Not Your Momma's Hip Replacement

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Objectives
- Understand the evolution of Total Hip Arthroplasty (THA)
- Understand advancements of surgical procedure
- Discuss pros and cons of Anterior vs. Posterior THA
- Understand indications for hip precautions and why they are changing
- Review urban orthopedic specialty hospitals' current outpatient protocols for THA
- Discuss return to sport after THA
- Discuss drivers of rapid recovery that impact acute care rehabilitation staffing
- Highlight strategies on how acute care staffing has changed to meet increased demand while maintaining employee satisfaction
- Envision where the world of THA rehab is going
- Create dialogue and challenge the status quo

Non-objectives
- Provide you with a protocol on how to treat your THA patients
- List commonly used exercises in rehabilitating a THA patient
- To only present material
  let's make this an interactive discussion!

Introduction
- Hip arthritis is a disabling disease with pain, limitation of motion, and often severe restriction of function
- This has driven physicians to create and constantly improve the THA to address this; procedure continues to grow in popularity

What is driving the change?
- The demands of patients for THA are no longer solely related to the resolution of hip pain and restoration of function, but also a quicker recovery
- Constraints from health care payers to reduce hospital length of stay
- Some companies are now denying inpatient coverage for THA/TKA
- Bundled payments
- Younger patients undergoing THA
- Move towards THA as an outpatient procedure
- Advancements in THA surgical procedures

Demographics
- According to the CDC, there are 332,000 THA performed each year in the US
- HHS does nearly 4,000 THA per year
- Patients <65 years are projected to contribute to the majority of growth
- Use of primary THA in the US is projected to increase by 174% by 2030, to 532,000 cases annually
- As the surgical procedures improve, and patient demands increase, we must evolve to keep up!

THA volume in the US
THA age distribution in the U.S.

We need to appreciate our past, in order to understand our future.

Surgical history

- 1891 in Germany by Professor Themistocles Gluck.
- Used ivory to replace femoral heads of patients with tuberculosis.
- 1925 in the U.S. by surgeon Marius Smith-Petersen.
- Created the first "head arthroplasty" out of glass.
- 1934: Wiles prosthesis
- 1953 in England by surgeon George McKee. Used metal-on-metal prosthesis with a cobalt-chrome surface over the acetabulum. Had a good survival rate (74% at 28 years), but grew unpopular due to local effects of metal particles from the prosthesis.

Surgical history

- 1962 in England by surgeon Sir John Charnley. The modern THA is born!
- Low Friction Arthroplasty Designs
  - Use PTFE (Teflon) as plastic liner

Surgical history

- Problems led to Evolution in Design and Materials
  - Polyethylene Wear
  - Implant Fixation
  - Osteolysis
  - Loosening of cemented stems

Surgical history: Modern advancements

- Design
  - Increased size of femoral heads
- Materials
  - Cross link polyethylene liners or ceramic liners
  - Plasma Tissue
  - Head: cobalt chrome or ceramic
- Templating
- Anesthesia
  - May use general anesthesia or localized anesthesia
  - Improved soft tissue repair
  - Transesophageal acid
  - Used to reduce major blood loss during a trauma

Modern advancements: Fixation non-cemented

- Changes in femoral stem design
  - Porous Metal
  - Plasma Sprayed
  - Coating HA
  - Trabecular Metal

Modern advancements: Non-cemented sockets

- Porous
- Grooved
- Plasma sprayed
- Trabecular Metal
Modern advancements: Articulating surfaces
- Metal/Polyethylene
- Metal/Metal
- Ceramic/Polyethylene
- Ceramic/Ceramic

Modern advancements: Articulating surfaces
- Metal on Metal Stems
  - If not aligned properly create metal ion debris
  - Effects can be detrimental
  - Many have been revised
  - Still used in hip resurfacing.

Not Your Momma's Hip Replacement
12/13/2017

Modern advancements: Dual mobility cup
- Modular with constraint
- Indicated for populations at higher risk for dislocation:
  - Elderly Female
  - Revision
  - Spinal Fusion
  - Neuromuscular disease

Expansion of peripheral nerve blocks
- IPACK block
- Saphenous block
- Sciatic block
- Lumbar plexus block
- Femoral block
- Fascia Iliaca Block

Modern advancements: Anesthesia
- Increased use of regional anesthesia
  - Minimal side effects
  - Hospital length of stay
  - Patient satisfaction
- Neuraxial anesthesia for pain control
- Expansion of peripheral nerve blocks

Modern advancements: Soft tissue repair posterior THA
- Insert video of posterior capsule repair during THA

Modern advancements: Increased stability posterior THA
- Insert video of checking hip stability during THA

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History of anterior approach
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History of anterior approach
Anterior Approach

But these were devised in the 1960’s!

No leg/ankle crossing

Sciatic Nerve Risk

Fracture Risk

Surgical Time

Surgical Time

No adduction

Soft Tissue

Almost half of all dislocations within 90 days of surgery occurred due to falling

Posterior approach

Many surgeons reducing duration of precautions

Implant Placement

But what’s the real risk?

Dislocation Rate

To allow for soft tissue repair to heal

No reaching to the floor

Radiation Exposure

Pain

Blood Loss

To allow for surgical healing and bony ingrowth

Soft Tissue

Recovery

LOS

Abduction pillow used in bed

Restriction of hip flexion to 90 degrees

The risk of instability decreased incrementally over time to <1% due to

Most recent literature supports the decrease in dislocation risk with modern

Blood Loss

The dislocation question: Soft tissue repair makes a difference; a meta

Recovery

A separate systematic review found comparable dislocation rate associated with anterolateral, direct

4 weeks vs. 6 weeks vs. 12 weeks

Fracture Risk

Some surgeons are reducing number of precautions or not

Why change what already works?

Why do we have precautions anyway?

Patient expectations are paramount during the early recovery period after the

Study at HSS reduced hip precautions from 6 to 4 weeks; all patients had a standard posterior THA,

5

Implant Placement

Elevated chairs, toilet seats and car

Trending: Reduced precautions

Current trend in post-op rehab: Are precautions too cautious?

• Why do we have precautions anyway?
  – To reduce risk of dislocation
  – But what’s the real risk?
  – To allow for soft tissue repair to heal
  – To allow for surgical healing and bony ingrowth
  – Why some surgeons call for WB precautions post-op

Traditional hip precautions

• Restriction of hip flexion to 90 degrees
  • No adduction
  • No internal rotation
  • No reaching to the floor
  • No forward bending while seated
  • No leg/ankle crossing
  • Abduction pillow used in bed
  • Supine sleeping
  • Elevated chairs, toilet seats and car seats.
  • But these were devised in the 1960’s!

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  – To allow for soft tissue repair to heal
  – To allow for surgical healing and bony ingrowth
  – Why some surgeons call for WB precautions post-op
Multiple studies support reducing use of hip precautions: Anterior approach (Natal et al.)

- Studied early dislocation rate in patients with anterolateral hip THA approach with no post-op restrictions
  - 499 cases w/403 dislocations within 1 week of surgery, a rate of 0.8% (11)

- Dislocation rates at 3 months for hip precautions vs. reduced precautions:
  - Standard hip precautions (THP) vs. reduced precautions (RP): 4 cases vs. 1 case
  - Results: No dislocations in the RP group vs. 3 in the THP group

- Conclusions: Use experienced surgeons; femoral heads of </= 28mm
- Larger studies are needed to verify this conclusion
- Changes initiated allowing hip flexion and ____________
- Why use dislocation?
  - Anterior approach hip surgery, seen in load
  - Hip remained unstable after reduction and was probably due to a steep acetabular inclination angle (15 deg)
  - Other risk factors including an ASA grade of 3 and high BMI (61)

- Results: No dislocations

- Why one dislocation?
  - Size of implants
  - Improved quality of life

Possible benefits of relaxed precautions

- Peak et al. study showed that patients given less precautions and restrictions enjoyed:
  - High levels of satisfaction post-op
  - Decreased cost! (Not Your Momma’s Hip Replacement)
  - Faster return to work
  - Improved quality of life

In light of this evidence, let’s consider this:

- Should hip precautions be selectively applied?
  - There is a place to be standardized hip precautions:
    - Previous hip surgery
    - Potential dislocation history
    - Neuropathological conditions
    - Lumbar fusion
    - Higher flexibility
    - Corrective tissue disorders
  - Encourage patients to move in ways they find comfortable and adopt any positions they choose. Do not push through discomfort.
  - Open dialogue with referring MD is key!

Dr. Peter Sculco felt compelled to relax hip precautions due to the following:

- Insert
  - Potential abductor weakness
  - Other risk factors including an ASA grade of 3 and high BMI (15 deg)
  - Potential abductor weakness
  - Reasons to avoid:
    - Avoidance
    - Hip instability after reduction and was probably due to a steep acetabular inclination angle (15 deg)
    - Other risk factors including an ASA grade of 3 and high BMI (61)

- Other benefits:
  - Decrease “stiff” hips and backs
  - Decreased cost!
  - Faster return to work
  - Improved soft tissue repair
  - Relieve anxiety and fear of patients

Conclusions:

- Increased cost associated with hip precautions

- Do lifestyle restrictions and precautions prevent dislocation after THA?
  - A systematic review and meta-analysis of the literature.
  - Reviewed both anterior and posterior approaches to THA

- Findings:
  - Decreased dislocation rate with decreased restrictions
  - Patient satisfaction and surgical technique important in the prevention of post-operative dislocations
  - Surgeons and PTs should not fear for an increased dislocation risk if they use a more liberal restriction and precautions protocol after THA, regardless of surgical procedure

- Conclusions:
  - “A more liberal hip restriction and precautions protocol will lead to earlier and better mobilization of patients and higher patient satisfaction”

UK survey of occupational therapist’s and physiotherapist’s experiences and attitudes towards hip replacement precautions and equipment

- 170 participants completed survey

- Findings:
  - % of individuals receiving the following after THA:
    - COR on bed (90%)
    - Saddle on chair (79%)
    - Bathing/transferers (77%)
    - Lift assist devices (19%)
    - Long-handled shoe horns (19%)
    - Hip precautions were routinely prescribed by 69% of respondents
  - Of the 69% of people who routinely give patients THA precautions, 20% felt that this should not be a routine practice

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The average hospital LOS following surgery was 10-14 days. The majority of patients discharge to home or directly to outpatient PT. Relaxation of precautions by some MDs.

How best to deliver? Felt they were better prepared to leave the hospital post-operatively.

One poster that showed that the experimental group had a faster hospital LOS (1.6 days vs. 2.7 days). The group had one pre-operative PT visit or multiple visits.

What should pre-operative PT include? - Pre-operative education may represent a useful adjunct, with low risk of undesirable effects, particularly in certain patients, for example people with depression, anxiety or unrealistic expectations, who may respond well to preoperative education that is tailored according to their physical, psychological and social needs.

Pre-operative education - exists in multiple forms:
- Strength and conditioning programs
- Group education classes
- One-on-one PT information session

Benefits for patients:
- Build muscular strength, endurance, flexibility
- Set post-operative expectations for recovery process
- Can pre-mine patients on use of assistive devices and transfers
- Can deliver MD specific instructions for post-operative care

One-on-one PT: Standard of care
- One-on-one PT visit on pre-operative screening day
- Stair training
- Gait training
- Educated on use of balanized microsite
- Post-operative exercises
- Discharge Planning
- Review IOME
- Surgeon specific instructions
- Specific post-op precautions

The HSS microsite

HSS microsite
- Hip Replacement
  - Left Hip Replacement, 6.21
  - Right Hip Replacement, 7.48
- Knee Replacement
  - Left Knee Replacement, 7.27
  - Right Knee Replacement, 7.53
- Shoulder Replacement
  - Left Shoulder Replacement, 1.05
  - Right Shoulder Replacement, 1.05

That's 38,677 unique views to our microsite from January - June 2017.
Pre-op PT utilization

- Efficacy of Physical Therapy Pre-operative Education with a Supplemental Web-based Application on Discharge disposition: Functional Outcomes and Patient Satisfaction Post Total Joint Replacement: A randomized Control Trial was presented at ARJR Rounds on September 24, 2015.
- 3,519 pre-ops seen since Sept 24, 2015 through October, 2017
- Currently seeing 250+ pre-op visits per month

<table>
<thead>
<tr>
<th>Pre-op visits</th>
<th>Post-op visits</th>
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<tr>
<td>9/24/2015-12/31/2016</td>
<td>1,218</td>
</tr>
<tr>
<td>1/1/2017-10/31/2017</td>
<td>2,301</td>
</tr>
</tbody>
</table>

Pre-op: Why it matters

- Ambulatory surgery for joint replacements
  - Some insurance payers are denying inpt stays after TJA
  - Some surgeons are moving towards same day discharge for patients
  - Preparation ahead of time is critical for patients to be comfortable discharging
  - Less time in hospital - less time for acute PT to train patients and clear them after surgery
  - Increased costs attenuated by reducing inpatient LOS

THA pathways

- Acute care inpatient stay
  - One size fits all
  - Pathway adherence low from PACU admitting to d/c
  - 2017, assigned 3 levels to meet individuality and what is actually happening based on real data
  - Rapid
    - Usual care
  - Complex

THR same day surgery

- Interdisciplinary workgroup task force identified early 2017
- Identified needs to facilitate this
- Surgeons involved
- Anesthesia involved
- PA’s, nursing, rehab, IT, nutrition, hospitalists, case management, operational excellence, pt. educ
- Developed strict criteria to start
- Roll out November 2017

Same day THR criteria

- No Medicare
  - Subsequently did identify and complete same day MC
- Agreeable to leave same day
- Has caregiver support
- Home care set up for following day
- No significant co-morbidities, medically stable
- < 70 years old
- Microsite and webinar development

Lessons learned

- Homecare set up
- Pharmacy information
- Change in culture
- Order set changes

Updated THA guidelines pre-op

- NYC metro area intensive home services available
- VNS provides 5-7 day a week rehab services to eligible patients
- Criteria
- Facilitates throughput

Initial data same day THR

- ___ surgeries with anterior approach
- ___ surgeries with posterior-lateral approach
- ___% met pathway goals on time
  - Left same day
  - ___% stayed over
  - Reasons: __________
Updated THA guidelines - week 1

Updated THA guidelines - weeks 2 through 6

Updated THA guidelines - weeks 7-12

Updated THA guidelines - weeks 13-18

Pearls and Pitfalls of Treating THA From an Outpatient Perspective

Pearl: Pre-operative PT may increase LE muscular power

Pearl: Understanding the relationship between THA dislocation rate and spinal fusion

Pitfall: Training for strength alone vs. explosive strength

Pitfall: Not obtaining surgeon’s recommended hip precautions and return to sports clearance
Pitfall: Physical activity may not increase after THA

Pitfall: Not using latest evidence to treat this population

Return to Sport after THA

Then vs. now return to activity

- Then...
  - Rheumatoid arthritis
  - Walking only
  - 10-20 year life span
- Now...
  - Anyone with joint degeneration (RA, OA, DDH)
  - Return to sports
  - Likely last a lifetime

Polyethylene vs. cross linked polyethylene wear

THA return to sports on the web

- Imremplantes of THA

Theoretical activity related concerns after THA

- Fracture
- Dislocation
- Aseptic loosening
- Bearing surface wear

- No good evidence to support ANY of these concerns!

Return to Sport After THA

- Based on these findings could we conclude that sporting activities that provide 4x or less BW pressures are safe? Less than 8x or less?
- Long term follow up of survivorship of prosthesis in patients engaged in sporting activity is yet to exist.
Peak tibial forces

<table>
<thead>
<tr>
<th>Activity</th>
<th>Peak Tibial Forces (as body weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Still Master level 1</td>
<td>1.4 x 0.1</td>
</tr>
<tr>
<td>Still Master level 3</td>
<td>3.3 x 0.3</td>
</tr>
<tr>
<td>Hip Master level 1</td>
<td>2.8 x 0.3</td>
</tr>
<tr>
<td>Hip Master level 2</td>
<td>2.2 x 0.3</td>
</tr>
<tr>
<td>Leg Press – fast reaction force (as body weight)</td>
<td>3.0 x 0.1</td>
</tr>
<tr>
<td>Jogging machine</td>
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</table>

Return to athletic activity: Consensus of the Hip Society and American Association of Hip and Knee Surgeons

Not Your Momma's Hip Replacement

Richard Iorio, MD

As the quality of the bearing surfaces improves and survivorship of TJA implants improves, the extent of perceived allowable athletic activity continues to be expanded. Just as the recommendation of the Hip and Knee Societies expanded between 1999 and 2005, I expect they will continue to become more adventurous as the technology of joint replacements improves.

Return to sport after THA

Why don't all patients return to sports? (Chang, et al. 2015)

- Why patients do not participate in sports activities after TKA
- 369 patients having undergone TKA given questionnaire 1 year post-op
- 76% reported they returned to sports
- Of the 24% who did not, 34% of these had participated in sports pre-operatively
  - 38% symptoms in operative knee
  - 33% symptoms in spine
  - 9.5% symptoms in non-operative knee

Jogging after THA (Abe, et al. 2013)

- 804 hips in 608 patients having undergone HRA (81 patients) and THA (527 patients)
- Mean age = 62 years, mean BMI = 23.2, mean follow up = 4.8 years
- At follow up visits:
  - Questionnaire on jogging routines
  - Radiographs to assess implant migration as well as software assessing polyethylene wear
  - Serum cobalt & chromium ion concentrations
- 70% of those who jogged pre-operatively continued jogging post-operatively
- No c/o of pain
- No radiographic evidence of loosening, abnormal component migration or excessive wear of soft tissue (mean 4.8 years)
- Reasons for not jogging in the 10/33 patients who jogged pre-operatively:
  - Anxiety, impossible because of pain, decreased ROM, muscle weakness, knee or lumbar pain
- Younger age, male, HRA, pre-operative jogging all associated w/ post-op jogging

What are young patients doing after hip reconstruction?

- 62 patients surveyed
- 60/62 patients participated in recommended activities
  - 2 active in jogging and squash
- Why not doing higher impact activities?
  - Fear (39%)
  - Surgeon recommendation (28%)
  - Hip Pain (17%) 
  - Fatigue (17%)
  - Decreased interest (14%)

HSS rehab’s return to sport criteria

- MD Clearance
- No increase in pain or edema with activity
- Symmetries LE strength, Y balance
- Descend 8” step without pain or deviation
- Strength, flexibility and motion throughout the kinetic chain to meet demands of sport
- Independent with full HEP
Return to sport after THA

- Definitely avoid this activity!!

Future state of outpatient THA care?

- Selectively applied precautions
- Remota PT
  - Pre-recorded exercises accessed via computer
  - Patients can follow progression at home.
- Bini and Mehraan found it to be as successful as clinic-based PT
- Group based therapy
  - Studies show patients receiving group PT classes achieve similar progress for ROM and patient reported outcome measures (PROMs) as patients receiving one-on-one PT
  - May be a cost effective option for delivering care

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What is driving these changes?

- Higher healthcare expenditures/costs
  - 3.2 trillion US dollars in 2015; 17.8% GDP; $10K pp
- Declining reimbursement
- Need to reduce length of stay
- Advances in surgical techniques
- Advances in technology
- Lean initiatives
  - CJR bundles, SNF oversight

Rehab’s role in cost containment?

- Improve throughput!
  - Discharge patients to home with home services safely
  - Rapid/Enhanced recovery models
  - Multi-modal approach to peri-operative care
  - Lean initiatives
  - Comprehensive joint replacement bundles
  - Follow patients through post-acute stay
  - Develop relationships with SNF/sub-acute
  - Alerts when patients readmitted locally
- Interested in significance of pre-op home visit

Effects of the LOS on cost of TKR and THR

- Hospital costs for TJA increased 2002-2013
- Increased costs attenuated by reducing inpatient LOS
- Upward trend in utilization of joint arthroplasty
- Reduction in LOS remains an important target for cost containment

Day of surgery mobilization

- Evidence DOS mobilization decreases LOS
- LOS decreased by 21 days in 2007
  - No difference in achievement of functional milestones
  - Functional endpoints that are less sensitive enough to detect changes as LOS decreased (days vs. hours)
  - Multi-modal approach led to required enhancements
- 2014 meta-analysis decreased LOS by 1.8 days
  - 5 RCT’s, 633 participants

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Education

Pre-operative education
- Group classes
- Website formats – webinar, videos
- Written handouts or pamphlets
- Evidence demonstrates may or may not benefit patient; warrants further investigation.

Pre-op PT 1:1 consult
- Review surgeon specific protocol
- Can flag unique needs; notify surgeon's office/fall risk team
- Individual session to patient and caregiver needs
- High patient satisfaction based on patient feedback

Enhanced recovery model

- Patient experience
  - Pre-operative education
  - Outpatient consultation
  - Pre-anesthetic assessment
  - Pre-procedural PT
  - DOS Admission
  - Pre-op medications
  - Type of anesthesia
  - Blood loss reduction
  - Multimodal analgesia delivery
  - DOS mobilization
  - Thromboembolic prophylaxis
  - Ongoing rehabilitation

McDonald et al. Cochrane Review. 2014

Galbraith et al, 2017

Molloy et al. 2017
Ongoing rehabilitation
- During hospital stay
  - MD PT plus additional practice exercise
  - Add additional visits in same day as needed to achieve milestones earlier if resources available
- Post-acute stays
- SNF oversight
- Relationships with sub-acute facilities
- Home services (Intensive Home PT 5-7 days/week)
- Outpatient services

Functional milestones
- Tool to evaluate quality and efficiency of PT for patients
  - Utilized on inpatients undergoing TJA at HSS
  - This tool was introduced in the 1980’s when LOS was significantly greater
  - Derived from consensus building from the therapy staff
  - Resulted in years of collecting data

Functional milestone achievements 2007
- Day of Surgery
  - Average 6 days to achieve FM (Mon, Tues, Wed)
  - THR Cane Unassisted 2.67 = 64 hours
  - THR Stairs Unassisted 2.81 = 67.4 hours
- POD #1
  - Average 8 days to achieve FM (Mon, Tues, Wed) and (Th, Fr, Sat)
  - THR Cane Unassisted 3.34 = 80 hours
  - THR Stairs Unassisted 3.57 = 79.5 hours

Functional milestone achievements comparison

Significant inpatient staffing changes
- Adding permanent staff to weekends
- Extending hours of service
- Adding additional sessions for mobility
- Staffing for the demand based on pathway requirements

Adding permanent staff to weekends
- Patient/hospital benefit
  - Time to clear rehab consistent per day of week
  - MDRs with permanent staff
  - Engaged staff who is aware of daily operations
  - Reduce per-claim costs
- Staff benefit
  - Weekend differential
  - Staff requests weekend day preferred
  - Engaged staff on weekends
  - Ownership of protocol changes
  - Senior staff an opportunity to be in charge of day
Extending hours of service  
7a to 9p M-F; 7a-5p Sat/Sun

Patient/Hospital Benefit
- Greater DOS coverage
- Patient d/c in evening vs. staying overnight
- Consistency of care
- Patient satisfaction-greater opportunity to be seen

Staff Benefit
- Staff chooses preferred weekend day or late night
- Staff can work a long day instead of 5 days a week
- Stagger work schedule combo long/short days

Adding additional opportunities for mobility

Patient/Hospital Benefit
- Primary THR/TKR/B2B session
- Patients receive additional practice session
- Goal of ambulation increase-opportunities to be up and walking
- Facilitate throughout pts may receive additional awesome to clear and go home
- High patient satisfaction

Staff Benefit
- Continuity of care
- Increase opportunities to interact with patient to ensure all questions/concerns addressed

Opportunities for staff to learn and grow
- Participate in interdisciplinary rounds
- Physician rounds
- Grand Rounds/Inservice/Case Studies/Journal clubs
- Rotation system
- Projects/data collection/research/CQI
- Students and interns
- Career ladder (title, responsibility and promotion options)
- Make staff opinions count: touchpoints with staff (open to feedback, suggestions, and ideas)

Current state: Where are we and what’s next?

ACUTE CARE

PT Staffing Effectiveness Project

Analyzing suggests timing of early PT visits, infant age - completely must impact rehab care time

Solutions Contributed By PT Team Emphasis: Coordination, reallocation of existing resources, and standardization

Not Your Momma’s Hip Replacement

12/13/2017
Solutions Designed to Address Project Challenges:
- **Adherence, Quality, Patient & Staff Satisfaction**

<table>
<thead>
<tr>
<th>Problem statements</th>
<th>Benefits</th>
<th>Solution design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reducing readmissions</td>
<td>✔️</td>
<td>- Refocus existing staff: more shifts begin at 7 am</td>
</tr>
<tr>
<td>Improving patient satisfaction</td>
<td>✔️</td>
<td>- Develop priority Score in EMR (EPIC) for scheduling</td>
</tr>
<tr>
<td>Improving collaboration between departments</td>
<td>✔️</td>
<td>- Reliable notification of PT readiness through EMR communication</td>
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**Future state of acute care orthopedics?**
- Ambulatory surgeries for TJA more prevalent
  - Medicare reimbursement driving this
- Acute care orthopedic rehab staffing models may resemble nursing staff models with longer shifts and 7 day a week coverage
  - Continue to improve technology with implant design, templating and surgical technique
- Intensive home services vs. rehab stays
  - Selectively applied precautions
  - No DME needs?

**Final thoughts**
- Increased demands for rehab services following TJA continue to grow as the number of procedures grows
- Future research needed regarding hip precautions post THR as opposed to the current blanket provision of movement restrictions; relates to DME needs
  - There is no cookie cutter approach
  - Communication is essential!
  - Do no harm; also do not be afraid to push people to return to the "best version of themselves"
  - Use data analytics for best practice staffing solutions (when demand is highest, staff accordingly, projections based on census)
  - Continually re-evaluate pathways for care delivery; individualize optimally within overall pathway parameters; record variances and modify as needed

**References**
1. CDC. "Total Hip and Knee Replacements." [www.cdc.gov](http://www.cdc.gov)
References


20. Guerra M, Singh P, Taylor N. Early mobilization of patients who have had a hip or knee joint replacement reduces length of stay in hospital: A systematic review. Clinical Rehabilitation. 2015: 29(9); 844-854.