Long-term results of per-operative knee arthroscopy in confirming suitability for unicompartmental arthroplasty

Timothy J McMeniman, James R Gill,

Peter J McMeniman, Daniel J Brimm,

Peter T Myers

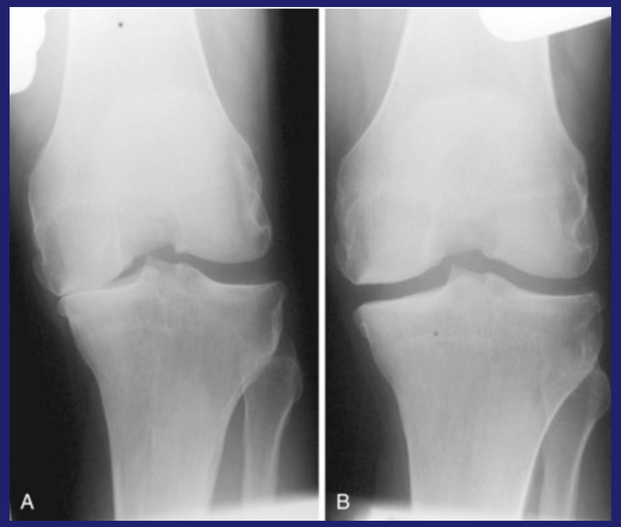
Brisbane Orthopaedic and Sports Medicine Centre

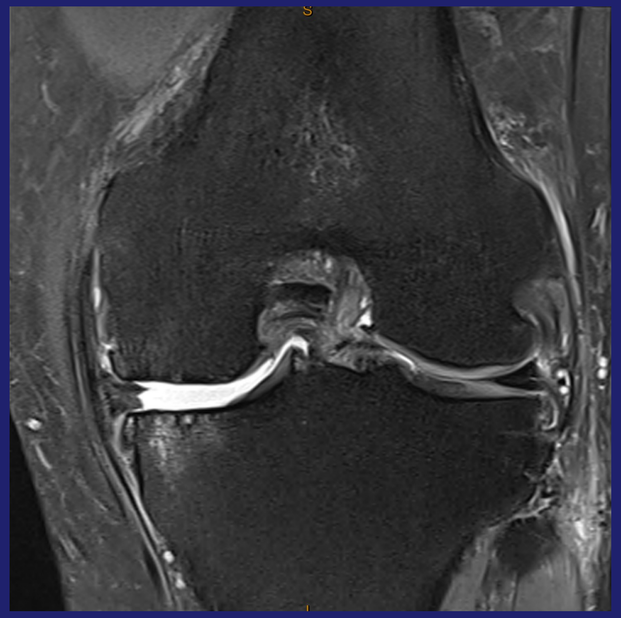
Declaration of Interest

- Timothy J McMeniman
  - Speaker for Smith and Nephew, Arthrex
  - Paid Consultant for DePuy/Synthes
- James R Gill
  - No Financial Conflicts to Disclose
- Peter J McMeniman
  - No Financial Conflicts to Disclose
- Daniel J Brimm
  - No Financial Conflicts to Disclose
- Peter Myers
  - Royalties received from Portal Sportsmed
  - Speaker for Smith and Nephew; Arthrex

Several Methods available for determining suitability for UKA[4]

- History, Examination and standard radiography
- Stress radiography
- Visualisation at the time of arthrotomy
- Radioisotope bone scanning/SPECT
- Magnetic resonance imaging
- Per-operative arthroscopy

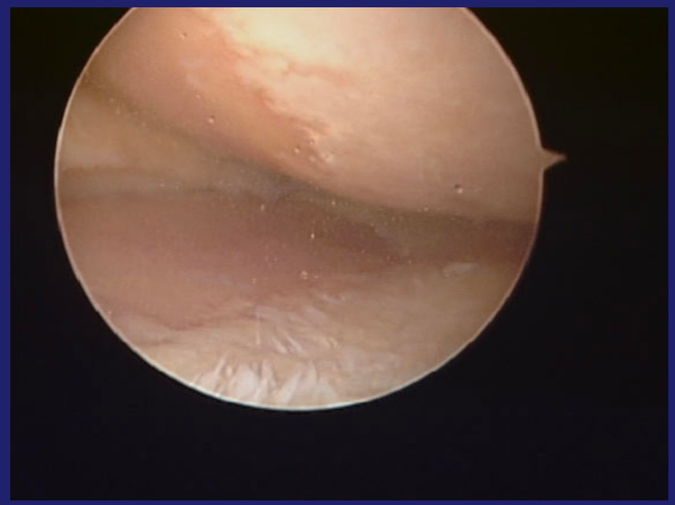


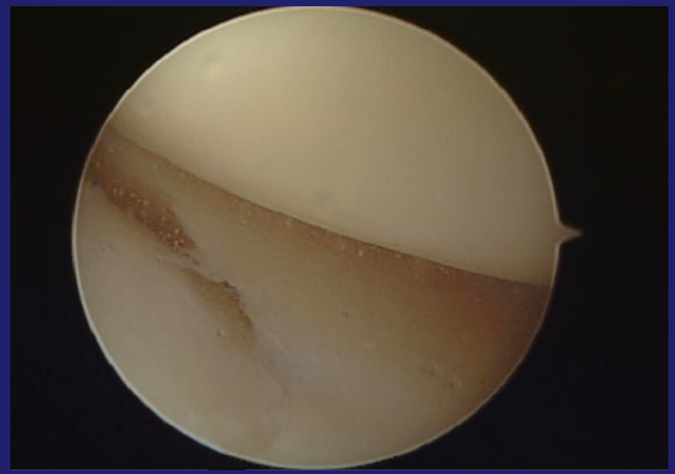


Per-operative arthroscopy at the time of UKA

- Advantages[4]
  - Comprehensive visualisation of all three compartments of the knee difficult to see via arthrotomy alone
    - Lateral meniscus posterior horn
    - Complete visualisation lateral chondral surfaces
    - Lateral facet of the patella

- Disadvantages[12]
  - Time
    - Positioning
    - Added surgical time
  - Presence of a lateral arthroscopic portal
  - Increased rate of change of surgical plan?



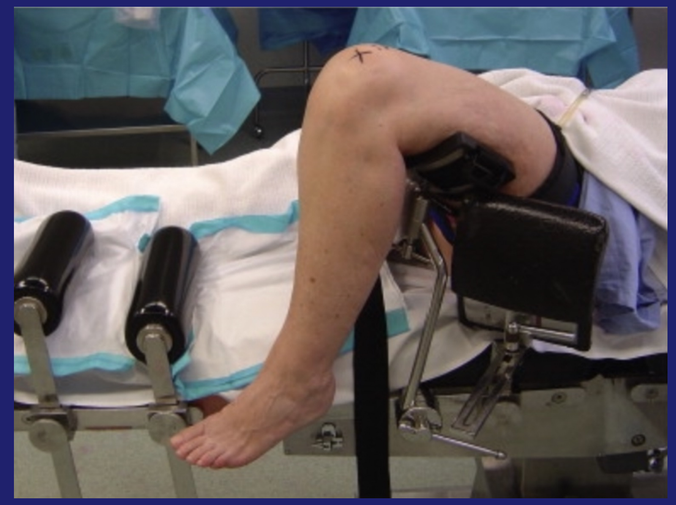


- Patients included in this series
  - All patients undergoing UKA between 1st January 2003 and 31st December 2019.
  - 359 Medial Oxford Unicompartmental arthroplasties
  - Mean age 65.2 ± 7.6 years
    - Main difference the low rate of patients in our practice < 55 yo (5.7% vs 12.7%)
  - 51.3% were female

- Indications for UKA used in this series
  - Medial unicompartmental signs and symptoms
  - Failed non operative treatment
  - Radiographic evidence of medial unicompartmental OA (Kellgren and Lawrence III or IV)
  - Less than ten degrees of fixed knee flexion
  - Knee flexion range of at least 90 degrees
  - A correctable deformity in the coronal plane
  - Intact anterior cruciate ligament
  - Radiographic evidence of patellofemoral OA, even if asymptomatic, was a contra-indication
  - Standard contraindications otherwise
    - Morbid obesity, Inflammatory arthritis

Application of peroperative arthroscopy in this series

- Prep and drape to proceed with UKA including leg holder.
- Bolsters and side support applied to bed for TKR as well
- Single portal arthroscopy
- All three compartments of the the knee inspected
  - ACL was inspected
  - Indications to proceed to TKA:
    - Grade 3 and 4 chondral lesions of any size on the lateral femoral condyle or tibia
    - Grade 4 lesions on the patellar or trochlear cartilage
    - Significant lateral meniscal tears involving the posterior horn or resulting in loss of 15–20% meniscal surface area
    - Extensive chondrocalcinosis involving the entire joint was also an indication for TKA.
- Proceed as appropriate following arthroscopy



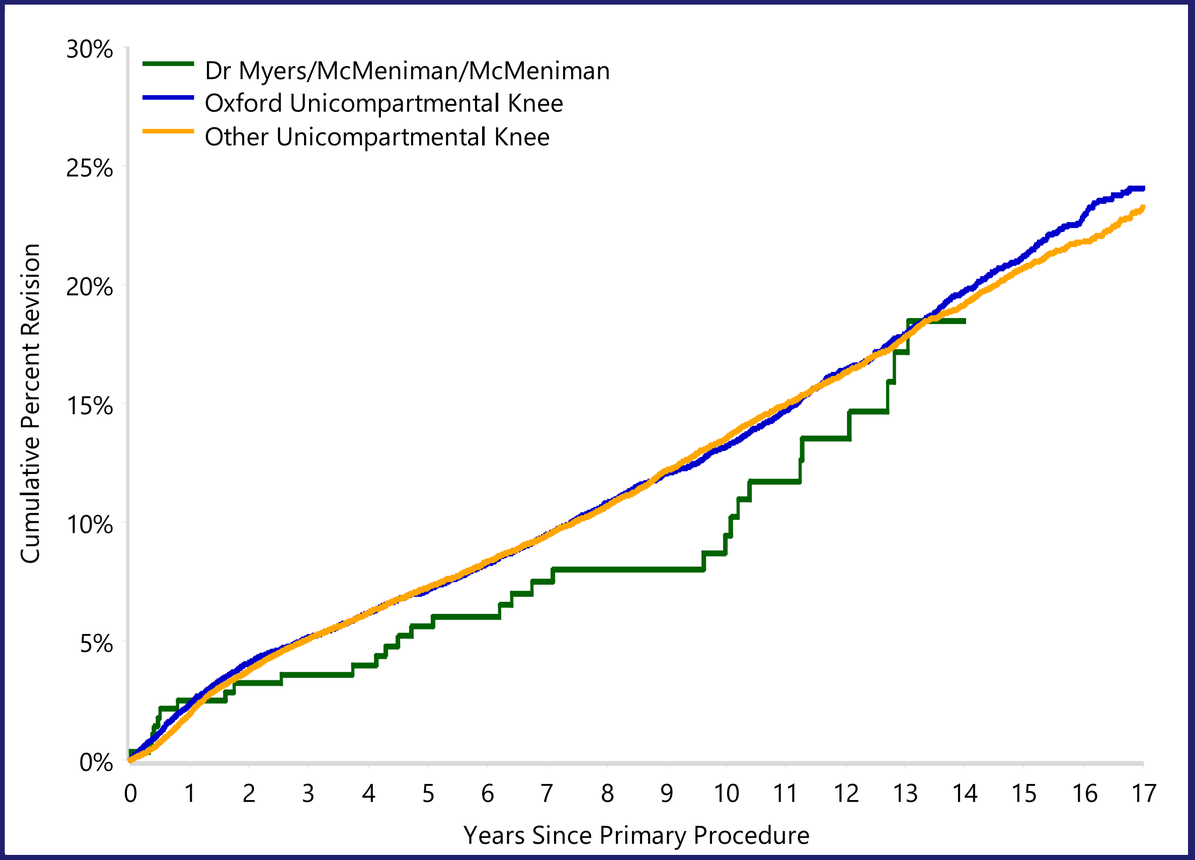
Results: High rate of change of plan resulting in TKA

- Per-operative arthroscopic examination resulted in a change of surgical plan from UKA to TKA in 22 % of patients

- Reasons for change of plan:
  - lateral compartment chondral damage of Outerbridge grade 3 or 4 in 66 knees
  - significant lateral meniscal tears in 5 patients
  - severe patellofemoral OA in one patient
  - extensive chondrocalcinosis in one patient

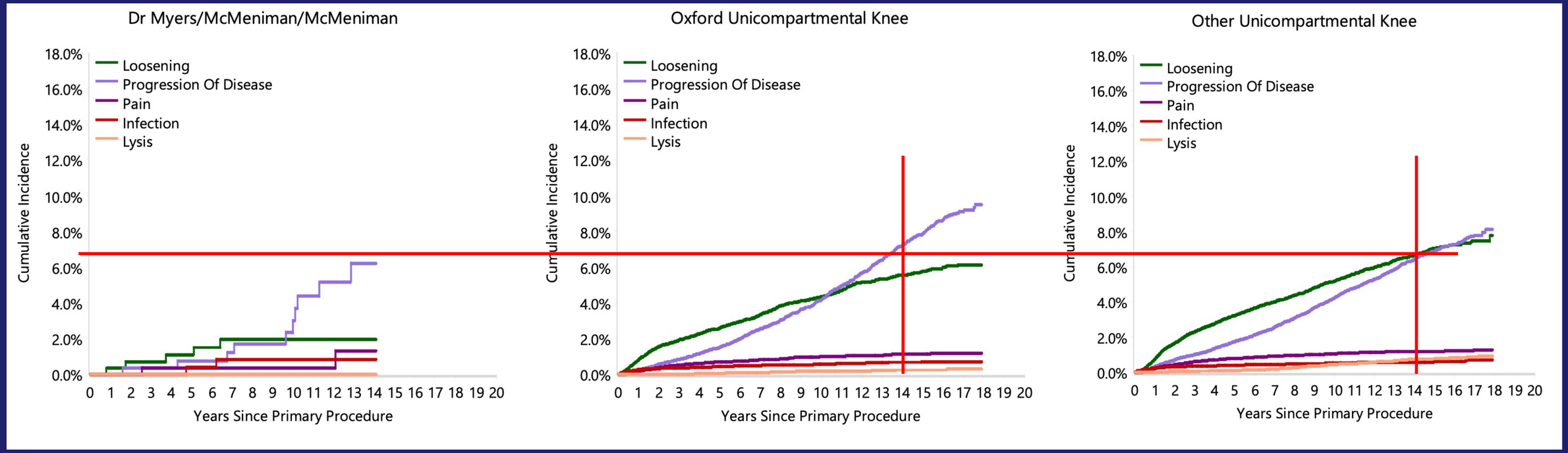
- Possible conclusion that arthroscopic criteria too strict.

Results: Revision Rate of this Series Compared to Oxford and Other UKA in Australian Natioanal Joint Replacement Registry



Revision Diagnosis	Per-operative arthroscopy and Oxford Unicondylar Knee (Group 1)			Oxford Unicondylar Knee (Group 2)			Other Unicondylar Knee (Group 3)		
	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Implant loosening	5	1.8	16.1	694	4.1	32.7	1530	4.8	39.5
Progression Of Disease	10	3.6	32.3	758	4.4	35.7	1298	4.1	33.5
Pain	2	0.7	6.5	151	0.9	7.1	300	0.9	7.7
Infection	2	0.7	6.5	94	0.6	4.4	158	0.5	4.1
Lysis				26	0.2	1.2	136	0.4	3.5
Bearing Dislocation	4	1.4	12.9	118	0.7	5.6	22	0.1	0.6
Fracture	3	1.1	9.7	66	0.4	3.1	82	0.3	2.1
Wear – Tibial Insert	1	0.4	3.2	31	0.2	1.5	77	0.2	2.0
Instability				35	0.2	1.6	45	0.1	1.2
Malalignment				35	0.2	1.6	34	0.1	0.9
Implant Breakage - Tibial				10	0.1	0.5	26	0.1	0.7
Osteonecrosis				5	0.0	0.2	25	0.1	0.6
Patellofemoral Pain	1	0.4	3.2	17	0.1	0.8	23	0.1	0.6
Wear – Tibial				8	0.0	0.4	21	0.1	0.5
Prosthesis Dislocation				18	0.1	0.8	3	0.0	0.1
Implant Breakage - Tibial Insert	1	0.4	3.2	17	0.1	0.8	12	0.0	0.3
Synovitis				2	0.0	0.1	16	0.1	0.4

Results: Reasons for revision between groups.



Vertical red lines are at 14 years post implantation

Results: Increase in progression of disease rate in peroperative arthroscopy group at 10 years, negating the decreased rate over the first 10 years

- Reasons as to this finding unclear but may be due to any of:
  - Statistical variation
  - Multifactorial pathophysiology of osteoarthritis
  - Chondrotoxicity of polyethylene wear particles and their role in disease progression[30] which is not avoided by diagnostic arthroscopy
  - Previous evidence pointing to increased failure rates if arthroscopy performed in the two years prior to UKA[31]

Limitations of this study

- Retrospective cohort study
- Data at this stage not differentiated based on fixation method
  - Ie cemented/uncemented
- Comparator group are from the NJRR is not differentiated
- No PROMS or other outcome data other than revision rates included

Conclusions

- Peroperative arthroscopy is a safe and effective additional method for confirming suitability for UKA
- However, it did not significantly improve long term survivorship of medial unicompartmental arthroplasty in this cohort compared to the cases in the NJRR over the 14 year period of follow up.
- Previously reported improved mid term survivorship[4] was not sustained.
- We were unable to demonstrate that peroperative arthroscopy produces a significant improvement in longevity

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