
Outpatient TKA Increasing Efficiency

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Disclosures

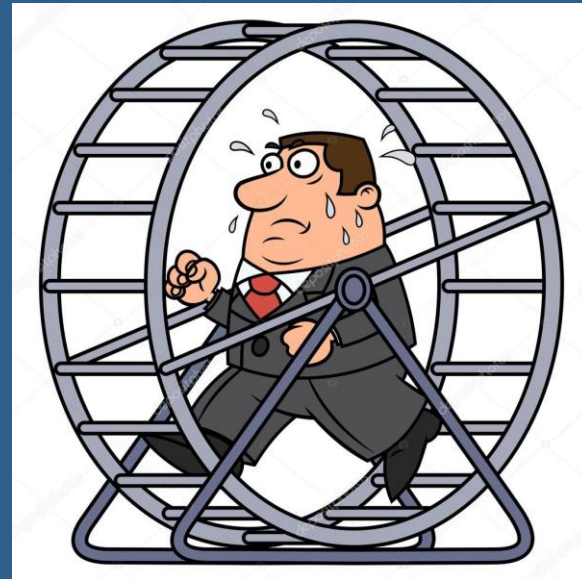
- I receive research support, I am a consultant and receive royalties from DePuy Synthes

Efficiency

It's not Just the Surgery

Useful work performed / energy expended

- Pre op aspects
- Patients
- Day of surgery
- Facility
- Surgeon



Outpatient Arthroplasty

Build it They will Come?



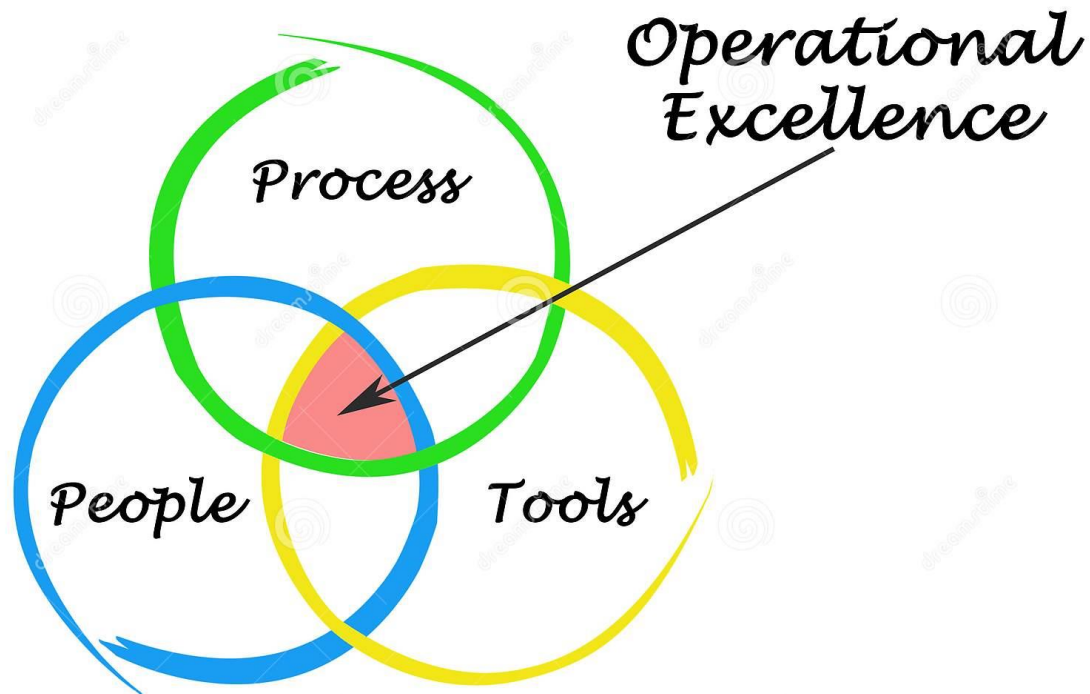
Gaining Efficiency

- Evaluate the process start to finish
- Use time metrics to establish expectations
- *Measure to manage*
- Identify reasons for outliers
- Establish best practices for each department

Operational Excellence



amazon



Time Metrics

- 1st case cut time
- In room to cut time
- Cut to closure (skin to skin)
- Wound closed to out of room
- Exit to next incision



Pre-op

- Appropriate indications for surgery
- Patient optimization
- Standardized pathways
- Medical PA overseer
- Ortho PA pt. preparation



Patient Screening

GREEN LIGHT PATIENT CRITERIA (ASC)

- Kellgren-Lawrence grade 3-4 osteoarthritis and has attempted conservative treatment
- No intra-articular knee/hip injection within the past 12 weeks (cortisone, Toradol, HA)
- Meets insurance criteria
- Age ≤ 75
- BMI < 38
- No latex or metal allergy or sensitivity
- Two or less medication allergies

NO HISTORY OF THE FOLLOWING CONDITIONS:

- DM or pre-diabetes
- Uncontrolled HTN ($\geq 130/\geq 80$ mmHg)
- CAD/cardiac stents
- Congestive heart failure (CHF)
- Major events such as MI, CVA, TIA
- Abnormal EKG, implanted pacemaker or defibrillator
- Chronic respiratory conditions (asthma, COPD, OSA)
- Kidney/renal disease
- Liver disease (fatty liver, elevated liver enzymes, history of hepatitis B/C, cirrhosis)
- Inflammatory arthritis (RA, JRA, SLE, psoriatic arthropathy, IBD, Still's disease, ankylosing spondylitis)
- Neurological disorders (Parkinson's, MS, CVA, dementia, epilepsy, ALS)
- Anemia or bleeding disorder
- Cancer (with exception of non-melanoma skin cancer)
- Psychological disorders (depression, anxiety, mood disorders, etc)
- Drug or alcohol abuse
- Urinary retention or enlarged prostate (BPH)
- Personal history of DVT or PE
- Prior lumbar fusion (*THA)
- Prior bariatric surgery
- Prior organ transplant
- Prior surgery or anesthesia complications including personal or family history of malignant hyperthermia or difficult intubation
- No hospitalizations within the past 90 days
- No recent infections within past 30 days (i.e. UTI, cellulitis, pneumonia)
- No active dental infections or periodontal (gum) disease
- Not taking any anticoagulants (excluding ASA)
- Not taking any biologic medications (i.e. TNF-Inhibitors, Interleukin Blockers) or prednisone
- MRSA screen negative
- No tobacco/nicotine use or use of illegal substances
- No/minimal ETOH intake (< 1 drink/day for women and < 5 drinks/week; < 2 drinks/day for men and < 10 drinks/week)
- No current or chronic narcotic use
- No other severe orthopedic issues or limitations that would affect TJR recovery (i.e. inability to use assistive devices i.e. walker or cane)
- Caregiver at home for initial 3 days post-op (spouse, family member, or close friend)
- No barriers to recovery identified regarding home assessment
- Transportation to post-op PT visits pre-arranged
- Lives within 90 min drive to POA
- Patient motivated and engaged (at discretion of provider)

- Healthy < 75 yo
- BMI < 38
- No medical co-morbidities
- Good caregiver

Risk Assessment

RISK ASSESSMENT: TOTAL JOINT REPLACEMENT AND SPINE FUSION

[Staff will complete the following:] HEIGHT: _____ WEIGHT: _____ BMI: _____
 < 18.5 (underweight) 18.5 – 30 (normal/overweight) 30.1 - 35 (class 1 obesity) 35.1 - 40 (class 2) > 40 (class 3)
 INSURANCE: Private insurance Medicare (with or without supplemental insurance) MedAdvantage/HMO
 DATE: _____
 NAME: _____ DOB: _____ AGE: _____ GENDER: _____
 INSURANCE: _____
 SURGEON: _____ PROCEDURE: _____ DATE OF SURGERY: _____
 PRIMARY CARE PROVIDER: _____
 CARDIOLOGIST: _____
 OTHER PROVIDERS: _____

MEDICATION ALLERGIES & REACTIONS:
 1. _____ 2. _____ 3. _____
 No known drug allergies Latex allergy Metal allergy

HISTORY OF ANESTHESIA OR SURGERY COMPLICATIONS:
 Personal history of malignant hyperthermia or a difficult intubation (airway issues): _____
 Family history of malignant hyperthermia / Relationship to person: _____

Do you take any blood thinners (anticoagulants / antiplatelet medications)?
 No Aspirin only Yes – Medication and medical condition: _____

Do you take steroids (i.e. prednisone) or "biologic" medications that affect the immune system (i.e. Plaquenil, Methotrexate)?
 No Yes – Medication and medical condition: _____

Have you had an infection within the past 30 days (i.e. urinary tract infection, cellulitis, pneumonia)?
 No Yes – Please explain: _____

Have you been hospitalized within the past 90 days? No Yes – Please explain: _____
 Have you had a dental cleaning within the past 6 months? Yes No – Date of last cleaning: _____

Do you have any current dental issues (gum disease, cavities, infection, etc)? No Yes:
 Have you had an injection in the affected joint within the past 90 days? No Yes – Date/Type: _____

DO YOU HAVE A HISTORY OF ANY OF THE FOLLOWING CONDITIONS:

CARDIAC	
<input type="checkbox"/> Atrial fibrillation	<input type="checkbox"/> Hypertension / high blood pressure
<input type="checkbox"/> Heart arrhythmia: _____	<input type="checkbox"/> Controlled (\leq 130/80 mmHg) <input type="checkbox"/> Uncontrolled (\geq 130/80 mmHg)
<input type="checkbox"/> Angina (chest pain)	<input type="checkbox"/> Coronary artery disease / heart disease
<input type="checkbox"/> Congestive heart failure	<input type="checkbox"/> Heart attack – Date: _____ <input type="checkbox"/> Bypass surgery (CABG) – Date: _____
<input type="checkbox"/> Abnormal EKG	<input type="checkbox"/> Cardiac stents – Date: _____
<input type="checkbox"/> Heart murmur	<input type="checkbox"/> > 1 year ago <input type="checkbox"/> < 1 year ago <input type="checkbox"/> Drug-eluting <input type="checkbox"/> Metal
<input type="checkbox"/> Heart valve disease	<input type="checkbox"/> Implanted devices
<input type="checkbox"/> Heart valve replacement	<input type="checkbox"/> Pacemaker <input type="checkbox"/> Defibrillator <input type="checkbox"/> Other

RESPIRATORY	
<input type="checkbox"/> Asthma	<input type="checkbox"/> Use of supplemental oxygen
<input type="checkbox"/> Emphysema	<input type="checkbox"/> Obstructive sleep apnea (OSA)
<input type="checkbox"/> Chronic obstructive pulmonary disease (COPD)	<input type="checkbox"/> CPAP <input type="checkbox"/> BiPAP <input type="checkbox"/> Other / dental device <input type="checkbox"/> None

OTHER	
<input type="checkbox"/> Stroke – Date: _____	<input type="checkbox"/> Diabetes Mellitus
<input type="checkbox"/> TIA ("mini-stroke") Date: _____	<input type="checkbox"/> Type II –OR– <input type="checkbox"/> Type I
<input type="checkbox"/> Ischemic (clot/blockage) <input type="checkbox"/> Hemorrhagic (bleeding)	<input type="checkbox"/> Controlled with diet and exercise
<input type="checkbox"/> Blood clot in LEG / deep vein thrombosis (DVT)	<input type="checkbox"/> Controlled with oral medications only
Date/Treatment: _____	<input type="checkbox"/> Controlled with oral medications + insulin/injections
<input type="checkbox"/> Blood clot in LUNG / pulmonary embolus (PE)	What was your last HbA1c? _____
Date/Treatment: _____	Date: _____
<input type="checkbox"/> Anemia	<input type="checkbox"/> Cancer – Type: _____
<input type="checkbox"/> Bleeding disorder: _____	Date of diagnosis: _____
<input type="checkbox"/> Clotting disorder: _____	Treatment: _____
<input type="checkbox"/> Peripheral vascular or arterial disease (PVD/PAD) or peripheral edema (leg swelling)	<input type="checkbox"/> Currently in remission
<input type="checkbox"/> Aneurysm	<input type="checkbox"/> Gastroesophageal reflux disease (GERD)
<input type="checkbox"/> Hyperlipidemia / high cholesterol	<input type="checkbox"/> Peptic ulcer disease (PUD)
	<input type="checkbox"/> Gastrointestinal (GI) bleed

RISK ASSESSMENT: TOTAL JOINT REPLACEMENT AND SPINE FUSION

<input type="checkbox"/> Hypothyroidism	<input type="checkbox"/> Prior bariatric surgery (gastric sleeve / band / bypass)
<input type="checkbox"/> Hyperthyroidism	<input type="checkbox"/> Prior organ transplant: _____ Date: _____
<input type="checkbox"/> Autoimmune disease (Lupus, MS, Type 1 Diabetes, etc.)	<input type="checkbox"/> Chronic Kidney Disease – Stage 1-4 (if known): _____
Condition: _____	<input type="checkbox"/> Dialysis – schedule: _____
<input type="checkbox"/> Neurological disorders (Parkinson's, Multiple Sclerosis, Dementia, Epilepsy, Amyotrophic Lateral Sclerosis/ALS/Lou Gehrig's disease, etc.)	<input type="checkbox"/> Kidney stones <input type="checkbox"/> Kidney infection
Condition: _____	<input type="checkbox"/> Liver disease
<input type="checkbox"/> Seizures – last seizure date: _____	<input type="checkbox"/> Cirrhosis <input type="checkbox"/> Hepatitis A <input type="checkbox"/> Hepatitis B
<input type="checkbox"/> Inflammatory arthritis (Rheumatoid or Psoriatic arthritis, Ankylosing Spondylitis, etc.)	<input type="checkbox"/> Hepatitis C: Treated? <input type="checkbox"/> No <input type="checkbox"/> Yes: _____
<input type="checkbox"/> Gout	<input type="checkbox"/> Benign prostatic hypertrophy (BPH) or other prostate issues
<input type="checkbox"/> Prior low back / lumbar fusion	<input type="checkbox"/> Urinary retention
<input type="checkbox"/> Other major orthopedic issues or limitations (i.e. joint pain other than the surgical site): _____	<input type="checkbox"/> Psychological or mental health disorders
<input type="checkbox"/> Other implanted devices (spinal cord stimulator, etc.)	<input type="checkbox"/> Depression <input type="checkbox"/> Anxiety <input type="checkbox"/> Other: _____
Date/Type: _____	<input type="checkbox"/> Treatment: _____
	<input type="checkbox"/> Well-controlled <input type="checkbox"/> Somewhat controlled
	<input type="checkbox"/> Poorly controlled
	<input type="checkbox"/> Other condition: _____

SUBSTANCE USE
 Tobacco or nicotine use (specify type and amount/frequency) _____ Date of last use: _____
 Marijuana use (specify type and amount/frequency) _____ Date of last use: _____
 Illegal substance use (specify type and amount/frequency) _____ Date of last use: _____
 Narcotic pain medication use (specify medication, dose/frequency, prescriber): _____
 Alcohol use: Women _____ Men _____
 < 1 drink/day and < 5 drinks/week < 2 drinks/day and < 10 drinks/week
 > 1 drink/day and/or > 5 drinks/week > 2 drinks/day and/or > 10 drinks/week
 Specify amount/frequency: _____ Specify amount/frequency: _____

MRSA/MSSA SCREEN

Do you have a history of a staph infection (MSSA or MRSA) or been told you are a carrier of this bacteria? No Yes: _____

Have you been exposed to anyone with this type of infection (to your knowledge)? No Yes: _____
 Do you have any current or chronic skin abscesses, cellulitis, wounds, ulcers, or sores? No Yes: _____

Do you have any chronic skin conditions such as psoriasis, rosacea, or eczema? No Yes: _____
 Are you immunocompromised (i.e. considered to have a poor immune system or at higher than average risk of infections due to certain medical conditions or medications i.e. steroids)? No Yes: _____

Have you been hospitalized in the last year? No Yes: _____
 Have you stayed in a nursing facility in the past year? No Yes: _____

Do you reside at a long-term care facility? No Yes: _____
 Have you been incarcerated in the past year? No Yes: _____

Do you work in a medical setting? (hospital, clinic, nursing home, etc.) No Yes: _____

CARDIOVASCULAR FITNESS ASSESSMENT

Can you climb one flight of stairs without chest pain or shortness of breath? No Yes: _____
 Can you climb four flights of stairs or walk up a hill? No Yes: _____

Can you do heavy work such as scrubbing floors or lifting or moving heavy furniture? No Yes: _____
 Do you participate in sports or have an exercise routine (walking, biking, swimming, hiking, skiing, group classes, etc.)? If yes, how often and how long do you exercise? No Yes: _____

Do you use an assistive device such as a walker, crutches, or cane? No Yes: _____

SOCIAL SUPPORT AND HOME ASSESSMENT

Do you live alone? No Yes: _____
 Do you have stairs in your home? No Yes: _____

Do you have someone dedicated to helping you with your recovery from surgery (spouse, family member, close friend)? No Yes: _____
 Person/Relationship: _____

Do you have someone to drive you to/from post-operative appointments and physical therapy? No Yes: _____
 Are you concerned about going home after surgery for any reason? No Yes: _____
 If yes, please explain: _____

Do you live within approximately a 90-minute drive to Proliance Orthopedic Associates or Valley Medical Center? If no, nearest Urgent Care/Hospital: _____ No Yes

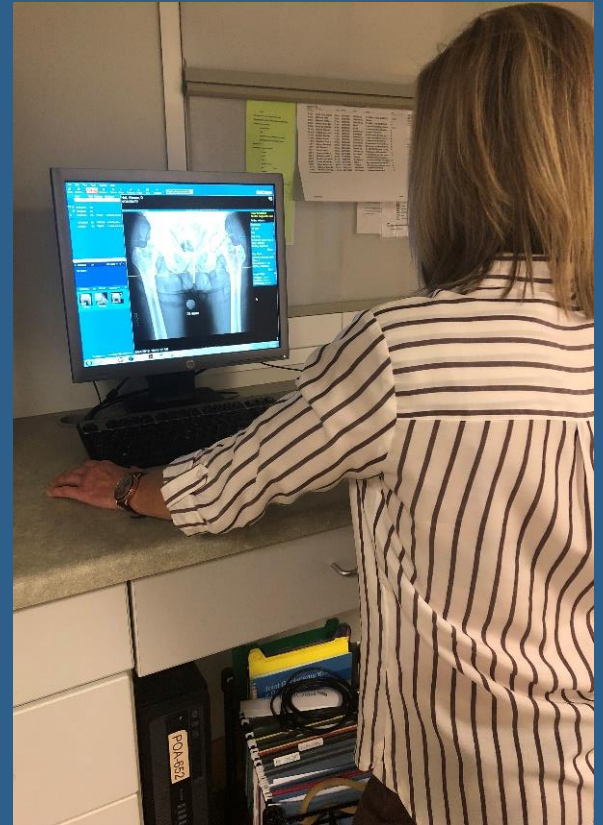
Medical PA

- Comprehensive medical evaluation
- Med reconciliation
- DVT risk stratification
- When to stop DMARs
- Review labs / consults
- Risk stratification



Pre-op Ortho

- PA coordinator
- Accurate X-ray templating / planning
- Right equipment / right time
- Patient education / expectations
- Assists with surgery
- Coordinates D/C



Optimization → Minimizing Risk



Surgery Potential Bottlenecks

- Admitting / Pt. readiness
- Anesthesia
- Turnover
- Inexperienced staff
- Instrument / implant readiness
- Miscommunication

Inefficiency is multifactorial → difficult to fix / assign blame

Admitting

- Dedicated RNs
- Med reconciliation
- Patient prep
- Confirm allergies / ABs
- Initiate multimodal pain Rx
- Reassure Pt. / family
- Pt. ready on time
- Communicate with OR staff
- Ability to audible if pt. late



Anesthesia

- Dedicated group
- Standardized protocols
- Block room vs. in OR
- Short acting spinal / saphenous n. blk
- In room helping to move patient
- Appropriate sedation

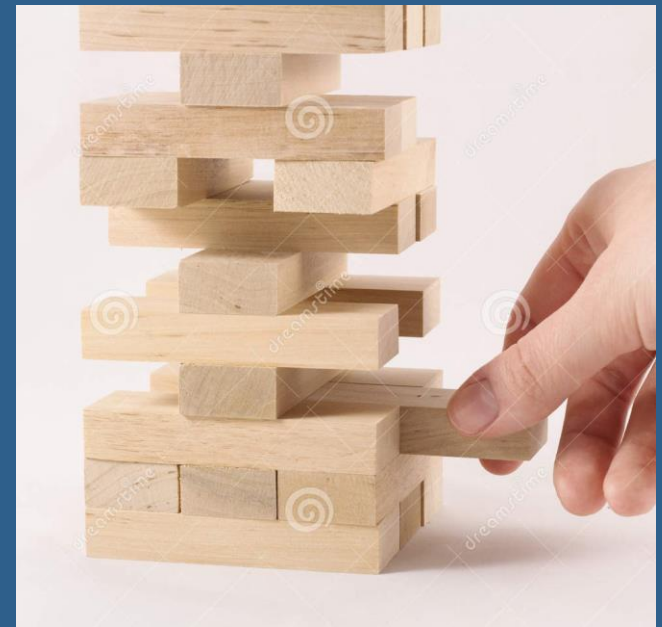


OR Staff

- Scrub / circulator / coordinator / implant rep
- **Need parallel function**
 - opening room
 - instrument set up
 - robots / navigation
 - bring patient
 - position / prep / drape

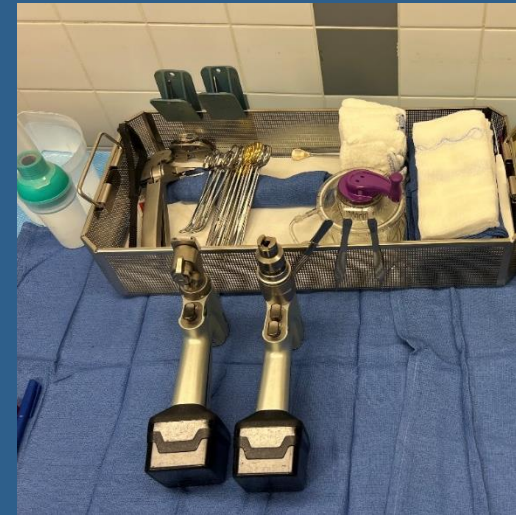


Gaining Efficiency



Instruments / Equipment

- Standardize basic sets
- Peel pack exceptions
- Consolidate pans
- Cement / cementless
- Standardize closure / dressings
- Robot ?



Next Case

- RN reviews next pt. EMR and X-Ray
- Talks with pre-op
- Questions / concerns reviewed



Discharge



Surgeon / Surgery

Operative Times Have Remained Stable for Total Hip Arthroplasty for >15 Years

Systematic Review of 630,675 Procedures

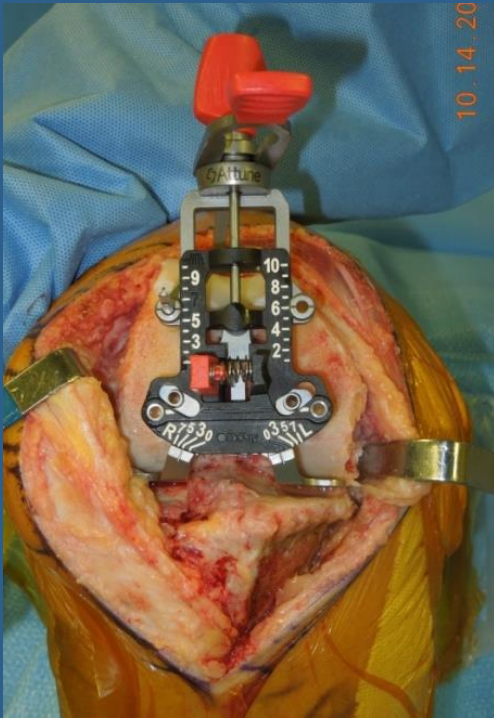
William A. Cantrell, BS, Linsen T. Samuel, MD, MBA, Assem A. Sultan, MD, Alexander J. Acuña, BS, and Atul F. Kamath, MD

Investigation performed at the Cleveland Clinic Foundation, Cleveland, Ohio

JBJS 2019

- Despite advances in
 - technique
 - technology
 - implants
 - ↓ LOS / complications
- Surgical times have remained 95 mins.

Surgery



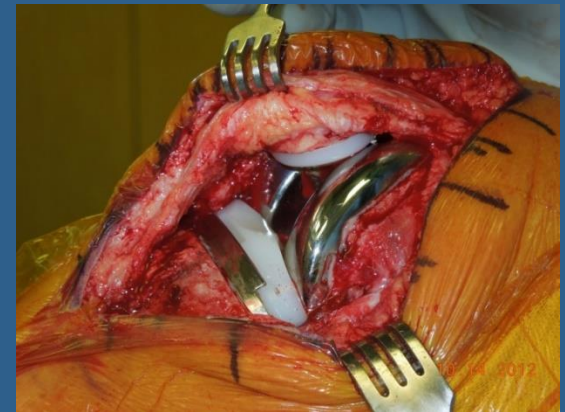
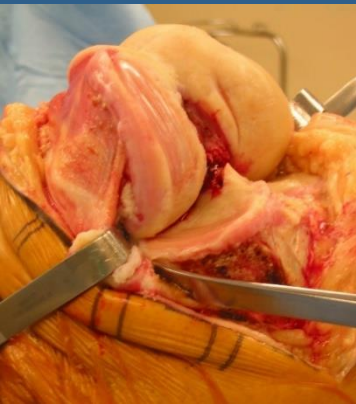
Surgeon How do I Gain Efficiency?

- Develop routines
- Consistent help
- Measure your times
- Scrub with other surgeons
- Video surgeries



Surgeon

- Measure what you do skin to skin time
 - incision to exposure
 - incision to trials
 - incision to implants for: cemented / cementless / CR / PS
 - closure time (what percent is it of overall time)



Introducing New Technology

How do you Measure Success / Justify

- Better patient outcomes
- Process more efficient
- Provides value
- Less stressful for surgeon/staff



Not Efficient



Keys to Efficiency

- Transparent time metrics
- Specialized teams
- Surgeon / staff communication
 - what is slowing the process?

pt. arrives late

pt. not ready when O.R. is

pt. ready to but O.R. is not

or ***The Surgeon***

Early Experience Outpatient TJR

1/1- 6/30 2022	SDD	NDD	Total Number of Joints
ASC	127	0	127
Hosp.	48	71	103
TOTAL	175	71	246

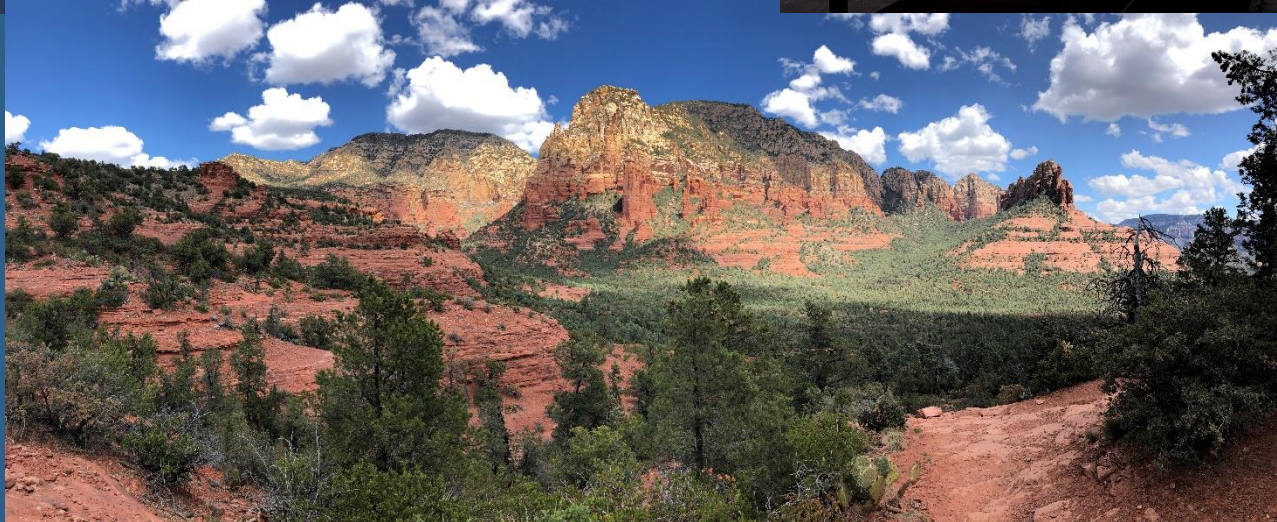
54% ASC
75% SDD

Gaining Efficiency

Conclusions

- Procedure used to be the start of the process now it's the conclusion
- Evaluate the process start to finish
- Use time metrics to establish expectations
- Goal: ***Operational Excellence***

Thank You





Outpatient Arthroplasty

Facility

Staff

Patients

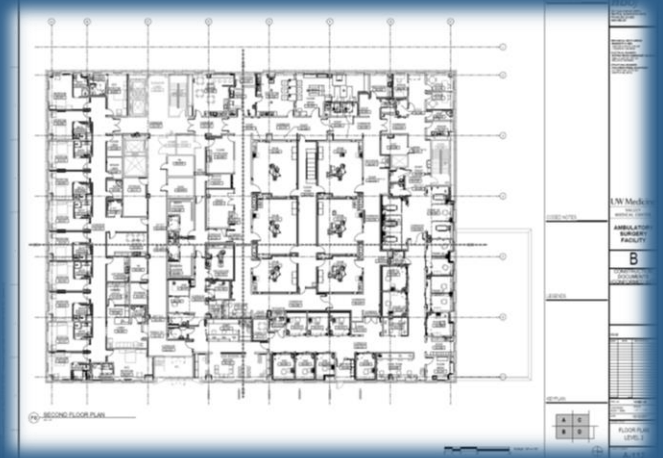
Pathways / plans

Optimizing the surgery

It's not just the procedure, it's the entire process

ASC TJR

- Visited ASC's in 2016
- Construction started Jan. 2018
- Opened for surgery mid Dec. 2021
- ASC Sq. footage 29,550



Early Experience Outpatient TJR

- Jan. 2022
 - ASC 30 cases
 - VMC 15 cases
 - 100% SDD
- Feb. 2022
 - ASC 18 cases
 - VMC 13 cases
 - 98% SDD
- Mar. 2022
 - ASC 21 cases
 - VMC 25 cases
 - 76% SDD

Q1 2022 → 122 primary joints
- 91% SDD
- 9% NDD