Total Joint Replacement and Chronic Pain

J de Beer FRCSC

The Hamilton Arthroplasty Group

MacOrtho
Evidence-Based Orthopaedics

McMaster University
Indications for TJR

No hard rules/”magic number”
Moderate consensus(for ortho surgeons):

- **Pain** – severe, rest/night, activity-limiting daily, progressive

- **Disability** – “significant” impairment of wt.bearing activities and ADL

- **Radiology** – correlation between XR & Sx poor, but preferred
Additional factors to consider..

- Mono-articular/polyarticular disease
- Hip vs knee
- Age
- Expectations
- Comorbidities
- Motivation/psycho-social factors
- Gender(?)
Hip vs Knee

Patient Perspective Survey of Total Hip vs Total Knee Replacement Surgery

Justin de Beer, Danielle Petruccelli, Anthony Adili, Liz Piccirillo, David Wismer, Mitch Winemaker
# Survey Responses: Pain

<table>
<thead>
<tr>
<th></th>
<th>THA Mean (SD)</th>
<th>TKA Mean (SD)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preoperative</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severity of pain</td>
<td>7.9 (2.5)</td>
<td>8.2 (2.2)</td>
<td>0.151</td>
</tr>
<tr>
<td>Severity of disability</td>
<td>7.3 (2.5)</td>
<td>7.9 (2.1)</td>
<td>0.002</td>
</tr>
</tbody>
</table>

**VAS scale** – 0=no pain/disability, 10=extreme pain/disability

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<tr>
<td>In-Hospital</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postoperative pain</td>
<td>5.0 (2.9)</td>
<td>5.5 (2.7)</td>
<td>0.002</td>
</tr>
<tr>
<td>Difficulty to begin walking</td>
<td>4.0 (2.7)</td>
<td>5.2 (2.7)</td>
<td>0.000</td>
</tr>
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## Survey Responses
Overall satisfaction with TJR meeting preoperative expectations for:

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<tr>
<td>Pain relief</td>
<td>8.6 (2.2)</td>
<td>8.7 (5.1)</td>
<td>0.843</td>
</tr>
<tr>
<td>Improvement in function</td>
<td>8.1 (2.5)</td>
<td>7.7 (2.5)</td>
<td>0.125</td>
</tr>
<tr>
<td>Improvement in range of motion</td>
<td>8.4 (2.1)</td>
<td>7.7 (2.7)</td>
<td><strong>0.003</strong></td>
</tr>
<tr>
<td>Improvement in quality of life</td>
<td>8.5 (2.3)</td>
<td>7.9 (2.7)</td>
<td><strong>0.021</strong></td>
</tr>
</tbody>
</table>

*VAS scale – 0=not satisfied, 10=extremely satisfied*
THA vs TKA

- THA’s trend to higher satisfaction cf. knees despite equivalent pain relief

- THA’s achieved greater change in score as measured by Oxford scores

- THA is more likely to “feel normal” cf TKA
Conclusions

- THA’s trend to higher satisfaction cf. knees despite equivalent pain relief
- THA’s achieved greater change as measured by Oxford scores
- THA is more likely to “feel normal” cf TKA
- Hips are happier, knees have more “issues”
Predictive factors for Outcomes

- Polyarticular disease
  - inferior functional outcomes
  - no described impact on pain

- Early (XR grade) OA
  - higher risk of PPOP & dissatisfaction with overall outcome (Polkowski et al CORR Jan 2013)
Predictive factors for Outcomes

- Comorbidities – negative impact on outcomes especially function
- Age
  - younger (<55)- better scores/objective outcomes but inferior satisfaction

(Williams et al JBJS 2013)

?expectations?
Patient expectations/satisfaction

- Multiple studies – similar findings

- $\pm 85 - 90\%$ pts expectations (largely) fulfilled (hips > knees)

- $\pm 80 - 85\%$ pts satisfied overall

- 80% satisfied with functional outcome

- 87% satisfied with pain relief

Nisdotter et al 2009
Patient expectations/satisfaction

- Discordance in TKA expectations between patients and surgeons

- 37% pts (esp. females) have higher expectations re outcomes cf surgeon

Ghomrawi, Mancuso et al CORR Jan 2013
Patient expectations/satisfaction

How do we do??
Outcomes

*Health-related quality of life in total hip and total knee arthroplasty. A qualitative and systematic review.*

- Overall both highly effective procedures
- Pts with poorer preop QoL more likely to experience greater improvement (change in score) but inferior ultimate/absolute scores

Ethgen et al JBJS May 2004
Oxford Hip/Knee Score abstracted from global database including data on 6376 primary THA/TKA cases performed at one site, among 6 surgeons between September 1998 and December 2007.

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<tr>
<td>Preoperative Oxford</td>
<td>42.8 (7.8)</td>
<td>40.5 (7.6)</td>
<td>0.000</td>
</tr>
<tr>
<td>1-year Oxford</td>
<td>20.3 (8)</td>
<td>23.9 (8.6)</td>
<td>0.000</td>
</tr>
<tr>
<td>Oxford Change Score</td>
<td>-22.5 (9.7)</td>
<td>-16.6 (9.5)</td>
<td>0.000</td>
</tr>
<tr>
<td>(Preop – 1year)</td>
<td></td>
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Despite unremarkable clinical or radiographic findings it has been reported that 10-30% of TKA patients experience minimal or no improvement after surgery - persistent pain = major issue

(Hawker GA et al, JBJS-Am 80(2);1998; Robertsson O et al, Acta Orthop Scand 71(3);2000; Noble, CORR 452;2006; Gandhi R et al, J Rheumatol 35(12);2008)
<table>
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<th>THA</th>
<th>TKA</th>
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<tr>
<td>1yr Pain Better than Preop Pain</td>
<td>95.5%</td>
<td>86.4%</td>
<td>0.034</td>
</tr>
<tr>
<td>1yr Pain Same as Preop Pain</td>
<td>3.4%</td>
<td>12.5%</td>
<td>0.024</td>
</tr>
<tr>
<td>1yr Pain Worse than Preop Pain</td>
<td>1.1%</td>
<td>1.1%</td>
<td>0.994</td>
</tr>
<tr>
<td>1yr Pain Same as or Worse than Preop Pain</td>
<td>4.5%</td>
<td>13.6%</td>
<td>0.034</td>
</tr>
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HAG Database 5 yr “Snapshot”

1106 1°THA – 111 (10%) 1yr pain rating same or worse cf preop
55% of these improved by 5yrs

1963 1°TKA – 234 (12%) 1yr pain rating same or worse cf preop
45% of these improved by 5yrs
Negative Predictors for Pain relief post-TKA?

- OA cf RA
- Poorer S/E status
- Anxiety/depression
- Low self-efficacy
- Pain catastrophizing/poor pain coping strategies
- Chronic Opioid use
- Chronic pain
- WSIB/Medico-legal litigation

Age, gender – impact function not pain
BMI not significant predictor of outcomes
Painful TJR??

- Hips – can usually find an organic cause back, infection, loosening, soft tissue impingement etc

- Knees – take longer than hips to reach MMR multiple potential organic pathologies true incidence of PPOP unknown - 6-12%?
Painful TKA – Organic pathology

- “Referred” pain – hip/spine/PVD
- Infection
- Loosening/fixation failure
- Malalignment
- Instability
- Patellar AVN
- Sensory neuromata
- RSD

- PPOP – no clear organic pathology identified
Persistent Postop. Pain

WSIB/Med-Legal litigation

- Well established that see ± 50% reduction in all outcome measures including pain
- More than doubles recovery time
- Complex – resentment/hostility etc
  - conflict – monetary vs medical
Persistent Postop. Pain

Pain Catastrophizing

Strong association with PPOP  Vissers et al 2012,
   Sullivan et al 2011,
Preop PCS scores predictive of PPOP Forsythe et al 2008,
   Riddle et al 2010

Somewhat complex – associated with worry, anxiety, helplessness, symptom magnification, low mental health
Persistent Postop. Pain

Pain Catastrophizing

Recent pilot study - improved TKA outcomes (decreased severity of postop pain, decreased PPOP and improved function) with psychologist-directed preop. pain coping skills training intervention

Riddle et al 2011
Persistent Postop. Pain

Self-efficacy:

Predicts function not pain Wylde et al 2012

Anxiety and depression:

Affect pain & function at 1 year – resolves by 5 yrs
i.e. slows recovery but not clearly associated with true PPOP

Fibromyalgia:

Controversial impact – D’Abruzzo et al 2012  -  Yes
Bican et al 2011  -  No
Persistent Postop. Pain
Central sensitization?

Singh et al 2008 - High preop pain predictive of PPOP

Lundblad et al 2008 – PPOP associated with high preop pain VAS and low pain threshold - ? Central sensitization?

Arendt-Nielsen et al 2010 – clear evidence of central sensitization in pts with OA knee and high self-reported pain levels
Persistent Postop. Pain
Chronic Pain?

*Wylde et al 2011* - Increased PPOP in pts with history of preop. chronic pain elsewhere?

? Inherent vulnerability?

*Liu et al 2012* – Chronic pain elsewhere independent risk factor for PPOP
Persistent Postop. Pain Chronic Opioids?

Chu et al 2006 – risk of tolerance and hyperalgesia with chronic opioid use

Zywiel et al JBJS 2011 - Chronic opioid use prior to TKA cf. matched controls

Stat. signif. - increased LoS

increased PPOP

unexplained stiffness

increased reoperation rate (all causes)
Persistent Postop. Pain Prevention??

Psychological screening and preop intervention?

Periop pregabalin? – PRCT – decreased opioids postop plus? decreased PPOP (Buvanendran et al 2010)

Low dose IV ketamine I/Op?
Persistent Postop. Pain

- A greater problem than previously thought in TJR patients
- Multiple predisposing factors
- Area of current and future (planned) research
Thank You