



Supplementary Material

10.1302/2046-3758.103.BJR-2020-0268.R1

Supplementary Appendix. PubMed search strategy: (“Patient Outcome Assessment”[MESH] OR (((“patient” or “self”) and (“report” or “reported” or “reporting” or “rated” or “rating” or “based” or “assessed”))) and (“measure” or “measurement” or “scale” or “instrument” or “questionnaire”))) AND (((((((“structural validity” OR “factor analysis” OR “factor analyses”) OR (“internal consistency” OR (cronbach AND (alpha OR alphas)))) OR ((cross-cultural or “cross cultural”) and (equivalence or validity))) OR ((test-retest OR (test AND retest)) AND reliab*)) OR (“measurement error” OR ((smallest OR minimal OR minimally OR clinical OR clinically) AND (important OR significant OR detectable) AND (change OR difference)) OR “limits of agreement”)) OR (“construct validity” OR concordance OR discriminative OR “known group”)) OR (reproducib* or responsive*)) AND (knee and (arthroplasty or prosthesis or replacement or resurfacing)))

Table i. Criteria for good measurement properties.

Measurement property	Description	Rating	Criteria
Structural validity	The degree to which the scores of a PROM are an adequate reflection of the dimensionality of the construct to be measured	+	CTT: CFA: CFI or TLI or comparable measure >0.95 OR RMSEA<0.06 OR SRMR <0.08 IRT/Rasch: No violation of unidimensionality: CFI or TLI or comparable measure >0.95 OR RMSEA <0.06 OR SRMR <0.08 AND No violation of local independence: residual correlations among the items after controlling for the dominant factor < 0.20 OR Q3's < 0.37 AND No violation of monotonicity: adequate looking graphs OR item scalability >0.30 AND Adequate model fit: IRT: $\chi^2 > 0.01$ Rasch: infit and outfit mean squares ≥ 0.5 and ≤ 1.5 OR Z standardized values > -2 and < 2
		?	CTT: Not all information for '+' reported IRT/Rasch: Model fit not reported
		-	Criteria for '+' not met
Internal consistency	The degree of the inter-relatedness among the items	+	At least low evidence for sufficient structural validity AND Cronbach's alpha(s) ≥ 0.70 for each unidimensional scale or subscale
		?	Criteria for "At least low evidence for sufficient structural validity" not met
		-	At least low evidence for sufficient structural validity AND Cronbach's alpha(s) < 0.70 for each unidimensional scale or subscale
Reliability	The proportion of the total variance in the measurements, which is due	+	ICC or weighted Kappa ≥ 0.70
		?	ICC or weighted Kappa not reported
		-	ICC or weighted Kappa < 0.70

	to true differences between patients		
Measurement error	The systematic and random error of a patient's score that is not attributed to true changes in the construct to be measured	+	SDC or LoA < MIC
		?	MIC not defined
		-	SDC or LoA > MIC
Hypotheses testing for construct validity	The degree to which the scores of a PROM are consistent with the hypotheses based on the assumption that the PROM validly measures the construct to be measured	+	The result is in accordance with the hypothesis
		?	No hypothesis defined (by the review team)
		-	The result is not in accordance with the hypothesis
Cross-cultural validity/measurement invariance	The degree to which the performance of the items on a translated or culturally adapted PROM is an adequate reflection of the performance of the items of the original version of the PROM	+	No substantial differences found between group factors (such as age, sex language) in multiple group factor analysis OR no significant DIF for group factors (McFadden's R2 < 0.02)
		?	No multiple group factor analysis OR DIF analysis performed
		-	Substantial differences between group factors OR DIF were found
Criterion validity	The degree to which the scores of a PROM are an adequate reflection of a 'gold standard'	+	Correlation with gold standard ≥ 0.70 OR AUC ≥ 0.70
		?	Not all information for '+' reported
		-	Correlation with gold standard < 0.70 OR AUC < 0.70
Responsiveness	The ability of a PROM to detect change over time in the construct to be measured	+	The result is in accordance with the hypothesis OR AUC ≥ 0.70
		?	No hypothesis defined (by the review team)
		-	The result is not in accordance with the hypothesis OR AUC < 0.70

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guideline for systematic reviews of patient-reported outcome measures. *Qual Life Res.* 2018;27(5):1147-1157.¹

+, sufficient; –, insufficient; ?, indeterminate

AUC, area under the curve; CFA, confirmatory factor analysis; CFI, comparative fit index; CTT, classical test theory; DIF, differential item functioning; ICC, intraclass correlation coefficient; IRT, item response theory; LoA, limits of agreement; MIC, minimal important change; PROM, patient-reported outcome measure; RMSEA: root mean square error of approximation; SDC, smallest detectable change; SRMR: Standardized Root Mean Residuals; TLI, Tucker-Lewis index.

Table ii. Grading of Recommendations Assessment, Development and Evaluation (GRADE)

approach for grading the quality of evidence.

Quality of evidence	Downgrade evidence if:
High Moderate Low Very low	<p>Risk of bias</p> <ul style="list-style-type: none"> -1 Serious (multiple studies of doubtful quality or only one study of adequate quality) -2 Very serious (multiple studies of inadequate quality or only one study of doubtful quality) -3 Extremely serious (only one study of inadequate quality) <p>Inconsistency</p> <ul style="list-style-type: none"> -1 Serious -2 Very serious <p>Imprecision</p> <ul style="list-style-type: none"> -1 Total sample size=50-100 -2 Total sample size < 50 <p>Indirectness</p> <ul style="list-style-type: none"> -1 Serious -2 Very serious

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Table iii. Methodological quality and qualitative rating for development and content validity for each instrument.

Instrument	Development				Content validity studies						Reviewers' rating		
	Methodological quality	Relevance	Comprehensiveness	Comprehensibility	Methodological quality	Relevance	Methodological quality	Comprehensiveness	Methodological quality	Comprehensibility	Relevance	Comprehensiveness	Comprehensibility
AAOS Hip and Knee	I	?	?	?		N		N		N	+	-	+
AKPS	I	?	?	?		N	I	?		N	+	+	+
ASAP	I	?	?	?		N		N	I	+	±	±	+
COMI-knee	I	?	?	?		N		N		N	+	±	+
FJS	I	?	?	?	D	?		N	D	+	+	+	+
HAA S	I	?	?	?	D	?	D	+	D	+	+	+	+
HFK S	I	?	?	?		N		N		N	+	+	+
ICOAP	I	+	?	?		N		N	I	?	+	+	+
KOOS	I	?	?	?	D	?	D	+	D	+	+	+	+
KOOS, JR	I	+	?	?		N		N		N	+	±	+
KOOS-PS	I	+	?	?	D	?		N		N	+	±	+

KOO S-12	I	+	?	?		N		N		N	+	+	+
KOS-ADL S	I	?	?	?		N		N		N	+	+	+
KPQ	I	?	?	?		N		N		N	+	±	+
KSP Q	I	?	?	?		N		N		N	+	+	+
KSS (2011)	I	?	?	?		N		N	I	+	+	+	+
KSS-A	I	?	?	?		N		N		N	+	+	+
KSS short form	I	?	?	?		N		N		N	+	±	+
LEAS	I	?	?	?		N		N		N	+	+	+
LEFS	I	+	?	?		N		N		N	+	+	+
Lequesne	I	?	?	?		N		N		N	+	+	+
Lysholm	I	?	?	?		N		N		N	?	?	+
MFJS	I	?	?	?		N		N		N	+	+	+
OA-CAT	I	?	?	?		N		N		N	N	N	N
OAK HQOL	D	+	?	?	D	?	D	+	I	+	+	+	+
OKS	I	+	?	?	D	?	D	+	D	+	+	+	+
OKS-APQ	I	+	?	?		N		N		N	+	+	+

PAQ-knee	I	?	?	?		N		N		N	+	+	+
PKIP	A	+	+	+		N		N		N	+	+	+
Tegner	I	?	?	?		N		N		N	±	-	+
UCLA	I	?	?	?		N		N	I	+	+	+	+
WOMAC	I	+	?	+		N	I	?		N	+	+	+
WOMAC-TKR	I	+	?	?		N		N		N	+	±	+
WORQ	I	?	?	?	D	?	D	+		N	+	+	+

A, Adequate; D, Doubtful; I, Inadequate; N, No data available; +, sufficient; -, insufficient; ±, inconsistent; ?, indeterminate

AAOS Hip and Knee, AAOS Hip and Knee Core Scale; AKPS, Anterior Knee Pain Scale; ASAP, Activity Scale for Arthroplasty Patients; COMI-knee, Core Outcome Measures Index knee; FJS, Forgotten Joint Score; HAAS, High-Activity Arthroplasty Score; HFKS, High-Flexion Knee Score; ICOAP, Intermittent and Constant Osteoarthritis Pain; KOOS, Knee Injury and Osteoarthritis Outcome Score; KOOS, JR, Knee Injury and Osteoarthritis Outcome Score Joint Replacement; KOOS-PS, Knee Injury and Osteoarthritis Outcome Physical function Short form; KOOS-12, 12-item short forms Knee Injury and Osteoarthritis Outcome; KOS-ADLS, Activities of Daily Living Scale of the Knee Outcome Survey; KPQ, Knee Pain Questionnaire; KSPQ, Knee Surgery Perception Questionnaire; KSS (2011), 2011 Knee Society Scoring System; KSS-A, Adjusted 2011 Knee Society Scoring System; KSS short form, Knee Society Scoring System short form; LEAS, Lower-Extremity Activity Scale; LEFS, Lower Extremity Functional Scale; Lequesne, Lequesne Algofunctional Index for the Knee; Lysholm, Lysholm Knee Scoring

Scale; MFJS, Modified Forgotten Joint Score; OA-CAT, Computer-Adaptive Test for Hip and Knee OA; OAKHQOL, OsteoArthritis of Knee and Hip Quality of Life Scale; OKS, Oxford Knee Score; OKS-APQ, Oxford Knee Score–Activity and Participation Questionnaire; PAQ-knee, Patient Administered Questionnaires Knee; PKIP, Patient’s Knee Implant Performance; Tegner, Tegner Activity Scale; UCLA, University of California Los Angeles activity score; WOMAC, Western Ontario and McMaster Universities Arthritis Index; WOMAC-TKR, Western Ontario and McMaster Universities Arthritis Index-Total Knee Replacement function short form; WORQ, Work, Osteoarthritis or joint-Replacement Questionnaire.

Thomsen et al. ¹²	A	?	V	+			D	+	D	-			A	1(+)		
Cao et al. ¹³			V	+			A	+					A	2(+)		
Hamilton et al. ¹⁴	V	+	V	+									A	2(+)	I	?
Ingelsrud et al. ¹⁵																
Heijbel et al. ¹⁶			V	+			D	+					V	1(+)		
Sansone et al. ¹⁷			V	+			A	+					A	1(+)		
High-Activity Arthroplasty Score (HAAS)																
Diesinger et al. ⁵			D	?									D	3(+)		
Monticone et al. ¹⁸			D	?			A	+	A	?			D	2(+) 1(-)		
High-Flexion Knee Score (HFKS)																
Na et al. ¹⁹													I	+	I	+
Intermittent and Constant Osteoarthritis Pain (ICOAP)																
Davis et al. ²⁰															A I	+
Ruysen-Witrand et al. ²¹			D	?			D	-					D	1(+) 2(-)	I	?
Robbins et al. ²²			D	?			A	-	A	-					I	?
Singh et al. ²³							D	-								
Mehta et al. ²⁴			D	?									V	8(+)		

Turner et al. ²⁵							I	-						I	?		
Zhang et al. ²⁶			D	?			D	+					A	3(+)	I	?	
Knee Injury and Osteoarthritis Outcome Score (KOOS)																	
Roos et al. ²⁷							D	+						A	1(-)	I	?
Xie et al. ²⁸			V	+			D	-						A	1(+)		
			V	-			D	-						A	1(-)		
de Groot et al. ²⁹			V	+										A	2(-)		
			V	+										A	1(+)		
			V	+			D	-	D	?				A	1(-)		
Monticone et al. ³⁰															I	?	
Sasaki et al. ³¹														D	2(+)		
Naylor et al. ³²									D	-							
Moutzouri et al. ³³			V	-			I	-	I	?				D	2(-)	I	?
Paradowski et al. ³⁴			V	+			D	+	D	-				A	1(+)	D	+
Steinhoff et al. ³⁵															I	?	
Singh et al. ²³							I	+						A	2(+)	I	?

12-item short forms Knee Injury and Osteoarthritis Outcome (KOOS-12)																
Gandek et al. ³⁹	A	+			D	+										
Gandek et al. ⁴⁰			V	+							I	+	A	+	I	?
Activities of Daily Living Scale of the Knee Outcome Survey (KOS-ADLS)																
Impellizzeri et al. ⁵⁰							D	+	D	?			A	3(+)	A	3(+)
Mizner et al. ⁵¹													A	2(+) 1(-)	I	?
Szczepanik et al. ⁵²			D	?			D	+	D	?			D	2(+)	D	2(+)
Knee Pain Questionnaire (KPQ)																
Boeckstyns et al. ⁵³							D	-								
Knee Surgery Perception Questionnaire (KSPQ)																
Levinger et al. ⁵⁴													A	+		
2011 Knee Society Scoring System (KSS 2011)																
Noble et al. ⁵⁵	A	?	D	?	D	+							A	4(+)		
Van Der Straeten et al. ⁵⁶			D	?			V	+					I	3(+)		
Debette et al. ⁵⁷															I	?
Dinjens et al. ⁴⁷			D	?			D	+					D	2(+)	I	?
Hamamoto et al. ⁵⁸			D	?			D	+					A	1(+) 1(-)		
Liu et al. ⁵⁹			D	?			I	+					I	3(+)		

Silva et al. ⁶⁰			D	?			I	2(+)										
Maniar et al. ⁶¹													A	5(+) 4(-)	I	+		
Kim et al. ⁶²			D	?			D	-					A	1(+) 1(-)	I	?		
Culliton et al. ⁶³			D	?									D	2(+) 1(?)	I	?		
Özden et al. ⁶⁴			D	?			A	+					A	3(-)				
Nishitani et al. ⁶⁵																		
Kayaalp et al. ⁶⁶			D	?			A	+					A	3(+) 1(-)	I	?		
Adjusted 2011 Knee Society Scoring System (KSS-A)																		
Dinjens et al. ⁶⁷			D	?									A	+	I	?		
Knee Society Scoring System short form (KSS short form)																		
Scuderi et al. ⁶⁸	A	-	D	?									I	+	A	+	I	?
	A	+	V	+									A	+				
Lower-Extremity Activity Scale (LEAS)																		
Saleh et al. ⁶⁹							D	+					A	-	A	-		
Ghomrawi et al. ⁷⁰													D	-	I	?		
Lower Extremity Functional Scale (LEFS)																		
Naal et al. ⁷¹	A	+	V	+			A	+					A	+	I	?		

Naal et al. ⁷²																	
Lysholm Knee Scoring Scale (Lysholm)																	
Swanenburg et al. ⁷³	A	?	D	?			I	+	I	?			A	+			
Lequesne Algofunctional Index for the Knee (Lequesne)																	
Theiler et al. ⁷⁴															I	?	
Dunbar et al. ⁷⁵			I	?			D	+									
Ruysse-Witrand et al. ²¹							D	-							I	?	
Modified Forgotten Joint Score (MFJS)																	
Robinson et al. ⁷⁶			D	?			D	+					A	+			
Computer-Adaptive Test for Hip and Knee OA (OA-CAT)																	
McDonough et al. ⁷⁷			V	+											I	?	
OsteoArthritis of Knee and Hip Quality of Life Scale (OAKHQOL)																	
Rat et al. ⁷⁸							D	-					D	-	I	?	
Gonzalez et al. ⁷⁹																	
Wang et al. ⁸⁰															I	?	
Oxford Knee Score (OKS)																	
Dawson et al. ⁸¹			V	2(+)			I	?					D	4(+)	I	?	
Dunbar et al. ⁸²							A	+					D	4(+) 2(-)			
Dunbar et al. ⁷⁵			V	+													
Robertsson et al. ⁸³															D	1(-)	
Liow et al. ⁸⁴							I	?									
Padua et al. ⁸⁵			V	+			D	+					A	1(+)			
Charoencholvanich et al. ⁸⁶			V	+									A	1(+)			

Haverkamp et al. ⁸⁷			V	2(+)			D	+					A	5(+) 1(-)	I	?
Whitehouse et al. ⁸⁸			V	+												
Xie et al. ⁸⁹			V	+									A	2(+)		
			V	+									A	1(+) 1(-)		
Ko et al. ⁹⁰			V	+												
Medalla et al. ⁹¹													D	3(+) 1(-)		
Naal et al. ⁹²			V	+			D	+					D	4(+)		
Impellizzeri et al. ⁵⁰							D	+	D	+			D	3(+)	D	2(+) 1(-)
Jenny et al. ⁹³			V	+									D	1(-)		
Reddy et al. ⁹⁴													D	2(+)		
Goncalves et al. ⁹⁵			V	+			D	+					A	3(+)		
Jenny et al. ⁹⁶			V	1(+) 1(-)									D	2(-)		
Eun et al. ⁹⁷			V	+			A	+					A	2(+)		

Xie et al. ¹²⁹			D	-			I	+					A	2(-)			
			D	+			I	+					A	2(-)			
Davis et al. ²⁰															I	?	
Kersten et al. ¹³⁰			D	+											I	?	
Impellizzeri et al. ⁵⁰							D	+	D	-			D	3(+)	D	+	
Ruyssen-Witrand et al. ²¹							D	+							I	?	
Escobar et al. ¹³¹																	
Escobar et al. ¹³²																	
Giesinger et al. ⁷															I	?	
Robbins et al. ²²			D	+			A	+	A	+					I	?	
SooHoo et al. ¹¹⁵															I	?	
Maratt et al. ¹³³																	
Giesinger et al. ¹³⁴																	
McDonough et al. ⁷⁷			D	+											I	?	
Kim et al. ⁶²															I	?	
Maniar et al. ⁶¹															I	?	
Gandek et al. ³⁶													I	1(+)	I	?	
Clement et al. ¹³⁵																	
Kayaalp et al. ⁶⁶															I	?	
Western Ontario and McMaster Universities Arthritis Index-Total Knee Replacement function short form (WOMAC-TKR)																	
Liebs et al. ¹³⁶			V	+									I	+		I	?
Work, Osteoarthritis or joint-Replacement Questionnaire (WORQ)																	
Kievit et al. ¹³⁷			D	?			V	+	V	+			A	+	I	?	

V, Very good; A, Adequate; D, Doubtful; I, Inadequate; N, No data available; +, sufficient; -, insufficient; ?, indeterminate.

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Table v. Description of data on interpretability and feasibility of each included instrument.

Instrument	Subscale	Percentage of missing items	Floor scores (%)	Ceiling scores (%)	MCID (anchor and value)	Normative data or cut-off values	Completion time
AAOS Hip and Knee		4.5-45.3% for different items	Pre-operation: almost invaluable	Pre-operation: almost invaluable 6-month post-operation: 9% 12-month post-operation: 16%			
AKPS		0%	13.2-month post-operation: 0%	13.2-month post-operation: 4%			
ASAP			3-year post-operation: 2%	3-year post-operation: 0%			
COMI-Knee		2.1-5.8%	Pre-operation: 1.4% 6-month post-operation: 0.5%	Pre-operation: 0% 6-month post-operation: 14%			
FJS		0-4.8%, and higher missing rate for item 10, 11 and 12 ranging from 7.5%-40%	2-month post-operation: 8% 6-month post-operation: 0.9-4.4% 1-year post-operation: 0-9% 2-year post-operation: 2.2% Over 2-year post-operation: 0-3.4%	2-month post-operation: 0% 6-month post-operation: 0% 1-year post-operation: 3-12% 2-year post-operation: 33% Over 2-year post-operation: 2.0-6.8%	Improvement in knee state 7.2-month post-operation: 10.9 1-year post-operation: 17-23		85 sec

HAAS		0%	6-month post-operation: 0% 3-, 3.8-year post-operation: 0%	6-month post-operation: 0% 3-, 3.8-year post-operation: 0%			1.6 min
HFKS		0%		12-month post-operation: 0%			
ICOAP	Constant pain	0%	Pre-operation: 4.6-33.0%	Pre-operation: 0-2.0%	Improvem ent in knee state pre- operation: 18.5		222 sec
	Intermittent pain	0%	Pre-operation: 1.6-6.0%	Pre-operation: 0-3.0%	Improvem ent in knee state post- operation: 18.7		
KOOS	Pain	0-3.2%	Pre-operation: 0-2% 6-month post-operation: 0- 0.2% 12-month post-operation: 0-0.2% Post-operation of revision TKA: 0%	Pre-operation: 0-1.0% 6-month post-operation: 10-15% 12-month post-operation: 11-28% 1.7-year post-operation: 13% Over 2-year post- operation: 33% Post-operation of revision TKA: 2%	Improvem ent in knee state post- operation: 16.7 Improvem ent in quality of life 2-year post- operation: 18-21	Cutoff value for Satisfacti on with the result of TKA 1-year post- operation : 84.5 3-year post- operation : 87.5	10min

Function, daily living	0-3.2%	Pre-operation: 0-0.7% 6-month post-operation: 0% 12-month post-operation: 0% Post-operation of revision TKA: 0%	Pre-operation: 0-0.4% 6-month post-operation: 7.0-9.4% 12-month post-operation: 6-29% 1.7-year post-operation: 3% Post-operation of revision TKA: 2%	Improvement in knee state post-operation: 18.4 Improvement in quality of life 2-year post-operation: 14-16	Cutoff value for Satisfaction with the result of TKA 1-year post-operation : 83.0 3-year post-operation : 87.5
Function, sports and recreational activities	0-74%	Pre-operation: 7-81% 6-month post-operation: 3.3-16.0% 12-month post-operation: 3.3-12.0% 1.7-year post-operation: 16% Post-operation of revision TKA: 38%	Pre-operation: 0-20% 2-week post-operation: 26.6% 6-month post-operation: 0-16% 12-month post-operation: 4.3-18.0% 1.7-year post-operation: 3% Post-operation of revision TKA: 6%	Improvement in knee state post-operation: 12.5	
Quality of life	0-3.2%	Pre-operation: 0-19% 6-month post-operation: 0.6-3.0% 12-month post-operation: 0-0.8% Post-operation of revision TKA: 4%	Pre-operation: 0-1.5% 6-month post-operation: 6-11% 12-month post-operation: 3-17% 1.7-year post-operation: 2%	Improvement in knee state pre-operation: 8.0 Improvement in knee	Cutoff value for Satisfaction with the result of TKA 1-year

				Over 2-year post-operation: 13% Post-operation of revision TKA: 4%	state post-operation: 15.6 Improvement in quality of life 2-year post-operation: 17	post-operation : 66.0 3-year post-operation : 66.0	
	Symptoms	0-3.2%	Pre-operation: 0-3% 6-month post-operation: 0% 12-month post-operation: 0% Post-operation of revision TKA: 0%	Pre-operation: 0-1.5% 6-month post-operation: 3.0-3.6% 12-month post-operation: 9-12% 1.7-year post-operation: 3% Over 2-year post-operation: 2% Post-operation of revision TKA: 4%	Improvement in knee state post-operation: 10.7 Improvement in quality of life 2-year post-operation: 7	Cutoff value for Satisfaction with the result of TKA 1-year post-operation : 80.5 3-year post-operation : 84.0	
KOOS, JR		8.0-9.2%	Pre-operation: 0.4-0.9% 45-day post-operation: < 0.1% 6-month post-operation: 0.2% 1-year post-operation: 0-0.8%	Pre-operation: 0.2% 45-day post-operation: 0.9% 6-month post-operation: 8.9% 1-year post-operation: 4.8-16.7%	Improvement in quality of life 2-year post-operation: 14		

			2-year post-operation: < 5%	2-year post-operation: < 15%			
KOOS-PS			2-year post-operation: no floor effects	2-year post-operation: slight ceiling effects	Improvement in knee state post-operation: 2.2		
KOOS-12	Pain	0.9-1.3%	Pre-operation: 0.4% 6-month post-operation: 0.2% 12-month post-operation: 0.2%	Pre-operation: 0.8% 6-month post-operation: 22.3% 12-month post-operation: 32.4%			
	Function	1.1-2.7%	Pre-operation: 0.8% 6-month post-operation: 0.2% 12-month post-operation: 0%	Pre-operation: 0.2% 6-month post-operation: 14.2% 12-month post-operation: 23.3%			
	Quality of life	1.9-2.3%	Pre-operation: 9.1% 6-month post-operation: 0.8% 12-month post-operation: 0.8%	Pre-operation: 0% 6-month post-operation: 7.6% 12-month post-operation: 11.6%			
	Summary	3.4-4.1%	Pre-operation: 0.4% 6-month post-operation: 0% 12-month post-operation: 0%	Pre-operation: 0% 6-month post-operation: 4.5% 12-month post-operation: 6.6%			
KOS-ADLS		11-27%	Pre-operation: 0% 6-month post-operation: 0%				6 min

KSS (2011)	Satisfaction	Around 0-5%	Pre-operation: 0-2% 6-12 weeks post-operation: 0% 3-month post-operation: 0% 12-month post-operation: 0% Post-operation (unclear time): 0%	Pre-operation: 0% 6-12 weeks post-operation: 7.0% 3-month post-operation: 0 12-month post-operation: 0-9.1% Post-operation (unclear time): 6.3%	Improvem ent in 1989 KSS pain score 1-year post- operation: 2.2		5.5-6.1 min, maximum for 30 min
	Expectation	Around 0-5%	Pre-operation: 0-0.3% 6-12 weeks post-operation: 0% 3-month post-operation: 0% 12-month post-operation: 0-2.3% Post-operation (unclear time): 4.8%	Pre-operation: 36-42% 6-12 weeks post-operation: 9.0% 3-month post-operation: 0% 12-month post-operation: 0-10.5% Post-operation (unclear time): 4.8%			
	Functional activities	0 to over 5%	Pre-operation: 0-0.9% 6-12 weeks post-operation: 0% 3-month post-operation: 0% 12-month post-operation: 0-0.3% 2-year post-operation: 0% Post-operation (unclear time): 0%	Pre-operation: 0% 6-12 weeks post-operation: 1.0% 3-month post-operation: 0% 12-month post-operation: 0% 2-year post-operation: 0% Post-operation (unclear time): 0%	Improvem ent in 1989 KSS pain score 1-year post- operation: 4.1		
KSS-A	Symptoms	10%	Pre-operation: 3% 6 weeks to over 5 years post-operation: 0%	Pre-operation: 0% 6 weeks to over 5 years post-operation: 16%			

	Satisfaction		Pre-operation: 9% 6 weeks to over 5 years post-operation: 1%	Pre-operation: 1% 6 weeks to over 5 years post-operation: 15%			
	Expectation		Pre-operation: 0% 6 weeks to over 5 years post-operation: 9%	Pre-operation: 61% 6 weeks to over 5 years post-operation: 16%			
	Function		Pre-operation: 0% 6 weeks to over 5 years post-operation: 0%	Pre-operation: 0% 6 weeks to over 5 years post-operation: 2%			
LEAS			Pre-operation: 0% 6-month post-operation of revision TKA: 0%	Pre-operation: 0% 6-month post-operation of revision TKA: 0%			
LEFS		The highest (9%) missing rate for item 16				Cutoff value for satisfacti on with symptom and function 6-month post- operation : 42.5 1-year post- operation : 58.5	Less than 2 minutes
Lequesne		21%	6.7-year post-operation: 0%	6.7-year post-operation: 6.4%			8.2 min
Lysholm		7%		Post-operation: 3%			
MFJS		6.1%, and less		1-2 years post-operation: 1.5%			

		missing data than FJS					
OA-CAT	Pain			Pre-operation: 0% 3-month post-operation: 6.1%			52 sec
	Function			Pre-operation: 0% 3-month post-operation: 1.5%			1 min 7 sec
OAKHQ OL							15-20 min
OKS		0-17% and the highest missing rate for item 4	Pre-operation: 0-7% 6-month post-operation: 0% 1-2 years post-operation: 0% Over 2-year post-operation: 0-0.1%	Pre-operation: 0-1% 6-month post-operation: 0.61-1.4% 1-2 years post-operation: 0.9-9.0% Over 2-year post-operation: 1.9-6.8%	Improvement in knee state 6-month post-operation: 5-9 1-year post-operation: 9-11 Improvement in general health state 1-year post-operation: 16.5 Satisfaction with	Normative score available for pre-operative and 6, 12 months post-operative population from the UK registry Cutoff value for satisfaction with symptoms and function 6-month	2min24sec-10min, maximum for 45min

					<p>surgery 1-year post- operation: 13.5 Satisfactio n with pain relief 1-year post- operation: 5 Satisfactio n with function 1-year post- operation: 4.3</p>	<p>post- operation : 35.5 1-year post- operation : 36.5</p>	
PAQ- knee			Pre-operation: 0% 13-month post-operation: 0%	Pre-operation: 0% 13-month post-operation: 1%			Less than 5 min
PKIP		0%	Pre-operation and post- operation: no	Pre-operation and post- operation: no	4- to 5- point change in Oxford Knee Score 1- year post- operation: 21.2		

Tegner		24%	6-day post-operation: 50% Post-operation: 3%	Post-operation: 0%			3.3 min
UCLA		0-7%	Post-operation: 0%	Post-operation: 1%		Cutoff value for satisfaction with symptoms and function 6-month post-operation : 5.5 1-year post-operation : 5.5	3.9 min
WOMAC	Pain	1-6%	Pre-operation: 0-2.5% 2-month post-operation: 0% 6-month post-operation: 0% 1-year post-operation: 0% 2-year post-operation: 0% Over 2-year post-operation: 0.5%	Pre-operation: 0-0.9% 2-month post-operation: 2.2% 3-month post-operation: 13.6% 6-month post-operation: 7.7-21.7% 1-year post-operation: 41.7% 2-year post-operation: 18.6-65.9% Over 2-year post-operation: 20.5-32.2%	Improvement in knee state 6-month post-operation: 22.6-22.9 2-year post-operation: 28.0 Improvement in pain 1-year post-	Cutoff value for satisfaction with choice and outcome 2-month post-operation : 17.5 1-year post-operation : 7.5	4.6-11.7 min for total, and 2min for function subscale, 41sec for pain subscale

					operation: 20.5-29.0 Improvement in quality of life 1-year post- operation: 11-21 2-year post- operation: 31.3	Cutoff value for satisfaction with symptoms 1-year post- operation : 25.0- 28.6	
	Function	3-14%	Pre-operation: 0-1.8% 2-month post-operation: 0% 6-month post-operation: 0% 1-year post-operation: 0% 2-year post-operation: 0% Over 2-year post- operation: 0.1%	Pre-operation: 0-0.3% 2-month post-operation: 1.1% 3-month post-operation: 3.0% 6-month post-operation: 1.1-9.4% 1-year post-operation: 20.8% 2-year post-operation: 3.9- 49.5% Over 2-year post- operation: 8.6-9.6%	Improvement in knee state 6-month post- operation: 17.7-19.0 2-year post- operation: 20.8 Improvement in function 1-year post- operation: 23.0-33.5	Cutoff value for satisfaction with choice and outcome 2-month post- operation : 33.5 1-year post- operation : 16.5 Cutoff value for satisfacti	

					Improvement in quality of life 1-year post-operation: 9-16 2-year post-operation: 26.9	on with symptoms 1-year post-operation : 32.3-36.7	
	Stiffness	1%	Pre-operation: 6.2-14.6% 2-month post-operation: 2.2% 6-month post-operation: 0.7-2.4% 1-year post-operation: 0% 2-year post-operation: 1.1% Over 2-year post-operation: 1.9%	Pre-operation: 0.9-15.4% 2-month post-operation: 29.0% 6-month post-operation: 15.6-51.6% 1-year post-operation: 64.6% 2-year post-operation: 26.61-82.4% Over 2-year post-operation: 25.8%	Improvement in knee state 6-month post-operation: 13.0-14.5 2-year post-operation: 21.4 Improvement in quality of life 1-year post-operation: 8-13 2-year	Cutoff value for satisfaction with choice and outcome 2-month post-operation : 31.5 1-year post-operation : 18.5	

					post-operation: 25.0		
WORQ			Pre-operation: <1% 3.8-year post-operation: 3.6%	Pre-operation: <1% 3.8-year post-operation: 8.8%	Satisfaction with work ability 3.8- year post-operation: 13		

AAOS Hip and Knee, AAOS Hip and Knee Core Scale; AKPS, Anterior Knee Pain Scale; ASAP, Activity Scale for Arthroplasty Patients; COMI-knee, Core Outcome Measures Index knee; FJS, Forgotten Joint Score; HAAS, High-Activity Arthroplasty Score; HFKS, High-Flexion Knee Score; ICOAP, Intermittent and Constant Osteoarthritis Pain; KOOS, Knee Injury and Osteoarthritis Outcome Score; KOOS, JR, Knee Injury and Osteoarthritis Outcome Score Joint Replacement; KOOS-PS, Knee Injury and Osteoarthritis Outcome Physical function Short form; KOOS-12, 12-item short forms Knee Injury and Osteoarthritis Outcome; KOS-ADLS, Activities of Daily Living Scale of the Knee Outcome Survey; KSS (2011), 2011 Knee Society Scoring System; KSS-A, Adjusted 2011 Knee Society Scoring System; LEAS, Lower-Extremity Activity Scale; LEFS, Lower Extremity Functional Scale; Lequesne, Lequesne Algofunctional Index for the Knee; Lysholm, Lysholm Knee Scoring Scale; MCID, minimal clinical important difference; MFJS, Modified Forgotten Joint Score; OA-CAT, Computer-Adaptive Test for Hip and Knee OA; OAKHQOL, OsteoArthritis of Knee and Hip Quality of Life Scale; OKS, Oxford Knee Score; PAQ-knee, Patient Administered Questionnaires Knee; PKIP, Patient's Knee Implant Performance; Tegner, Tegner Activity Scale; UCLA, University of California Los Angeles

activity score; WOMAC, Western Ontario and McMaster Universities Arthritis Index; WORQ, Work, Osteoarthritis or joint-Replacement Questionnaire.