Attune PS (cemented)/Attune (cementless) Total Knee Investigation

Note: This analysis compares the Attune PS (ctd)/Attune (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-2024.

Note: Procedures using prostheses with no recorded use in 2023 are excluded from the comparator.

TABLE 1

Revision Rate of Primary Total Knee Replacement

The revision rate of the Attune PS (ctd)/Attune (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)
Attune PS (ctd)/Attune (cless)	28	992	1889	1.48 (0.98, 2.14)
Other Total Knee	24903	735091	4686173	0.53 (0.52, 0.54)
TOTAL	**24931**	**736083**	**4688062**	**0.53 (0.53, 0.54)**

Note: Prostheses no longer used in 2023 are excluded from the comparator.

TABLE 2

Yearly Cumulative Percent Revision of Primary Total Knee Replacement

The yearly cumulative percent revision of the Attune PS (ctd)/Attune (cless) 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
Attune PS (ctd)/Attune (cless)	1.9 (1.2, 3.0)	3.3 (2.3, 4.8)						
Other Total Knee	1.0 (0.9, 1.0)	1.8 (1.8, 1.8)	2.4 (2.3, 2.4)	2.8 (2.7, 2.8)	3.1 (3.1, 3.1)	3.4 (3.4, 3.5)	3.7 (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	16 Yrs
Attune PS (ctd)/Attune (cless)								
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)	5.5 (5.5, 5.6)	5.8 (5.7, 5.9)	6.2 (6.1, 6.3)	6.6 (6.5, 6.8)

CPR	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs	22 Yrs	23 Yrs
Attune PS (ctd)/Attune (cless)							
Other Total Knee	7.0 (6.8, 7.1)	7.3 (7.1, 7.4)	7.5 (7.3, 7.7)	7.7 (7.5, 8.0)	8.0 (7.7, 8.3)	8.2 (7.9, 8.6)	8.2 (7.9, 8.6)

Note: Prostheses no longer used in 2023 are excluded from the comparator.

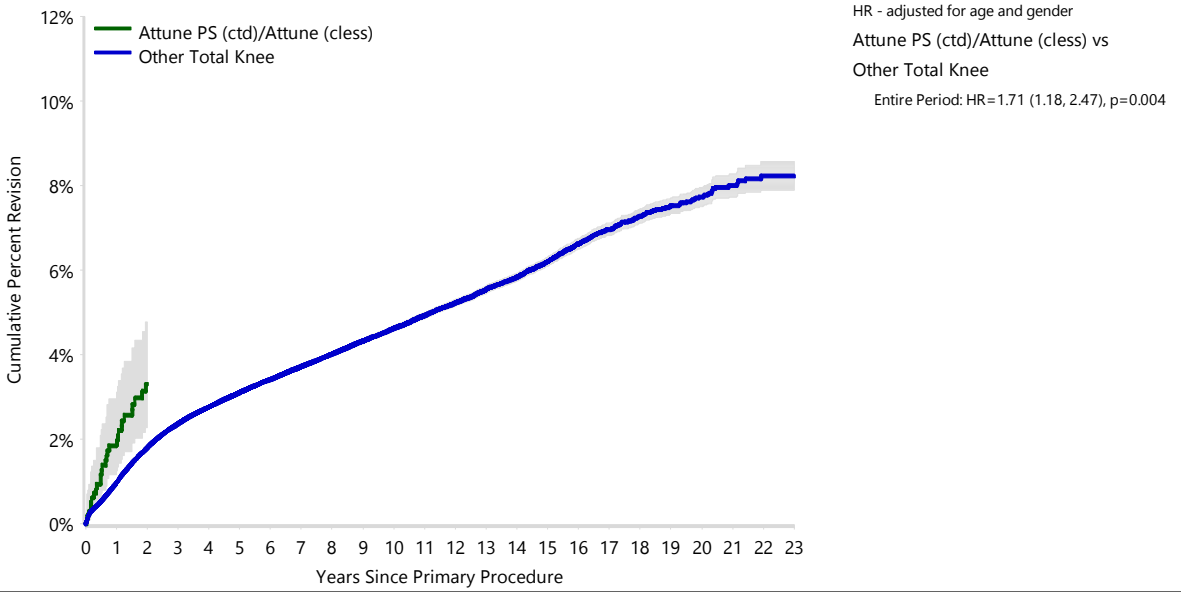
FIGURE 1

Yearly Cumulative Percent Revision of Primary Total Knee Replacement

The yearly cumulative percent revision of the Attune PS (ctd)/Attune (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
Attune PS (ctd)/Attune (cless)	992	836	547	38	0	0	0	0	0	0	0	0
Other Total Knee	735091	655636	589163	522730	463050	402400	344698	290547	241598	196807	158427	125444

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
Attune PS (ctd)/Attune (cless)	0	0	0	0	0	0	0	0	0	0	0	0
Other Total Knee	96689	72841	53727	38715	27059	18808	12662	7866	4467	2602	1229	297

Note: Prostheses no longer used in 2023 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

	Attune PS (ctd)/Attune (cless)		Other Total Knee	
Primary Diagnosis	Number	Percent	Number	Percent
Osteoarthritis	28	100.0	24098	96.8
Rheumatoid Arthritis			313	1.3
Tumour			178	0.7
Other Inflammatory Arthritis			153	0.6
Osteonecrosis			89	0.4
Fracture			48	0.2
Other			23	0.1
Chondrocalcinosis			1	0.0
TOTAL	**28**	**100.0**	**24903**	**100.0**

Note: Prostheses no longer used in 2023 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 3.3 Years)

Revision Diagnosis	Attune PS (ctd)/Attune (cless)			Other Total Knee		
	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	9	0.9	32.1	5339	0.7	33.4
Loosening	14	1.4	50.0	2919	0.4	18.3
Instability	1	0.1	3.6	1674	0.2	10.5
Pain	1	0.1	3.6	1160	0.2	7.3
Patellofemoral Pain				1055	0.1	6.6
Patella Erosion				878	0.1	5.5
Arthrofibrosis	1	0.1	3.6	812	0.1	5.1
Fracture	2	0.2	7.1	517	0.1	3.2
Malalignment				375	0.1	2.3
Incorrect Sizing				195	0.0	1.2
Patella Maltracking				145	0.0	0.9
Bearing Dislocation				113	0.0	0.7
Lysis				97	0.0	0.6
Wear Tibial Insert				80	0.0	0.5
Prosthesis Dislocation				61	0.0	0.4
Implant Breakage Patella				58	0.0	0.4
Metal Related Pathology				56	0.0	0.4
Implant Breakage Tibial Insert				47	0.0	0.3
Synovitis				42	0.0	0.3
Osteonecrosis				36	0.0	0.2
Implant Breakage Femoral				22	0.0	0.1
Implant Breakage Tibial				19	0.0	0.1
Tumour				15	0.0	0.1
Heterotopic Bone				8	0.0	0.1
Wear Patella				8	0.0	0.1
Progression Of Disease				2	0.0	0.0
Incorrect Side				1	0.0	0.0
Patella Dislocation				1	0.0	0.0
Wear Tibial				1	0.0	0.0
Other				253	0.0	1.6
N Revision	**28**	**2.8**	**100.0**	**15989**	**2.2**	**100.0**
N Primary	**992**			**735091**		

Note: This table is restricted to revisions within 3.3 years for all groups to allow a time-matched comparison of revisions.
Note: Prostheses no longer used in 2023 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 Attune PS (ctd)/Attune (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

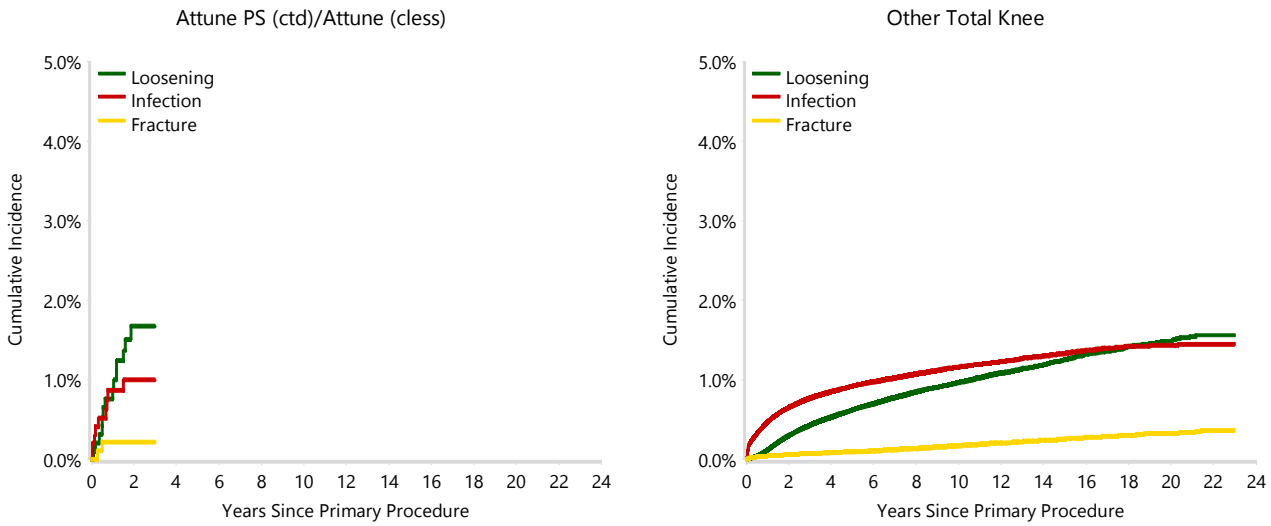


TABLE 5

Type of Revision Performed for Primary Total Knee Replacement

This analysis identifies the components used in the revision of the Attune PS (ctd)/Attune (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 Attune PS (ctd)/Attune (cless) total knee combination compared to all other total knee prostheses.

Table 5: Primary Total Knee Replacement - Type of Revision (Follow-up Limited to 3.3 Years)

	Attune PS (ctd)/Attune (cless)		Other Total Knee	
Type of Revision	Number	Percent	Number	Percent
TKR (Tibial/Femoral)	2	7.1	3136	19.6
Tibial Component	15	53.6	1278	8.0
Femoral Component	1	3.6	953	6.0
Cement Spacer			853	5.3
Removal of Prostheses			98	0.6
Total Femoral			9	0.1
Reinsertion of Components			6	0.0
N Major	**18**	**64.3**	**6333**	**39.6**
Insert Only	9	32.1	5643	35.3
Patella Only	1	3.6	2788	17.4
Insert/Patella			1186	7.4
Minor Components			35	0.2
Cement Only			4	0.0
N Minor	**10**	**35.7**	**9656**	**60.4**
TOTAL	**28**	**100.0**	**15989**	**100.0**

Note: This table is restricted to revisions within 3.3 years for all groups to allow a time-matched comparison of revisions.
Note: Prostheses no longer used in 2023 are excluded from the comparator.

TABLE 6

Revision Rates of Attune PS (ctd)/Attune (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 Attune PS (ctd)/Attune (cless) Primary Total Knee Replacement by Fixation

Fixation	N Revised	N Total
Cemented	1	2
Hybrid (Tibial Cemented)	0	1
Hybrid (Tibial Cementless)	27	989
TOTAL	**28**	**992**

TABLE 7

Revision Rates of Attune PS (ctd)/Attune (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 Attune PS (ctd)/Attune (cless) Primary Total Knee Replacement by Bearing Surface

Bearing Surface	N Revised	N Total
XLPE + Antioxidant	28	992
TOTAL	**28**	**992**

TABLE 8

Revision Rates of Attune PS (ctd)/Attune (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 Attune PS (ctd)/Attune (cless) Primary Total Knee Replacement by Bearing Mobility

Bearing Mobility	N Revised	N Total
Rotating	28	992
TOTAL	**28**	**992**

TABLE 9

Revision Rates of Attune PS (ctd)/Attune (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 Attune PS (ctd)/Attune (cless) Primary Total Knee Replacement by Stability

Stability	N Revised	N Total
Posterior Stabilised	28	992
TOTAL	**28**	**992**

TABLE 10

Revision Rates of Primary Total Knee Replacement by State

This enables a state by state variation to be identified for the Attune PS (ctd)/Attune (cless) 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
Attune PS (ctd)/Attune (cless)	NSW	0	4
	QLD	17	820
	WA	11	166
	SA	0	2
Other Total Knee	NSW	7326	251255
	VIC	5374	148666
	QLD	5344	152837
	WA	3053	79959
	SA	2756	64009
	TAS	458	18786
	ACT/NT	592	19579
TOTAL		**24931**	**736083**

Note: Prostheses no longer used in 2023 are excluded from the comparator.

TABLE 11

Number of Revisions of Attune PS (ctd)/Attune (cless) Primary Total Knee Replacement by Year of Implant

This analysis details the number of prostheses reported each year to the Registry for the Attune PS (ctd)/Attune (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 2023 has a maximum of one year to be revised, whereas a primary procedure performed in 2021 has a maximum of three years to be revised.

Table 11: Number of Revisions of Attune PS (ctd)/Attune (cless) Primary Total Knee Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2019	1	1
2020	0	38
2021	18	530
2022	9	287
2023	0	136
TOTAL	**28**	**992**

TABLE 12

Revision Rates of Attune PS (ctd)/Attune (cless) 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 Attune PS (ctd)/Attune (cless) 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	Material
Femoral				
Attune PS	150410101-150410210	PS FEMORAL COMPONENT	YES	
Attune PS	150410123-150410226	PS NARROW FEMORAL COMPONENT	YES	
Tibial				
Attune	150611001-150611010	ROTATING TIBIAL BASEPLATE POROCOAT	NO	METAL

Table 12: Revised Number of Attune PS (ctd)/Attune (cless) Primary Total Knee Replacement by Catalogue Number Range

Femoral Range	Tibial Range	N Revised	N Total
150410101-150410210	150611001-150611010	19	702
150410123-150410226	150611001-150611010	9	290
TOTAL		**28**	**992**