Regional Revision Network;
The Challenges Faced and Experience to Date

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Running and Setting up Surgical Virtual Out-Patient Clinics
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Why a Revision Arthroplasty Network?
A Growing Problem

Projections of Primary and Revision Hip and Knee Arthroplasty in the United States from 2005 to 2030

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**Fig. 1**
The projected number of primary total hip arthroplasty (THA) and total knee arthroplasty (TKA) procedures in the United States from 2005 to 2030.

**Fig. 2**
The projected number of revision total hip arthroplasty (THA) and total knee arthroplasty (TKA) procedures in the United States from 2005 to 2030.
Knees are Failing due to Challenges like:

Loosening & Instability

<table>
<thead>
<tr>
<th>Overall Reasons for Revision Surgery</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loosening</td>
<td>31.2%</td>
</tr>
<tr>
<td>Instability</td>
<td>18.7%</td>
</tr>
<tr>
<td>Infection</td>
<td>16.2%</td>
</tr>
<tr>
<td>Polyethylene Wear</td>
<td>10.0%</td>
</tr>
<tr>
<td>Arthrofibrosis</td>
<td>7.0%</td>
</tr>
<tr>
<td>Malalignment</td>
<td>6.6%</td>
</tr>
<tr>
<td>Isolated Patella Revision</td>
<td>4.1%</td>
</tr>
<tr>
<td>Periprosthetic Fracture</td>
<td>3.2%</td>
</tr>
</tbody>
</table>

Knee Revision Cases Last Longer due to Complexity

Outcomes are Worse

Patients are Less Satisfied with Revisions than Primaries

Table 10. Satisfaction Outcome Data

<table>
<thead>
<tr>
<th>Satisfaction</th>
<th>Primary, Mean (SD)</th>
<th>Revision, Mean (SD)</th>
<th>Difference</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global</td>
<td>86.4 (24.7)</td>
<td>72.9 (36.3)</td>
<td>-13.5</td>
<td>.01</td>
</tr>
<tr>
<td>Pain</td>
<td>87.5 (24.8)</td>
<td>70.1 (37.0)</td>
<td>-17.4</td>
<td>.01</td>
</tr>
<tr>
<td>Function</td>
<td>82.5 (26.7)</td>
<td>66.7 (37.7)</td>
<td>-15.8</td>
<td>.01</td>
</tr>
<tr>
<td>Recreation</td>
<td>77.3 (24.7)</td>
<td>62.1 (36.3)</td>
<td>-15.1</td>
<td>.01</td>
</tr>
</tbody>
</table>

Revision Total Knee Arthroplasty: 1990 through 2002 (Finnish Register)

• 2637 Knee Revisions from 1990 to 2002
  • Survivorship studied repeat revision as endpoint
  • 95% at 2 years
  • 89% at 5 years
  • 79% at 10 years
    • Age > 70 years
    • > 5 years from primary
    • No PFJ issues

  Good Outcome Predictors
And it gets worse the next time

Failure rates for 4762 revision total hip arthroplasties in the Norwegian Arthroplasty Register

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26% failure rate at 10 years
Inferior functional outcome
Even worse with subsequent re-revisions
2\textsuperscript{nd} revision 28% failure at 10y
3\textsuperscript{rd} revision 40%
4\textsuperscript{th} revision 41%
And It’s Risky!

- Associated with increasing complexity
- Severe impact on our patients
- Medicare Data 1997-2002 (Ong)
  - Instability 1.6x higher than primary
  - Infection 13.3x higher
  - Re-revision 103.6x higher
  - Re-operation within 180 days 35.6%
## Revision TKR in the UK

<table>
<thead>
<tr>
<th></th>
<th>Total Ops</th>
<th>Total Surgeons</th>
<th>Average Ops per Surgeon</th>
<th>Surgeons delivering 5 or fewer*</th>
<th>Surgeons delivering 10 or fewer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>% of all Surgeons</td>
<td>Number</td>
<td>% of all Surgeons</td>
<td>Number</td>
</tr>
<tr>
<td>Primary hip</td>
<td>74,193</td>
<td>51.6</td>
<td>230</td>
<td>16.0%</td>
<td>340</td>
</tr>
<tr>
<td>Hip revision</td>
<td>10,078</td>
<td>12.9</td>
<td>360</td>
<td>45.9%</td>
<td>471</td>
</tr>
<tr>
<td>Total knee replacement</td>
<td>73,043</td>
<td>48.5</td>
<td>130</td>
<td>8.6%</td>
<td>243</td>
</tr>
<tr>
<td>Unicondylar knee replacement</td>
<td>6,582</td>
<td>10.3</td>
<td>348</td>
<td>54.6%</td>
<td>467</td>
</tr>
<tr>
<td>Patello-femoral knee replacement</td>
<td>1,207</td>
<td>3.4</td>
<td>294</td>
<td>83.8%</td>
<td>330</td>
</tr>
<tr>
<td>Knee revision</td>
<td>5,828</td>
<td>6.6</td>
<td>512</td>
<td>58.2%</td>
<td>704</td>
</tr>
</tbody>
</table>
Provision of Specialist Orthopaedics

Established links high volumes and improved outcomes

Need to service increasing workload cost effectively

Manage the challenge of advanced materials and technique

‘Affordable innovation’

Clinical and financial sense to concentrate complex procedures in specialist hubs

Specialist centers drive innovation, improve outcomes and reduce costs

Suggestion that these ‘specialised services’ provided, via MDTs, at specialist centres through ‘networks’
Nottingham University Hospitals NHS Trust
Successful in ‘bid’ for NHS England pilot project establishing revision network

EMSON ‘network’ population
NUH 2.5 Million, SFHFT 420,000, ULH 750,000

NHS England ‘requirements’ Improved NJR submission. Reduced loan kit utilisation
100% compliance for relevant cases
Perceived Challenges

• Clinical Colleagues
  – Anticipated Challenges
    • Engagement
    • ‘NUH’ – A threat
    • ‘Inferiority’ perception

  – Actual Challenges
    • None
    • Embraced by all
    • Viewed as Supportive not Threatening
Nottingham University Hospitals NHS Trust
Successful in ‘bid’ for NHS England pilot project establishing revision network

EMSON ‘network’ population
NUH 2.5 Million, SFHFT 420,000, ULH 750,000

NUH revision surgeons met with clinical and management colleagues from 4 local hospitals
Immediate sign up and ‘buy in’ from clinical colleagues
Tied in with GIRFT initiative. (NUH afforded exemplar status in GIRFT report)

Collective development of clinical criteria, referral protocol, communication pathways, evaluation mechanisms and subsequently, clinical outcome review
Direct discussion during visits has already begun to influence the shape and form of orthopaedic networks, including one network for revision arthroplasty in Nottingham, a city wide review in Manchester and very direct participation in the on going review of the structure of orthopaedic delivery in London.
The Real Challenges

• 'Establishment’ Challenges
  • Governance
  • IT Challenges
    – Webex - Initial set-up/On-going licence
    – PACS - Reliability and speed
    – IT infrastructure in general
  • Consultant time re-imbursement (PA’s)
    – Value to the trust
    – Who pays?
  • Co-ordinator salary
    – Who pays?
Case presentation, via proforma  
Referred via coordinator electronically  
All investigations and imaging available  
Initial plan presented  
Group discussion and a definitive plan developed  
‘Signed off’ by chair  
Communicated with referral hospital  
Audit initial activity aiming eventually to ensure 100% compliance for relevant cases
The EMSON Team

Specialist orthopaedic team leader ‘Chair’
Other orthopaedic colleagues
Microbiologist
Radiologist
(Plastics)
(Anaesthetist)
(PT OT)

Institution facilities
Specialist inventory equipment and implants
Specialist imaging
Critical care, HDU, Rehab services

Vascular/ General Surgical input as available
Activity to date

Meetings weekly since 5\textsuperscript{th} January 2015

18 Consultants from 5 hospitals

Data to end 2017

999 Cases  507 Hips  492 Knees

274 in 2015  135  139

369 in 2016  198  171

356 in 2017  174  182

Significant numbers had amendment or addition to initial plan

Direct transfers to NUH:

6 in 2015, 4 in 2016 and 8 in 2017
Discussion of cases involving a change in plan
Summary

No challenge to involve clinical colleagues

Terms of reference established rapidly

Referral protocol and ‘proforma’ determined

Major problem was **Communication logistics**
- IT / Video facilities and PACS links
- Identifying a ‘best’ time and funding of PAs

Excellent ‘buy in’
East Midlands Specialist Orthopaedic Network

Careful to have an ‘inclusive’ presentation / discussion style

Comments

  Communication technology is not ideal
  Timing is challenging
    ’no one else to discuss the complex cases with’
    ‘meetings have improved practice and confidence’
    ‘The discussion provided valuable advice, helped planning and kit’
    ‘increased confidence’

All groups keen to continue to participate
Specialist Orthopaedic Networks

Introduction now been planned across the NHS

Led by a group of high volume revision TKR surgeons (KRWG)

Hub Sites based on volumes and geography

Cost implications and re-imbursement for treating hospitals to be addressed
Acknowledgements

EMSON is a collective and integrated process
I would like to acknowledge and thank the surgeons at

Pilgrim Hospital, Boston
Lincoln County Hospital
Grantham District Hospital
Sherwood Forest Hospitals
Nottingham University Hospitals

for their support and engagement
A network for complex hip/knee surgery

Set up and (early) experience

EMSON well received and supported by referring surgeons
Network meeting protected, integral and popular part of our week
  IT links, timetables/job plans were issues initially and remain
Analysis of outpatient referrals
  20% rise in tertiary referrals to ARJM and PJJ
Future focus on outcomes, improving value for money, reducing loan kit costs and ensuring 100% compliance, remuneration
Now average 12-15 cases per week
  Introducing (all) complex primaries will be a challenge
Outcome review and combined face to face network meetings
Thank you