

Apex Knee CR (cementless)/Apex Knee (cementless) Total Knee Investigation

Note: This analysis compares the Apex Knee CR (cless)/Apex Knee (cless) 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-2025>.

Note: Procedures using prostheses with no recorded use in 2024 are excluded from the comparator.

TABLE 1

Revision Rate of Primary Total Knee Replacement

The revision rate of the Apex Knee CR (cless)/Apex Knee (cless) 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)
Apex Knee CR (cless)/Apex Knee (cless)	32	529	4138	0.77 (0.53, 1.09)
Other Total Knee	24675	720532	4531401	0.54 (0.54, 0.55)
TOTAL	24707	721061	4535539	0.54 (0.54, 0.55)

Note: Prostheses no longer used in 2024 are excluded from the comparator.

TABLE 2

Yearly Cumulative Percent Revision of Primary Total Knee Replacement

The yearly cumulative percent revision of the Apex Knee CR (cless)/Apex Knee (cless) total knee combination is compared to all other total knee prostheses.

Table 2: Yearly Cumulative Percent Revision (95% CI) of Primary Total Knee Replacement

CPR	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs	7 Yrs	8 Yrs
Apex Knee CR (cless)/Apex Knee (cless)	2.5 (1.4, 4.2)	4.6 (3.1, 6.7)	5.0 (3.4, 7.2)	5.6 (4.0, 8.0)	5.6 (4.0, 8.0)	6.2 (4.4, 8.7)	6.2 (4.4, 8.7)	6.2 (4.4, 8.7)
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, 2.8)	3.1 (3.1, 3.2)	3.5 (3.4, 3.5)	3.8 (3.7, 3.8)	4.1 (4.0, 4.2)

CPR	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs
Apex Knee CR (cless)/Apex Knee (cless)	6.5 (4.6, 9.1)	6.5 (4.6, 9.1)	6.5 (4.6, 9.1)	6.5 (4.6, 9.1)				
Other Total Knee	4.4 (4.3, 4.5)	4.7 (4.7, 4.8)	5.1 (5.0, 5.1)	5.4 (5.3, 5.5)	5.7 (5.6, 5.8)	6.0 (5.9, 6.1)	6.4 (6.3, 6.5)	6.8 (6.7, 7.0)

CPR	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs	22 Yrs	23 Yrs
Apex Knee CR (cless)/Apex Knee (cless)							
Other Total Knee	7.3 (7.1, 7.4)	7.6 (7.4, 7.8)	7.9 (7.7, 8.1)	8.1 (7.9, 8.3)	8.4 (8.1, 8.6)	8.5 (8.2, 8.8)	8.6 (8.3, 8.9)

Note: Prostheses no longer used in 2024 are excluded from the comparator.

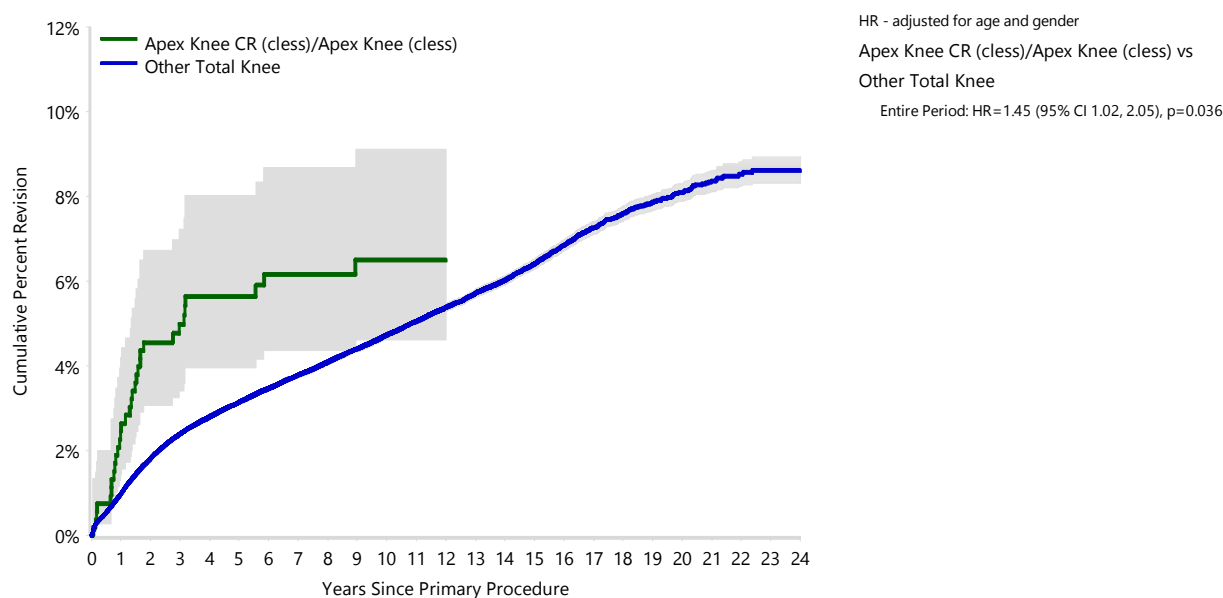
FIGURE 1

Yearly Cumulative Percent Revision of Primary Total Knee Replacement

The yearly cumulative percent revision of the Apex Knee CR (cless)/Apex Knee (cless) 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



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	11 Yrs
Apex Knee CR (cless)/Apex Knee (cless)	529	515	492	439	410	403	344	314	300	281	208	113
Other Total Knee	720532	640213	561543	497753	434915	379811	325931	276166	231177	190893	154374	123755

Number at Risk	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs	22 Yrs	23 Yrs
Apex Knee CR (cless)/Apex Knee (cless)	52	0	0	0	0	0	0	0	0	0	0	0
Other Total Knee	97936	75221	56549	41508	30003	21223	14967	10421	6807	4051	2359	1090

Note: Prostheses no longer used in 2024 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	Apex Knee CR (cless)/Apex Knee (cless)		Other Total Knee	
	Number	Percent	Number	Percent
Osteoarthritis	32	100.0	23858	96.7
Rheumatoid Arthritis			301	1.2
Tumour			192	0.8
Other Inflammatory Arthritis			158	0.6
Osteonecrosis			90	0.4
Fracture			50	0.2
Other			25	0.1
Chondrocalcinosis			1	0.0
TOTAL	32	100.0	24675	100.0

Note: Prostheses no longer used in 2024 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 (Follow-up Limited to 12.9 Years)

Revision Diagnosis	Apex Knee CR (cless)/Apex Knee (cless)			Other Total Knee		
	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	6	1.1	18.8	6948	1.0	29.2
Loosening	10	1.9	31.3	5014	0.7	21.1
Instability	1	0.2	3.1	2478	0.3	10.4
Pain	1	0.2	3.1	1712	0.2	7.2
Patella Erosion	8	1.5	25.0	1689	0.2	7.1
Patellofemoral Pain	1	0.2	3.1	1440	0.2	6.1
Arthrofibrosis	1	0.2	3.1	1041	0.1	4.4
Fracture				940	0.1	4.0
Malalignment	1	0.2	3.1	482	0.1	2.0
Wear Tibial Insert	1	0.2	3.1	261	0.0	1.1
Lysis				233	0.0	1.0
Incorrect Sizing				209	0.0	0.9
Patella Maltracking	1	0.2	3.1	173	0.0	0.7
Implant Breakage Tibial Insert				169	0.0	0.7
Bearing Dislocation				137	0.0	0.6
Implant Breakage Patella				129	0.0	0.5
Metal Related Pathology	1	0.2	3.1	94	0.0	0.4
Prosthesis Dislocation				70	0.0	0.3
Synovitis				59	0.0	0.2
Osteonecrosis				46	0.0	0.2
Implant Breakage Femoral				38	0.0	0.2
Wear Patella				37	0.0	0.2
Implant Breakage Tibial				34	0.0	0.1
Tumour				29	0.0	0.1
Heterotopic Bone				12	0.0	0.1
Progression Of Disease				7	0.0	0.0
Wear Tibial				5	0.0	0.0
Incorrect Side				1	0.0	0.0
Patella Dislocation				1	0.0	0.0
Wear Femoral				1	0.0	0.0
Other				293	0.0	1.2
N Revision	32	6.0	100.0	23782	3.3	100.0
N Primary	529			720532		

Note: This table is restricted to revisions within 12.9 years for all groups to allow a time-matched comparison of revisions.

Note: Prostheses no longer used in 2024 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 Apex Knee CR (cless)/Apex Knee (cless) 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

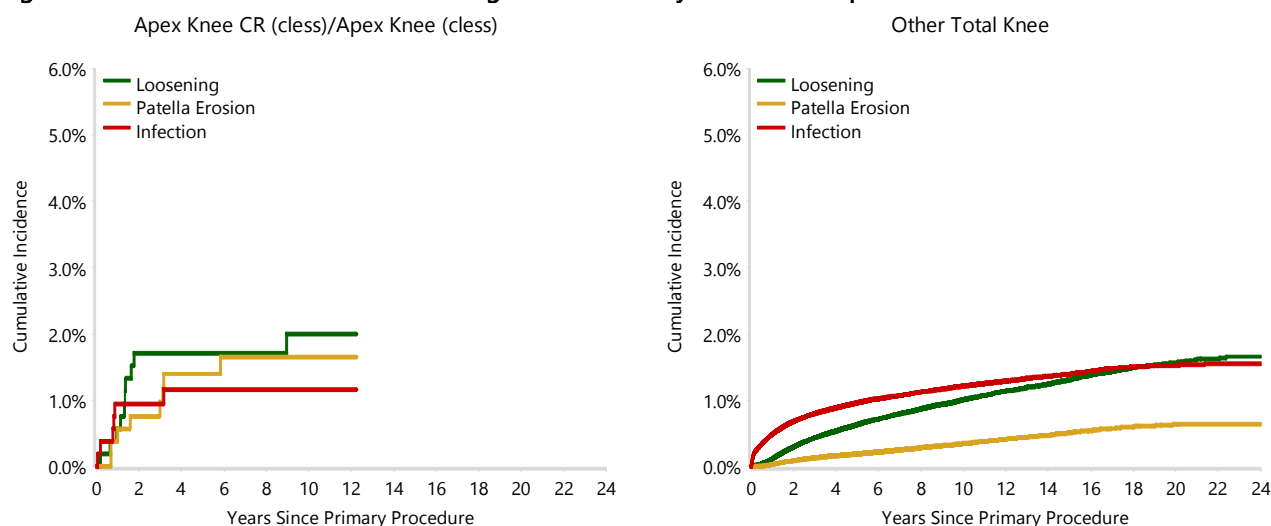


TABLE 5

Type of Revision Performed for Primary Total Knee Replacement

This analysis identifies the components used in the revision of the Apex Knee CR (cless)/Apex Knee (cless) 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 Apex Knee CR (cless)/Apex Knee (cless) total knee combination compared to all other total knee prostheses.

Table 5: Primary Total Knee Replacement - Type of Revision (Follow-up Limited to 12.9 Years)

Type of Revision	Apex Knee CR (cless)/Apex Knee (cless)		Other Total Knee	
	Number	Percent	Number	Percent
TKR (Tibial/Femoral)	6	18.8	5566	23.4
Tibial Component	8	25.0	1770	7.4
Femoral Component			1173	4.9
Cement Spacer			1055	4.4
Removal of Prostheses			121	0.5
Total Femoral			21	0.1
Reinsertion of Components			7	0.0
N Major	14	43.8	9713	40.8
Insert Only	7	21.9	7506	31.6
Patella Only	8	25.0	4059	17.1
Insert/Patella	3	9.4	2434	10.2
Minor Components			62	0.3
Cement Only			8	0.0
N Minor	18	56.3	14069	59.2
TOTAL	32	100.0	23782	100.0

Note: This table is restricted to revisions within 12.9 years for all groups to allow a time-matched comparison of revisions.

Note: Prostheses no longer used in 2024 are excluded from the comparator.

TABLE 6**Revision Rates of Apex Knee CR (cless)/Apex Knee (cless) 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 Apex Knee CR (cless)/Apex Knee (cless) Primary Total Knee Replacement by Fixation

Fixation	N Revised	N Total
Cemented	0	1
Cementless	32	524
Hybrid (Tibial Cemented)	0	4
TOTAL	32	529

TABLE 7**Revision Rates of Apex Knee CR (cless)/Apex Knee (cless) 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 Apex Knee CR (cless)/Apex Knee (cless) Primary Total Knee Replacement by Bearing Surface

Bearing Surface	N Revised	N Total
Non XLPE	32	527
XLPE + Antioxidant	0	1
Unknown	0	1
TOTAL	32	529

TABLE 8**Revision Rates of Apex Knee CR (cless)/Apex Knee (cless) 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 Apex Knee CR (cless)/Apex Knee (cless) Primary Total Knee Replacement by Bearing Mobility

Bearing Mobility	N Revised	N Total
Fixed	32	528
Unknown	0	1
TOTAL	32	529

TABLE 9**Revision Rates of Apex Knee CR (cless)/Apex Knee (cless) 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 Apex Knee CR (cless)/Apex Knee (cless) Primary Total Knee Replacement by Stability

Stability	N Revised	N Total
Minimally Stabilised	32	528
Unknown	0	1
TOTAL	32	529

TABLE 10**Number of Revisions of Apex Knee CR (cless)/Apex Knee (cless) Primary Total Knee Replacement by Year of Implant**

This analysis details the number of prostheses reported each year to the Registry for the Apex Knee CR (cless)/Apex Knee (cless) 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 2024 has a maximum of one year to be revised, whereas a primary procedure performed in 2022 has a maximum of three years to be revised.

Table 10: Number of Revisions of Apex Knee CR (cless)/Apex Knee (cless) Primary Total Knee Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2012	2	69
2013	6	83
2014	12	118
2015	6	78
2016	0	11
2017	0	3
2018	1	29
2019	2	53
2020	0	6
2021	1	23
2022	2	48
2023	0	7
2024	0	1
TOTAL	32	529