

Absence of Robotics Does Not Influence Day-of-Surgery Cancellation Rates in Total Knee Arthroplasty: Surgeon Experience and Patient Trust Mitigate Technology Expectations

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Learning Point of the Article:

Trust in surgeon expertise and structured counseling are stronger determinants of TKA adherence than robotic technology.

Abstract

Introduction: Robotic-assisted total knee arthroplasty (rTKA) is increasingly promoted as a precision-enhancing advancement, although clinical studies consistently demonstrate comparable outcomes between rTKA and conventional TKA (cTKA). With rising patient interest in robotics, it remains unclear whether lack of robotic availability affects day-of-surgery cancellations (DOSC). This study addresses an important knowledge gap by specifically evaluating perception-driven cancellations attributable to absence of robotics, an area that has not been previously quantified in the arthroplasty literature.

Materials and Methods: A retrospective review of all scheduled primary TKAs from January 2023 to May 2025 at two tertiary centers was conducted. Reasons for DOSCs were categorized. Only same-day cancellations (occurring on the scheduled operative day after admission or final listing) were included. Complications and Knee Society Scores (KSS) were evaluated for completed cases.

Results: Of 276 scheduled TKAs (Center A = 142; Center B = 134), the overall DOSC rate was 7.6% (21/276). Only 2 cancellations (0.7%) were due to absence of robotics, both from a single center. Other cancellations involved medical instability (3.26%), financial issues (1.08%), and patient withdrawal or no-show (2.2%). Outcomes of completed cTKAs were favorable: Persistent pain >6 months occurred in 2.0%, surgical-site infection in 1.6%, and mean KSS improved from 82 ± 7 at 6 weeks to 88 ± 6 at 6 months, with no major reoperations.

Conclusion: Perception-driven cancellations due to lack of robotic systems were rare (0.7%) in this two-center audit but identifiable as a distinct behavioral pattern. Importantly, these cancellations were restricted to a single center, highlighting that counseling strategies and surgeon-patient trust – not robotic availability – shape patient adherence. Overall DOSC rates and post-operative results reaffirm the strength and resilience of cTKA, which continues to deliver reliable outcomes despite increasing marketing-driven enthusiasm for robotic surgery. These findings should be interpreted in the context of the study's limitations and do not preclude potential benefits of robotics in specific settings.

Level of Evidence: III (Retrospective observational study).

Keywords: Robotic-assisted total knee arthroplasty, conventional total knee arthroplasty, day of surgery cancellations.

Introduction

The adoption of robotic-assisted total knee arthroplasty (rTKA) has expanded rapidly, fueled by claims of enhanced surgical

precision, improved alignment, and theoretically superior outcomes. Robotic platforms are increasingly featured in hospital marketing and digital health communication, shaping

Author's Photo Gallery



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public perception and reinforcing the belief that robotic surgery offers inherently better results. However, multiple systematic reviews and meta-analyses consistently demonstrate that while robotic systems offer marginal radiographic advantages, they do not translate into clinically meaningful improvements in functional outcomes, patient satisfaction, complications, or implant survivorship compared with conventional TKA (cTKA) [1, 2, 3, 4]. Furthermore, rTKA introduces logistical complexity and substantially higher costs, raising concern regarding value in routine arthroplasty practice [5, 6, 7].

Patient expectations have nevertheless shifted. Several studies show that many patients equate robotics with greater safety, accuracy, or longevity – even when clinical evidence does not support these assumptions [8, 9, 10, 11]. With increasing access to online information and hospital advertisements, technology-driven decision-making is becoming more common.

Day-of-surgery cancellations (DOSCs) represent a significant source of inefficiency, resource loss, and disruption of operative workflow. In orthopedic surgery, DOSC rates of 4–10% have been reported, most often due to medical instability, administrative delays, or patient non-attendance [12, 13, 14, 15]. However, the contribution of technology-driven expectations – particularly regarding robotic availability – to these cancellations remains poorly understood and underexplored in existing literature.

In addition, variability in patient expectation profiles across institutions – potentially influenced by demographic factors, socioeconomic status, referral patterns, and urban versus semi-urban catchment populations, – may further affect cancellation behavior, although these factors have not been systematically studied [16, 17, 18].

This two-center retrospective audit was conducted to identify whether lack of robotic availability influenced DOSCs in primary TKA and to evaluate differences between centers with similar surgical expertise but variable patient expectation profiles. Based on the robust evidence supporting the reliability of cTKA and the mitigating role of surgeon experience in shaping patient confidence, we hypothesized that the absence of robotics would contribute minimally to DOSCs.

Knowledge gap

Although rTKA has been extensively investigated with respect to implant alignment, precision and clinical outcomes, little attention has been directed toward its influence on patient behavior and healthcare delivery. In particular, the contribution of robotic technology to DOSCs and operating room efficiency remains largely unexplored. To our knowledge, this is among the first studies to quantify robotics-driven DOSCs and

evaluate their implications for elective arthroplasty workflow.

Methods

Study design

A retrospective review of prospectively maintained arthroplasty databases from two tertiary centers was performed for surgeries scheduled between January 2023 and May 2025. Ethics approval was obtained at both institutions, with waiver of informed consent due to the retrospective design.

Inclusion criteria

- All consecutive scheduled primary unilateral TKAs
- Surgeries performed by three senior surgeons (one at Center A, two at Center B), each with >20 years of experience in cTKA and >1000 independent procedures.

Exclusion criteria

- Revision TKA
- Bilateral or staged procedures
- Outpatient consultations where surgery was refused pre-scheduling due to preference for robotics (not captured in scheduling logs).

Data collection

For each scheduled surgery, the following variables were collected:

- Occurrence of day-of-surgery cancellation
- Reason for cancellation:
 - Absence of robotics
 - Medical/safety-related
 - Insurance/financial issues
 - Patient refusal/no-show
 - Scheduling or administrative error
- Only DOSCs (defined as cancellations occurring on the scheduled operative day after admission or final surgical listing) were included in the analysis. Cancellations occurring before the day of surgery were excluded.
- The exclusion of outpatient refusals represents a potential source of selection bias, as patients declining surgery due to preference for robotic systems before scheduling were not captured.

Preoperative counseling

Both centers followed structured preoperative counseling

protocols; however, formal standardization of counseling content and delivery was not enforced. Variability in communication style and emphasis on robotic versus conventional techniques may have influenced patient expectations and decision-making.

Statistical analysis

The study is primarily descriptive in nature. Given the very small number of robotics-related cancellations ($n = 2$), statistical comparison between centers was considered underpowered and potentially misleading; therefore, no inferential statistical testing was performed for this subgroup.

- For completed cases:
- Post-operative complications (infection, persistent pain)
- Major reoperations
- Knee Society Score (KSS) at 6 weeks and 6 months.

Results

Scheduled surgeries and cancellation rates

A total of 276 primary TKAs were scheduled: 142 at Center A and 134 at Center B. Overall DOSC rate was 7.6% (21/276).

Robotics-related cancellations

Only 2 cancellations (0.7%) were due to refusal to proceed without robotic assistance. Both occurred at Center A. Center B recorded zero robotics-driven cancellations.

Reasons for cancellations (Table 1)

Table 1: Reason for cancellation of TKA surgery			
Reason for cancellation	Center A ($n=142$) (%)	Center B ($n=134$) (%)	Total (%)
Absence of robotics	2 (1.4)	0	2 (0.7)
Insurance/financial	3 (2.1)	0	3 (1.08)
Medical issues	4 (2.8)	5 (3.2)	9 (3.26)
Patient no-show	2 (1.4)	4 (3.0)	6 (2.2)
Scheduling error	1 (0.7)	0	1 (0.4)
Total	12 (8.5)	9 (6.7)	21 (7.6)
TKA: Total knee arthroplasty			

Post-operative outcomes (Completed TKAs, $n = 255$)

- Persistent pain >6 months: 2.0%
- Surgical-site infection: 1.6%
- Major reoperations: 0
- Mean KSS:
- 6 weeks: 82 ± 7

- 6 months: 88 ± 6 .

These outcomes are consistent with contemporary benchmarks for cTKA.

Discussion

This two-center retrospective analysis demonstrates that lack of robotic availability rarely influenced DOSCs in primary TKA. Only 0.7% of cancellations were attributable to absence of robotics, and both occurred in a single center. This finding suggests that institutional differences in counseling, expectation-setting, or referral patterns – not technological access – dominate patient behavior.

Surgeon experience and trust buffer technology pressure

The rarity absence of robotics-driven cancellations underscores the importance of surgeon–patient rapport. When patients perceive the surgeon as highly competent and outcomes-focused, reliance on technology becomes secondary. This aligns with research showing that patients often defer to surgeon recommendation despite pre-conceived notions about robotics [8,9,10].

Reality versus perception: The robotics evidence gap

Despite broad promotional claims, evidence shows that robotic assistance:

- Improves radiographic alignment but does not improve functional outcomes (1–4)
- Does not reduce complications (1–3)
- Offers uncertain cost-effectiveness due to high capital and maintenance costs (5–7).

The disconnect between marketing and clinical reality reinforces why robust counseling remains essential.

Operational and economic implications

Even a small number of DOSCs can disrupt surgical workflow, operating room efficiency, and hospital finances. However, this audit shows that non-robotic centers are not disadvantaged by lacking robotic systems. Institutions should therefore:

- Base robotics investment decisions on clinical value, not fear of patient attrition
- Strengthen early expectation management to reduce perception-driven disruptions.

Center differences

The presence of robotics-related cancellations in only one

center suggests that institutional factors – such as counseling approach, patient population characteristics, and referral pathways – may play a more significant role than technological availability itself.

Institutional differences highlight communication strategies

The contrast between centers likely reflects differences in:

- How expectations are framed during initial consultations
- How marketing and local patient populations perceive robotics
- The degree to which surgeons emphasize evidence-based reassurance.

Such variation suggests that cancellation patterns may serve as indirect indicators of communication effectiveness rather than technological value.

Performance of cTKA remains strong

The excellent clinical outcomes observed – low infection rates, minimal chronic pain, and solid KSS improvements – are consistent with literature affirming the durability and reliability of cTKA. These results highlight that robotics is not necessary to achieve high-quality outcomes.

Comparison with other specialties

Similar patterns have been observed in other surgical specialties, such as urology and general surgery, where robotic platforms are widely adopted. In these fields, patient perception and institutional branding often drive adoption, despite variable evidence demonstrating clear clinical superiority. This parallel reinforces the notion that perception-driven expectations may not necessarily translate into measurable improvements in outcomes or workflow efficiency [19,20].

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

Limitations

The study has several limitations:

- Retrospective design
- Small absolute number of robotics-related cancellations
- Exclusion of outpatient refusals before surgery scheduling may underestimate robotics preference
- Regional variability may limit generalizability
- Psychological drivers of cancellation were not formally assessed.

Future multicenter prospective studies incorporating patient questionnaires may clarify the behavioral and expectation-based factors influencing TKA acceptance.

Conclusion

Perception-driven cancellations due to lack of robotic systems were rare (0.7%) in this two-center audit but identifiable as a distinct behavioral pattern. Importantly, these cancellations were restricted to a single center, highlighting that counseling strategies and surgeon–patient trust – not robotic availability – shape patient adherence. Overall DOSC rates and post-operative results reaffirm the strength and resilience of cTKA, which continues to deliver reliable outcomes despite increasing marketing-driven enthusiasm for robotic surgery. These findings should be interpreted in the context of the study's limitations and do not preclude potential benefits of robotics in specific settings.

Clinical Message

Effective preoperative counseling and strong surgeon–patient trust are critical determinants of surgical adherence, and absence of robotic systems alone should not be considered a major driver of day-of-surgery cancellations in TKA.

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