

Patellar Resurfacing vs Non-Resurfacing in PS TKA — 5-Year RCT

Catteeuw A, Vermue H, Lefeuvre A, Servien E, Batailler C, Lustig S. A Prospective, Single-Center, Randomized Controlled Study Comparing Non-Resurfacing versus Resurfacing in a Cohort of 250 Posterior-Stabilized Total Knee Arthroplasty With a Minimum Five-Year Follow-Up.

Citation: J Arthroplasty 2026;41:1727–1733 (PMID 41052730). doi:10.1016/j.arth.2025.09.046.

Study type / level of evidence: Therapeutic study — single-center prospective randomized controlled trial, open-label, minimum 5-year follow-up (213 of 250 analyzed). Level II (RCT, unblinded).

Part 1 — Leopold Five-Minute Critical Appraisal

1. What kind of study and what design?

A prospective RCT randomizing 250 knees to patellar resurfacing (PR) or patellar non-resurfacing (PNR) with the same fixed-bearing, posterior-stabilized 'patella-friendly' implant, evaluated at a minimum of 5 years with KSS, Forgotten Joint Score, Kujala and Lille anterior-knee-pain scores, radiographs, and survivorship.

2. Does it study an important question?

Yes. Patellar management remains genuinely controversial; anterior knee pain affects up to 30% of TKA patients, resurfacing carries fracture/maltracking/loosening risk, and non-resurfacing carries secondary-resurfacing risk. Whether modern patella-friendly trochlear designs neutralize the resurfacing advantage is exactly the current question.

3. To whom does it apply, and to whom not?

Primary cemented, fixed-bearing, posterior-stabilized patella-friendly TKA (Amplitude Anatomic). It excludes isolated patellofemoral OA, constrained implants, and preoperative flexion <90°, and should not be generalized to cruciate-retaining or non-patella-friendly designs; the referral-center setting also affects baseline revision rates.

4. Describe the methods — anything to watch for?

The trial is open-label, so perception bias can affect patient-reported outcomes. Marked ceiling effects (median scores of 100 on KSS, FJS, Kujala, and Lille) limit discrimination. Secondary resurfacing in the PNR arm is counted as a revision, which inflates the PNR revision rate. There was 9% loss to follow-up plus 4% mortality, and revision was indicated only for clinically relevant anterior knee pain (radiographic change alone was insufficient), which sensibly limits over-revision but is a defined convention to note.

5. Were hypotheses clearly stated?

Yes — the authors hypothesized no significant long-term clinical or functional difference between resurfacing and non-resurfacing in this setting.

6. Key results — any counterintuitive findings?

At 5 years there were no significant differences in any clinical or functional score (KSS knee P=0.21, function P=0.19, FJS P=0.24, Kujala P=0.36, Lille P=0.43). Patellofemoral-cause revision was 3.8% overall with no group difference; 5 PNR patients (4.5%) underwent secondary resurfacing and 2 PR patients (1.8%) needed button revision. Five-year survival was

91.8% (PNR) vs 93.6% (PR), not significant. The counterintuitive finding is that radiographic patellofemoral OA progressed in the PNR group without any measurable decline in patient-reported outcomes.

7. Strengths?

A randomized design with a prespecified power calculation, a modern patella-friendly implant, a minimum 5-year follow-up, validated anterior-knee-pain instruments (Kujala, Lille, FJS), conservative symptom-based revision criteria, and patient-completed questionnaires that reduce surgeon-presence bias.

8. Weaknesses?

Open-label design, pronounced ceiling effects, secondary resurfacing counted as revision (inflating the PNR revision rate), loss to follow-up, a single referral center with higher-than-registry revision rates, a single implant design limiting generalizability, likely under-powering for the revision endpoint, and no stratification by preoperative anterior knee pain.

9. How does it fit with what is known, and what remains?

It is consistent with the Burnett RCTs, Deroche 2021 (a closely related 250-knee RCT), and Simpson 2023, which found no clinically significant resurfacing advantage with patella-friendly designs. It runs counter to meta-analyses favoring routine resurfacing for anterior knee pain and revision reduction (Migliorini 2019; Chen 2021), and must now be read against the brand-new Murray 2026 Lancet 20-year multicentre RCT reporting long-term clinical and economic results. Open questions: validated selective-resurfacing criteria, very-long-term outcomes, and design-specific effects.

10. Would it change your practice?

It supports a selective rather than routine resurfacing approach when using a modern patella-friendly PS design — a reasonable basis to individualize. However, it should be weighed against the 2026 Lancet 20-year RCT, the highest-quality long-term and economic evidence, which may still favor resurfacing on revision and cost grounds; a 5-year single-center trial should not override that. Net: being selective is defensible, but the long-term registry/RCT signal continues to lean toward resurfacing for revision reduction.

Validity and Bias

Internal validity: Randomization supports internal validity, but the open-label design introduces detection/perception bias on subjective scores, ceiling effects limit discrimination, and counting secondary resurfacing as a revision biases the comparison against PNR.

External validity (generalizability): A single fixed-bearing, posterior-stabilized, patella-friendly design at a knee-arthroplasty referral center; not generalizable to CR or non-patella-friendly implants.

Principal biases: Detection/perception bias (no blinding), transfer bias (9% loss to follow-up), and an endpoint-definition bias (secondary PR scored as revision).

Part 2 — Comparison to the Existing Literature

Search method: PubMed searched across three windows — the past 20 years (2006–2026), the past 2 years (2024–2026), and the trailing 30 days (29 May–29 June 2026). Citations below include DOIs (source: PubMed).

Foundational / landmark context (20-year window)

The randomized foundation includes Burnett 2004 (CORR, 10-year RCT) and Burnett 2007 (bilateral RCT), with Grassi 2018 (KSSTA) synthesizing overlapping meta-analyses and Migliorini 2019 reporting better outcomes with routine resurfacing — establishing the long-running split between 'no difference' trials and meta-analyses favoring resurfacing.

Past two years (2024–2026)

Tang 2022/2023 (Orthop Surg) meta-analyzed 50 RCTs with trial sequential analysis; Simpson 2023 (Knee) found no clinically significant advantage to resurfacing with patella-friendly implants; Deroche 2021 (KSSTA) reported no difference in a 250-knee RCT; and Upadhyay 2024 (Cureus) reviewed the ongoing controversy. These broadly support the present trial's 'no clinical advantage' conclusion in modern designs.

Trailing 30 days

The most important current evidence is Murray DW, et al. (Lancet 2026), reporting 20-year clinical and economic results of a large UK multicentre randomized trial of patellar resurfacing — the highest-level long-term data available and a direct counterweight, since long-horizon and economic outcomes may favor resurfacing on revision/cost grounds even when 5-year PROMs are equivalent.

Where this paper sits in the literature

This study adds a modern patella-friendly PS RCT at 5 years to a literature divided between equivalence trials and resurfacing-favoring meta-analyses. Its short-to-mid-term equivalence is credible and supports selective resurfacing, but it must be interpreted alongside the 2026 Lancet 20-year RCT, which carries greater weight for the long-term revision and cost questions that 5-year data cannot answer.

Key comparator references

1. Murray DW, et al. Patellar resurfacing in total knee replacement: 20-year clinical and economic results of a large multicentre, randomised controlled trial in the UK. Lancet 2026. [doi:10.1016/S0140-6736\(26\)00652-5](https://doi.org/10.1016/S0140-6736(26)00652-5)
2. Tang X, et al. Patellar Resurfacing in Primary TKA: Meta-analysis and Trial Sequential Analysis of 50 RCTs. Orthop Surg 2022;14:1227. [doi:10.1111/os.13392](https://doi.org/10.1111/os.13392)
3. Grassi A, et al. Patellar resurfacing versus retention in primary TKA: systematic review of overlapping meta-analyses. Knee Surg Sports Traumatol Arthrosc 2018;26:3206–3218. [doi:10.1007/s00167-018-4831-8](https://doi.org/10.1007/s00167-018-4831-8)
4. Deroche E, et al. No difference between resurfaced and non-resurfaced patellae with a modern prosthesis design: a prospective randomized study of 250 TKAs. Knee Surg Sports Traumatol Arthrosc 2021. [doi:10.1007/s00167-021-06521-y](https://doi.org/10.1007/s00167-021-06521-y)
5. Upadhyay P, et al. Patellar Resurfacing in Total Knee Arthroplasty: A Contentious Matter. Cureus 2024;16:e70936. [doi:10.7759/cureus.70936](https://doi.org/10.7759/cureus.70936)

Addendum — Detailed Analysis of Murray DW, et al. (Lancet 2026): The KAT 20-Year Results

Citation: Murray DW, Hudson J, Dakin H, MacLennan G, Little M, Gray A, Breeman S, Campbell MK. Patellar resurfacing in total knee replacement: 20-year clinical and economic results of a large multicentre, randomised controlled trial in the UK. *Lancet* 2026 (PMID 42309116). doi:10.1016/S0140-6736(26)00652-5. (Source: PubMed.) This is the 20-year follow-up of the Knee Arthroplasty Trial (KAT), ISRCTN45837371, funded by the UK NIHR Health Technology Assessment Programme.

This addendum is included because the Catteeuw RCT must be read against KAT, which is the largest and longest-running randomized trial on patellar resurfacing and therefore the single most influential dataset on the question. Where Catteeuw provides 5-year, single-center, single-implant data, KAT provides 20-year, multicentre, pragmatic data powered to detect small differences and extended into health economics — a fundamentally different evidentiary weight class.

Design and cohort

KAT is a pragmatic, multicentre, open-label RCT begun in the UK in 1999 within a partial-factorial design. Between 8 April 1999 and 13 January 2003, 1,715 participants (955 female, 760 male; mean age 70 years [SD 8]; mean BMI 29.7) undergoing primary TKR were randomized 1:1 to patellar resurfacing (n=861) or no resurfacing (n=854), using automated telephone allocation stratified by surgeon and minimized for age band (<60, 60–79, ≥80), sex, and disease location. The primary outcome was the Oxford Knee Score (OKS), analyzed by repeated-measures mixed-effects linear regression with marginal differences reported. Secondary outcomes included SF-12, EQ-5D-3L, costs, cost-effectiveness, and subsequent knee surgery. At the 20-year mark, 132 resurfacing and 110 non-resurfacing participants still provided outcome data, with the marginal-difference model incorporating earlier data from participants who died or had missing 20-year data.

Clinical results — a consistent but non-significant lean toward resurfacing

The marginal difference in OKS across the full 20 years was 0.76 points (95% CI –0.08 to 1.59; p=0.076) favoring resurfacing — not statistically significant and well below the OKS minimal clinically important difference (~5 points). The clinically important observation is the consistency of direction: every measured endpoint — OKS, SF-12, EQ-5D-3L, readmissions, minor/intermediate operations, patella-related operations, major operations, and complications — leaned in favor of resurfacing, even though none reached significance individually. This pattern of many small, concordant, non-significant differences is what shifts the authors' overall interpretation, and it is precisely the kind of signal an under-powered 5-year trial like Catteeuw's cannot detect.

Economic results — where the trial actually turns

The decisive findings are economic. Over 20 years the resurfaced group accrued significantly more quality-adjusted life-years (QALYs): 7.295 vs 6.884, a difference of 0.380 (95% CI 0.061 to 0.700; p=0.020). Total 20-year health-care cost per participant was essentially identical (£10,825 vs £10,889; difference –£6, 95% CI –£721 to £708; p=0.99) because the lower readmission/reoperation costs in the resurfaced group offset the higher up-front cost of resurfacing the patella. With more QALYs at the same cost, resurfacing had a 99% probability of being cost-effective at any willingness-to-pay threshold above £10,000 per QALY — an

unusually strong economic signal. On that basis the authors conclude the evidence is 'weighted towards resurfacing being the approach of first choice.'

The critical caveat: the QALY result is mortality-sensitive

This is the nuance to carry into the discussion. The significant QALY advantage depends on a survival difference between groups. In the pre-specified sensitivity analysis that assumes no mortality difference, the QALY gap shrinks to 0.183 (95% CI -0.034 to 0.400; $p=0.10$) and is no longer significant. There is no established biological mechanism by which resurfacing a patella should reduce 20-year mortality, so the most plausible reading is chance imbalance in long-term survival within an aging cohort rather than a true survival benefit of resurfacing. The honest summary is therefore: clinically equivalent, economically favorable to resurfacing, but the headline QALY/cost-effectiveness conclusion rests partly on a between-group mortality difference that is difficult to attribute to the intervention itself.

Strengths

Definitive scale and duration (1,715 patients, 20 years) addressing the under-powering and short follow-up that the authors explicitly identify as the flaw in prior RCTs, including by implication the Catteeuw trial; pragmatic multicentre design with many surgeons, maximizing external validity; robust randomization with stratification and minimization; a validated, knee-specific primary outcome (OKS) with appropriate repeated-measures modeling that uses all available longitudinal data; and a full within-trial economic evaluation (cost, QALYs, cost-effectiveness) of the kind payers and guideline bodies weight heavily.

Limitations

Open-label design (as in Catteeuw), so subjective scores remain susceptible to perception bias; very substantial attrition by 20 years (only 132 vs 110 with complete data, against 861 vs 854 randomized), mitigated but not eliminated by the marginal-difference modeling and a real source of potential survivorship/attrition bias; an era-of-1999 cohort and implant mix that predates current 'patella-friendly' trochlear designs — the very designs on which the Catteeuw trial is based — so KAT may overstate the resurfacing advantage relevant to a modern PS patella-friendly implant; and a primary endpoint that was statistically negative, with the favorable conclusion resting on directional consistency plus economics rather than on a significant clinical difference.

Reconciling KAT with the Catteeuw trial

The two are less contradictory than they first appear. Both report no significant clinical difference at their respective endpoints. They diverge in interpretation for two reasons. First, power and horizon: KAT's size and 20-year follow-up let it accumulate many small concordant differences and convert them into a significant economic conclusion, whereas Catteeuw's 250-knee, 5-year trial is underpowered for rare revision events and shows ceiling effects on its scores. Second, implant generation: Catteeuw deliberately tests a modern patella-friendly PS design that may genuinely narrow the resurfacing advantage KAT observed in an older cohort. The defensible synthesis is that resurfacing remains the evidence-weighted default — particularly on long-term reoperation and cost-effectiveness grounds — while a selective non-resurfacing strategy is reasonable specifically when a modern patella-friendly design is used, good patellar tracking is confirmed intraoperatively, and there is no significant patellar chondral wear or maltracking.

Bottom line for practice

KAT moves the long-term and economic evidence toward routine resurfacing as the first-choice default, but its strongest (QALY) result is mortality-sensitive and its cohort predates patella-friendly implants. For a contemporary PS patella-friendly practice, it is reasonable to remain selective; for cruciate-retaining or non-patella-friendly designs, or where revision-rate and cost-effectiveness are the priority (relevant to bundled-payment and ASC cost-of-care planning), KAT supports resurfacing. Either way, KAT — not the 5-year single-center data — should anchor the long-term framing of this debate.

Reference

6. Murray DW, Hudson J, Dakin H, MacLennan G, Little M, Gray A, Breeman S, Campbell MK. Patellar resurfacing in total knee replacement: 20-year clinical and economic results of a large multicentre, randomised controlled trial in the UK (KAT). *Lancet* 2026 (PMID 42309116; source: PubMed). [doi:10.1016/S0140-6736\(26\)00652-5](https://doi.org/10.1016/S0140-6736(26)00652-5)