Apex Total Conventional Hip Investigation

Note: This analysis compares the Apex femoral stem prosthesis with all other total conventional hip 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-2026.

Note: Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator. Procedures using prostheses with no recorded use in 2025 are excluded from the comparator.

TABLE 1

Revision Rate of Primary Total Conventional Hip Replacement

The revision rate of the Apex total conventional hip prosthesis is compared to all other total conventional hip prostheses.

Table 1: Revision Rates of Primary Total Conventional Hip Replacement

Component	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Apex	214	2591	29790	0.72 (0.63, 0.82)
Other Total Conventional Hip	19701	568612	3623071	0.54 (0.54, 0.55)
TOTAL	**19915**	**571203**	**3652861**	**0.55 (0.54, 0.55)**

Note: Prostheses no longer used in 2025 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

TABLE 2

Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement

The yearly cumulative percent revision of the Apex total conventional hip prosthesis is compared to all other total conventional hip prostheses.

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

CPR	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs
Apex	2.2 (1.7, 2.9)	2.8 (2.2, 3.5)	3.3 (2.7, 4.0)	3.7 (3.1, 4.5)	4.5 (3.8, 5.4)	5.1 (4.3, 6.0)
Other Total Conventional Hip	1.7 (1.7, 1.8)	2.1 (2.1, 2.2)	2.5 (2.4, 2.5)	2.8 (2.7, 2.8)	3.0 (3.0, 3.1)	3.3 (3.2, 3.3)

CPR	7 Yrs	8 Yrs	9 Yrs	10 Yrs	11 Yrs	12 Yrs
Apex	5.6 (4.8, 6.6)	6.1 (5.2, 7.1)	6.8 (5.9, 7.9)	7.2 (6.3, 8.4)	7.8 (6.7, 8.9)	8.4 (7.3, 9.6)
Other Total Conventional Hip	3.5 (3.5, 3.6)	3.8 (3.7, 3.9)	4.1 (4.0, 4.2)	4.4 (4.3, 4.5)	4.7 (4.6, 4.8)	5.1 (5.0, 5.2)

CPR	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs
Apex	8.9 (7.8, 10.2)	9.2 (8.0, 10.6)	9.7 (8.4, 11.1)	10.1 (8.8, 11.6)	10.5 (9.1, 12.1)	10.7 (9.3, 12.4)
Other Total Conventional Hip	5.4 (5.3, 5.5)	5.8 (5.7, 5.9)	6.2 (6.1, 6.3)	6.6 (6.5, 6.7)	7.0 (6.8, 7.1)	7.3 (7.1, 7.5)

CPR	19 Yrs	20 Yrs	21 Yrs	22 Yrs	23 Yrs	24 Yrs	25 Yrs
Apex	11.5 (9.8, 13.6)						
Other Total Conventional Hip	7.7 (7.5, 7.9)	8.0 (7.8, 8.2)	8.6 (8.3, 8.9)	9.0 (8.7, 9.4)	9.6 (9.1, 10.0)	9.6 (9.2, 10.1)	10.3 (9.4, 11.2)

Note: Prostheses no longer used in 2025 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

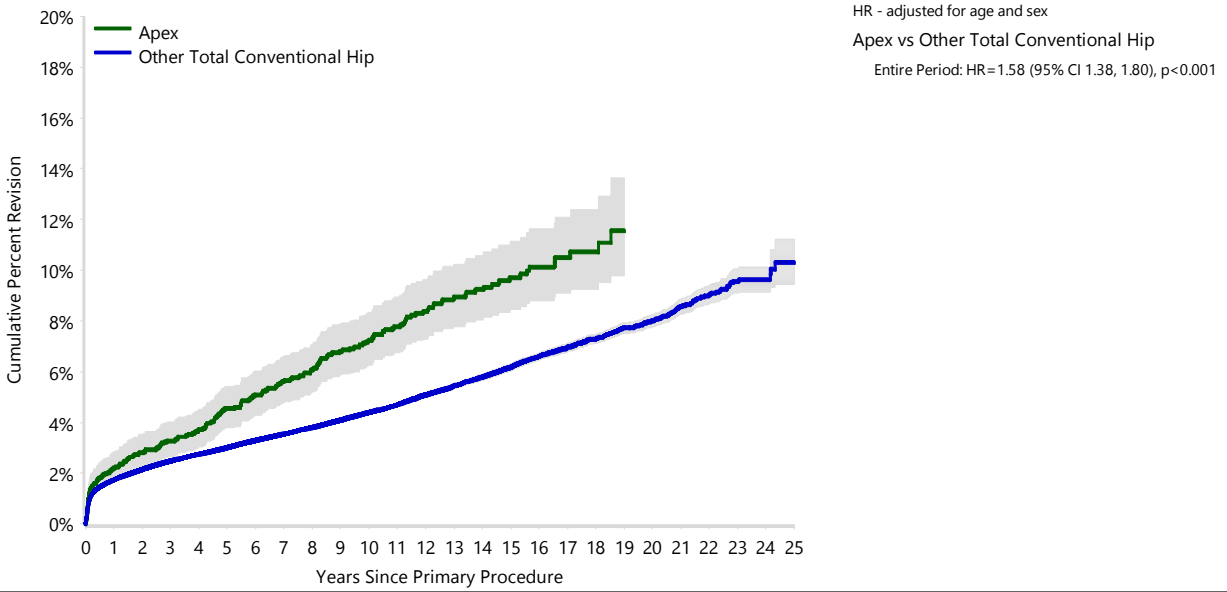
FIGURE 1

Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement

The yearly cumulative percent revision of the Apex total conventional hip prosthesis is compared to all other total conventional hip 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 Conventional Hip Replacement



Number at Risk	0 Yr	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs	7 Yrs
Apex	2591	2508	2460	2415	2366	2286	2217	2107
Other Total Conventional Hip	568612	501603	445433	391564	344389	299354	259516	220948

Number at Risk	8 Yrs	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs
Apex	1991	1843	1653	1426	1239	1026	847	694	566
Other Total Conventional Hip	185798	153739	124848	99575	79802	63343	49730	38033	28355

Number at Risk	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs	22 Yrs	23 Yrs	24 Yrs	25 Yrs
Apex	421	257	143	36	0	0	0	0	0
Other Total Conventional Hip	20437	14638	10400	7396	4859	2863	1455	560	95

Note: Prostheses no longer used in 2025 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

TABLE 3

Primary Diagnosis for Revised Primary Total Conventional Hip 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 conventional hip prostheses.

Table 3: Primary Diagnosis for Revised Primary Total Conventional Hip Replacement

	Apex		Other Total Conventional Hip	
Primary Diagnosis	Number	Percent	Number	Percent
Osteoarthritis	192	89.7	16296	82.7
Fractured Neck Of Femur	7	3.3	1521	7.7
Osteonecrosis	9	4.2	844	4.3
Developmental Dysplasia	2	0.9	321	1.6
Rheumatoid Arthritis	3	1.4	201	1.0
Failed Internal Fixation	1	0.5	165	0.8
Tumour			157	0.8
Other Inflammatory Arthritis			102	0.5
Fracture/Dislocation			60	0.3
Other			21	0.1
Arthrodesis Takedown			13	0.1
TOTAL	**214**	**100.0**	**19701**	**100.0**

Note: Prostheses no longer used in 2025 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm 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 Conventional Hip Replacement - Reason for Revision (Follow-up Limited to 20.5 Years)

	Apex			Other Total Conventional Hip		
Revision Diagnosis	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	34	1.3	15.9	5010	0.9	25.5
Prosthesis Dislocation/Instability	49	1.9	22.9	4379	0.8	22.3
Fracture	22	0.8	10.3	4338	0.8	22.1
Loosening	37	1.4	17.3	3614	0.6	18.4
Pain	4	0.2	1.9	339	0.1	1.7
Leg Length Discrepancy	4	0.2	1.9	307	0.1	1.6
Malposition	4	0.2	1.9	282	0.0	1.4
Implant Breakage Stem	9	0.3	4.2	208	0.0	1.1
Lysis	9	0.3	4.2	196	0.0	1.0
Implant Breakage Acetabular Insert	6	0.2	2.8	126	0.0	0.6
Wear Acetabular Insert				106	0.0	0.5
Incorrect Sizing	1	0.0	0.5	96	0.0	0.5
Metal Related Pathology	17	0.7	7.9	90	0.0	0.5
Implant Breakage Acetabular	9	0.3	4.2	73	0.0	0.4
Wear Head	2	0.1	0.9	48	0.0	0.2
Tumour				46	0.0	0.2
Heterotopic Bone	2	0.1	0.9	26	0.0	0.1
Implant Breakage Head				26	0.0	0.1
Wear Acetabulum	1	0.0	0.5	6	0.0	0.0
Osteonecrosis				4	0.0	0.0
Synovitis				2	0.0	0.0
Progression Of Disease				1	0.0	0.0
Other	4	0.2	1.9	321	0.1	1.6
N Revision	**214**	**8.3**	**100.0**	**19644**	**3.5**	**100.0**
N Primary	**2591**			**568612**		

Note: This table is restricted to revisions within 20.5 years for all groups to allow a time-matched comparison of revisions.
Note: Prostheses no longer used in 2025 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

FIGURE 2

Cumulative Incidence Revision Diagnosis of Primary Total Conventional Hip 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 total conventional hip prosthesis. A comparative graph is provided of the cumulative incidence for the same reasons for revisions for all other total conventional hip prostheses.

Figure 2: Cumulative Incidence Revision Diagnosis for Primary Total Conventional Hip Replacement

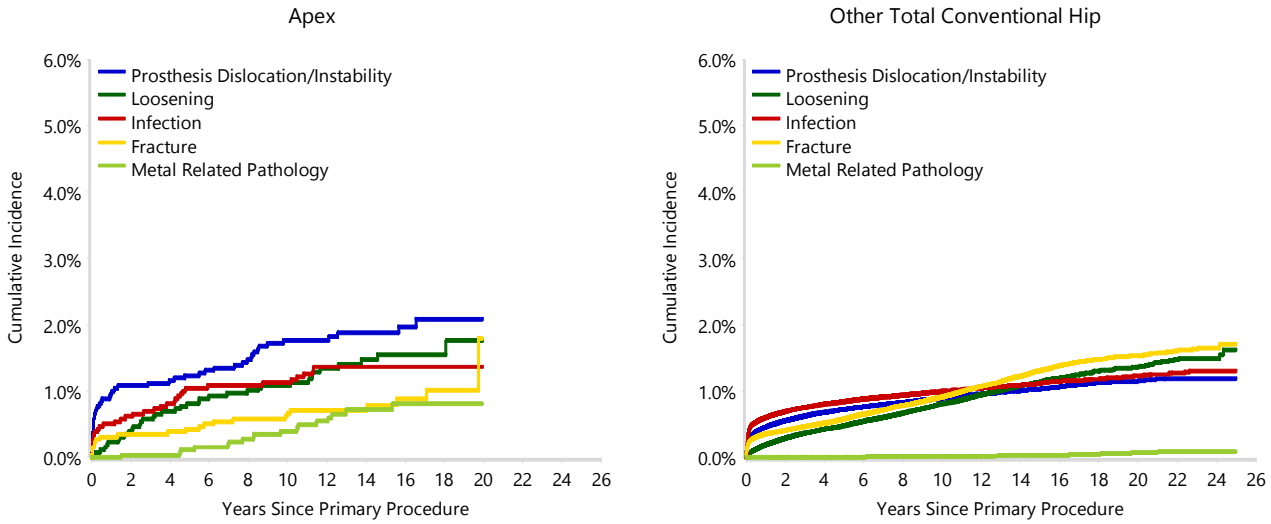


TABLE 5

Type of Revision Performed for Primary Total Conventional Hip Replacement

This analysis identifies the components used in the revision of the Apex total conventional hip prosthesis and compares it to the components used in the revision of all other total conventional hip 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 conventional hip prostheses i.e. is there a difference in the type of revision undertaken for the Apex total conventional hip prosthesis compared to all other total conventional hip prostheses.

Table 5: Primary Total Conventional Hip Replacement - Type of Revision (Follow-up Limited to 20.5 Years)

	Apex		Other Total Conventional Hip	
Type of Revision	Number	Percent	Number	Percent
Femoral Component	47	22.0	6634	33.8
Acetabular Component	80	37.4	3297	16.8
THR (Femoral/Acetabular)	27	12.6	2288	11.6
Cement Spacer	12	5.6	556	2.8
Removal of Prostheses			92	0.5
Reinsertion of Components			27	0.1
Total Femoral			12	0.1
Bipolar Head and Femoral			10	0.1
N Major	**166**	**77.6**	**12916**	**65.8**
Head/Insert	13	6.1	5360	27.3
Head Only	13	6.1	912	4.6
Minor Components	4	1.9	285	1.5
Insert Only			168	0.9
Head/Neck	8	3.7		
Head/Neck/Insert	7	3.3	1	0.0
Neck Only	3	1.4		
Bipolar Only			1	0.0
Cement Only			1	0.0
N Minor	**48**	**22.4**	**6728**	**34.2**
TOTAL	**214**	**100.0**	**19644**	**100.0**

Note: This table is restricted to revisions within 20.5 years for all groups to allow a time-matched comparison of revisions.
Note: Prostheses no longer used in 2025 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

TABLE 6

Revision Rates of Apex Primary Total Conventional Hip 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 Primary Total Conventional Hip Replacement by Fixation

Fixation	N Revised	N Total
Cementless	214	2582
Reverse Hybrid (Femur Cementless)	0	9
TOTAL	**214**	**2591**

TABLE 7

Revision Rates of Apex Primary Total Conventional Hip 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 prosthesis are listed.

Table 7: Revised Number of Apex Primary Total Conventional Hip Replacement by Bearing Surface

Bearing Surface	N Revised	N Total
Ceramic/Ceramic	137	1825
Ceramic/Non XLPE	7	59
Ceramic/XLPE	19	287
Ceramic/XLPE + Antioxidant	0	4
Metal/Metal	34	157
Metal/Non XLPE	6	64
Metal/XLPE	11	193
Unknown	0	2
TOTAL	**214**	**2591**

TABLE 8

Revision Rates of Apex Primary Total Conventional Hip Replacement by Approach

This analysis is provided as some prostheses are used with a variety of surgical approaches. All surgical approaches used with this prosthesis are listed.

Table 8: Revised Number of Apex Primary Total Conventional Hip Replacement by Approach

Approach	N Revised	N Total
Anterior	0	7
Lateral	9	179
Posterior	19	369
TOTAL	**28**	**555**

Note: Excludes 2036 procedures with no approach recorded

TABLE 9

Revision Rates of Primary Total Conventional Hip Replacement by State

This enables a state by state variation to be identified for the Apex total conventional hip prosthesis and provides the comparative data for each of the states for all other total conventional hip 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 9: Revised Number of Primary Total Conventional Hip Replacement by State

Component	State	N Revised	N Total
Apex	NSW	131	1458
	VIC	47	743
	QLD	8	73
	WA	26	298
	ACT/NT	2	19
Other Total Conventional Hip	NSW	5507	167002
	VIC	4853	146558
	QLD	3968	104359
	WA	2510	64946
	SA	1887	52084
	TAS	439	18269
	ACT/NT	537	15394
TOTAL		**19915**	**571203**

Note: Prostheses no longer used in 2025 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

TABLE 10

Number of Revisions of Apex Primary Total Conventional Hip Replacement by Year of Implant

This analysis details the number of prostheses reported each year to the Registry for the Apex total conventional hip 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 2025 has a maximum of one year to be revised, whereas a primary procedure performed in 2023 has a maximum of three years to be revised.

Table 10: Number of Revisions of Apex Primary Total Conventional Hip Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2005	6	75
2006	36	247
2007	25	223
2008	22	265
2009	22	197
2010	17	169
2011	12	190
2012	9	219
2013	18	246
2014	16	188
2015	13	193
2016	10	168
2017	4	88
2018	2	61
2019	2	44
2020	0	18
TOTAL	**214**	**2591**

TABLE 11

Revision Rates of Apex Primary Total Conventional Hip 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 Apex 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	Stem Type	Coating
Femoral Stem						
Apex	120902BH-121758BH	STEM MODULAR HIP	NO	METAL	REQUIRES FEMNECK	HA COATED
Apex	150902-151758	MODULAR HIP STEM	NO	METAL	REQUIRES FEMNECK	HA COATED
Apex	151002H-151456H	STEM MODULAR HIP	NO	METAL	REQUIRES FEMNECK	HA COATED
Apex	151153RSA-151305RSA	STEM MODULAR HIP RSA TITANIUM	NO	METAL	REQUIRES FEMNECK	HA COATED

Table 11: Revised Number of Apex Primary Total Conventional Hip Replacement by Catalogue Number Range

Femoral Stem Range	N Revised	N Total
120902BH-121758BH	1	14
150902-151758	187	2259
151002H-151456H	17	199
151153RSA-151305RSA	9	119
TOTAL	**214**	**2591**

TABLE 12

Revision Rates of Apex Primary Total Conventional Hip 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 12: Revised Number of Apex Primary Total Conventional Hip Replacement by Acetabular Component

Acetabular Component	N Revised	N Total
ABGII	6	59
ABGII (Shell/Insert)	0	1
Acetabular Shell (Global)	36	548
Allofit	0	1
BSC-Cup	2	59
Cer-Met	12	144
Cera Fit	1	27
Continuum	0	1
Cormet	0	4
Delta-One-TT	0	2
Delta-PF	0	27
Delta-TT	2	24
Duraloc Option	0	2
FMP	2	71
Fin II	77	1010
Icon	34	152
Logical G	1	5
Marathon	0	2
Muller	0	1
Novae	0	13
Novae E	0	8
PINNACLE	13	156
Procotyl L	5	94
R3	0	1
Reflection (Shell)	0	1
SPH-Blind	9	35
Trabecular Metal (Shell)	0	2
Trident (Shell)	2	24
Trident/Tritanium (Shell)	1	2
Trilogy	11	108
Trinity	0	6
ZCA	0	1
TOTAL	**214**	**2591**