



8th Advanced Course on Knee Surgery

January 19th to 23rd – 2020

Cemented Vs Cementless: All In or Selective Indication?

Ali Al Belooshi

MB Bch LRCPSI FRCSC MBA

Orthopedic Consultant

Assistant Professor UAEU/MBRU

Total knee replacement

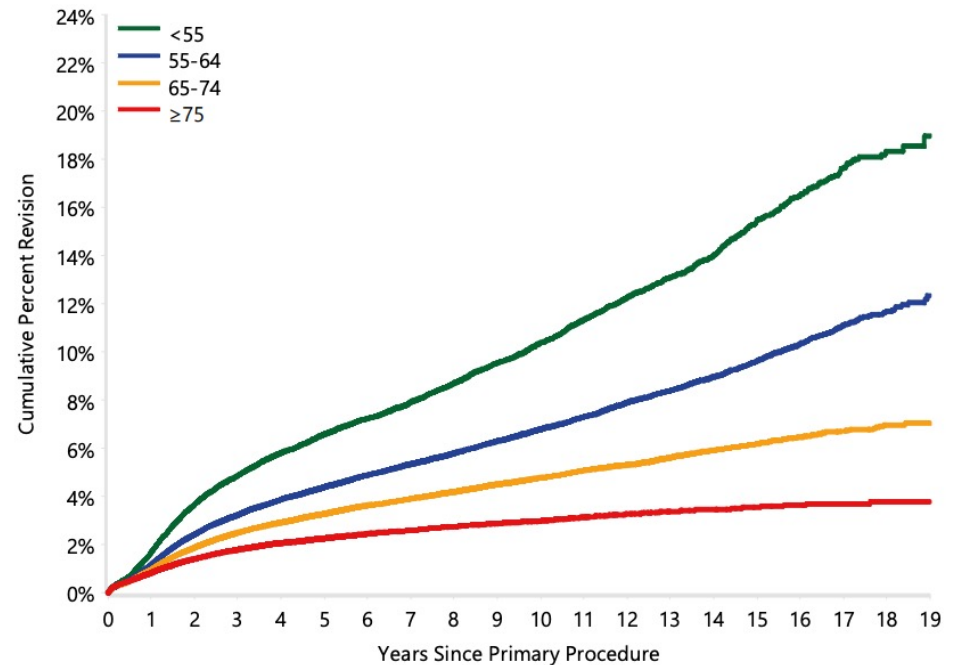
- Pain relief
- Restoration of Function / Mobility
- Survivorship 90-95 % @ 10-15 years
- 80-85% @ 20-25 years
- Historical data patients > 60 years of age
- Fastest Segment
 - Patients < 60 years of age



Revision Burden in TKR

- 14.5% by 2030
- In 75 years of age or more
- 2.5 x in patients < 65 years of age
- 5 x in pts < 55 years of age

Figure KT12 Cumulative Percent Revision of Primary Total Knee Replacement by Age (



Why are total knees failing today? Etiology of total knee revision in 2010 and 2011

Schroer WC, Berend KR et al.
J of Arthroplasty 2013

- 6 centers, 844 failed TKA
- Aseptic loosening (31.2%) - Ingrowth/interface failure
- Instability (18.7%)
- Infection (16.2%)
- Polyethylene wear (10.0%)
- Arthrofibrosis (6.9%)
- Malalignment (6.6%)
- Mean time to failure was 5.9 years (range 10 days to 31 years).
- 35.3% of all revisions occurred less than 2 years after the index arthroplasty, 60.2% in the first 5 years

Fixation method

- Cement
- Cementless
- Hybrid



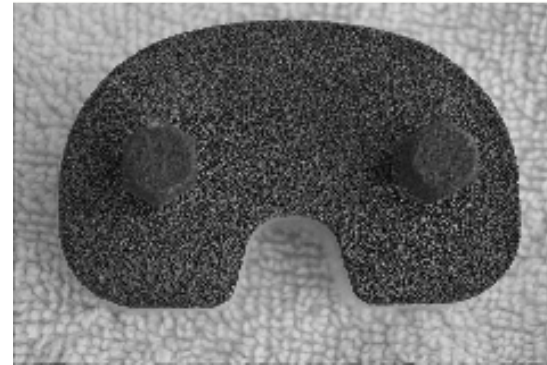
Cementless Total Knee Replacement

- Concerns
 - Initial experience Failure
 - Porous Materials used
 - Initial Fixation
 - Sintered porous beads
 - Plasma Spray
 - Prolong / Persistent pain
 - Mesh Coating
- Inferior Clinical outcomes
- Survivorship



Modern Cementless TKR

- Porous Tantalum
- 3D printed porous technology
 - High Porosity
 - 40-70% more than conventional porous coating
 - High friction surface
 - A more near normal pattern of bone remodeling around and within the implant
 - Press fit implant
 - Potential for immediate weight bearing.

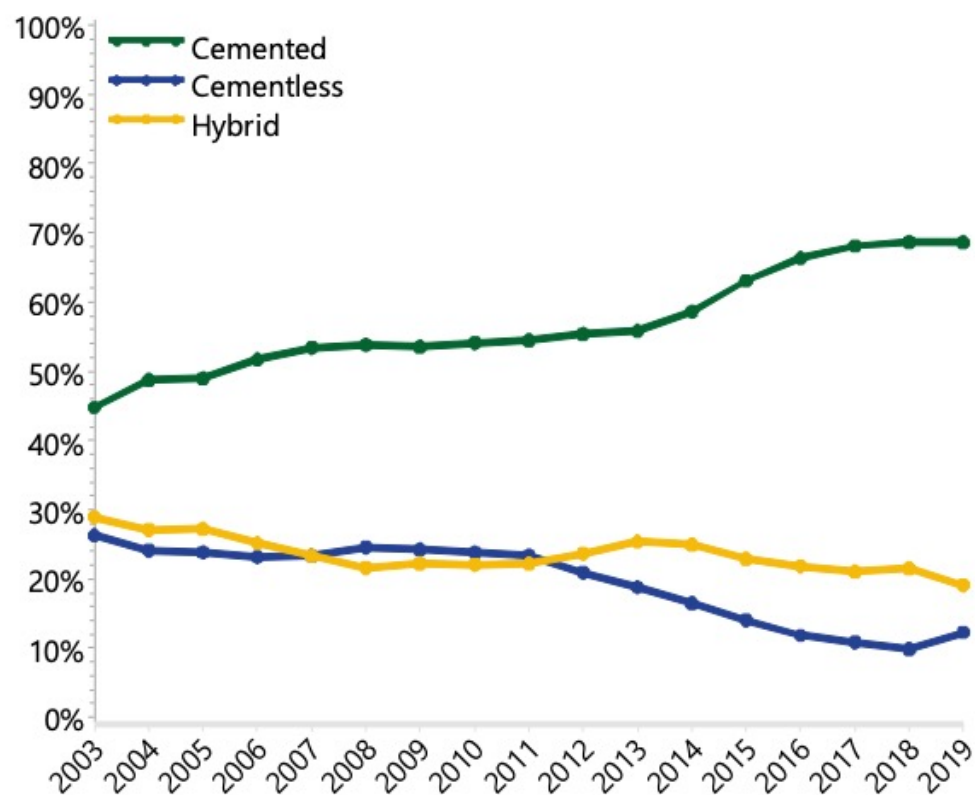


**All in for cementless or Selective
Indication?**



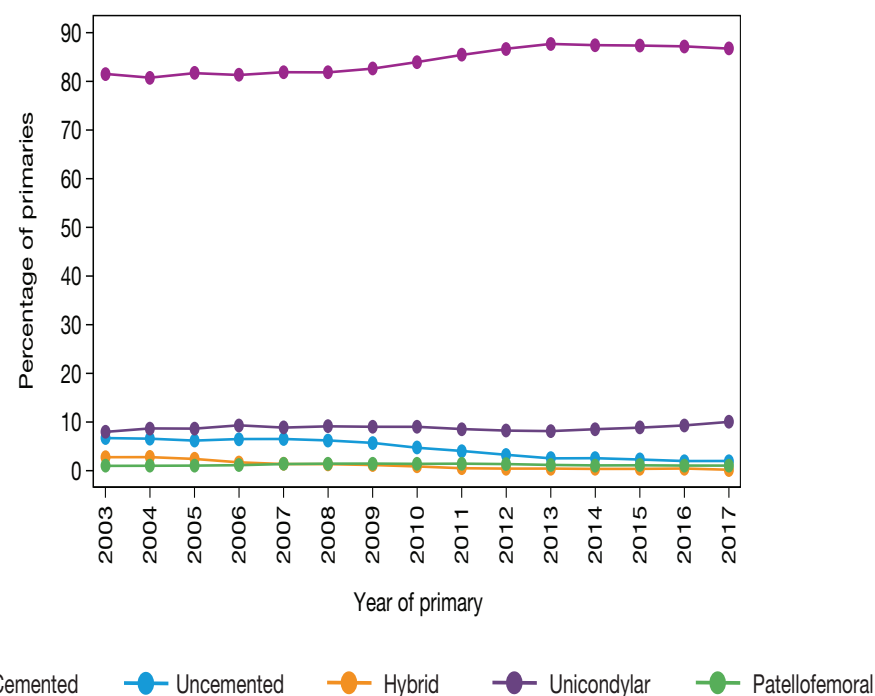
Registry Data

Figure KT4 Primary Total Knee Replacement by Fixation

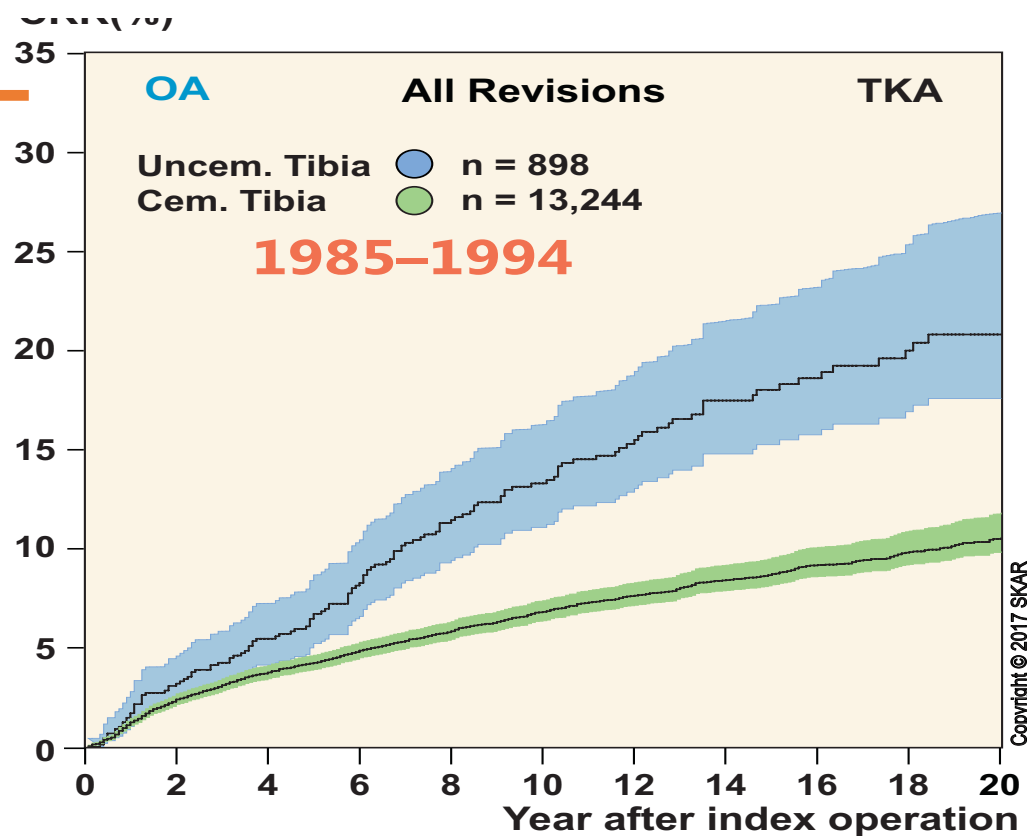
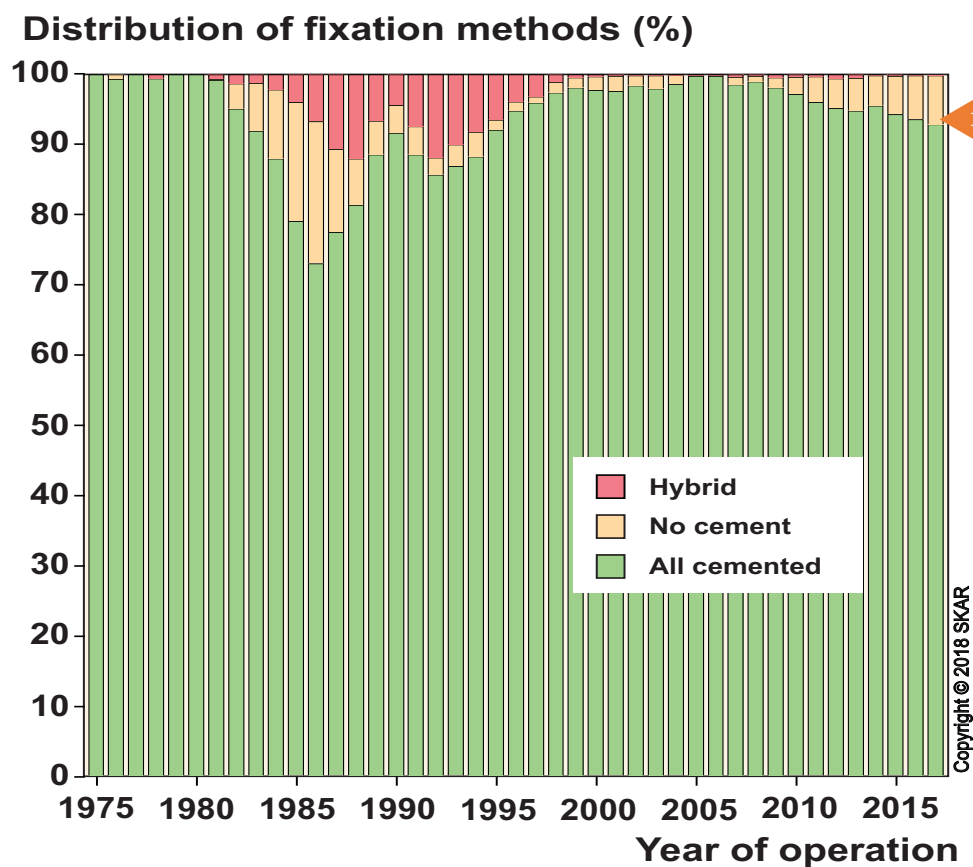


Australian JNR

Figure 3.18 Fixation by year of procedure in primary knee replacement.

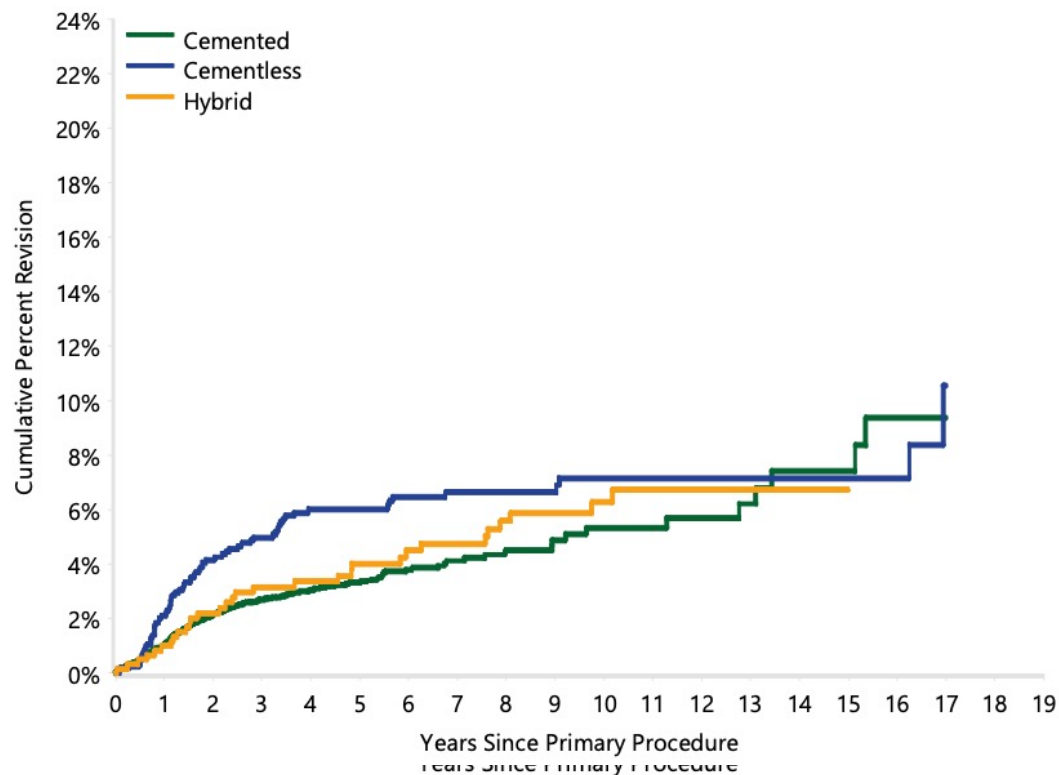


Registry Data



Fixation varies depending on Prosthesis Stability

Figure KT38 Cumulative Percent Revision of Medial Pivot Design Primary Total Knee Replacement by Fixation (Primary Diagnosis OA)



HR - adjusted for age and gender

Cem

Er

Cem

Er

Hyb


Er

Cementing the tibia component gave the best outcome in minimally stabilized knee

Cementing both femur and tibia gave the best outcome for PS and medial pivot knee.

RCT study

The Journal of Bone and Joint Surgery. British volume, Vol. 89-B, No. 12 | Knee

 Free Access

A randomised controlled trial of cemented *versus* cementless press-fit condylar total knee replacement

15-YEAR SURVIVAL ANALYSIS

P. N. Baker, F. M. Khaw, L. M. G. Kirk, C. N. A. Esler, P. J. Gregg

Published Online: 1 Dec 2007 <https://doi.org/10.1302/0301-620X.89B12.19363>

- Cemented 227 Vs Cementless 224

- NO Difference

RCT Study

[Int Orthop](#). 2014 Feb; 38(2): 297–303.

PMCID: PMC3923946

Published online 2014 Jan 14. doi: [10.1007/s00264-013-2243-4](https://doi.org/10.1007/s00264-013-2243-4)

PMID: [24420155](https://pubmed.ncbi.nlm.nih.gov/24420155/)

Cementless and cemented total knee arthroplasty in patients younger than fifty five years. Which is better?

[Young-Hoo Kim](#), [Jang-Won Park](#), [Hyung-Mook Lim](#), and [Eun-Soo Park](#)

- Simultaneous BIL TKR
- Mean age 54.3
- 80 cemented CR NEXT Gen Vs 80 Cementless CR Next GEN
- F/u Mean 16.6 Years

- 100 survival cemented TKR
- 100 survival cementless femur
- 98.75% survival Cementless Tibia

How about Morbid Obese Patients?

Multicenter Study > J Arthroplasty. 2016 Aug;31(8):1727-31. doi: 10.1016/j.arth.2016.01.025.
Epub 2016 Jan 29.

Cemented vs Cementless Total Knee Arthroplasty in Morbidly Obese Patients

Deren T Bagsby¹, Kimona Issa², Langan S Smith³, Randa K Elmallah², Logan E Mast⁴,
Steven F Harwin⁵, Michael A Mont², Samrath J Bhimani⁶, Arthur L Malkani⁴

- 149 Cemented Vs 143 Cementless
- BMI > 40

- Cementless TKAs have significantly lower revision rates compared to cemented TKA (0.7% vs 13%, $p < 0.001$)

Mata-analysis

Cementless versus cemented total knee arthroplasty in young patients: a meta-analysis of randomized controlled trials

Chengyu Chen ¹, Ruodong Li ²

Affiliations + expand

PMID: 31426816 PMCID: [PMC6700781](#) DOI: [10.1186/s13018-019-1293-8](#)

[Review](#) > [Int J Surg](#). 2018 May;53:312-319. doi: 10.1016/j.ijsu.2018.04.015. Epub 2018 Apr 12.

No difference in implant survivorship and clinical outcomes between full-cementless and full-cemented fixation in primary total knee arthroplasty: A systematic review and meta-analysis

Kai Zhou ¹, Haoda Yu ¹, Jinglong Li ¹, Haoyang Wang ¹, Zongke Zhou ², Fuxing Pei ¹

[Review](#) > [J Bone Joint Surg Br](#). 2009 Jul;91(7):889-95. doi: 10.1302/0301-620X.91B7.21702.

Survival and clinical function of cemented and uncemented prostheses in total knee replacement: a meta-analysis

R Gandhi ¹, D Tsvetkov, J R Davey, N N Mahomed

No significance difference
Cemented Vs Cementless
in survival and functional
outcome

RSA Study

The best tool for predicting long term
fixation of implants

RSA Study

> [Bone Joint J.](#) 2019 Jul;101-B(7_Supple_C):55-60.
doi: 10.1302/0301-620X.101B7.BJJ-2018-1493.R1.

Predictive value of short-term migration in determining long-term stable fixation in cemented and cementless total knee arthroplasties

[E K Laende](#)¹, [C G Richardson](#)², [M J Dunbar](#)¹

- 58 cemented Vs 21 cementless RSA
- MTPM Static and inducible (single leg stance)
- Strong correlation between 1 to 2 years RSA finding to > 10 years follow up findings
- Median overall migration at long-term follow-up was the same in both
- Inducible displacement at ten years was significantly higher for cemented components ($p < 0.001$)
- Cemented showing progressive migration over the long-term
- Cementless fixation migrates the most in the first two years, but then stabilizes

RSA Study

Migration of a novel 3D-printed cementless versus a cemented total knee arthroplasty: two-year results of a randomized controlled trial using radiostereometric analysis

Shaho Hasan ¹, Koen T van Hamersveld ¹, Perla J Marang-van de Mheen ², Bart L Kaptein ¹, Rob G H H Nelissen ³, Sören Toksvig-Larsen ⁴ ⁵

- 36 cemented vs cementless 3D printed
 - MTPM at 3, 12 & 24 months
- No difference in mean migration between the two groups ($p = 0.497$)
 - cementless TKA show increased migration in the initial three months, which then stabilises

Cost-Effectivness

- Lawrie et al's ²⁰¹⁹ recent RCT
- Cementless implants cost on average \$366 more than cemented
- Total costs of cementation \$588 to \$1,043
- 10 min saved \$36/ min
- less hospital stay due to younger active patient



Cementless TKR

- Very young
- High Demand
- Morbid Obese patient
- Robotic surgery might improve the results:
 - Decreasing outlier
 - Better alignment
 - Better soft tissue balance
 - Better bony cut surface
- It is a matter of time for Cementless to be the gold standard

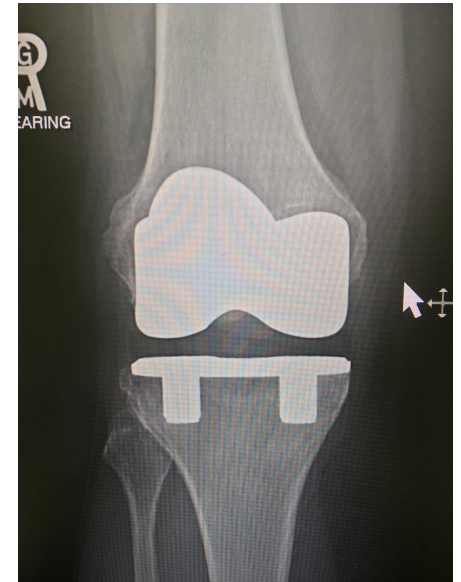


Cemented TKR is still the Gold Standard

- Implant design
 - Good track record
 - Roughened surface
 - Adequate Keel length
- Cement type
- Cementing technique

TAKE Home Message

- *Cementless is best option for very young, high demand patient and morbid obese patients*
- *Cemented TKR remains the gold standard for now in all other patients*
- *Pay attention to your cementing technique*
- *Longer term data is needed to show superiority of cementless implants*



Thank You

