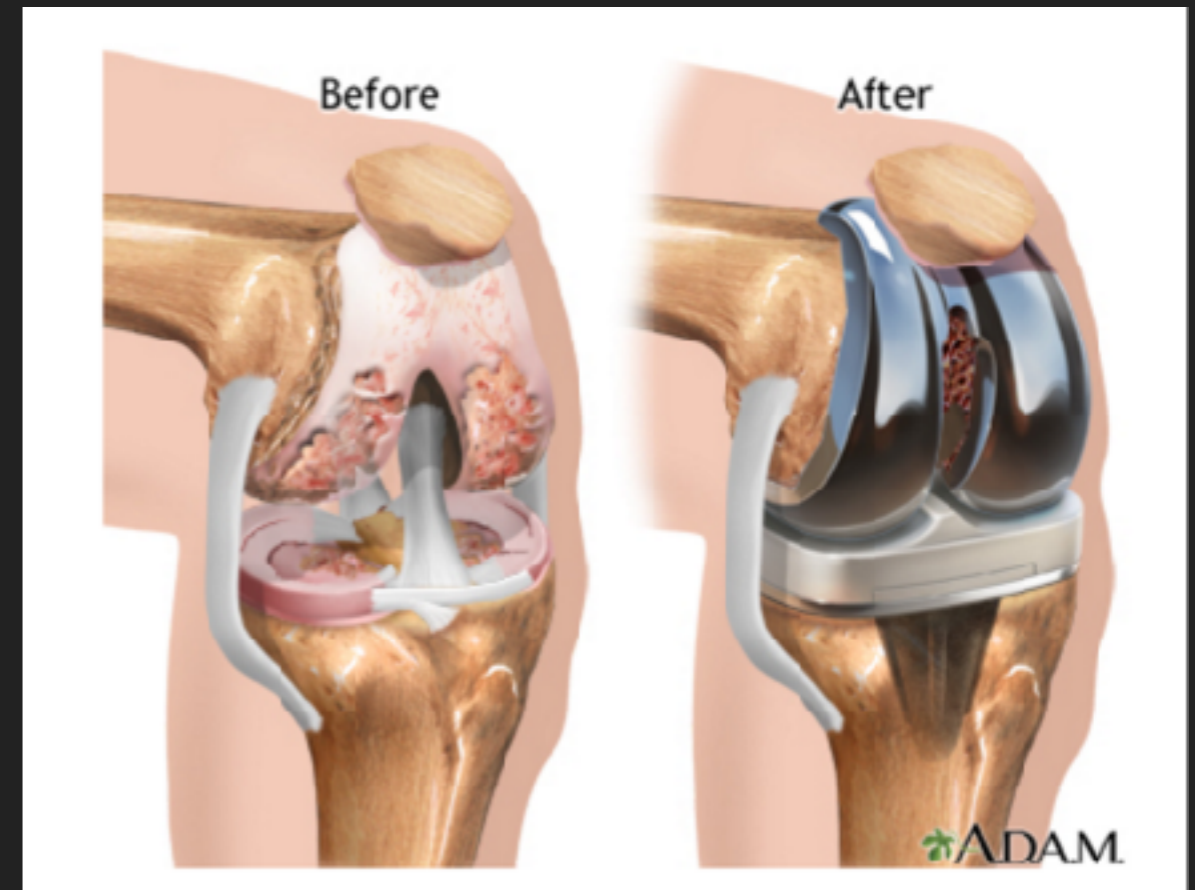


SENSOR-ASSISTED TOTAL KNEE ARTHROPLASTY

MARTHA KALISZ

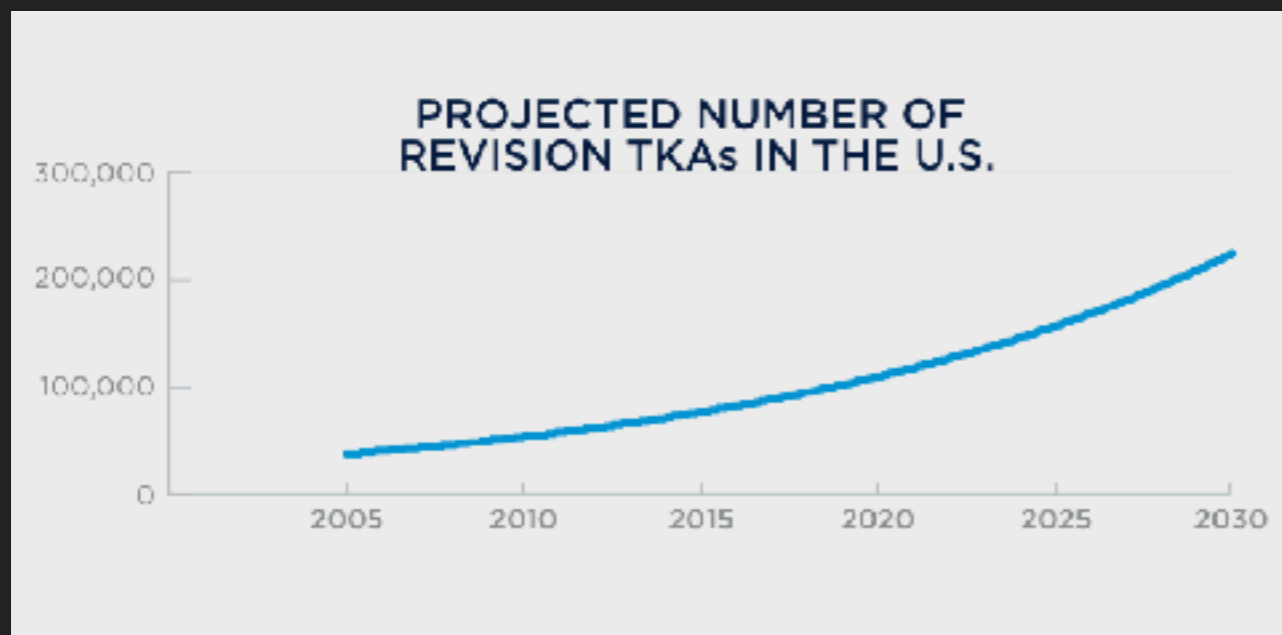
TOTAL KNEE ARTHROPLASTY PROCEDURE

- ▶ Purpose: decrease pain, optimize movement
- ▶ Resurface femur, tibia, patella
- ▶ Position implants, spacer
 - ▶ Temporary implant for size
- ▶ Balance joint*
- ▶ Insert permanent implants



TKA STATS

- ▶ 14th most common inpatient procedure in 2009
- ▶ 719,000 TKAs each year, \$15,000 per procedure
- ▶ 54,000 revisions performed each year, \$73,000 per procedure



- ▶ 12-13% annual TKA revision rate
- ▶ Revision expected inc: 37,544 (2005) - 56,918 (2030)

REASONS FOR KNEE REVISION

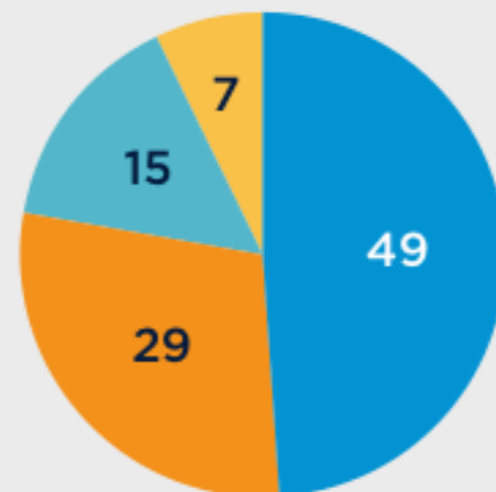
- ▶ Polyethylene wear
- ▶ Loosening
- ▶ Instability
- ▶ Infection
- ▶ Arthrofibrosis
- ▶ Malalignment/Malpositioning
- ▶ Extensor mechanism deficiency
- ▶ Avascular Necrosis - patella
- ▶ Periprosthetic fracture
- ▶ Isolated patellar resurfacing

CAUSES FOR KNEE REVISION

- ▶ Coronal instability
- ▶ Coronal/sagittal instability (combined)
- ▶ Global instability
- ▶ Flexion instability

FREQUENCY OF REQUIRED SURGICAL CORRECTIONS

- Soft Tissue Releases
- Bone Cuts
- Liner Thickness
- Tibial Rotation



STUDY BY KIM ET AL

- ▶ Population: 39 pnts; TKA revision due to stiffness
 - ▶ "Stiffness" - ROM $<90^\circ$ or flex contracture $>10^\circ$ 3mo
- ▶ Purpose: review outcome of TKA revision due to stiffness to find predictors of failure to gain ROM post-revision

STUDY BY KIM ET AL RESULTS

▶ Pre-revision Averages

- ▶ ROM: 67° (range 0-110°)
- ▶ Flex contracture: 12° (0-40°)
- ▶ Knee Society Score (KSS): 45.7 (19-86)
- ▶ Functional score: 41.8 (5-90)

▶ Post-operative Averages

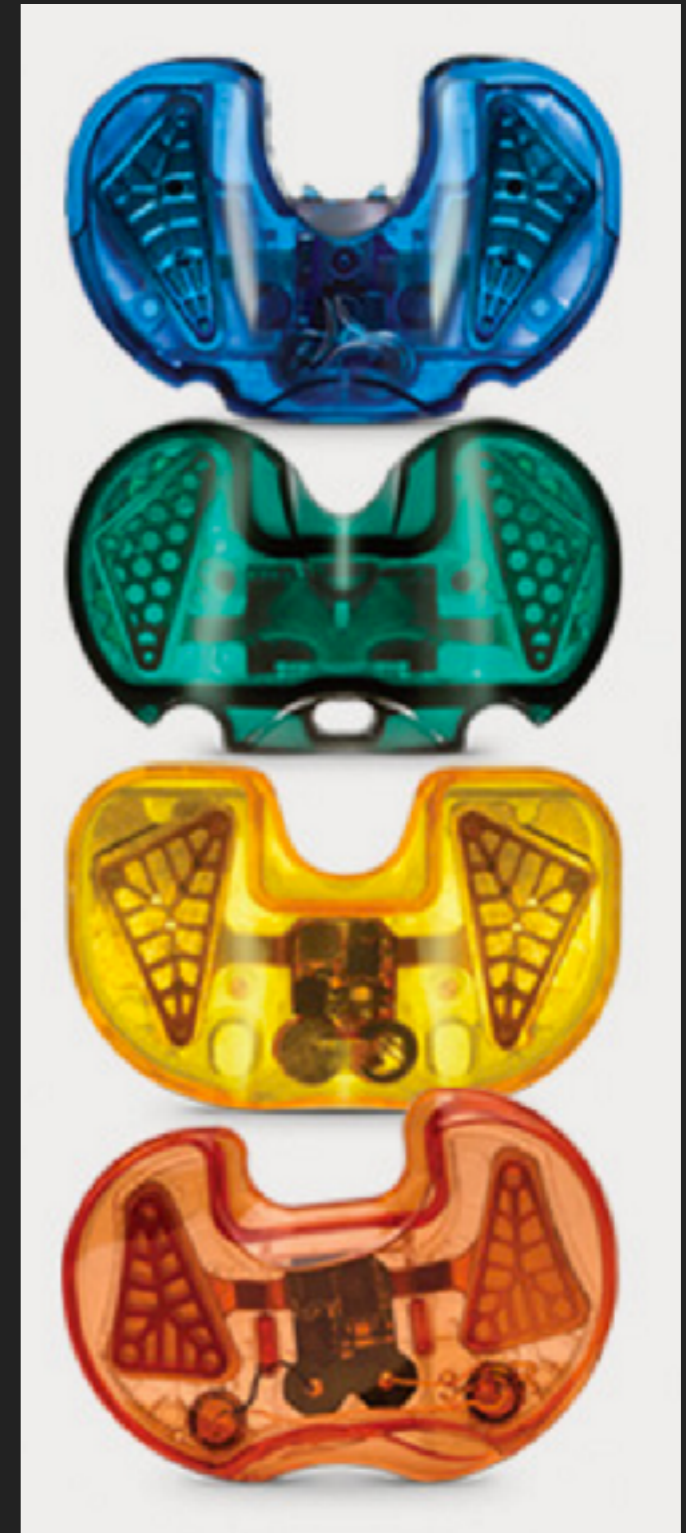
- ▶ ROM: 85° (range 10-120°)
- ▶ Flex contracture: 6° (0-30°)
- ▶ Knee Society Score (KSS): 67.9 (10-100)
- ▶ Functional score: 62.9 (0-100)

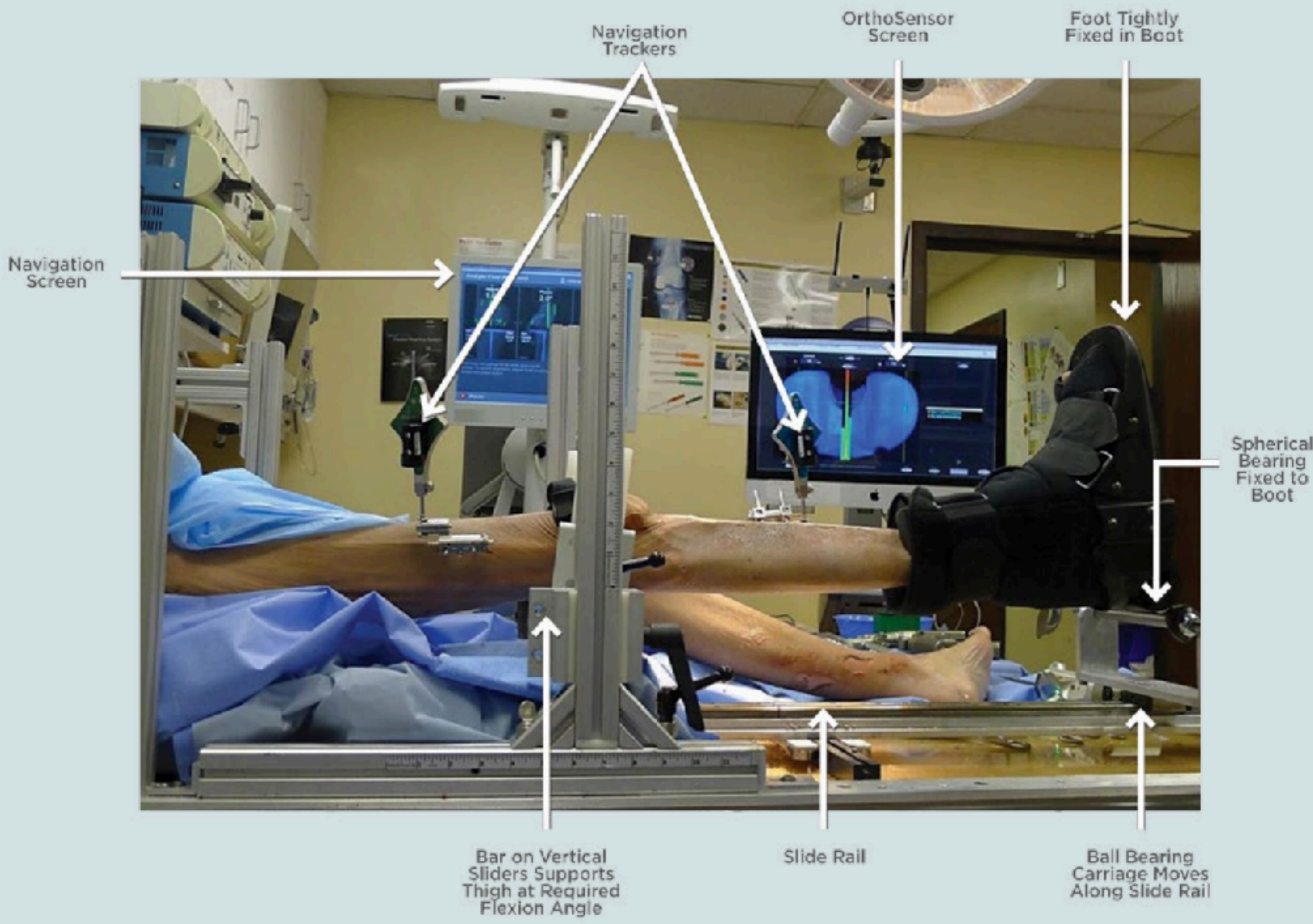
49% REVISION FAILURE

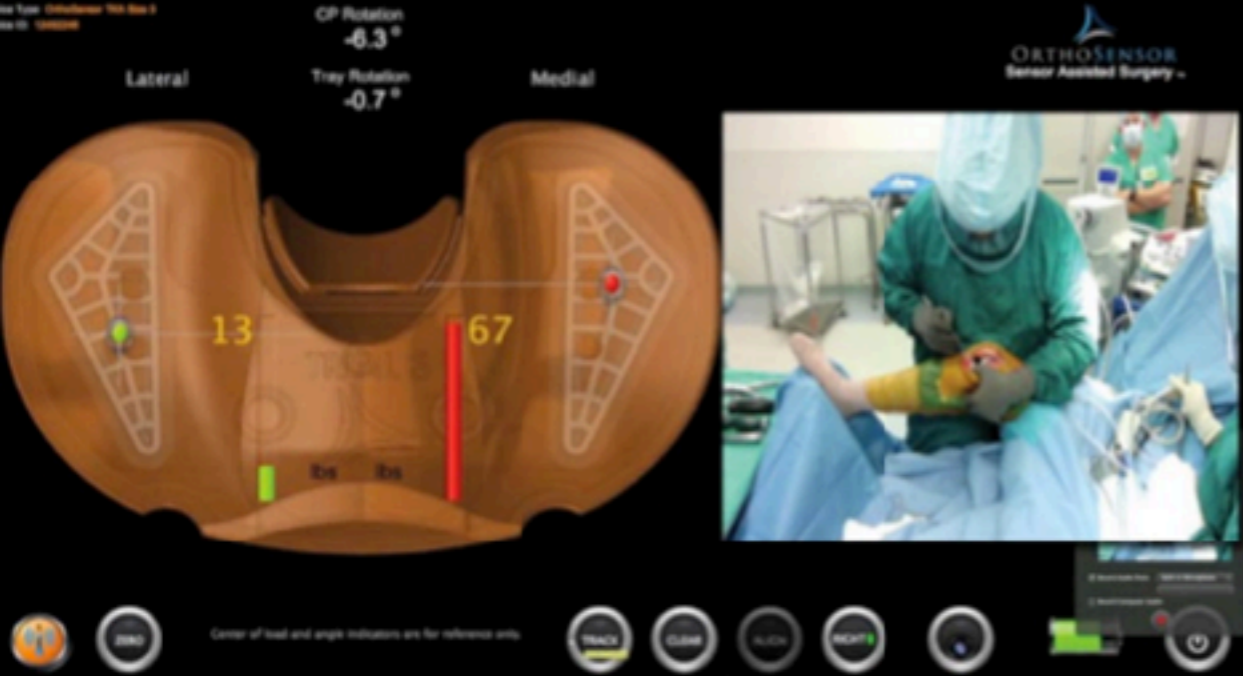
- ▶ Unpredictable

VERASENSE™ BY ORTHOSENSOR

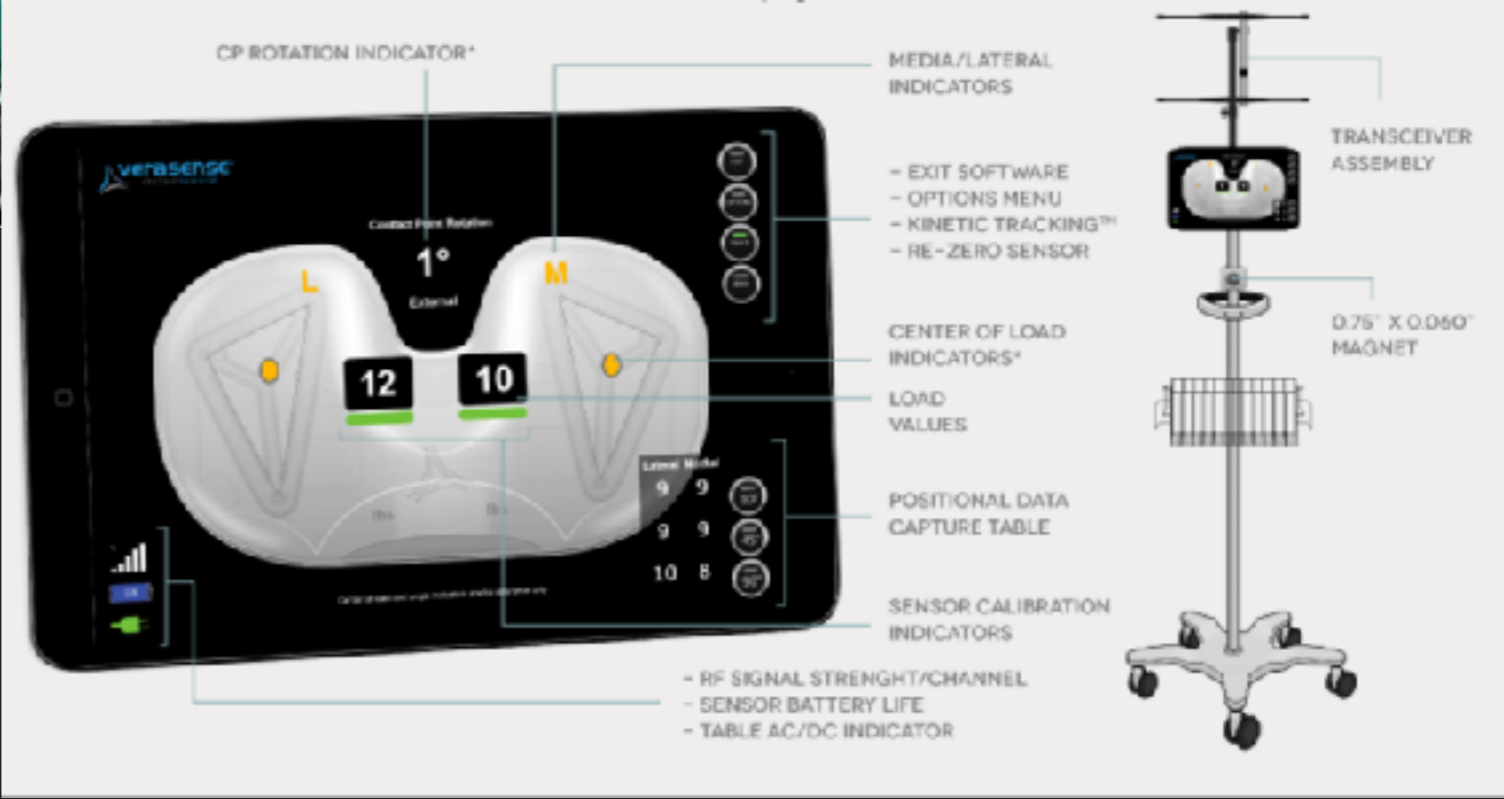
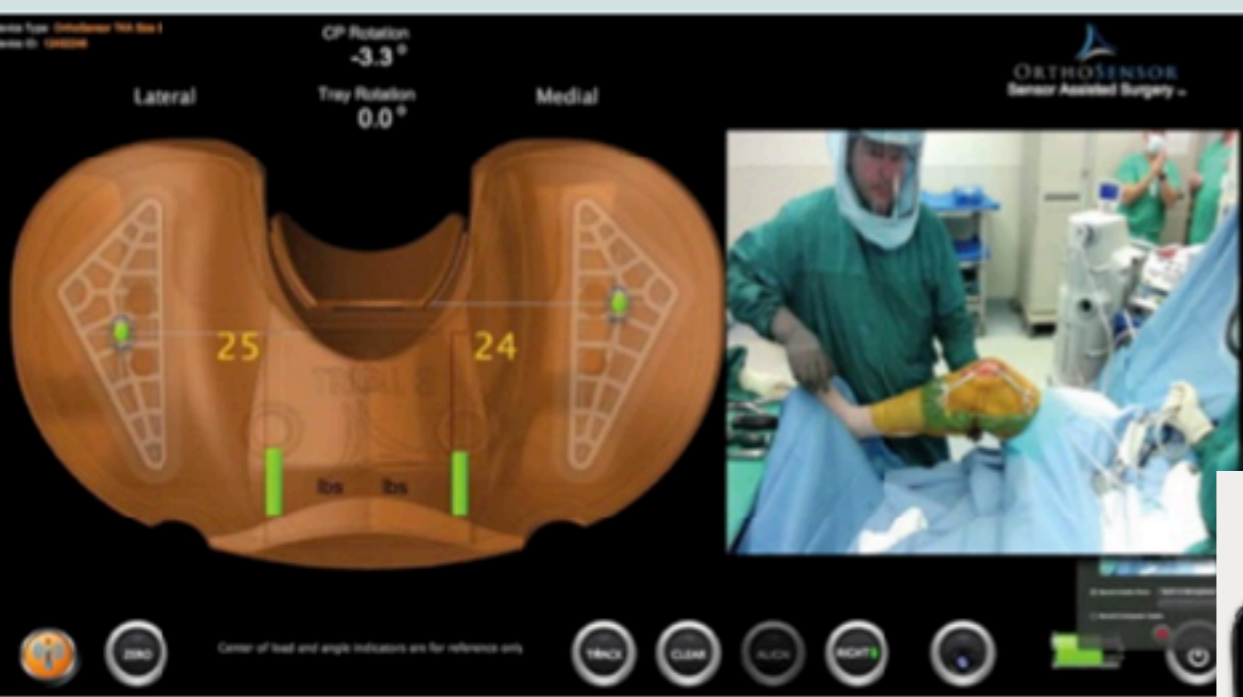
- ▶ Ligament balance quantification system
- ▶ Sensor and intra-operative monitor
- ▶ Real time information
 - ▶ Soft tissue release
 - ▶ Implant position
- ▶ Soft tissue balance, tibio-femoral congruency and implant position
- ▶ Disposable





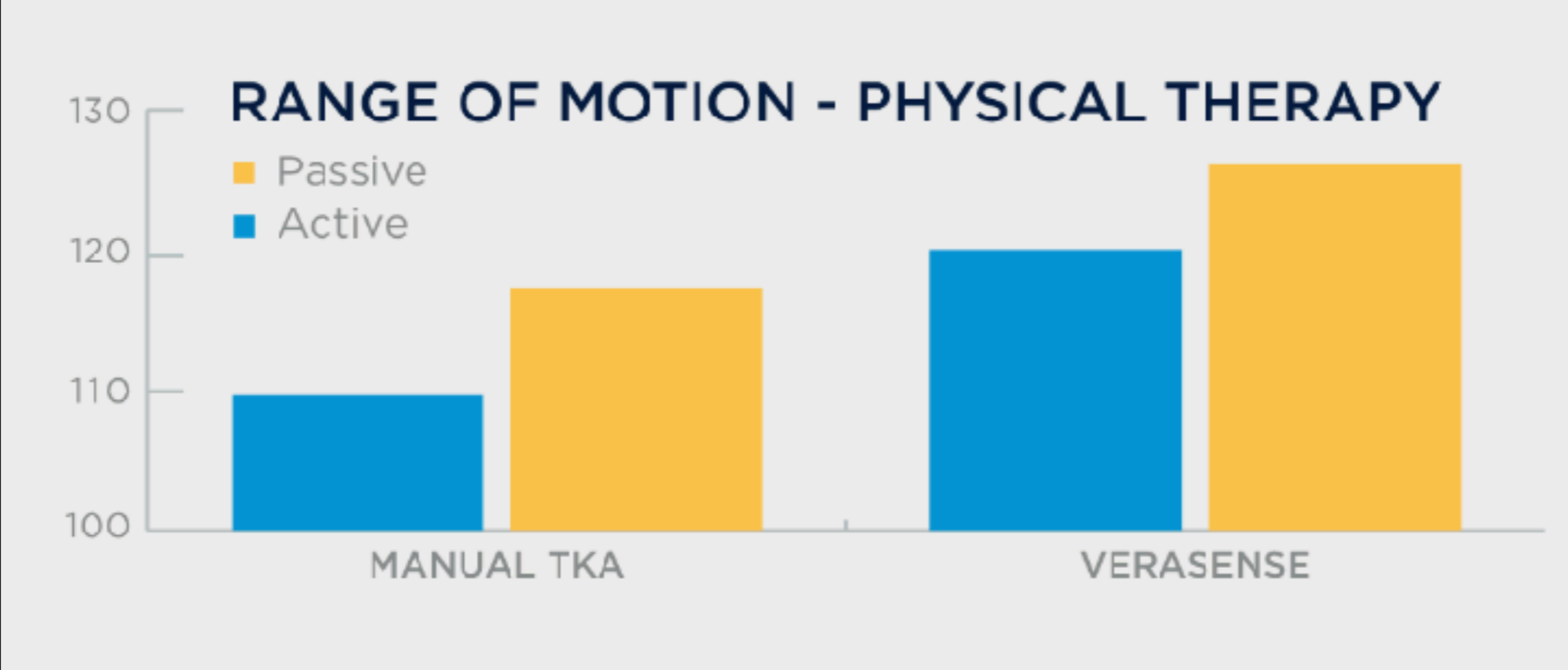


Pre-Release



- RF SIGNAL STRENGTH/CHANNEL
- SENSOR BATTERY LIFE
- TABLE AC/DC INDICATOR

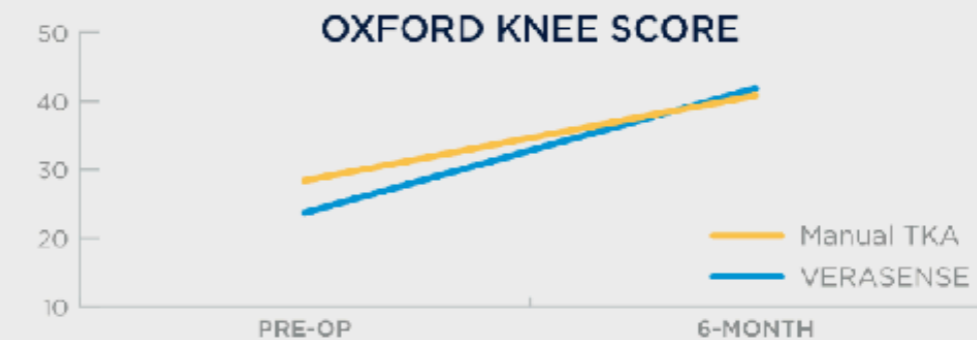
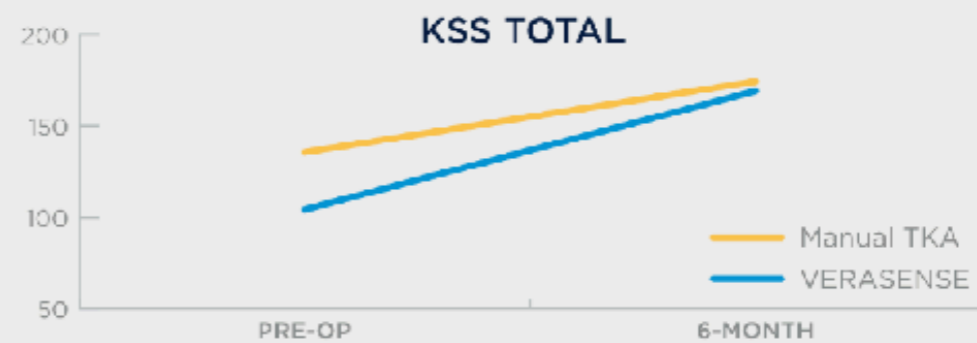
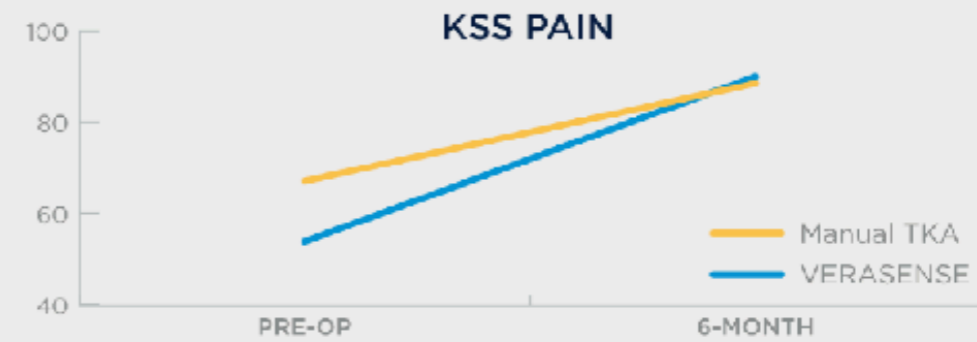
30 DAY OUTLOOK



SENSOR-ASSISTED TOTAL KNEE ARTHROPLASTY

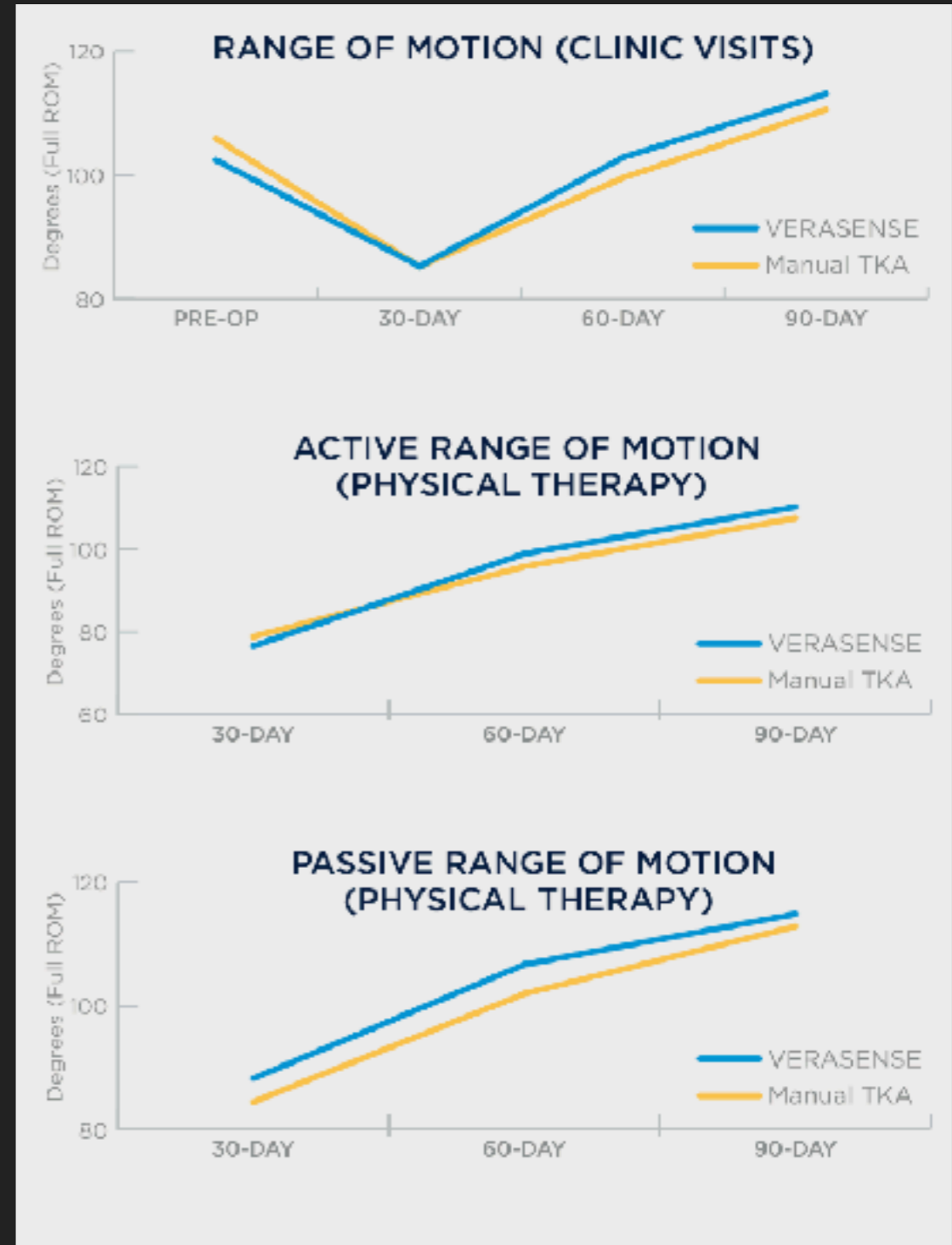
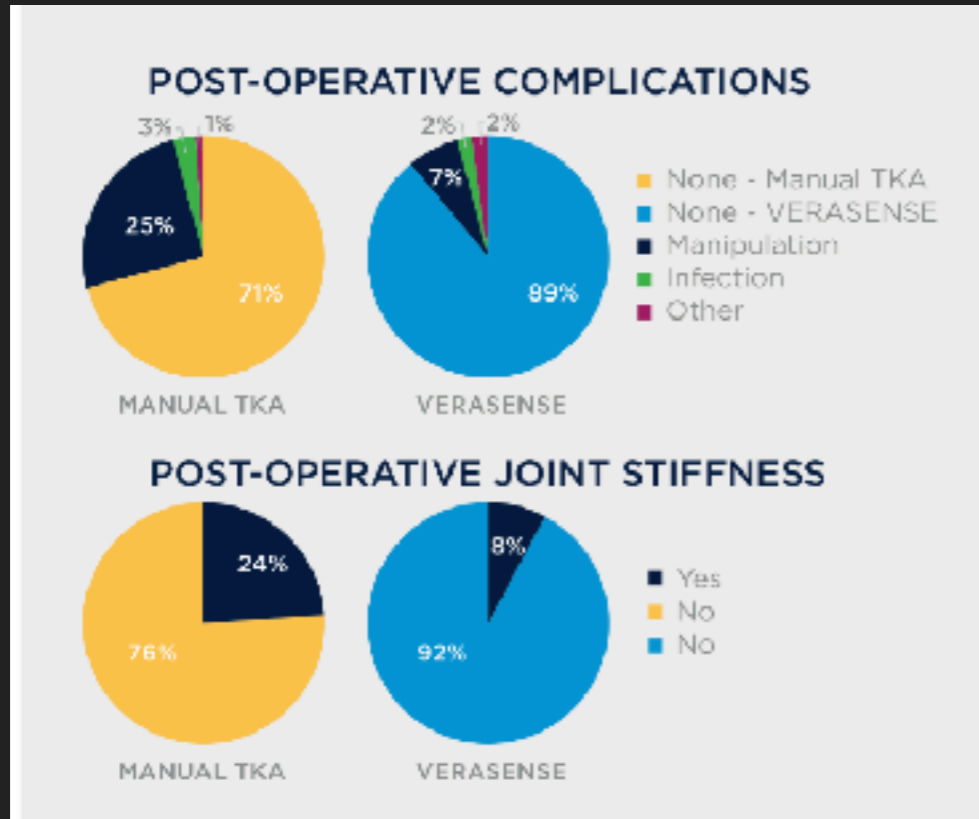
IMPROVEMENT RATE OF VERASENSE GROUP (TIMES FASTER THAN MANUAL TKA)

KSS Pain	1.69
KSS Function	1.66
KSS Total	1.68
Oxford Knee Score	1.5



SENSOR-ASSISTED TOTAL KNEE ARTHROPLASTY

90 DAY OUTLOOK



	MANUAL TKA	VERASENSE	P-VALUE
Pre-Operative Range of Motion	105.7	102.4	0.214
Pre-Operative KSS Function	55.5	48.1	<0.001
Post-Operative Stiffness	24	8	0.002
Post-Operative Complications	29	12	0.002
Surgical Interventions within 90 Days	25	10	0.004

SENSOR-ASSISTED TOTAL KNEE ARTHROPLASTY

PATIENT SATISFACTION

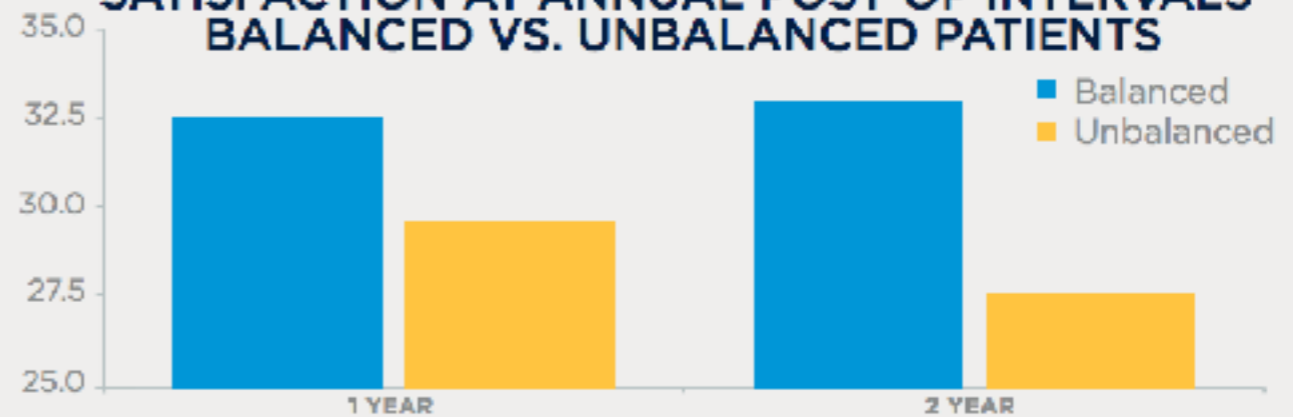
PRIMARY TKA PATIENTS REPORTING SATISFACTION

Average Patient Satisfaction Reported in Literature 81%
 (Brown-Forsythe=3.048; homogeneity <0.001; df=11)

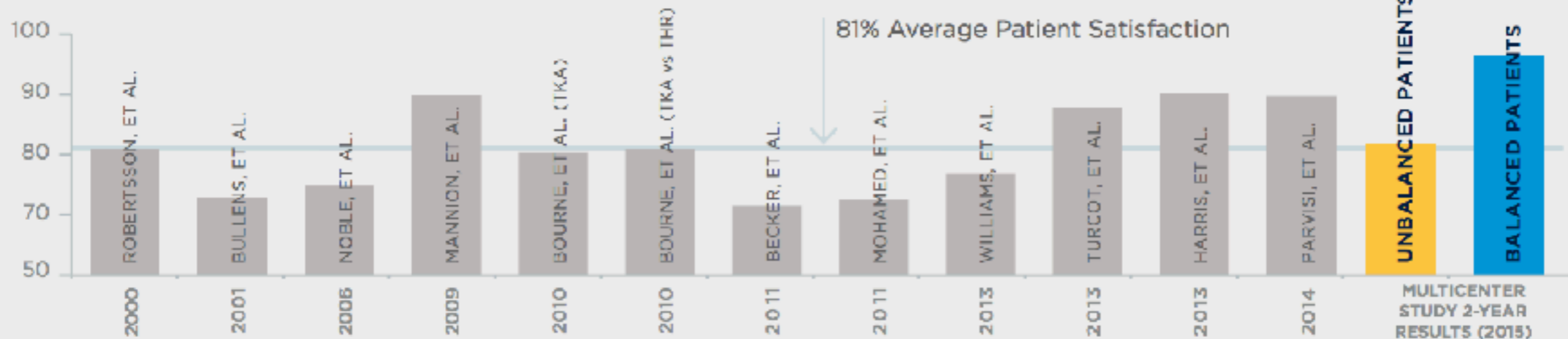
Sensor-Assisted Patients Exhibiting Balance 97%

P < 0.001

SATISFACTION AT ANNUAL POST-OP INTERVALS BALANCED VS. UNBALANCED PATIENTS



PATIENT-REPORTED SATISFACTION: "SATISFIED" TO "VERY SATISFIED" COMPARISON TO LITERATURE



TOTAL KNEE ARTHROPLASTY ECONOMICS

- ▶ 12-13% annual TKA revision rate
 - ▶ 4.5% TKA result in early revisions (first 2 years)
- ▶ 3 year study, 278 pts sensor assisted TKA
 - ▶ 13 expected revisions (\$73,000 per revision)
 - ▶ 1 actual revision (\$876,000 saved)
- ▶ Annual revision cost: 2.7 billion

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