

Primary TKA Journal Club

Disclosures

- ▶ CORIN Ltd.- Apollo Robotic Knee Platform

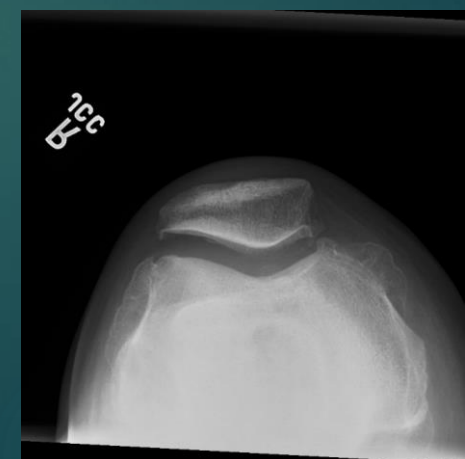
Topics

- ▶ Fixation
- ▶ Alignment
- ▶ Technology/ Robotics
- ▶ Bearing Choice
- ▶ Therapy



Fixation

- ▶ 59yoM, h/o open meniscectomy and subsequent A/S
- ▶ HTN, BMI 30



Questions

- ▶ What % of your TKAs are cemented vs cementless?
- ▶ If cementless, all comers vs selective?

Cementless Versus Cemented Total Knee Arthroplasty

Concise Midterm Results of a Prospective Randomized Controlled Trial

Charles P. Hannon, MD, MBA, Rondek Salih, MPH, Robert L. Barrack, MD, and Ryan M. Nunley, MD

Investigation performed at Washington University in St. Louis, St. Louis, Missouri

J Bone Joint Surg Am. 2023;105:1430-4

- ▶ RCT 127 TKA pts (mean f/u 6yr) of original 141 pts (2yr) (2014-2016)
 - ▶ Same TKA design
- ▶ Clinical and Radiographic Outcomes
 - ▶ Oxford Knee, Knee Society, and Forgotten Joint Scores
- ▶ Survivorship 100% in both groups
- ▶ Radiographically no loosening in either group
- ▶ No difference in PROMs
 - ▶ Higher % of pts either extremely/very satisfied in cementless group (84% vs 66%, $p = 0.01$)

In Total Knee Arthroplasty, Cementless and Hybrid Tibial Components Did Not Differ from Cemented Components for Revision-Free Survival and Had No Aseptic Loosening at 10 Years

Gibon E, Lewallen DG, Larson DR, Stuart MJ, Pagnano MW, Abdel MP, John N. Insall Award: randomized clinical trial of cementless versus cemented tibial durable and reliable at a mean 10-years follow-up. J Arthroplasty. 2023 Jun;38(6S):S14-S20.

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- ▶ Same PS TKA design
 - ▶ Cementless monoblock (n=132), hybrid monoblock tibia w/ 2 cementless pegs (n=130), modular cemented baseplate (n=135)
- ▶ 10 year follow-up
- ▶ Outcomes
 - ▶ Survivorship (all cause, aseptic loosening);
 - ▶ Knee Society pain/function

TABLE I Cementless monoblock tibia or hybrid monoblock tibia versus traditional modular cemented tibia in TKA (Intention-to-treat analysis)*

Outcomes	Cementless monoblock	Hybrid monoblock	Traditional modular cemented	P value†
Event rates at a mean 10 years‡				
Revision-free survival	96%	96%	89%	0.05
Aseptic loosening of tibial component	0%	0%	7%	0.003
Survival free from any reoperation	92%	90%	82%	0.08
Mean scores				
Knee Society pain score‡	79	75	74	0.30
Knee Society function score‡	69	72	66	0.51

*TKA = total knee arthroplasty. †P value is for comparison of the 3 treatment groups—pairwise comparisons were not performed. ‡Score range, 0 (worst knee condition) to 100 (best knee condition).

Questions

- ▶ If cemented, what factors/ level of data would be needed to make a switch?
- ▶ How does one factor cost into decision making?

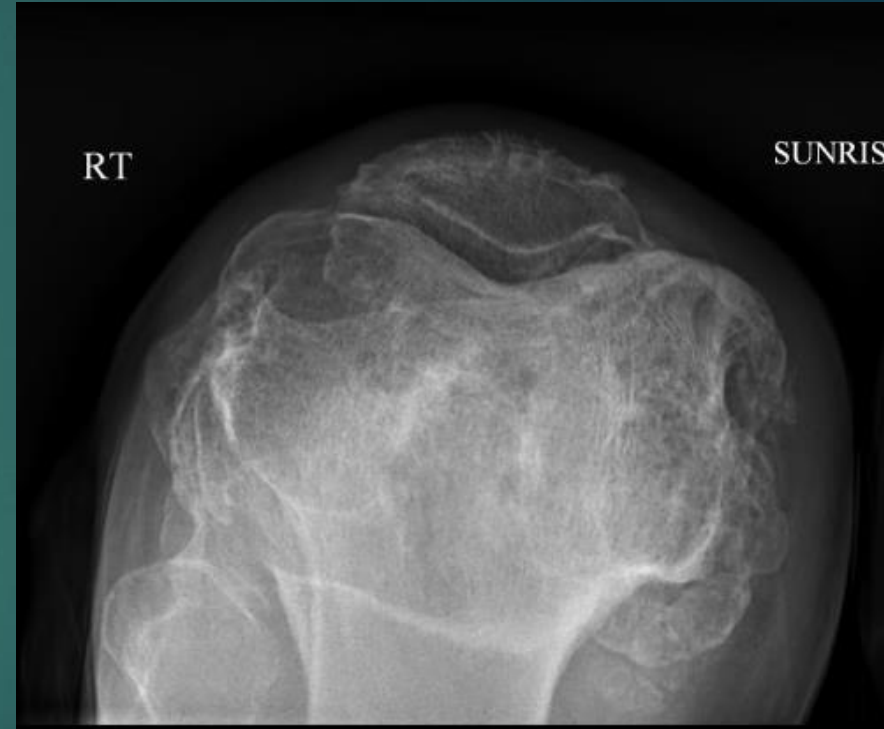
Alignment

- ▶ 67yoM
- ▶ COPD, cirrhosis, DM, colon CA, BMI 33
- ▶ L>R knee pain

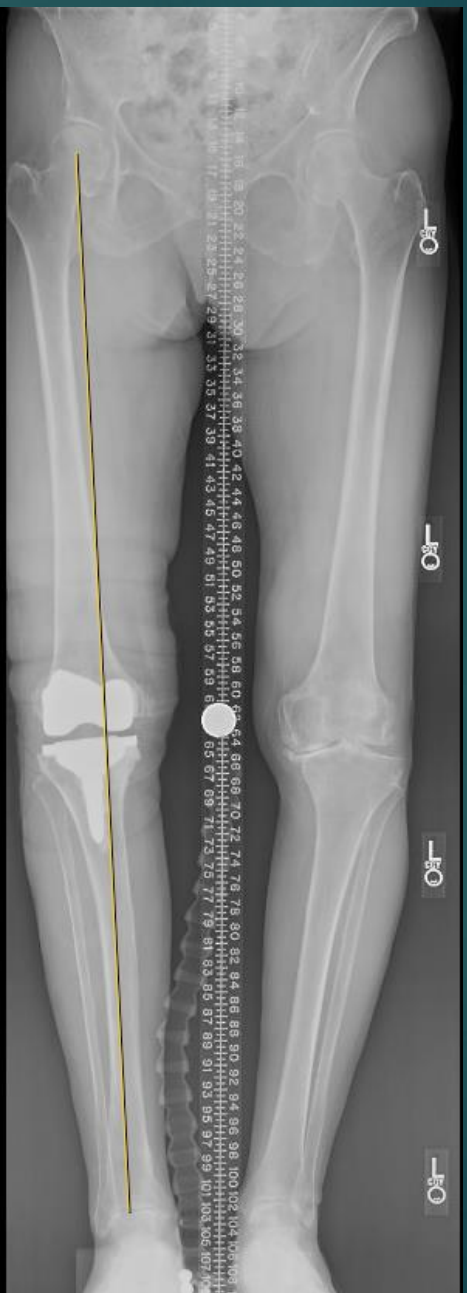












Questions

- ▶ Do you think that adopting individualized vs universal alignment strategies can really mitigate TKA patient dissatisfaction?
- ▶ Is anyone still concerned about survivorship of implants based on obliquity of joint line?

A Randomized Controlled Trial of Kinematically and Mechanically Aligned Total Knee Arthroplasties: Long-Term Follow-Up

H. Gene Dossett, MD ^{a,*}, Jaymeson R. Arthur, MD ^b, Justin L. Makovicka, MD ^b,
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- ▶ Original cohort 88 pts (44 KA via PSI, 44 MA via conventional instruments)
 - ▶ N=62 @ mean 13 yr f/u
- ▶ Outcomes: Reoperations, complications, PROMs (WOMAC, Oxford Knee, Forgotten Joint, patient satisfaction)
- ▶ 15 pts (17%) had ≥ 1 reoperation, 5 pts (6%) complete revision
- ▶ No difference in major/minor complications between groups
- ▶ KA TKAs self reported non significant ($p=0.16$) improved satisfaction (96% vs 82%) but no difference in all other PROMs

Patient-Reported Outcomes of Kinematic vs Mechanical Alignment in Total Knee Arthroplasty: A Systematic Review and Meta-analysis of Randomized Controlled Trials

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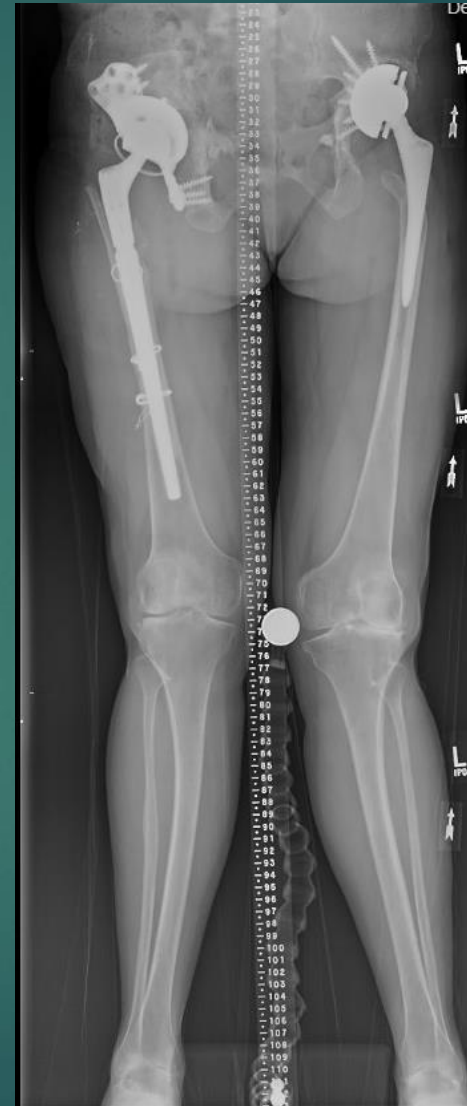
- ▶ 6 RCT studies included
 - ▶ Evaluated for risk of bias and inconsistencies of methodology
- ▶ PROMs: WOMAC, Oxford Knee, Knee Society Score
- ▶ Majority of studies demonstrated low risk of bias
- ▶ Heterogeneity in technique to achieve MA vs KA
- ▶ No significant difference in any outcome measure between KA vs MA

Questions

- ▶ What would be the ideal methodology of a study to compare differences in alignment strategies?
- ▶ Given ceiling effect of our PROMs, what outcomes should we be measuring to differentiate between KA vs MA techniques in future studies?

Technology/ Robotics

- ▶ 55yoF w/ JRA, multiple previous arthroplasties
- ▶ Happy w/ recent L TKA, now wants R TKA



Questions

- ▶ What % of your arthroplasty practice is 'technology assisted'? Is there a difference in TKA vs THA?
- ▶ What was your adoption curve?
- ▶ What do you see as the benefit of 'technology assisted' TKA?



■ KNEE

Robotic Arm-assisted versus Manual (ROAM) total knee arthroplasty: a randomized controlled trial

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K. Smith,
D. J. Weir,
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Newcastle, UK*

- ▶ 100 pts: robotic vs manual TKA
- ▶ Primary outcomes: WOMAC functional score @ 6 month
- ▶ No difference in WOMAC functional score, satisfaction, EQ-5D, utility gain or fulfillment of patient expectation @6mo
- ▶ rTKA greater improvement in WOMAC pain @2mo but not @ 6mo

Robotic Arthroplasty Clinical and cost Effectiveness Randomised controlled trial (RACER-knee): a study protocol

 James Griffin^{1, 2}, Edward T Davis³,  Helen Parsons^{1, 2}, Elke Gemperle Mannion¹,  Chetan Khatri^{1, 2},  David R Ellard^{1, 2}, Mark J Blyth⁴,  Nicholas David Clement^{5, 6}, David Deehan⁷, Nicholas Flynn⁸, Josephine Fox⁹, Nicholas J Grant⁹, Fares S Haddad¹⁰, Charles E Hutchinson^{2, 11}, James Mason¹, Bishal Mohindru¹,  Chloe E H Scott^{12, 13},  Toby O Smith¹, John A Skinner¹⁴, Andrew D Toms¹⁵,  Sophie Rees¹⁶,  Martin Underwood^{1, 2},  Andrew Metcalfe^{1, 2}
Correspondence to James Griffin; James.Griffin@warwick.ac.uk

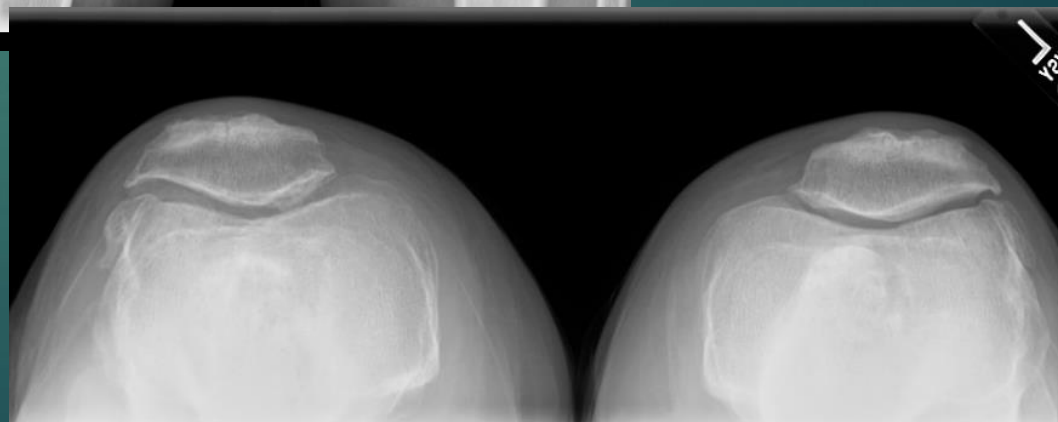
- ▶ Multicenter, RCT rTKA vs mTKA
 - ▶ Sham incisions for arrays, blinded operative reports
- ▶ 332 pts, to provide 90% power for MCID (12pt diff) in Forgotten Joint Score @12mo
 - ▶ Additional early and late secondary outcome measures (pain, opiate use, EBL, and hospital LOS)
- ▶ Embedded learning study to assess outcomes of surgeons training w/ robotic system
- ▶ Cost effectiveness evaluated using within trial and modeling approaches

Questions

- ▶ What outcomes should studies comparing rTKA and mTKA focus on?
- ▶ How do we balance the education of the trainees w/ increasing adoption of technology in our ORs?

Bearing Choice

- ▶ 59F R knee pain
- ▶ DM, HTN, BMI 34
- ▶ ROM 5-115
- ▶ 10° valgus partially correctible



Questions

- ▶ Has your choice of PE inserts changed over your career? And if so why?
- ▶ Is bearing choice even a clinically relevant issue at this point in time?

Total knee replacement survivorship by Design Philosophy: are we ignoring medial pivot design? Analysis based on the UK National Joint Registry

D M Staunton, R Mohan, J R Carter, A J Highcock

[Acta Orthop Belg. 2023 Mar;89\(1\):37-43.](#)

- UK National Joint Registry, 2020
- CR, PS, MB, vs MP
- Outcome: All cause revision calculated to 15ys w/ K-M curves

- 1,144,384 TKAs
 - CR (67%), PS (23%), MB (7%) and MP (3%)
- MP and CR- best survivorship (95.7% and 95.6%) @15yrs
 - Statistically significant at, and beyond, 10yrs
- PS and MB lower at all time points (94.5%) @15yrs

Ultracongruent Designs Compared to Posterior-Stabilized and Cruciate-Retaining Tibial Inserts – What Does the Evidence Tell Us? A Systematic Review and Meta-Analysis

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- ▶ 19 studies included, 2000-2022 (2015->)
 - ▶ 5 UC vs CR, 14 UC vs PS
 - ▶ Level 1 (PRCT) or 2 (prospective comparison) studies
 - ▶ Only 1 RCT considered “good quality”
 - ▶ Kinematic and Clinical outcomes
- ▶ CR studies: no difference in knee flexion or WOMAC scores
- ▶ PS studies: better AP stability and more femoral rollback for PS, no difference in knee flexion, M-L stability, WOMAC, KSS

Therapy

- ▶ 65yoF 6wks s/p L TKA
- ▶ Pre-op ROM 5-120
- ▶ Intra-op ROM 0-120
- ▶ 6wks ROM 0-75



Questions

- ▶ What is your current practice regarding postop PT for TKA patients? Did that change during pandemic? And does that differ for THAs?

A Smartphone Application-Based Remote Rehabilitation System for Post-Total Knee Arthroplasty Rehabilitation: A Randomized Controlled Trial

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- ▶ 100 TKA pts: telerehab (APP + sensor) vs control
- ▶ Primary outcome: ROM @12wks
- ▶ Secondary outcomes: PROMS (WOMAC, KSS, SF-36), functional tests (SST, SLST), satisfaction, costs, complications, and 90d readmission rates
- ▶ @12wks, telerehab outperformed controls in ROM (124 vs 119), SF-36 (62 vs 46), SLST (13 vs 9), and SST (17 vs 19)
- ▶ No difference in WOMAC, KSS, costs, complications and readmissions

Questions

- ▶ What role do you see for tech based solutions for postop therapy for TKA patients?

THANKS

