

Revision Total Knee Arthroplasty for Bicompartamental Osteoarthritis Within 18 Months after Unicompartmental Knee Arthroplasty

Sir,

Unicondylar knee arthroplasty (UKA) maintains native knee kinematics, preserving physiological biomechanics and offering functional advantages over total knee arthroplasty (TKA) in properly selected patients with isolated medial osteoarthritis.¹ Despite its benefits, progression of arthritis to the contralateral or patellofemoral compartment constitutes a leading cause of implant failure. While such progression typically develops 5-8 years post-surgery, sub-2-year progression represents a highly atypical failure mode.² Since 2018,³ very few documented cases of this accelerated bicompartamental degeneration have been reported in peer-reviewed literature, and critically, none of these early failures were correlated with occupational biomechanical stress or heavy labour. This pattern suggests that rapid polycompartmental degeneration may involve distinct pathological mechanisms beyond biomechanical overload, warranting investigation into biological factors or patient-specific comorbidities.

A 56-year female warehouse packager presented on May 15, 2021, with 18-month right knee pain (visual analogue scale [VAS] 7/10). Preoperative radiographs showed a medial joint space width of 0.8 mm (lateral 5.2 mm) without patellofemoral involvement (Figure 1A and B).

Uncomplicated medial UKA (Zimmer Biomet Oxford Unicompartmental Knee System Phase 3) performed on June 3, 2021, restored neutral alignment (hip-knee-ankle [HKA] angle 178°). Immediate postoperative films confirmed optimal component positioning (Figure 2A and B).

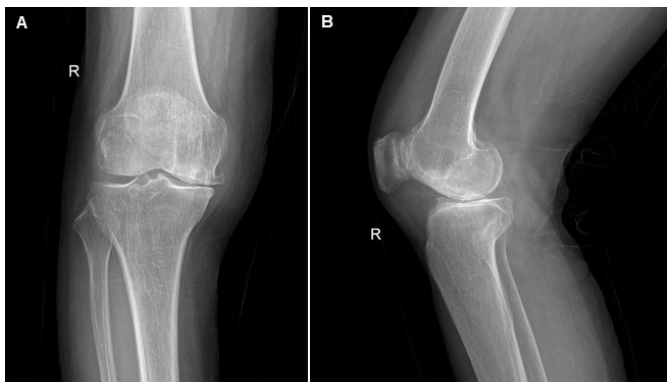


Figure 1: Preoperative radiographs. (A) Anteroposterior and (B) lateral views showing isolated medial osteoarthritis.

Symptoms recurred at 12 months with activity-related pain escalation (VAS 8/10). December 2022 radiographs revealed lateral compartment collapse (joint space 1.1 mm) and patellofemoral osteophytes (Figure 3A and B). Revision TKA (Zimmer Biomet NexGen LPS) performed on January 10, 2023, achieved a mechanical axis of 179° (Figure 4A and B).

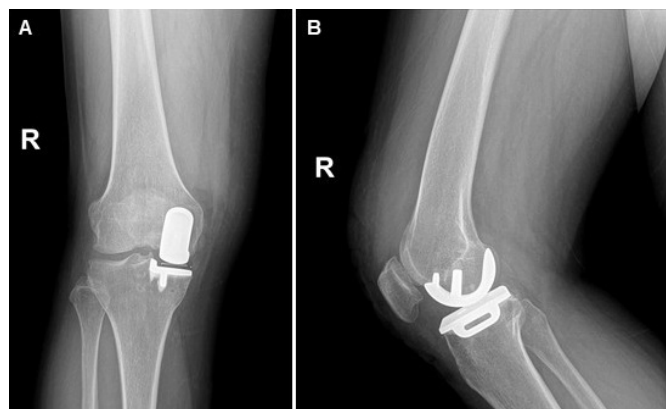


Figure 2: Post-UKA imaging. (A) Coronal and (B) sagittal projections demonstrating component positioning.

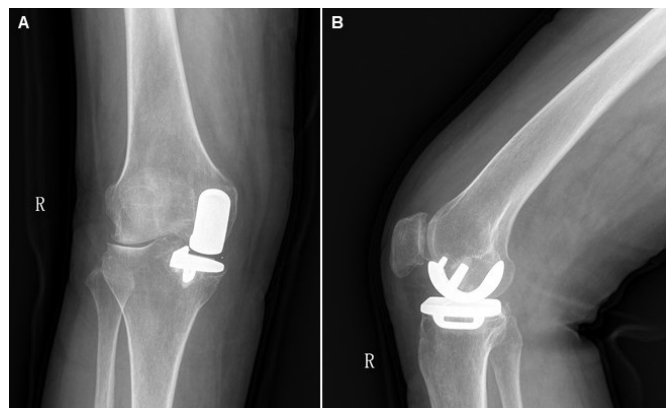


Figure 3: Eighteen-month progression. (A) Lateral compartment collapse and (B) patellofemoral degeneration.

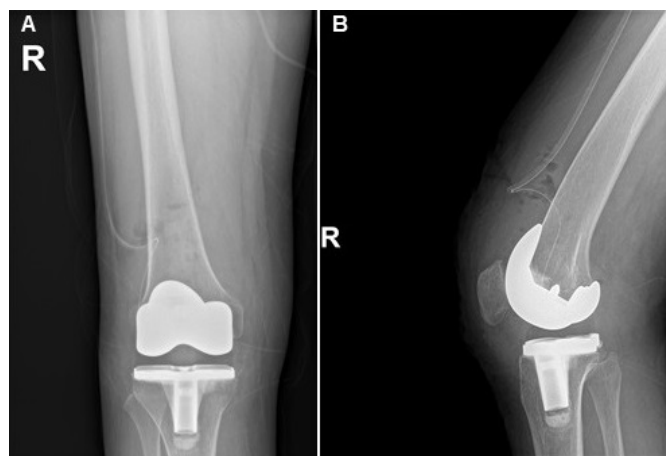


Figure 4: Post-revision TKA. (A) Anteroposterior and (B) lateral views showing reconstruction.

This case demonstrates a critical point in occupational biomechanics. Frequent axial loading (>20 kg) increases lateral contact pressures to 28.6 ± 3.4 MPa in UKA knees vs. 18.2 ± 2.1 MPa in controls ($p = 0.003$).⁴ Therefore, we suggest that postoperative weight-bearing restriction be <15 kg for manual laborers.⁵

This case highlights an uncommon yet clinically significant mode of early failure following UKA, marked by the rapid progression of osteoarthritis into the lateral and patellofemoral compartments within 18 months. Unlike previously reported cases, this patient's occupational exposure to repetitive heavy lifting likely contributed to accelerated degeneration, suggesting that high axial loading may undermine the long-term success of UKA in labour-intensive populations. Given the increased compartmental stress observed in such scenarios, postoperative guidelines should be re-evaluated, particularly for manual labourers. We recommend implementing strict postoperative weight-bearing restrictions (<15 kg) and emphasising careful patient selection to mitigate early UKA failure due to biomechanical overload.

COMPETING INTEREST:

The authors declared no conflict of interest.

AUTHORS' CONTRIBUTION:

XYP, XFS: Conceptualisation, data curation, formal analysis, funding acquisition, investigation, methodology, and project administration, resources, software, supervision, validation, and writing of the original draft.

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