

SAL/SAL Total Knee Investigation

Note: This analysis compares the SAL/SAL femoral/tibial combination with all other total knee prostheses.

This combination 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-2023>.

Note: Procedures using prostheses with no recorded use in 2022 are excluded from the comparator.

TABLE 1

Revision Rate of Primary Total Knee Replacement

The revision rate of the SAL/SAL total knee combination is compared to all other total knee prostheses.

Table 1: Revision Rates of Primary Total Knee Replacement

Component	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
SAL/SAL	15	56	752	1.99 (1.12, 3.29)
Other Total Knee	26836	757949	5069780	0.53 (0.52, 0.54)
TOTAL	26851	758005	5070532	0.53 (0.52, 0.54)

Note: Prostheses no longer used in 2022 are excluded from the comparator.

TABLE 2

Yearly Cumulative Percent Revision of Primary Total Knee Replacement

The yearly cumulative percent revision of the SAL/SAL total knee combination is compared to all other total knee prostheses.

Table 2: Yearly Cumulative Percent Revision of Primary Total Knee Replacement

CPR	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs	7 Yrs	8 Yrs
SAL/SAL	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	1.9 (0.3, 12.6)	1.9 (0.3, 12.6)	1.9 (0.3, 12.6)	5.9 (1.9, 17.2)	5.9 (1.9, 17.2)	5.9 (1.9, 17.2)
Other Total Knee	1.0 (1.0, 1.0)	1.8 (1.8, 1.9)	2.4 (2.4, 2.4)	2.8 (2.8, 2.9)	3.1 (3.1, 3.2)	3.5 (3.4, 3.5)	3.8 (3.7, 3.8)	4.0 (4.0, 4.1)

CPR	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs
SAL/SAL	12.6 (5.8, 25.9)	14.8 (7.3, 28.6)	17.2 (9.0, 31.7)	19.7 (10.7, 34.7)	19.7 (10.7, 34.7)	27.8 (16.7, 44.0)	30.6 (18.8, 47.1)
Other Total Knee	4.3 (4.3, 4.4)	4.6 (4.6, 4.7)	4.9 (4.9, 5.0)	5.2 (5.2, 5.3)	5.6 (5.5, 5.6)	5.9 (5.8, 5.9)	6.2 (6.1, 6.3)

CPR	16 Yrs	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs	22 Yrs
SAL/SAL	33.3 (21.1, 50.1)	33.3 (21.1, 50.1)	33.3 (21.1, 50.1)	33.3 (21.1, 50.1)	37.5 (24.0, 55.2)		
Other Total Knee	6.6 (6.5, 6.8)	7.0 (6.9, 7.2)	7.3 (7.2, 7.5)	7.6 (7.4, 7.8)	7.8 (7.6, 8.0)	8.0 (7.8, 8.2)	8.2 (7.9, 8.6)

Note: Prostheses no longer used in 2022 are excluded from the comparator.

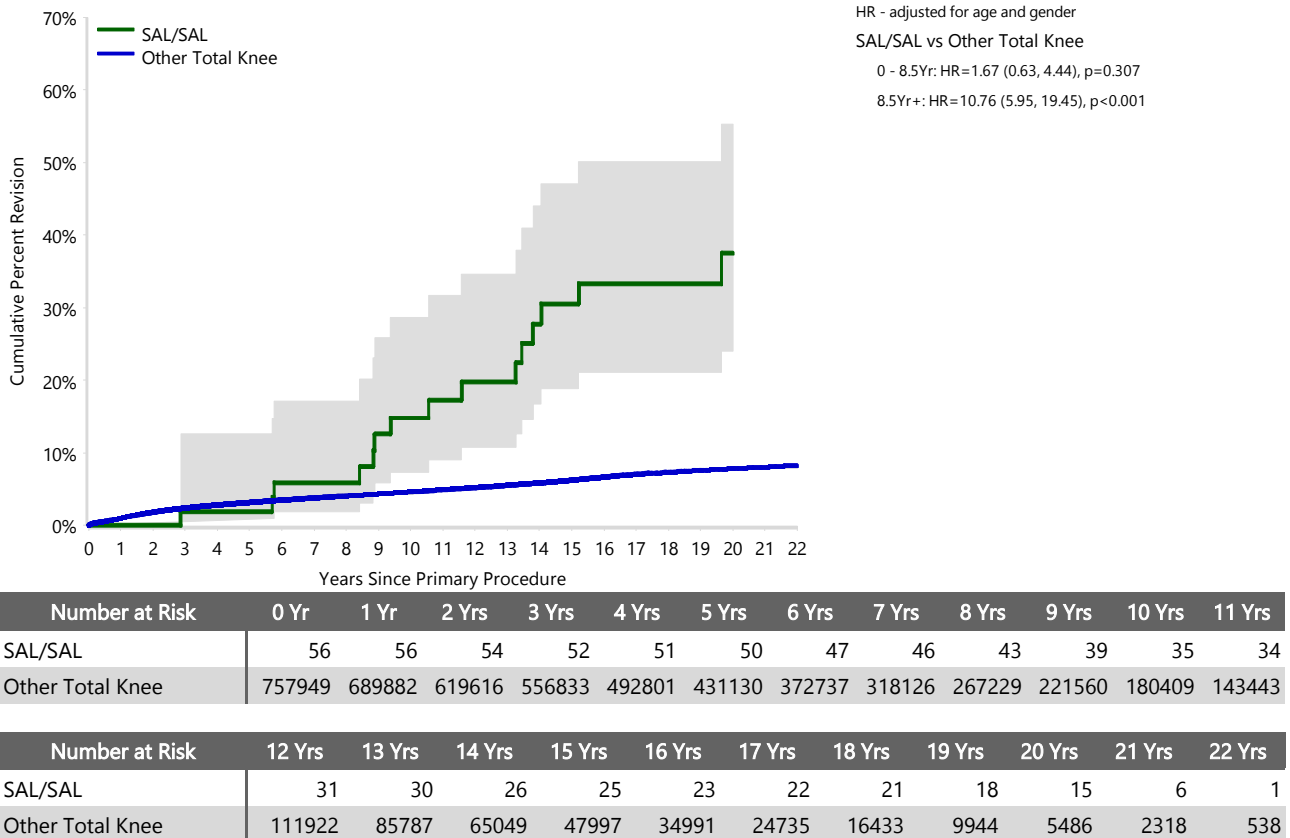
FIGURE 1

Yearly Cumulative Percent Revision of Primary Total Knee Replacement

The yearly cumulative percent revision of the SAL/SAL total knee combination is compared to all other total 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 Total Knee Replacement



Note: Prostheses no longer used in 2022 are excluded from the comparator.

TABLE 3**Primary Diagnosis for Revised Primary Total 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 total knee prostheses.

Table 3: Primary Diagnosis for Revised Primary Total Knee Replacement

Primary Diagnosis	SAL/SAL		Other Total Knee	
	Number	Percent	Number	Percent
Osteoarthritis	15	100.0	26004	96.9
Rheumatoid Arthritis			342	1.3
Tumour			162	0.6
Other Inflammatory Arthritis			160	0.6
Osteonecrosis			101	0.4
Fracture			48	0.2
Other			18	0.1
Chondrocalcinosis			1	0.0
TOTAL	15	100.0	26836	100.0

Note: Prostheses no longer used in 2022 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 Total Knee Replacement - Reason for Revision

Revision Diagnosis	Number	SAL/SAL		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	3	5.4	20.0	7356	1.0	27.4
Loosening	6	10.7	40.0	6021	0.8	22.4
Instability				2610	0.3	9.7
Pain				2037	0.3	7.6
Patellofemoral Pain				1933	0.3	7.2
Patella Erosion	1	1.8	6.7	1785	0.2	6.7
Arthrofibrosis	1	1.8	6.7	1035	0.1	3.9
Fracture				1023	0.1	3.8
Malalignment				602	0.1	2.2
Wear Tibial Insert	1	1.8	6.7	368	0.0	1.4
Lysis	1	1.8	6.7	331	0.0	1.2
Incorrect Sizing				262	0.0	1.0
Patella Maltracking				186	0.0	0.7
Implant Breakage Tibial Insert				174	0.0	0.6
Bearing Dislocation	1	1.8	6.7	151	0.0	0.6
Implant Breakage Patella				140	0.0	0.5
Metal Related Pathology	1	1.8	6.7	107	0.0	0.4
Prosthesis Dislocation				84	0.0	0.3
Synovitis				75	0.0	0.3
Osteonecrosis				55	0.0	0.2
Implant Breakage Tibial				42	0.0	0.2
Implant Breakage Femoral				39	0.0	0.1
Wear Patella				36	0.0	0.1
Tumour				34	0.0	0.1
Heterotopic Bone				14	0.0	0.1
Wear Tibial				9	0.0	0.0
Progression Of Disease				7	0.0	0.0
Patella Dislocation				2	0.0	0.0
Incorrect Side				1	0.0	0.0
Wear Femoral				1	0.0	0.0
Other				316	0.0	1.2
N Revision	15	26.8	100.0	26836	3.5	100.0
N Primary	56			757949		

Note: Prostheses no longer used in 2022 are excluded from the comparator.

FIGURE 2

Cumulative Incidence Revision Diagnosis of Primary Total 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 SAL/SAL total knee combination. A comparative graph is provided of the cumulative incidence for the same reasons for revisions for all other total knee prostheses.

Figure 2: Cumulative Incidence Revision Diagnosis for Primary Total Knee Replacement

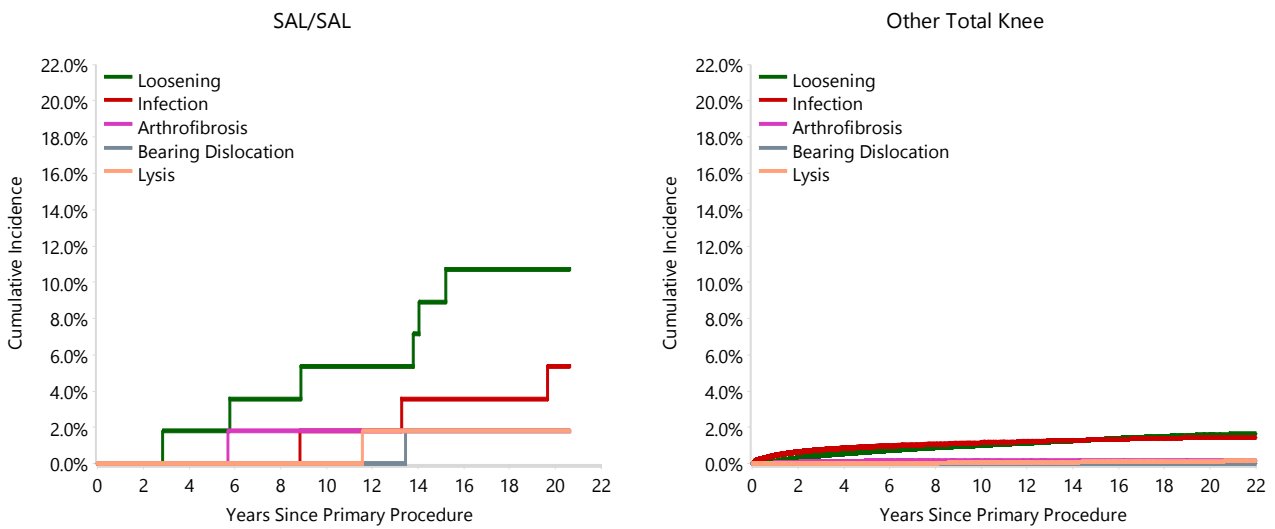


TABLE 5

Type of Revision Performed for Primary Total Knee Replacement

This analysis identifies the components used in the revision of the SAL/SAL total knee combination and compares it to the components used in the revision of all other total 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 total knee prostheses i.e. is there a difference in the type of revision undertaken for the SAL/SAL total knee combination compared to all other total knee prostheses.

Table 5: Primary Total Knee Replacement - Type of Revision

Type of Revision	SAL/SAL		Other Total Knee	
	Number	Percent	Number	Percent
TKR (Tibial/Femoral)	10	66.7	6657	24.8
Tibial Component	1	6.7	2136	8.0
Cement Spacer			1363	5.1
Femoral Component			1322	4.9
Removal of Prostheses			154	0.6
Total Femoral			24	0.1
Reinsertion of Components			13	0.0
N Major	11	73.3	11669	43.5
Insert Only	3	20.0	7583	28.3
Patella Only	1	6.7	4730	17.6
Insert/Patella			2772	10.3
Minor Components			64	0.2
Cement Only			18	0.1
N Minor	4	26.7	15167	56.5
TOTAL	15	100.0	26836	100.0

Note: Prostheses no longer used in 2022 are excluded from the comparator.

TABLE 6**Revision Rates of SAL/SAL Primary Total Knee Replacement by Fixation**

This analysis is provided as some prostheses have more than one fixation option. Additionally there are prostheses where an alternative to the recommended approach to fixation was used e.g. a cementless prosthesis that has been cemented or vice-versa.

Table 6: Revised Number of SAL/SAL Primary Total Knee Replacement by Fixation

Fixation	N Revised	N Total
Cemented	10	28
Hybrid (Tibial Cemented)	5	28
TOTAL	15	56

TABLE 7**Revision Rates of SAL/SAL Primary Total Knee Replacement by Bearing Surface**

This analysis is provided as some prostheses are combined with a variety of bearing surfaces. All bearing surfaces used with this combination are listed.

Table 7: Revised Number of SAL/SAL Primary Total Knee Replacement by Bearing Surface

Bearing Surface	N Revised	N Total
Non XLPE	15	56
TOTAL	15	56

TABLE 8**Revision Rates of SAL/SAL Primary Total Knee Replacement by Bearing Mobility**

This analysis is provided as some prostheses are combined with a variety of bearing mobilities. All bearing mobilities used with this combination are listed.

Table 8: Revised Number of SAL/SAL Primary Total Knee Replacement by Bearing Mobility

Bearing Mobility	N Revised	N Total
Rotating	15	56
TOTAL	15	56

TABLE 9**Revision Rates of SAL/SAL Primary Total Knee Replacement by Stability**

This analysis is provided as some prostheses are combined with a variety of stabilities. All stabilities used with this combination are listed.

Table 9: Revised Number of SAL/SAL Primary Total Knee Replacement by Stability

Stability	N Revised	N Total
Minimally Stabilised	15	56
TOTAL	15	56

TABLE 10

Revision Rates of Primary Total Knee Replacement by State

This enables a state by state variation to be identified for the SAL/SAL total knee combination and provides the comparative data for each of the states for all other total 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 10: Revised Number of Primary Total Knee Replacement by State

Component	State	N Revised	N Total
SAL/SAL	NSW	10	36
	QLD	2	9
	SA	2	4
	ACT/NT	1	7
Other Total Knee	NSW	7959	262433
	VIC	5825	153047
	QLD	5766	157008
	WA	3245	81139
	SA	2967	66419
	TAS	437	18133
	ACT/NT	637	19770
TOTAL		26851	758005

Note: Prostheses no longer used in 2022 are excluded from the comparator.

TABLE 11**Number of Revisions of SAL/SAL Primary Total Knee Replacement by Year of Implant**

This analysis details the number of prostheses reported each year to the Registry for the SAL/SAL total knee combination. 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 2022 has a maximum of one year to be revised, whereas a primary procedure performed in 2020 has a maximum of three years to be revised.

Table 11: Number of Revisions of SAL/SAL Primary Total Knee Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2000	1	3
2001	12	30
2002	2	23
TOTAL	15	56

TABLE 12

Revision Rates of SAL/SAL Primary Total 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 SAL/SAL 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	Fixation
Femoral				
SAL	49244011-49244011	SAL FEMUR NON-POROUS	YES	
SAL	49244051-49244051	SAL FEMUR POROUS	NO	POROUS
SAL	49244061-49244061	SAL FEMUR POROUS	NO	POROUS
SAL	49244302-49244302	SAL FEMUR NON-POROUS	YES	
SAL	49244312-49244312	SAL FEMUR NON-POROUS	YES	
SAL	49244352-49244352	SAL FEMUR POROUS	NO	POROUS
SAL	49244362-49244362	SAL FEMUR POROUS	NO	POROUS
SAL	49244603-49244603	SAL FEMUR NON-POROUS	YES	
SAL	49244613-49244613	SAL FEMUR NON-POROUS	YES	
SAL	49244653-49244653	SAL FEMUR POROUS	NO	POROUS
SAL	49244663-49244663	SAL FEMUR POROUS	NO	POROUS
SAL	49245004-49245004	SAL FEMUR NON-POROUS	YES	
SAL	49245014-49245014	SAL FEMUR NON-POROUS	YES	
SAL	49245054-49245054	SAL FEMUR POROUS	NO	POROUS
SAL	49245064-49245064	SAL FEMUR POROUS	NO	POROUS
SAL	49245415-49245415	SAL FEMUR NON-POROUS	YES	
Tibial				
SAL	49246424-49249250	SAL TIBIA BASE PLATE MONOBLOCK	YES	

Table 12: Revised Number of SAL/SAL Primary Total Knee Replacement by Catalogue Number Range

Femoral Range	Tibial Range	N Revised	N Total
49244011-49244011	49246424-49249250	0	2
49244051-49244051	49246424-49249250	0	2
49244061-49244061	49246424-49249250	0	1
49244302-49244302	49246424-49249250	3	4
49244312-49244312	49246424-49249250	2	5
49244352-49244352	49246424-49249250	1	2
49244362-49244362	49246424-49249250	1	5
49244603-49244603	49246424-49249250	3	7
49244613-49244613	49246424-49249250	1	4
49244653-49244653	49246424-49249250	1	6
49244663-49244663	49246424-49249250	0	3
49245004-49245004	49246424-49249250	0	2
49245014-49245014	49246424-49249250	0	3
49245054-49245054	49246424-49249250	0	4
49245064-49245064	49246424-49249250	2	5
49245415-49245415	49246424-49249250	1	1
TOTAL		15	56