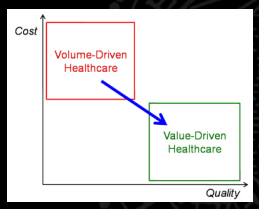
The Importance of Value in Healthcare



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UCSF Department of Orthopaedic Surgery
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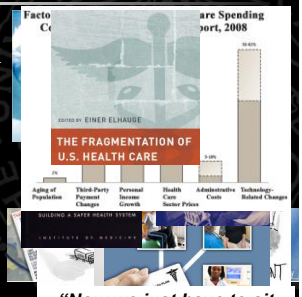
Visiting Scholar, Harvard Business School

Disclosures/Conflicts of Interest

- **Research Support:**
  - AHRQ, NIH, RWJF, CHCF, UC CHQI, CMS
- **Consultant:**
  - Institute for Healthcare Improvement, Pacific Business Group on Health
  - Visiting Scholar, Harvard Business School
- **Governance/Leadership Roles:**
  - AAOS (Council on Research and Quality)
  - AAHKS (Health Policy, EBPC)
  - COA (Past-President)
  - OREF (Board of Trustees)
  - UCSF Medical Center (HTAP)
  - California Joint Replacement Registry (Chair)

Problems with US Healthcare System

- Emphasis on health*care*, not health
- Fragmented delivery, payment systems
- Medical error/defensive medicine
- 'Medical arms race'
- Moral hazard



"Now we just have to sit back and wait for the Fed to bail us out."

Lack of Competition Based on Value

- **Patient choice and competition for patients are powerful forces to encourage continuous improvement in value and restructuring of care**
- **Today's competition in health care is not aligned with value**

Financial success of system participants	≠	Patient success

- **Creating positive-sum competition on value is fundamental to health care reform**

*Slide courtesy of Michael Porter, PhD

Primary Goal: Improve Value

- **Value = *Outcome** / Cost**

Patient Centered Outcomes

CONGRESS

VALUE

Cost to Achieve Outcomes

Hospital

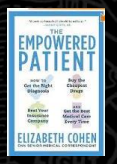
AdvaMed

BRIDGES to Excellence
Rewarding Quality across the Healthcare System

*Outcome= Quality (e.g., clinical safety, satisfaction, convenience)

Prerequisites for Value Based Healthcare

- **Empower patients, providers, payors/purchasers with better information**
  - **Tools for efficient, real time data capture**
  - **Transparency of cost, quality**
    - **Actionable, easy to understand/use, risk adjusted**



- **Reorganize delivery, payment system around patient-centered value (not volume)**
  - **Align stakeholder incentives around value**
    - **Increased accountability for providers, patients**

- ***Leadership* from the medical profession**

Clinical Orthopaedics and Related Research®
A Publication of The Association of Bone and Joint Surgeons®

Factors That Influence Provider Selection for Elective Total Joint Arthroplasty

Kevin J. Bozic MD, MBA, David Kaufman MD,
Vanessa C. Chan MPH, Stephanie Caminiti APRN,
Courtland Lewis MD

Clin Orthop Relat Res (2013) 471:1865–1872

Dimension	Relative Importance on 5 point Likert Scale (n=243)
Physician Manner	**4.68**
Physician Quality	**4.64**
Hospital Factors	4.01
Physician Reputation	4.00
Customer Service	3.98
Physician Qualifications	3.97
Non-Clinical Features (convenience, cost)	3.50

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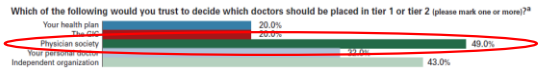
Clin Orthop Relat Res (2013) 471:1865–1872

	Average (5 point Likert Scale)
I believe that my choice of surgeon will have an important impact on my outcome.	**4.7**
There are big differences in the quality of care among different orthopaedic surgeons.	**4.5**
I had adequate information to choose the surgeon for my procedure.	**3.3**
I found data that helped me understand how this surgeon compares to other surgeons.	**3.2**

Who Will Define 'Quality' in Orthopaedics?



AAOS American Academy of Orthopaedic Surgeons

Blue Distinction®

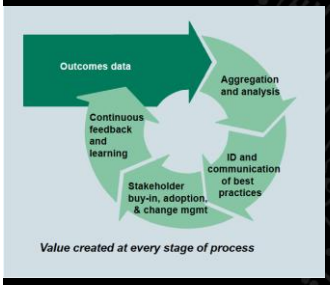
U.S.News America's Best Hospitals

*Sinaiko and Rosenthal, *AJMC*, 2010

"Requires development of quality measures and ensures close collaboration with physicians and other stakeholders regarding the measures used in the performance program."

-SGR Repeal and Medicare Provider Payment Modernization Act (HR 4015/S 2000)

Empowering Patients, Providers with Data



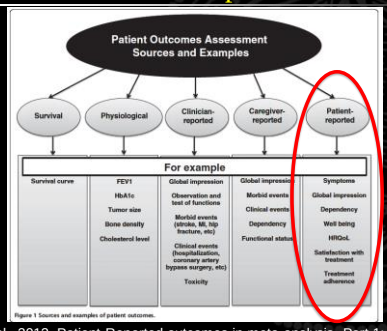
ICHOM

ACS NSQIP
AMERICAN COLLEGE OF SURGEONS
NATIONAL SURGICAL QUALITY IMPROVEMENT PROGRAM

AJRR AMERICAN JOINT REPLACEMENT REGISTRY

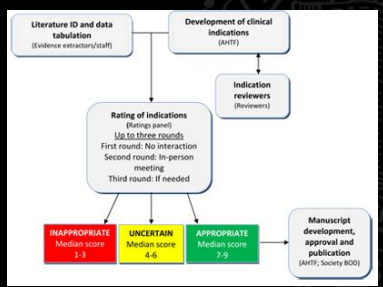
CALIFORNIA JOINT REPLACEMENT REGISTRY

Which Outcomes are Important to Measure?

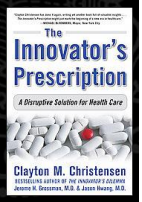


Johnston et al., 2013, Patient-Reported outcomes in meta-analysis- Part 1: assessing risk of bias and combining outcomes, Health and Quality of Life Outcomes,

Population Health Management: Appropriateness



Population Health Management: 'Downstreaming'

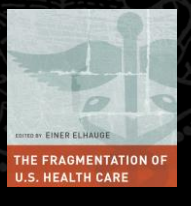


American Society of Orthopaedic Physician's Assistants
ASOPA

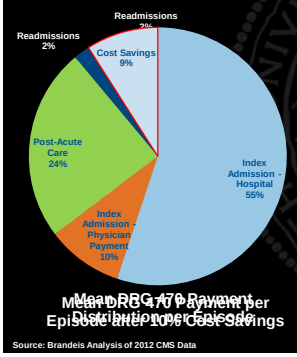
Population Health Management: Patient Engagement

Transitioning to Value Based Payment

- **Providers function in silos**
  - **Waste, inefficiency**
- **Delivery, payment systems don't promote alignment, accountability**
- **Regulatory, legal barriers to alignment**
  - **Stark, anti-kickback, CMP, Tax Code**



Value Driven Payment

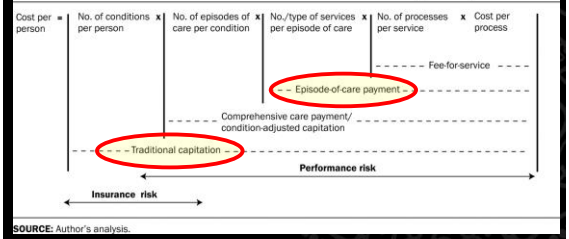


Source: Brandeis Analysis of 2012 CMS Data

- Reduce/eliminate ***non value-added*** care
  - Inappropriate care
  - Avoidable complications/readmissions/reoperations
  - Excess cost due to variation in price
  - Standardization

Providers Bear More Risk

EXHIBIT 1
Variables For Which The Provider Is At Risk Under Alternative Payment Systems

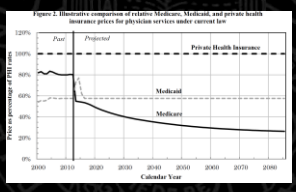


SOURCE: Author's analysis.

The Choice is Ours…

"The first, critical step (in healthcare reform) is physician leadership"-Mark McClellan, MD, PhD, testimony to Senate Finance Committee, May, 2010

- Either we find ways to stretch our healthcare dollars by improving quality and eliminating waste, or…
- Cost containment will be imposed on us by limiting access and cutting provider reimbursement



Leadership Opportunity for Orthopaedics

"Control your own destiny or someone else will" – Jack Welch

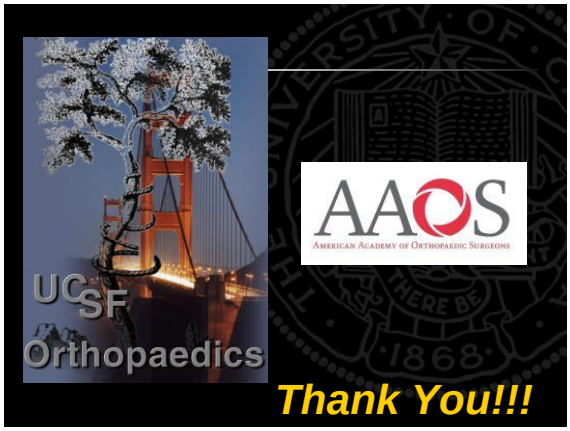
Value is Agnostic to Practice Setting

- **Private practice**
  - **Solo/small group**
  - **Single specialty**
- **Hospital-based**
- **Multi-specialty group**
- **Integrated delivery network**
- **Academic practice**

KAISER PERMANENTE®

Are *You* Ready for Value Based Healthcare?

- **Focus on sustainable, patient-centric value creation**
- **Credible data!**
  - **Cost**
  - **Outcomes**
- **Well-defined goals, performance metrics**
- ***Leadership!!***


UCSF
Orthopaedics
AAOS
American Academy of Orthopaedic Surgeons
Thank You!!!

The Value of Hip Arthroscopy

Thomas G. Sampson M.D.
San Francisco, CA

Presenter Disclosure Information

Arthroscopic surgery for osteoarthritis

Thomas G Sampson M.D.

Disclosure Information

The following relationships exist:

Consultant and Speaker:

Con Med; Smith and Nephew; Arthrex

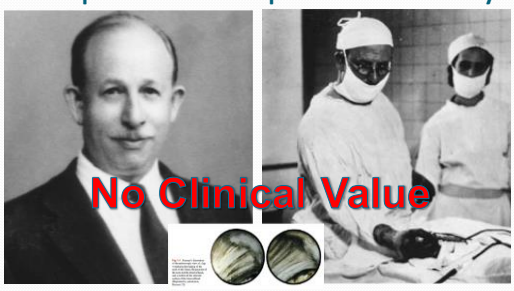
Journal Review:

Journal of Bone and Joint Surgery - British; Arthroscopy; Clinical Orthopaedics and Related Research; AJSM

International Society for Hip Arthroscopy:

Past President

1931 Cadaver Hip Arthroscopy Peripheral Compartment Only



Early Development 1970-1980

A different way of doing joint surgery with minimally invasive techniques (Arthroscopy)

Central Compartment — **Johnson**

Distraction (Traction) — **Errikson**

Questionable value

Lateral Approach 1984 (Glick and Sampson)

Supine approach 1991 (Byrd)

Central Compartment-Long Scopes and Canulated Instruments

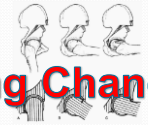
Patients and Industry sees value

Hip Arthroscopy: The Next Evolution in Sports Medicine
Freddie H. Fu, MD, DSc,DPs (Editor)

Recognize Instability, Labral Repair, Research, Fellowships

Educators see value

FAI(Femoro-acetabular Impingement)
Ganz



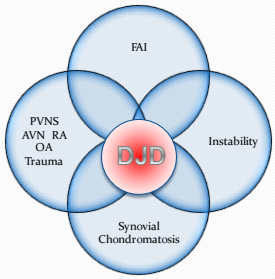
Everthing Changed!

Arthroscopic Femoroplasty 2001

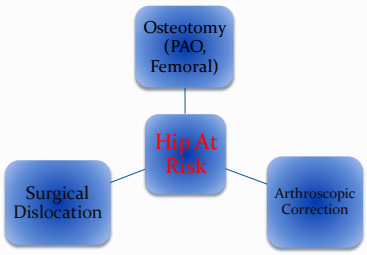
Hip Preservation Center Stage

Treat the CAM with resection osteoplasty using a specific reproducible technique

Etiology of Hip Pain and DJD Explored



Available Procedures Hip Pathology or Injury



Both Open and Arthroscopic Evolve Osteoplasty (Femoroplasty)

Open Surgical Dislocation **Arthroscopic**

OLC

Literature

Industry

(Stryker, Smith and Nephew, ConMed-Linvatec, Arthex, Wolfe, Stortz)

Company X

Arthroscopic Treatment of FAI is now Mainstream

Why should we be concerned (Financial Healthcare)

Clin Orthop Relat Res (2012) 470:1079–1089
DOI 10.1007/s11999-011-2023-7
Clinical Orthopaedics and Related Research®
SYMPOSIUM: VALUE BASED HEALTHCARE

Is Hip Arthroscopy Cost-effective for Femoroacetabular Impingement?

David W. Shearer MD, MPH, Jonathan Kramer BS, Kevin J. Bozic MD, MBA, Brian T. Feeley MD

- If NO arthritis, may be cost effective or beneficial
- With arthritis, probably NOT cost effective unless there is a benefit delay to a THR for 16 years

The Patient

(Ideal compared to open surgery)

1. Day surgery
2. Reduced pain and disability
3. Reduced loss of productivity (work)
4. Reduced limited mobility
5. Quicker return to self-care (reduced family burden), ADLs and sports

Clin Orthop Relat Res. Mar 2010; 468(3): 741–746.

Prospective Analysis of Hip Arthroscopy with 10-year Followup

J. W. Thomas Byrd, MD and Kay S. Jones, MSN, RN

- 50 patients (52 hips)
- 38 years (range, 14–84 years)
  - 27 males and 23 females
- Median improvement = 25 points (mHHS)
  - preoperative= 56 points
  - postoperative=81 points
- 14 patients converted to THA
  - 2 died
- Arthritis is an indicator of poor long-term outcomes

Tissue damage

Surgical dislocation

Arthroscopic

The value of hip arthroscopic surgery?

1. Define the goals of surgery
2. Optimizing cost per outcome
3. Best practices advice

Define the goals of surgery

- Relieve pain
- Preserve cartilage and labrum
- Restore ROM and function

Optimizing cost per outcome

- Direct costs-
  - Physician
  - Surgical
  - Therapy
- Indirect costs-
  - Time away from work or school
  - Time away from team
  - Family, etc.

Best practices advice for hip arthroscopy

- Any non-arthritic hip condition
- Some with < **Tönnis 1**
- Expectations match outcomes
- Surgeons expectations = patients expectations
- Reasonable and proven procedures

Other tips to maximize value to patient, surgeon, hospital, insurer, government (public health benefits)

1. Correct indications, supported by H&P and imaging
2. Surgeon should know his abilities, and optimize the surgical environment
3. Hospitals and surgical centers of excellence only (avoid the occasional hip scope)
4. Insurers should pay a reasonable fee to support centers of excellence
5. Insurers and Government should rely on members (not bureaucrats) of AAOS and AANA to determine appropriate hip surgical procedures

INTERNATIONAL SOCIETY FOR HIP ARTHROSCOPY

Maximizing Hip Care: Capturing and Demonstrating Value in *TOTAL HIP REPLACEMENT*

Ryan M. Nunley, M.D.
Associate Professor

Joint Preservation, Resurfacing, and Replacement Service
of Orthopaedic Surgery
Washington University in St. Louis

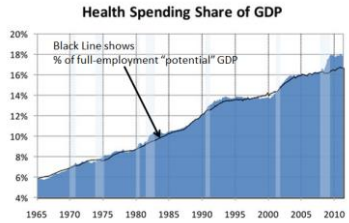
Disclosures

My disclosures are listed in the AAOS database.

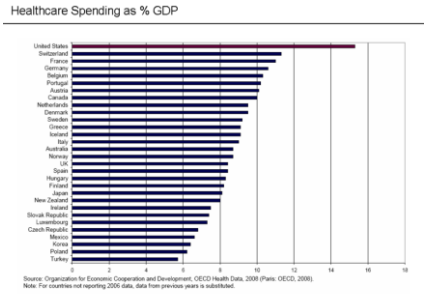
- **Consultant**: Smith & Nephew, Wright Medical Technology, Medtronic, CardioMEMS, Integra Life Sciences, DePuy, Cardinal Health, Bluebelt, Biocomposites, Mobile Compression Systems
- **Research Support**: Smith & Nephew, Wright Medical Technology, Biomet, Stryker, Medical Compression Systems, EOS Imaging, DePuy

Barnes-Jewish Hospital | Washington University Physicians
Orthopedics

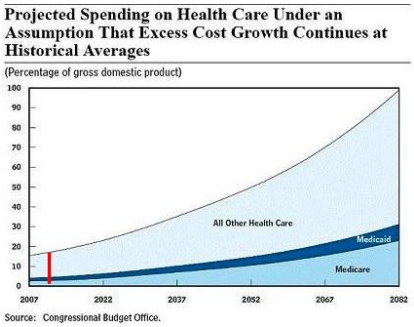
The Problem: Uncontrolled health care costs



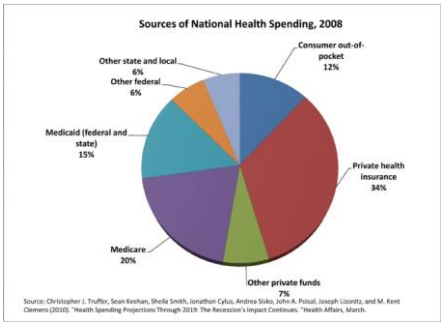
International Healthcare



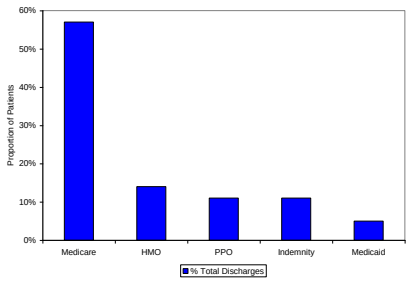
U.S. Health Care System in Crisis



US Insurers-all patients



U.S. Total Joint Payer Mix



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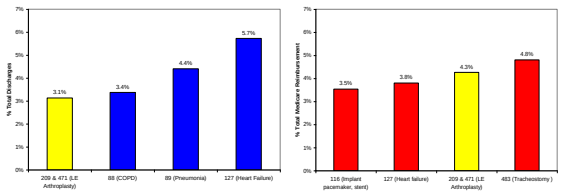
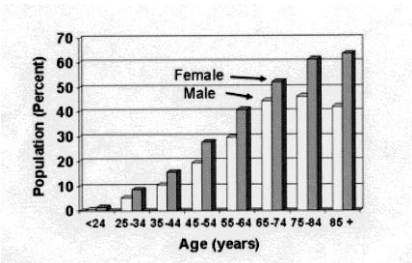
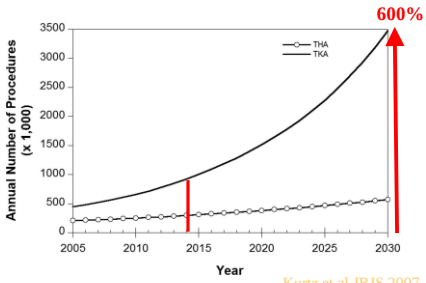


Incidence of Arthritis in U.S.



The Problem:

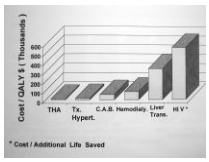
- Number of patients needing TJA will continue to grow



Kurtz et al JBJS 2007

Background

- Total hip replacement is one of the most cost-effective procedures in all of medicine



ARTICLES THE LANCET 1129

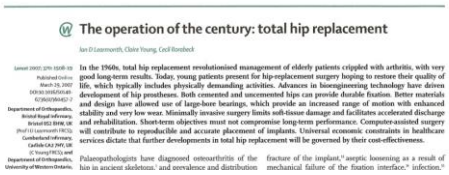
ARTHROPLASTY OF THE HIP

A New Operation

JOHN CHARNLEY

M.B., B.Sc. Manc., F.R.C.S.

- Cautioned against overutilization of THA in young active patients
- Described those over 65 yrs as best suited candidates
- By the 2nd decade, considered expanding THA to much younger and more active pts



The operation of the century: total hip replacement

Ian D Learmonth, Claire Young, Cecil Rorabeck

In the 1960s, total hip replacement revolutionised management of elderly patients crippled with arthritis, with very good long-term results. Today, young patients present for hip-replacement surgery hoping to restore their quality of life, which typically includes physically demanding activities. Advances in bioengineering technology have driven development of hip prostheses. Both cemented and uncemented hips can provide durable fixation. Better materials and design have allowed use of large-bore bearings, which provide an increased range of motion with enhanced stability and very low wear. Minimally invasive surgery limits soft-tissue damage and facilitates accelerated discharge and rehabilitation. Short-term objectives must not compromise long-term performance. Computer-assisted surgery will contribute to reproducible and accurate placement of implants. Universal economic constraints in healthcare services dictate that further developments in total hip replacement will be governed by their cost-effectiveness.

Palaeopathologists have diagnosed osteoarthritis of the hip in ancient skeletons[1] and prevalence and distribution

fracture of the implant,[4] aseptic loosening as a result of mechanical failure of the fixation interface,[5] infection.[6]

- Primary goals
  - Pain relief
  - Restoration of Essential Functions
- One of the most cost-effective medical interventions for improving quality of life

Total Hip Arthroplasty

- Implant Design
- Bearing Surfaces
- Surgical Techniques
- Lead to improved outcomes
  - Increased patient satisfaction
  - Enhanced Implant Durability
- Increased patient expectations and demand

Total Hip Arthroplasty

- # THAs in the United States continues to steadily increase

Kurtz et al. JBJS-Am 2007

- Most rapid rate of growth is in younger patients

Kurtz et al. J Arthroplasty 2009

Rating scales for THA

- Harris, Merle d'Aubigne developed hip scores in 1960's
- Consistent with indications at that time, excellent score required only pain relief, normal walking, and successful basic ADLs

- In spite of application of procedures to younger, more active, more demanding patient population, same rating scales still utilized
- General outcomes, QOL measures added; substantial ceiling effect persists
- *Evidence emerging that all patient expectations are not being met*

Fulfillment of Patients' Expectations for Total Hip Arthroplasty

By Carol A. Mancuso, MD, Jennifer Jout, MPH, Eduardo A. Salvati, MD, and Thomas P. Sculco, MD

Investigation performed at the Hospital for Special Surgery, New York, NY

- 43% of patients had *ALL* of their expectations fulfilled completely
- Absence of *any* post-operative limp among most important prognostic factors for satisfaction

Specific values important to patients, spouses, families, employers not specifically addressed by current rating scales:

- Return to employment at high level
- Return to high level recreation
- Return to normal sexual function

National Multi-Center Study Recently Completed to:

- Establish current level of success/ function of modern implants in returning high demand patients to crucial activities
- Determine if there are any discernible differences among currently utilized implants (including THA vs. SRA)

Definitions

- Modern implants = uncemented stem + advanced bearing surface
- Advanced bearing surface:
  - Highly cross-linked polyethylene against metal, ceramic, or Oxinium
  - Ceramic-ceramic
  - Metal-metal (monoblock, modular, SRA)
- High demand patients = age ≤ 60 + high activity level (premorbid UCLA score ≥ 6)

Multicenter Study: Methods

- Collected data through the administration of an *unbiased and blinded* telephone questionnaire to evaluate functional outcomes of modern hip implants at a minimum of one year after surgery.
- Included patients from 5 geographically diverse medical centers with experience using different types of advanced bearing surfaces.

Investigational Centers

- Washington University School of Medicine
  - St. Louis, MO
- Rush University Medical Center
  - Chicago, IL
- Thomas Jefferson University/Rothman Institute
  - Philadelphia, PA
- Anderson Orthopaedic Clinic
  - Arlington, VA
- The Center for Hip and Knee Surgery
  - Mooresville, IN

Survey Center Methodology

- University of Wisconsin Survey Center (UWSC) was chosen as an independent third party surveyor
- UWSC has long track record of administering health questionnaires for state and federal agencies
  - No affiliation with any of the surgeons
  - No knowledge or interest in bearing surfaces

Overall Sample Disposition and Response Rate

Sample Disposition	Total Cases
Completed Interview	943
Partial Interview	43
Eligible, Non-interview	361
Unknown Eligibility, Non-interview	33
Not Eligible	44
Total	1424
AAPOR Response Rate 1	**68%**

Demographics and UCLA

Demographics and Pre-morbid UCLA Activity Score	All Hips	Standard Head THA (≤32mm)	Big Head THA (>32mm)	SRA
n	806	359	323	124
Number Male	531 (65.88%)	195 (54.32%)	236 (73.07%)	100 (80.65%)
Number Female	275 (34.12%)	164 (45.68%)	87 (26.93%)	24 (19.35%)
Age at surgery (mean; years)	49.50	48.62	50.30	49.93
Length f/u (mean; years)	2.31	2.56	2.32	1.57
Number UCLA = 10	306 (38.01%)	109 (30.45%)	121 (37.46%)	76 (61.29%)
Number UCLA = 9	107 (13.29%)	34 (9.50%)	52 (16.10%)	21 (16.94%)
Number UCLA = 8	98 (12.17%)	57 (15.92%)	31 (9.60%)	10 (8.06%)
Number UCLA = 7	61 (7.58%)	34 (9.50%)	24 (7.43%)	3 (2.42%)
Number UCLA = 6	233 (28.94%)	124 (34.64%)	95 (29.41%)	14 (11.29%)
UCLA frequency missing	1	1	0	0

UCLA Activity Score

- In the year before your hip became painful, did you…

10	Regularly participate in impact sports such as jogging, tennis, skiing, acrobatics, ballet, heavy labor, or backpacking.
9	Sometimes participate in impact sports.
8	Regularly participate in very active events, such as golf or bowling.
7	Regularly participate in active events, such as bicycling.
6	Regularly participate in moderate activities, such as swimming and unlimited housework or shopping.

- Regularly: 1 x week or more; Sometimes: 1 x month or less

Employment

- THA is one of the most commonly performed surgical procedure in the world
- Limited information in the literature to provide to patients, employers, and insurance companies about returning to work after THA
- Employment is vital component to overall quality of life in young, active patients

Job Demand Classification (U.S. Dept. of Labor)

- Sedentary:
  - Sometimes stand or walk, but sit down most of the time.
  - Occasionally, lift up to a 10 lb load.
- Light:
  - Walk or stand more than one third of the time.
  - Often lift up to 10 lbs.
- Medium: Often lift up to 20 lbs, sometimes up to 50 lbs.
- Heavy: Often lift up to 50 lbs, sometimes up to 100 lbs.
- Very Heavy: Often lift over 50 lbs, sometimes over 100 lbs.

Pre-op Job Demand Classification by Group

Job Classification	All Hips	Standard Head THA (≤32mm)	Big Head THA (>32mm)	SRA
n	806	359	323	124
Sedentary	107 (13.54%)	51 (14.45%)	38 (12.10%)	18 (14.63%)
Light	68 (8.61%)	34 (9.63%)	28 (8.92%)	6 (4.88%)
Medium	190 (24.05%)	91 (25.78%)	66 (21.02%)	33 (26.83%)
Heavy	188 (23.80%)	80 (22.66%)	80 (25.48%)	28 (22.76%)
Very Heavy	237 (30.00%)	97 (27.48%)	102 (32.48%)	38 (30.89%)
Frequency missing	16	6	9	1

Return to Job Demand Classification Post-op?

- Return to the usual job you had before your hip operation either with or without restrictions?
  - Sedentary: 97.98%
  - Light: 93.75%
  - Medium: 95.95%
  - Heavy: 94.08%
  - Very Heavy: 90.91%

No difference based on type of implant

Nunley et al. J Arthroplasty 2011Rand Award

Working for Pay after Surgery

- 90.4% worked after surgery
- 1.6 % permanently disabled due to hip
- Mean time off work was 6.9 weeks
- 94.1% returned to their usual job
- 1.7% unable to return to usual job due to hip
- 25.9% had some form of temporary work restrictions when they first returned
  - Temporary restrictions lasted mean 7.3 weeks

Symptoms; Function:

No difference in standard vs. large head THA

	Standard THA (≤ 32mm)	Large THA (≥ 36mm)
NO limp last 30 days	46%	50%
Able to walk > 1 hour	52%	56%
Tried to run	74%	69%
Run > 1 mile	9%	14%
Run for exercise	27%	33%

Patient Specific Index: The *Most Important Activity* to the patient that they would like to be able to return to

Top Activities	
Walking	175
Running/Jogging	119
Golf	89
Biking	70
Basketball	59
Racquet Sports (tennis, squash, racquetball)	53
Baseball/Softball	38

Pt specific index: No difference seen between THA cohorts

Return to Most Important Activity	Std THA	Large THA
UCLA 6/7/8	**93%**	**91%**
UCLA 9/10	**86%**	**91%**

Sexual Activity Results

Sexually active after surgery?	Sexually Active 89.5%	Not Sexually Active 10.5%	**10 patients (1.4%) stated not sexually active due to hip**	**Favors males (p<0.0001) and younger patients(p=0.0082)**
Frequency after surgery?	More Frequent 43.5%	Same 52.0%	Less Frequent 4.5%	**Favors females (p=0.0001) due to less apprehension and greater mobility**
Quality after surgery?	Better Quality 69.9%	Same 28.0%	Worse Quality 2.2%	**Favors females (p=0.0011) due to less pain and greater mobility**
Hip Instability during sex?	No Instability 96.7%	Sensation "slip out" 3.3%		**No significant difference between groups**

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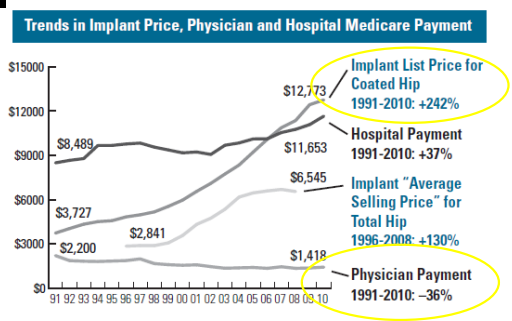
Return to Sexual Function?

- Ability to Return to sex activity
- Quality of sexual activity
- Feeling of hip instability during sex
- Bearing surface
- Femoral head size

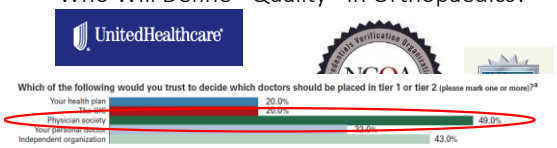
No difference based on type of implant

CCJR-OREF Award Paper

[redacted]ology impact Surgeon "Value"



Who Will Define "Quality" in Orthopaedics?



Quality Reporting

- External / Internal Reporting Systems
  - HealthGrades / Vitals MD (External)
    - Hospital Rating Systems
    - Risk Adjusted Data
    - Primarily Joints/Spine

Service Initiatives

Satisfaction

- HCAHPS (CMS)
- Insurance Companies
- Press Ganey
- HealthGrades
- Internally Generated Survey

Cost Initiatives

- Practice (FTE's; Malpractice; Supplies)
- Hospital (LOS; OR; Implant Supplies, etc.)
- Episode of Care / Bundled Payment

Total Hip Replacement

- One of the most cost effective procedures in all of medicine
- Expanding to younger and more active pt population
- Need for improved economic value by
  - Increased efficiency to meet growing demand
  - Reduction in cost of care
- Bundled Payments/ACOs are here to stay

THANK YOU

Periacetabular Osteotomy for Symptomatic Acetabular Dysplasia

Young-Jo Kim, MD/PhD
Associate Professor of Orthopaedic Surgery

Boston Children's Hospital Orthopedic Center
HARVARD MEDICAL SCHOOL TEACHING HOSPITAL

Acetabular Dysplasia

- **Insufficient acetabular coverage leads to mechanical instability**
- **Overloaded labrum and acetabular cartilage at the acetabular edge degenerates and results in hip PAIN with activity and OSTEOARTHRITIS**
- **Periacetabular osteotomy reorients the shallow acetabulum resulting in less PAIN and POSSIBLE slowing of OA progression**

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Bernese Periacetabular Osteotomy

Clinical Outcome after PAO

- **Survival data using THA as end point**
  - 5-10 year 84-90%
    Matheney, Kim, and Millis JBJS 2009 91:2113-2123
    Troelsen, Elmengaard, Soballe JBJS 2009 91:2169-2179
  - 20 year 60%
    Steppacher, Tannast, Ganz, Siebenrock CORR 2008 466:1633-1644

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Predictors of Failure

- **Higher age**
- **More osteoarthritis, Tonnis grade>1**
- **Poor joint congruency after osteotomy**
- **Severe dysplasia**

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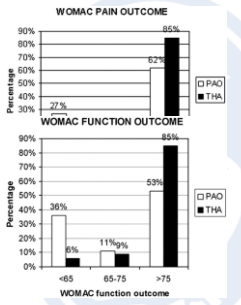
QOL in PAO patients older than 40

- **Cohort comparison study**
- **WOMAC and SF-12 assessment**
- **Although PAO resulted in good QOL, THA was better.**



Garbuz, et al. J Arthroplasty 2008 23:960

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Cost Effectiveness of PAO

- **Cost effectiveness primarily a function of pre-existing OA and longevity after surgery**
- **Tonnis grade I – PAO more cost effective**
  - Cost effectiveness of $7856 per quality adjusted life year
- **Tonnis grade II – PAO still more cost effective, but**
  - Cost effectiveness of $824 per quality adjusted life year
- **Tonnis grade III – THA more cost effective**

Sharifi, Sharifi, Morshed, Bozic, Diab JBJS 2008 90:2447

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Proper patient selection is key!

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Radiographic Assessment of Hip OA

- **Plain radiographic features**
  - Joint space narrowing
  - Osteophyte formation
  - Subchondral cyst formation
- **Radiographic views**
  - Standing vs supine AP pelvis views
  - False profile view
  - Functional view (abduction, flexion, internal rotation view)

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Tönnis Grade of OA

- Subjective grading of radiographic OA on AP pelvis

- Grade 0 – no arthritis
- Grade 1 – increased sclerosis of head and acetabulum, slight narrowing of the joint space, slight lipping at the joint margins

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Tönnis Grade of OA

- Grade 2 – small cysts in the head or acetabulum, increasing narrowing of the joint space, moderate loss of sphericity of head
- Grade 3 – large cysts in the head or acetabulum, severe narrowing or obliteration of the joint space, severe deformity of the head, necrosis

- Difficult to distinguish between grade 0 and 1
- Inter-rater reliability can be poor

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Joint Space Width – Quantitative Measure of Cartilage Loss

- Measure the minimum space between acetabulum and femoral head in the weight bearing zone
- Usually more reliable measure
- JSW > 3 mm considered normal
- JSW < 2.5 mm is considered arthritic

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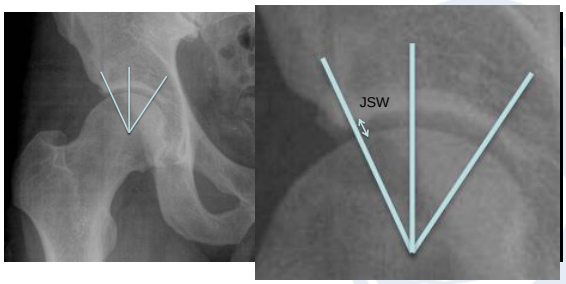
Joint Space Width



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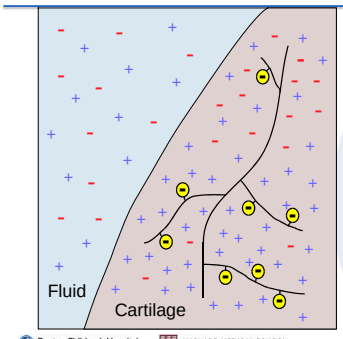
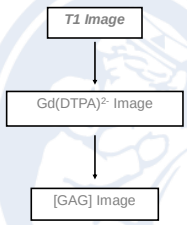
delayed Gadolinium Enhanced MRI of Cartilage





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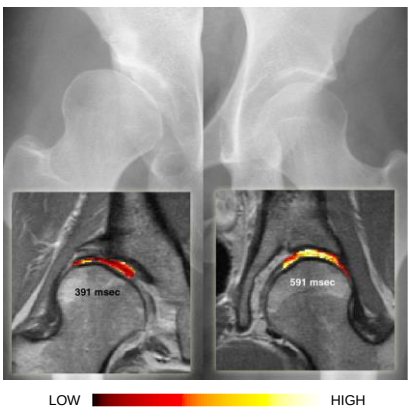

Delayed Gadolinium-Enhanced Magnetic Resonance Imaging of Cartilage to Predict Early Failure of Bernese Periacetabular Osteotomy for Hip Dysplasia

TORIN CUNNINGHAM, REBECCA JESSEL, DAVID ZURAKOWSKI, MICHAEL B. MILLIS, YOUNG-JO KIM

JBJS 2006, 88A:1540-1548

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Study Design

- **Prospective cohort study looking at factors affecting early failure of the joint after PAO**
- **Looked at pre-operative dGEMRIC, patient factors, radiographic factors**
- **Looked at clinical and radiographic failure as well as conversion to THR**

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Results

- **Multiple stepwise logistic regression confirmed that dGEMRIC and joint subluxation are predictors of outcome independent of age, center-edge angle of Wiberg, Tönnis grade, and joint congruency.**
- **Final model:**
  - dGEMRIC: likelihood ratio test=9.91, p=0.002
  - Subluxation: likelihood ratio test=6.33, p=0.012

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Patient Selection for Pelvic Osteotomy

- **44 year old woman with chronic right hip pain with activity**
- **Pain in the anterior groin**
- **Pain with activity and night pain**

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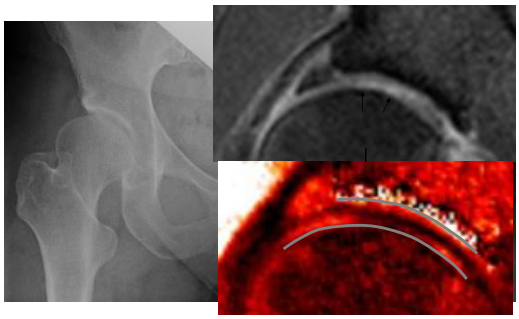

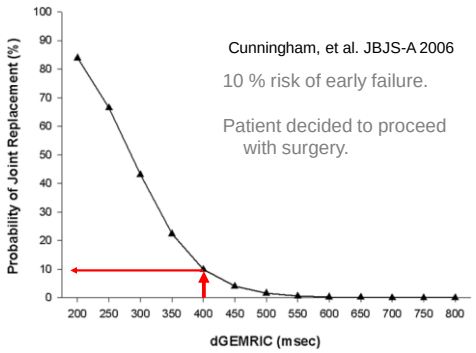

Cunningham, et al. JBJS-A 2006

10 % risk of early failure.

Patient decided to proceed with surgery.

7 years post-op

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Conclusion

- **PAO can be a cost effective solution in young patients with minimal osteoarthritis**
- **Proper staging of cartilage damage is helpful in improving the overall outcome after PAO**

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VuMedi

Maximizing Hip Care: Capturing and Demonstrating Value Webinar

Managing the Hip at Risk

21st Century Paradigm

Allston J. Stubbs, M.D., M.B.A.
Medical Director Hip Arthroscopy & Associate Professor
Department of Orthopaedic Surgery

October 20, 2014

VuMedi
www.vumedi.com
Surgical Videos Online

Allston J. Stubbs, M.D., M.B.A.

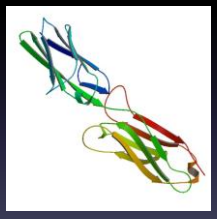
I have financial relationships with the following companies:

- Consultant: Smith & Nephew
- Stock: Johnson & Johnson
- Research Support: Bauerfeind
- Department Support: Smith & Nephew Endoscopy, Depuy-Mitek
- Boards/Committees: AOSSM, ISHA, AANA, *Journal of Arthroscopy*

What is a "Hip at Risk"

Hip predisposed to OA

- Nature
  - Genetics
  - Acquired: LCP, SCFE, DDH
  - Inflammatory
- Nurture
  - Occupation
  - Athletics
  - Trauma
  - Other: AVN



VCAM Biomarker

It's more than FAI and dysplasia

"Why Do We Care?"

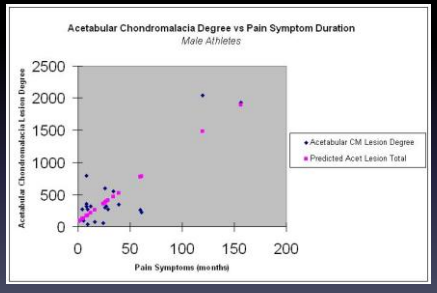
40 y/o Tae Kwon Do Olympian

6 months . . .

FAI CAM Impingement

Acetabular Surface Injury

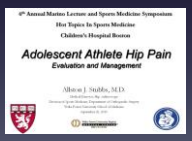
Effect of Symptoms on CM



Stubbs et al. ISAKOS 2011

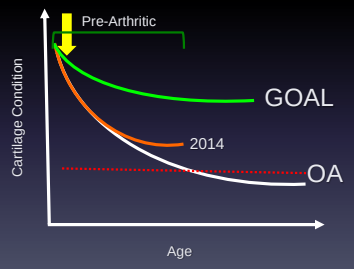
Why are the apparent #'s increasing?

- Improved recognition by MDs, PTs
- Better educated patient population
- MRI Arthrography
- Institutionalization of Sport
  - Start at Age 3
  - Formal
  - Year Round
  - Male and Female



Hip at Risk: OA Progression

21st Century Vision



Why Does It Matter?

Patient & Provider

2.4 years of Hip Pain

Why Does It Matter?
Public and Government

Significant pressure for VALUE

How do we add VALUE?

- Reactive to Proactive Strategy
- Series to Parallel Team-Based Thinking
- Anticipating Future Paradigm Modifiers

STRATEGIC APPROACH

Proactive Strategy

- Patient Selection and Treatment
  - *What is our trigger for intervention: pain, MRI, other*
- Diagnostic Capabilities and Tools
  - *Sensitivity & Specificity Optimization*
- Automated Outcome Assessment
  - *Parallel background work-flow*

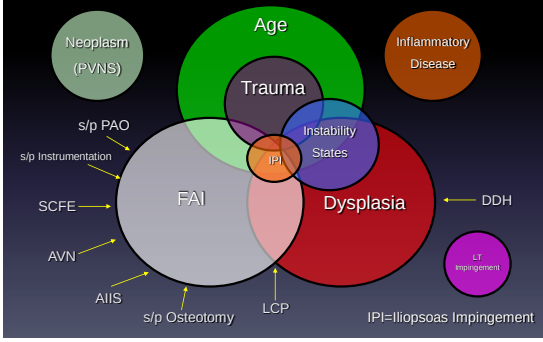
Hip Screening Programs

- Scoliosis Model
- SCFE Model

Does prophylactic treatment make sense?

Nine Theories of Chondrolabral Dysfunction

Need "hip system" answers not silver bullet . . .



Innovate with Existing Technology until advancements are made

Functional Testing

Modified Dynamic Trendelenburg Test

NORMAL ABNORMAL

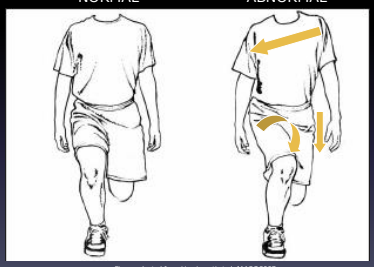
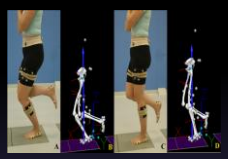
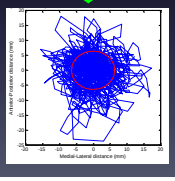
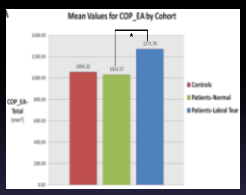


Figure adapted from Limpisvasti et al. JAAOS 2007

Balance & Labral Tears

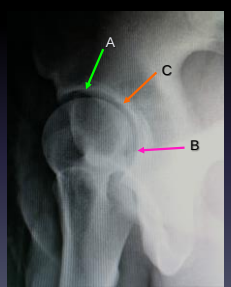






False Profile View:

Weight Bearing



Extract Maximum Information
1) Joint space
2) Joint shape
3) Extraarticular impingement
4) Other

Parallel Team-Based Thinking

- Hip-Based Team
- Coordinated Protocols
- Integrated Systems

Feagin Leadership Method

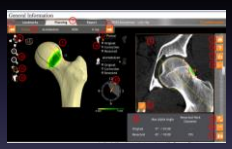
Prearthritic Hip Team

- Orthopaedic
- Radiographic
- Operative
- Rehabilitative
- Financial
- Patient & Patient Team

Coordinated message to patient, hospital, insurer

Anticipating Future Paradigm Modifiers

- Biologics
  - Stem cells & bioprinting
- Diagnostics
  - Biomarkers & 4-D
- Surgical Techniques
  - Outpatient & combination
- Certification
  - Hip specialization



Don't allow the impossibilities of the present limit the possibilities of the future

Performance Assessment

Easiest area for leadership

- Automated
- Background
- Accessible

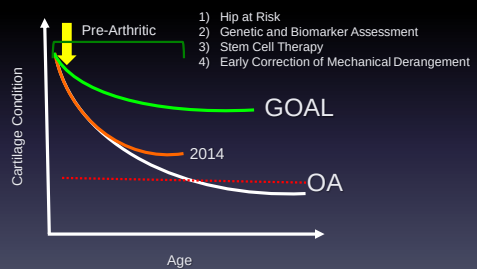
Provider clinical care unaffected

Can we achieve Level 1 Evidence

- Patient enrollment
- Is non-treatment ethical
- Who is paying for it

Hip at Risk: OA Progression

21st Century Vision



Thank You!

INTERNATIONAL SOCIETY FOR HIP ARTHROSCOPY @ishanet

Cambridge, UK October 2015
www.isha.net

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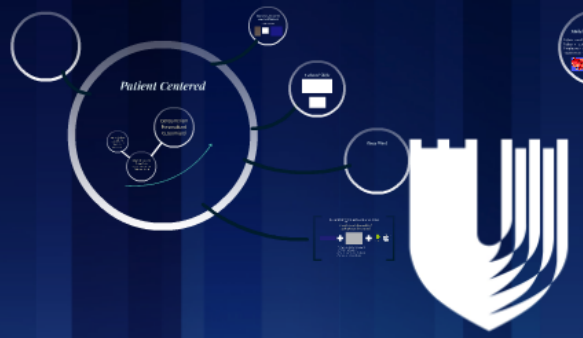
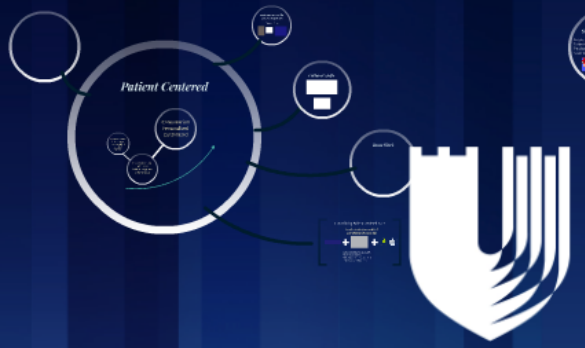


Value Driven Outcomes in the Hip

Richard C Mather III MD
Assistant Professor
Duke Orthopaedics



Value Driven Outcomes in the Hip

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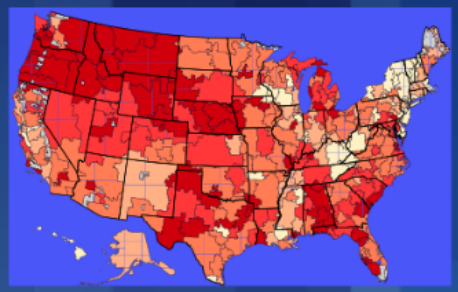
Duke Orthopaedics

Principles of Value-driven Outcomes

1. Stakeholder perspective
2. Patient-centered
3. Relevant costs & benefits
4. Keep it simple

Stakeholder Perspective

Payers - cost, access
Patients - cost, access, patient experience
Employers - cost, access, patient experience
Government - cost, access, quality



Patient Centered

Consumerism
Personalized
Customized

Empirical Medicine
Probabilistic
Pattern recognition
Evidence-based

Intuitive Medicine
trial and error
problem solving
Anecdotal
Experience

Outcomes are not the same to all patients

Return to Play

Cultural Shifts

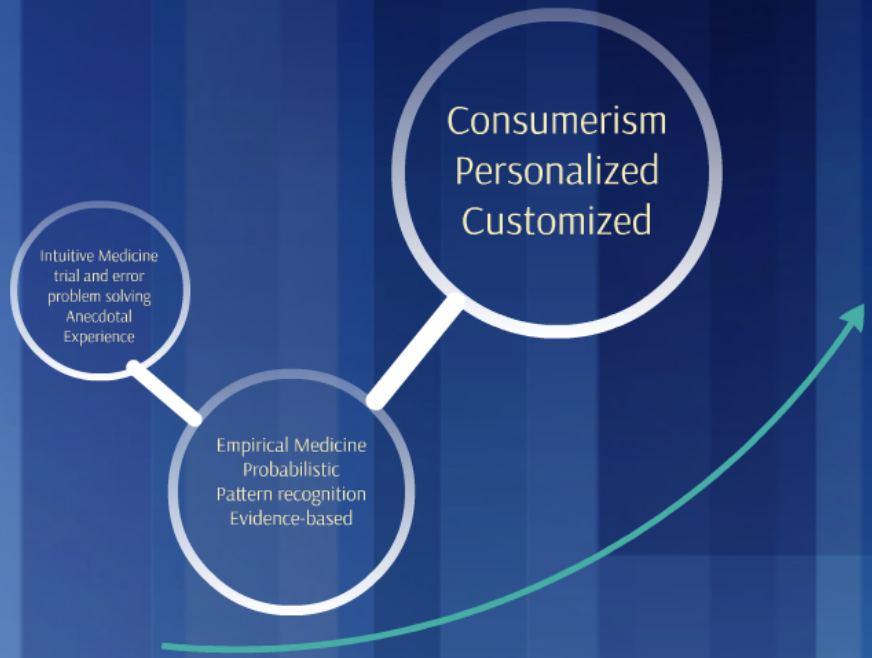
Bozic Work

Streamlining Patient-centered Care

Create a rich, personalized and efficient decision aid

- Increase patient engagement
- Maximize outcomes
- Match patient to the treatment
- Improve referral patterns

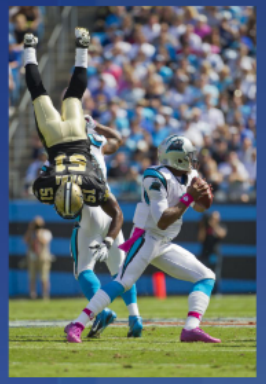
Patient Centered



Bozic Work

Outcomes are not the same to all patients

Return to Play

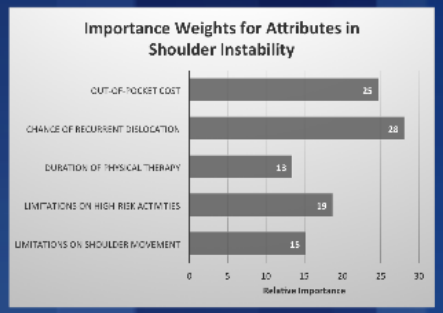


Cultural Shifts

Streamlining Patient-centered Care

Create a rich, personalized and efficient decision aid

MOON
MULTICENTER ORTHOPEDIC OUTCOMES NETWORK

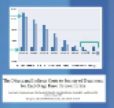


ANDROID

- Increase patient engagement
- Maximize outcomes
- Match patient to the treatment
- Improve referral patterns

Consider all relevant costs and benefits

5 condition papers
Knee OA, ACL tear, Rotator cuff tears, hip fracture & disc herniation



Current Phase

THA FAI

Expand Conditions

AAOS Value Project

Consider all relevant costs and benefits

Current Phase

THA

FAI

Peds ACL, clubfoot, hip dysplasia

Expand Conditions

AAOS Value Project

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Richard C. Mather III MD
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Bill Robb MD
Mininder Kocher MD
Pete Mandell MD
Steve Ross MD
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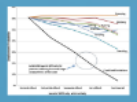
Part I: MSK-Value Model

Modeling the indirect economic implications of musculoskeletal disorders and treatment

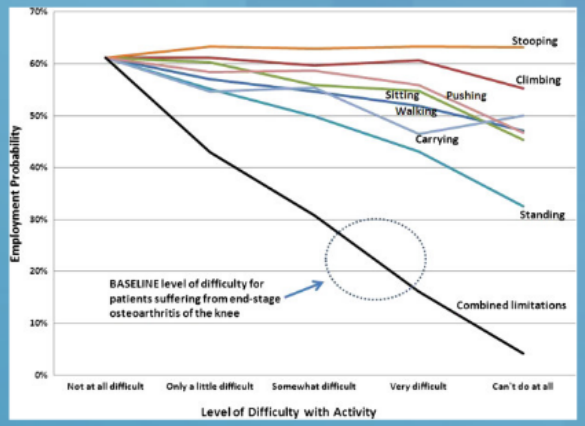


Hypothesis: Successful treatment of MSK conditions = higher household income, higher probability of being employed, fewer missed workdays and lower probability of disability payments

Part I: MSK-Value Model

Modeling the indirect economic implications of musculoskeletal disorders and treatment

Timothy M Dall[1*], Paul Gallo[1], Lane Koenig[2], Qian Gu[2] and David Ruiz Jr[2]



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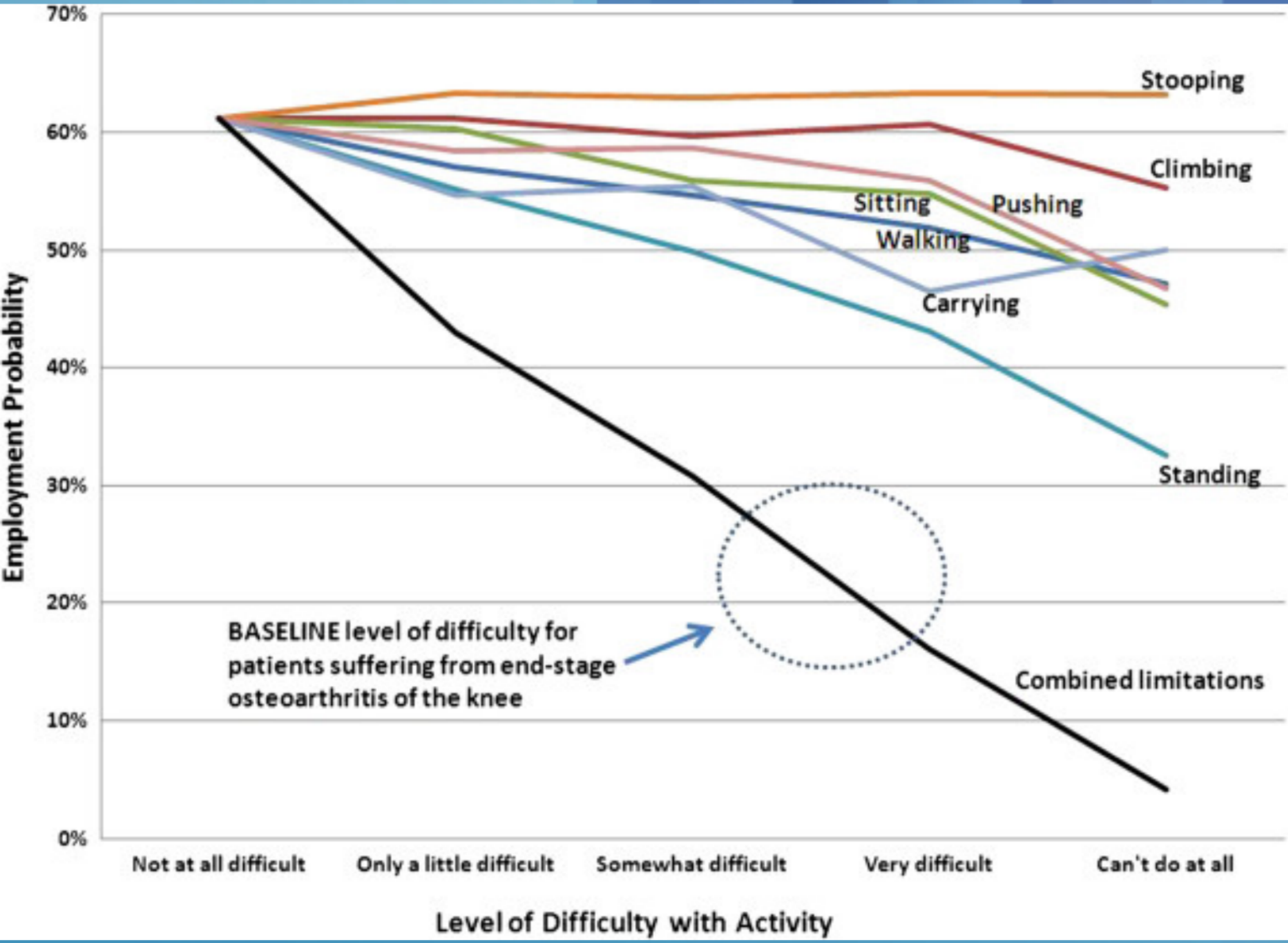
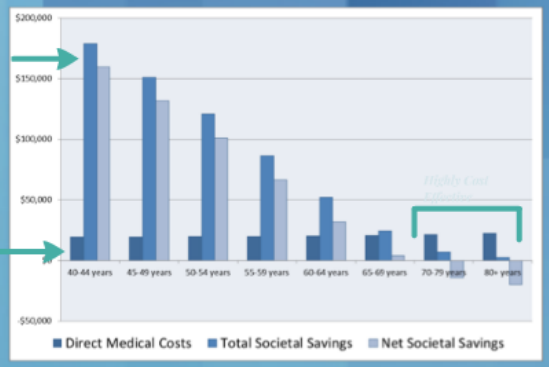

70%
60%
50%
40%
30%
20%
10%
0%
Employment Probability
Stooping
Climbing
Sitting
Pushing
Walking
Carrying
Standing
Combined limitations
BASELINE level of difficulty for patients suffering from end-stage osteoarthritis of the knee
Not at all difficult
Only a little difficult
Somewhat difficult
Very difficult
Can't do at all
Level of Difficulty with Activity

5 condition papers
Knee OA, ACL tear, Rotator cuff tears, hip fracture & disc herniation



The Direct and Indirect Costs to Society of Treatment for End-Stage Knee Osteoarthritis

David Ruiz Jr., MA, Lane Koenig, PhD, Timothy M. Dall, MS, Paul Gallo, BS, Alexa Narzikul, BA, Javad Parvizi, MD, and John Tongue, MD

Investigation performed at KNG Health Consulting, LLC, Rockville, Maryland

Current Phase

AAHKS

The American Orthopaedic Society for Sports Medicine

AANA
Arthroscopy Association of North America

POSNA
The Pediatric Orthopaedic Society of North America

THA

FAI

Peds ACL, clubfoot, hip dysplasia

Expand Conditions

Keep it Simple…

Collect something

Patient satisfaction

Return to work

iHOT33
international
hip outcome tool

4 questions account for 99% of variability

QALYs

SF-6D from SF-12/36

EQ-5D - shortest

mHHS


A Cost-effectiveness Analysis of Total Hip Arthroplasty for Osteoarthritis of the Hip

Table 6.—Cost-effectiveness Ratio Estimates of THA and Other Procedures*

Procedure	Additional Cost, $†
THA (lifetime estimate)	
60-year-old white women	Cost saving
[illegible]-year-old white men	[illegible]/QALY
Low-dose zidovudine therapy for asymptomatic HIV infection—continuous effect	7800/LY
Coronary artery bypass, left main disease plus angina	[illegible]/QALY
THA (first 3 y following surgery)	6700/QALY
Hydrochlorothiazide for hypertension	24 900/LY
Screening mammography, women ≥50 y	20 000 to 30 000/LY
Coronary artery bypass, two-vessel disease plus angina	57 400/QALY
Renal dialysis, in-center benefit, men	59 400 to 68 300/LY
Low-dose zidovudine therapy for asymptomatic HIV—one-time effect	83 600/LY
Cholestyramine for high cholesterol	91 200/LY
Captopril for hypertension	98 100/LY
Autologous blood donations for elective THA	218 800/QALY
Screening mammography, women <50 y	232 400/LY

*THA indicates total hip arthroplasty; QALY, quality-adjusted life year; LY, life year; and HIV, human immunodeficiency virus.

1996