

Clinically Important Differences are Often Not Achieved in Patient-Reported Outcomes for Robot-Assisted and Navigated Unicompartmental Total Knee Arthroplasty: A Systematic Review

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INTRODUCTION:

Technology is increasingly incorporated into unicompartmental knee arthroplasty (UKA) by way of computer-assisted navigation (N-UKA) and robot-assisted surgery (R-UKA) in order to improve alignment, implant positioning, and gap balancing. Whether the addition of intraoperative technology aids in achievement of the minimal clinically important difference (MCID) in patient-reported outcomes (PROMs) compared to conventional UKA (C-UKA) remains unknown. The goal of this systematic review was to assess whether differences in PROMs between C-UKA and technology-assisted UKA reached MCID values.

METHODS:

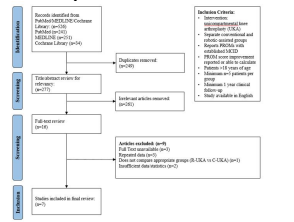
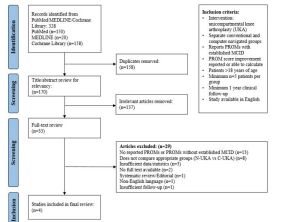
PubMed / MEDLINE / Cochrane Library were systematically reviewed for studies that compared PROMs between primary C-UKA, the control group, and N-UKA or R-UKA. Delta improvements between groups were compared to established MCID values. Additional radiographic and clinical differences were assessed. Review of literature yielded four (N=328) N-UKA and seven (N=526) R-UKA studies with C-UKA cohorts as control groups for analysis.

RESULTS:

Differences in preoperative and postoperative PROMs were reported as statistically significant in three of four studies (75%) comparing N-UKA and C-UKA, however none of the studies reported values that reached the MCID. Differences in preoperative and postoperative PROMs were reported as statistically significant in four of seven studies (57.1%) comparing R-UKA and C-UKA, however only three of the studies (42.9%) reported values that reached the MCID. Improved radiographic outcomes for N-UKA and R-UKA were reported in 75% and 57.1% of studies respectively. Only one study reported improved revision rates with R-UKA compared to C-UKA.

DISCUSSION AND CONCLUSION:

Though studies may report better improvements in PROMs in N-UKA and R-UKA compared to C-UKA, these often may not achieve clinically significant values. Future studies comparing clinical outcomes between technology-assisted UKA and C-UKA should report PROMs within the context of validated MCID values.



Author	Year	N (UKA)	N (C-UKA)	N (R-UKA)	Navigation System	Follow-Up (months)	Outcome Measure	Significant	Achieved MCID
1. Stone	2009	74	71	68	OrthoMap	24	HOOS Knee	Yes	Yes
2. Song	2018	34	34	68	OrthoMap	108	HOOS Knee	Yes	Yes
3. Hwang	2011	28	28	48	OrthoMap	24	KOOS	Yes	Yes
4. Zhang	2014	48	41	81	Navio Vision	24	KOOS	Yes	Yes

Table 1: Summary table including PROM improvement differences between N-UKA and C-UKA studies in MCID.

Author	Year	N (UKA)	N (C-UKA)	N (R-UKA)	Navigation System	Follow-Up (months)	Outcome Measure	Significant	Achieved MCID
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Figure 1: Preferred reporting items for systematic reviews and meta-analysis flow chart for systematic review of N-UKA articles. PROM, patient-reported outcome measure; MCID, minimal clinically important difference; N-UKA, navigated unicompartmental knee arthroplasty; C-UKA, conventional unicompartmental knee arthroplasty

Figure 2: Preferred reporting items for systematic reviews and meta-analysis flow chart for systematic review of R-UKA articles. PROM, patient-reported outcome measure; MCID, minimal clinically important difference; R-UKA, robotic unicompartmental knee arthroplasty; C-UKA, conventional unicompartmental knee arthroplasty