

DAIR versus Implant Revision for Acute Periprosthetic Joint Infection after Total Knee Arthroplasty

TriNetX US Collaborative Network · propensity-score matched · 5-year outcomes

Wayne Hoskins¹ Muaz Wahid² Zuhair Zaidi² Jaime Bellamy³ Charles Gusho⁴ Antonia F. Chen²

¹ University of Melbourne, Melbourne, VIC, Australia ² UT Southwestern, Dallas, TX, USA ³ University of Missouri–Kansas City, Kansas City, MO, USA ⁴ University of Missouri, Columbia, MO, USA

KEY FINDING

For knee PJI, implant revision resulted in **BETTER** infection control (fewer 5-year PJI-related events) at both time points, but with more mechanical loosening and all-cause revision. The trade-off: infection control versus mechanical durability.

Background & Aim

- Early periprosthetic joint infection (PJI) within 6 weeks of total knee arthroplasty (TKA) is a therapeutic window; immature biofilm makes debridement, antibiotics and implant retention (DAIR) feasible. DAIR success ranges widely (0–84%).
- Concern over DAIR failure has driven interest in early implant revision, but comparative evidence is scarce.
- Aim: compare infection-related and mechanical outcomes of DAIR versus implant revision for early TKA PJI, by timing.

Methods

- TriNetX US network (>118M patients); primary TKA 2005–2020 with PJI (ICD-10 T84.5) treated ≤ 12 weeks.
- Timing strata: ≤ 6 weeks and 6–12 weeks; 1:1 propensity-score matched (age, sex, race, 13 comorbidities).
- Primary outcome: PJI-related event at 5 years. Secondary: surgical site infection (SSI), all-cause revision, mechanical complications, mortality.
- Odds ratios with 95% CI; p < 0.05; analyses validated in R v4.3.

1,062

matched pairs
DAIR vs. Implant Revision
≤6 weeks

843

matched pairs
DAIR vs. Implant Revision
6–12 weeks

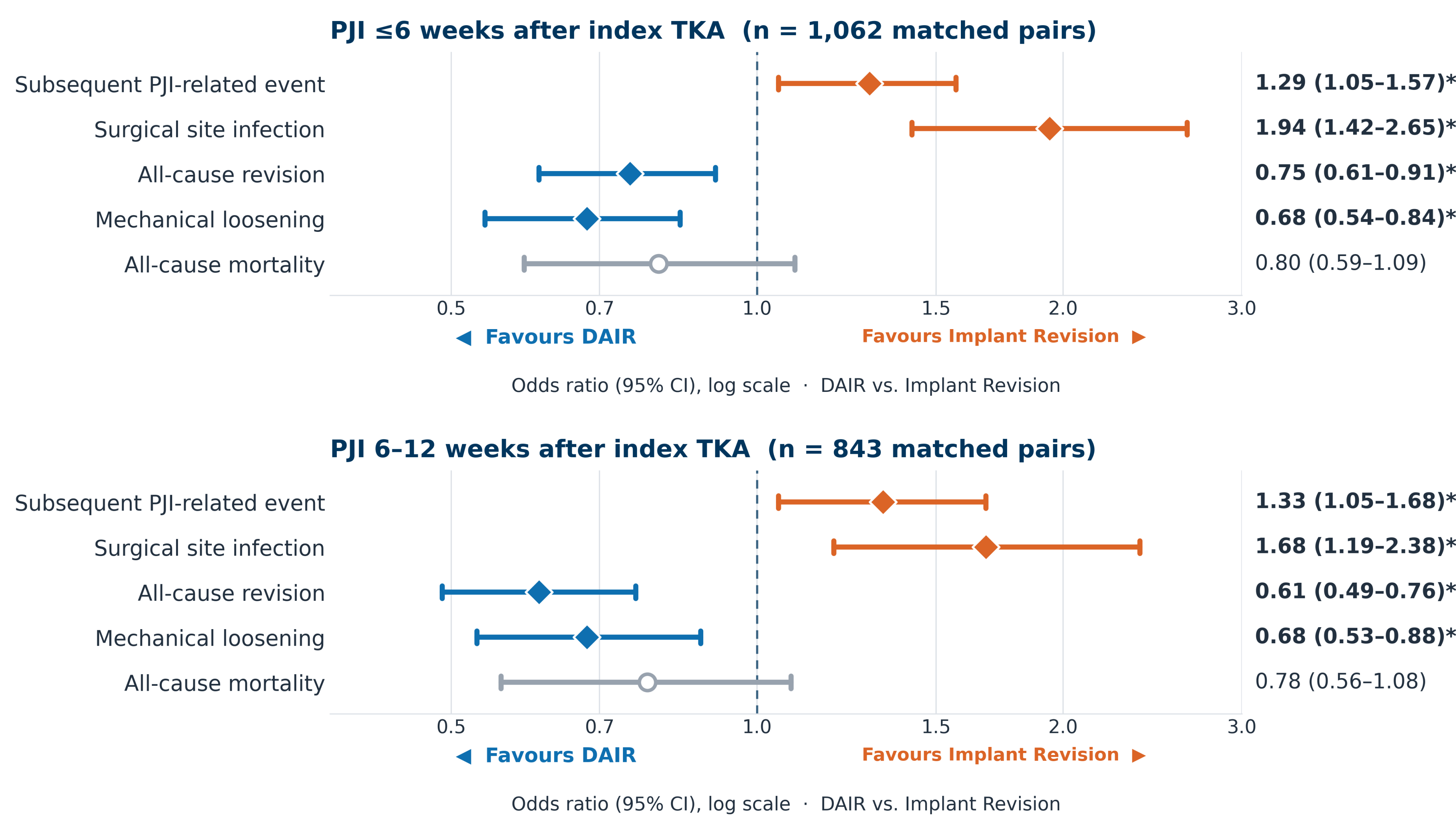
5-yr

outcome
follow-up

1:1

propensity-
score matched

Results: 5-year outcomes (TKA PJI, DAIR vs. implant revision)



★ statistically significant (95% CI excludes 1.0). Diamonds = significant · open circles = non-significant.

Definitions: PJI-related event = reoperation coded for periprosthetic (deep, implant-associated) infection, i.e. treatment failure. SSI = surgical-site (wound) infection, not necessarily involving the prosthesis. A PJI-related event is the **more serious** outcome.

OR 1.29 / 1.33

Favours Revision ★

PJI-related event, both time points (p ≤ 0.017)

OR 1.94 / 1.68

Higher with DAIR ★

Surgical site infection (p ≤ 0.003)

OR 0.75 / 0.61

Favours DAIR ★

All-cause revision (p ≤ 0.003)

OR 0.68 / 0.68

Favours DAIR ★

Mechanical loosening (p ≤ 0.003)

Conclusions & clinical take-home

- Implant revision (both ≤6 and 6–12 weeks) resulted in significantly better infection control than DAIR, with fewer 5-year PJI-related events and SSIs.
- However, implant revision resulted in significantly higher all-cause revision and mechanical loosening; the reconstruction (implant choice and fixation) drove these failures.
- Challenges DAIR as the default treatment for knee PJI; supports aggressive debridement / implant exchange, balanced against mechanical risk. Fixation choice is critical when revising.



UT Southwestern
Medical Center



Mizzou
University of Missouri