

LCS Patella-Trochlear Knee Investigation

Note: This analysis compares the LCS trochlear prosthesis with all other patella-trochlear knee prostheses.

This prosthesis has been identified as having a significantly higher rate of revision. For a detailed explanation of the process used by the Registry that results in identification of prostheses that have a higher than anticipated rate of revision please refer to the Prostheses with Higher than Anticipated Rates of Revision chapter of the most recent AOANJRR Annual Report, <https://aoanjrr.sahmri.com/annual-reports-2022>.

Note: Procedures using prostheses with no recorded use in 2021 are excluded from the comparator.

TABLE 1

Revision Rate of Primary Patella-Trochlear Knee Replacement

The revision rate of the LCS patella-trochlear knee prosthesis is compared to all other patella-trochlear knee prostheses.

Table 1: Revision Rates of Primary Patella-Trochlear Knee Replacement

Component	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
LCS	217	413	4106	5.29 (4.61, 6.04)
Other Patella-Trochlear Knee	563	3634	21060	2.67 (2.46, 2.90)
TOTAL	780	4047	25165	3.10 (2.89, 3.32)

Note: Prostheses no longer used in 2021 are excluded from the comparator.

TABLE 2

Yearly Cumulative Percent Revision of Primary Patella-Trochlear Knee Replacement

The yearly cumulative percent revision of the LCS patella-trochlear knee prosthesis is compared to all other patella-trochlear knee prostheses.

Table 2: Yearly Cumulative Percent Revision of Primary Patella-Trochlear Knee Replacement

CPR	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs	7 Yrs
LCS	3.9 (2.4, 6.2)	8.0 (5.7, 11.1)	11.9 (9.1, 15.4)	16.9 (13.6, 20.9)	20.7 (17.1, 25.0)	23.8 (19.9, 28.2)	28.4 (24.2, 33.1)
Other Patella-Trochlear Knee	1.7 (1.3, 2.2)	4.2 (3.5, 4.9)	7.0 (6.2, 8.0)	9.4 (8.4, 10.6)	11.6 (10.5, 12.9)	13.6 (12.3, 15.0)	16.8 (15.3, 18.4)

CPR	8 Yrs	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs
LCS	31.3 (27.0, 36.1)	35.3 (30.8, 40.3)	40.9 (36.1, 45.9)	43.1 (38.3, 48.3)	46.1 (41.2, 51.2)	50.3 (45.3, 55.5)	52.0 (47.0, 57.3)
Other Patella-Trochlear Knee	18.7 (17.1, 20.4)	21.3 (19.5, 23.2)	24.0 (22.1, 26.2)	26.1 (24.0, 28.5)	29.0 (26.5, 31.7)	32.2 (29.3, 35.4)	34.7 (31.3, 38.3)

CPR	15 Yrs	16 Yrs	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs
LCS	53.9 (48.7, 59.2)	61.3 (55.4, 67.2)					
Other Patella-Trochlear Knee	37.8 (33.7, 42.2)						

Note: Prostheses no longer used in 2021 are excluded from the comparator.

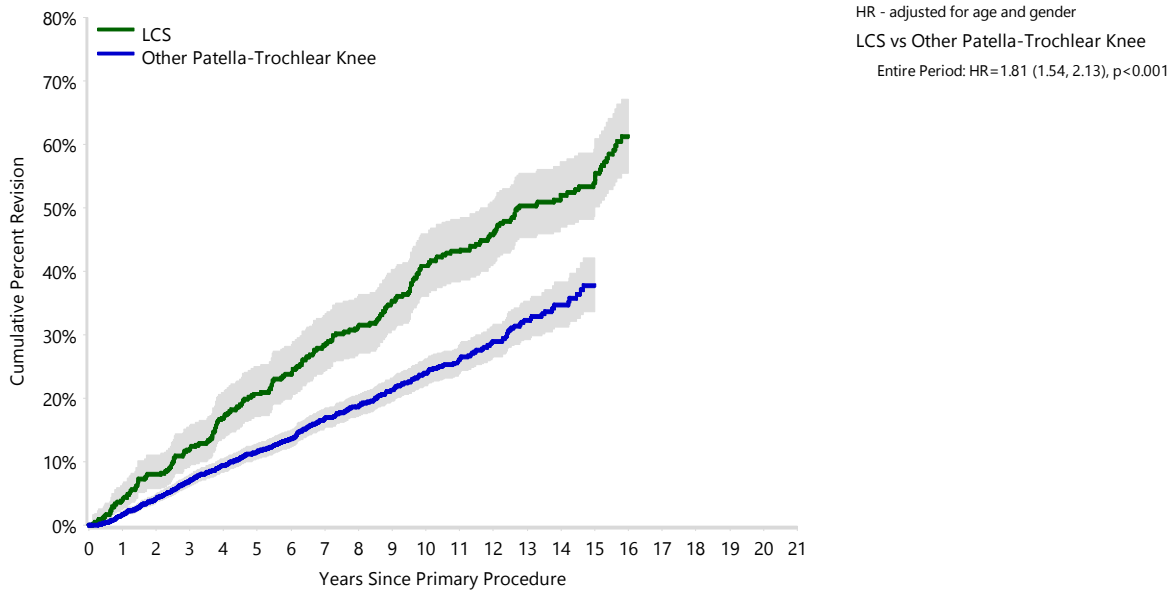
FIGURE 1

Yearly Cumulative Percent Revision of Primary Patella-Trochlear Knee Replacement

The yearly cumulative percent revision of the LCS patella-trochlear knee prosthesis is compared to all other patella-trochlear knee prostheses. In addition, hazard ratios are reported.

Hazard ratios are reported for specific time periods during which the hazard ratio is constant. This is done to enable more specific and valid comparisons of the risk of revision over time. The pattern of variation in risk has important implications with respect to the underlying reasons for any difference.

Figure 1: Cumulative Percent Revision of Primary Patella-Trochlear Knee Replacement



Number at Risk	0 Yr	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs	7 Yrs	8 Yrs	9 Yrs	10 Yrs
LCS	413	397	378	355	331	312	299	276	258	238	208
Other Patella-Trochlear Knee	3634	3274	2899	2517	2141	1827	1515	1259	1035	851	664

Number at Risk	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs
LCS	196	182	155	125	85	44	32	17	8	0	0
Other Patella-Trochlear Knee	495	333	208	125	78	33	12	1	1	0	0

Note: Prostheses no longer used in 2021 are excluded from the comparator.

TABLE 3**Primary Diagnosis for Revised Primary Patella-Trochlear Knee Replacement**

This table identifies the diagnosis of the primary procedure which was subsequently revised. This information is provided as there is a variation on outcome depending on the primary diagnosis. It is therefore important when considering the reasons for a higher than anticipated rate of revision that there is identification of the primary diagnosis. This information should be compared to the primary diagnosis for the revisions of all other patella-trochlear knee prostheses.

Table 3: Primary Diagnosis for Revised Primary Patella-Trochlear Knee Replacement

Primary Diagnosis	LCS		Other Patella-Trochlear Knee	
	Number	Percent	Number	Percent
Osteoarthritis	215	99.1	557	98.9
Other Inflammatory Arthritis	1	0.5	3	0.5
Rheumatoid Arthritis	1	0.5	2	0.4
Other			1	0.2
TOTAL	217	100.0	563	100.0

Note: Prostheses no longer used in 2021 are excluded from the comparator.

TABLE 4

Reasons for Revision

This is reported in two ways: a percentage of primary procedures revised and as a percentage of all revision procedures.

% Primaries Revised: This shows the proportional contribution of each revision diagnosis as a percentage of the total number of primary procedures. This percentage can be used to approximate the risk of being revised for that diagnosis. Differing percentages between groups, with the same distribution of follow up time, may identify problems of concern.

% Revisions: The number of revisions for each diagnosis is expressed as a percentage of the total number of revisions. This shows the distribution of reasons for revision within a group but cannot be used as a comparison between groups.

Table 4: Primary Patella-Trochlear Knee Replacement - Reason for Revision

Revision Diagnosis	Number	LCS		Other Patella-Trochlear Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Progression Of Disease	85	20.6	39.2	347	9.5	61.6
Loosening	35	8.5	16.1	73	2.0	13.0
Pain	22	5.3	10.1	57	1.6	10.1
Implant Breakage Patella	25	6.1	11.5	4	0.1	0.7
Infection	6	1.5	2.8	19	0.5	3.4
Wear Patella	17	4.1	7.8	10	0.3	1.8
Malalignment	5	1.2	2.3	9	0.2	1.6
Fracture	1	0.2	0.5	8	0.2	1.4
Patella Maltracking	3	0.7	1.4	7	0.2	1.2
Lysis	5	1.2	2.3	6	0.2	1.1
Metal Related Pathology	6	1.5	2.8			
Instability	1	0.2	0.5	5	0.1	0.9
Wear Tibial Insert	1	0.2	0.5	4	0.1	0.7
Prosthesis Dislocation	1	0.2	0.5	3	0.1	0.5
Arthrofibrosis				2	0.1	0.4
Incorrect Sizing				2	0.1	0.4
Osteonecrosis	1	0.2	0.5	2	0.1	0.4
Patellofemoral Pain	2	0.5	0.9	2	0.1	0.4
Implant Breakage Femoral				1	0.0	0.2
Other	1	0.2	0.5	2	0.1	0.4
N Revision	217	52.5	100.0	563	15.5	100.0
N Primary	413			3634		

Note: Prostheses no longer used in 2021 are excluded from the comparator.

FIGURE 2

Cumulative Incidence Revision Diagnosis of Primary Patella-Trochlear Knee Replacement

This figure details the cumulative incidence of the most common reasons for revision. The five most common reasons for revision are included as long as each of these reasons account for more than 10 procedures or at least 5% of all revisions for the LCS patella-trochlear knee prosthesis. A comparative graph is provided of the cumulative incidence for the same reasons for revisions for all other patella-trochlear knee prostheses.

Figure 2: Cumulative Incidence Revision Diagnosis for Primary Patella-Trochlear Knee Replacement

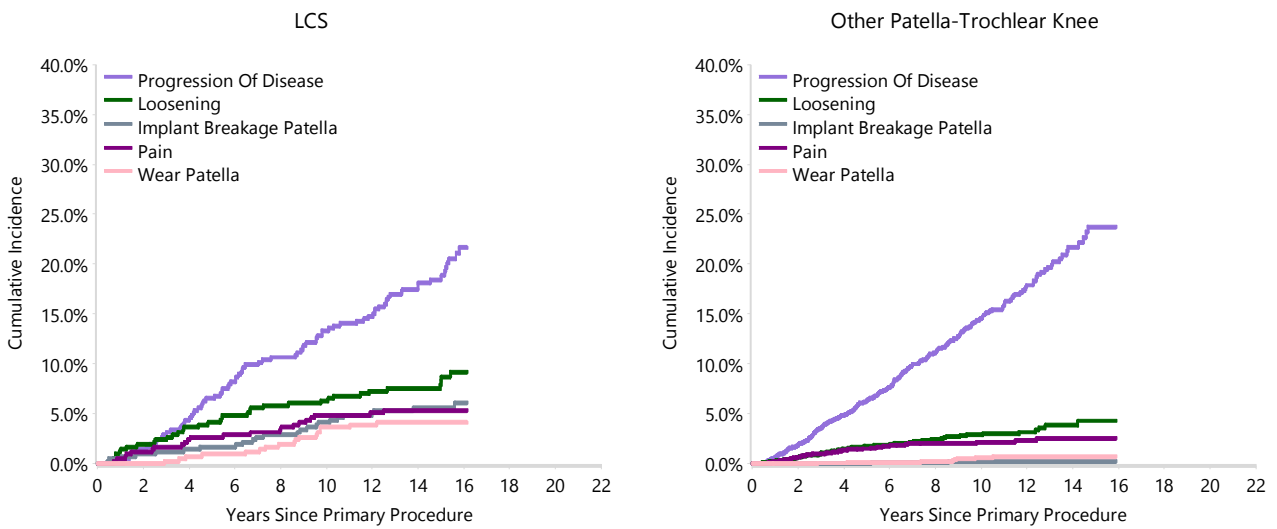


TABLE 5

Type of Revision Performed for Primary Patella-Trochlear Knee Replacement

This analysis identifies the components used in the revision of the LCS patella-trochlear knee prosthesis and compares it to the components used in the revision of all other patella-trochlear knee prostheses.

The reason this analysis is undertaken is to identify whether there is one or more components which are being replaced that differ from the components replaced for revisions of all other patella-trochlear knee prostheses i.e. is there a difference in the type of revision undertaken for the LCS patella-trochlear knee prosthesis compared to all other patella-trochlear knee prostheses.

Table 5: Primary Patella-Trochlear Knee Replacement - Type of Revision

Type of Revision	LCS		Other Patella-Trochlear Knee	
	Number	Percent	Number	Percent
TKR (Tibial/Femoral)	174	80.2	497	88.3
Patella/Trochlear Resurfacing	4	1.8	14	2.5
UKR (Uni Tibial/Uni Femoral)	1	0.5	13	2.3
Removal of Prostheses			5	0.9
Cement Spacer			3	0.5
Femoral Component			3	0.5
N Major	179	82.5	535	95.0
Patella Only	38	17.5	28	5.0
N Minor	38	17.5	28	5.0
TOTAL	217	100.0	563	100.0

Note: Prostheses no longer used in 2021 are excluded from the comparator.

TABLE 6

Revision Rates of Primary Patella-Trochlear Knee Replacement by State

This enables a state by state variation to be identified for the LCS patella-trochlear knee prosthesis and provides the comparative data for each of the states for all other patella-trochlear knee prostheses.

The purpose of this analysis is to determine if the higher than anticipated rate of revision has widespread distribution between states. If there is widespread distribution then the reason for the higher than anticipated rate of revision is unlikely to be surgeon specific. If the prosthesis has been used in only a small number of states it is not possible to distinguish if the higher than anticipated rate of revision is related to the prosthesis, surgeon, technique or patient.

Table 6: Revised Number of Primary Patella-Trochlear Knee Replacement by State

Component	State	N Revised	N Total
LCS	NSW	75	156
	VIC	28	49
	QLD	10	20
	SA	99	177
	TAS	1	2
	ACT/NT	4	9
Other Patella-Trochlear Knee	NSW	214	1259
	VIC	165	1078
	QLD	60	469
	WA	37	290
	SA	65	405
	TAS	4	41
	ACT/NT	18	92
TOTAL		780	4047

Note: Prostheses no longer used in 2021 are excluded from the comparator.

TABLE 7**Number of Revisions of LCS Primary Patella-Trochlear Knee Replacement by Year of Implant**

This analysis details the number of prostheses reported each year to the Registry for the LCS patella-trochlear knee prosthesis. It also provides the subsequent number of revisions of the primaries reported in that year.

Primary procedures performed in later years have had less follow up time therefore the number revised is expected to be less than the number revised in earlier years. For example, a primary procedure performed in 2021 has a maximum of one year to be revised, whereas a primary procedure performed in 2019 has a maximum of three years to be revised.

Table 7: Number of Revisions of LCS Primary Patella-Trochlear Knee Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2002	16	26
2003	39	56
2004	42	68
2005	25	47
2006	27	65
2007	25	64
2008	28	60
2009	15	27
TOTAL	217	413

TABLE 8**Revision Rates of LCS Primary Patella-Trochlear Knee Replacement by Catalogue Number Range**

Many prostheses have a number of catalogue ranges. The catalogue range is specific to particular design features; more than one catalogue range usually indicates a minor difference in design in a particular LCS prosthesis.

This analysis has been undertaken to determine if the revision rate varies according to the catalogue number range.

Model	Catalogue Range	Catalogue Description	Cement
Trochlear			
LCS	118003050-118012050	LCS PFJ INSET TROCHLEAR	YES

Table 8: Revised Number of LCS Primary Patella-Trochlear Knee Replacement by Catalogue Number Range

Trochlear Range	N Revised	N Total
118003050-118012050	217	413
TOTAL	217	413

TABLE 9**Revision Rates of LCS Primary Patella-Trochlear Knee Replacement by Component**

A prosthesis may be combined with multiple components. This analysis has been undertaken to determine if the revision rate varies according to the component with which it is combined.

Table 9: Revised Number of LCS Primary Patella-Trochlear Knee Replacement by Patella Component

Patella Component	N Revised	N Total
LCS	207	395
Nexgen	1	1
No Patella	6	9
PFC Sigma	3	7
Scorpio	0	1
TOTAL	217	413