

Accolade II/Trident Tritanium (Shell) Total Conventional Hip Investigation

Note: This analysis compares the Accolade II/Trident Tritanium (Shell) femoral stem/acetabular combination with all other total conventional hip 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-2022>.

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 2021 are excluded from the comparator.

TABLE 1

Revision Rate of Primary Total Conventional Hip Replacement

The revision rate of the Accolade II/Trident Tritanium (Shell) total conventional hip combination 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)
Accolade II/Trident Tritanium (Shell)	87	3187	8147	1.07 (0.86, 1.32)
Other Total Conventional Hip	15772	450268	2712990	0.58 (0.57, 0.59)
TOTAL	15859	453455	2721137	0.58 (0.57, 0.59)

Note: Prostheses no longer used in 2021 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 Accolade II/Trident Tritanium (Shell) total conventional hip combination is compared to all other total conventional hip prostheses.

Table 2: Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement

CPR	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs	7 Yrs
Accolade II/Trident Tritanium (Shell)	2.2 (1.8, 2.8)	2.9 (2.3, 3.6)	3.1 (2.5, 3.8)	3.4 (2.7, 4.2)	3.5 (2.8, 4.4)	3.5 (2.8, 4.4)	
Other Total Conventional Hip	1.7 (1.7, 1.8)	2.2 (2.1, 2.2)	2.5 (2.5, 2.6)	2.8 (2.8, 2.9)	3.1 (3.0, 3.2)	3.4 (3.3, 3.5)	3.7 (3.6, 3.7)

CPR	8 Yrs	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs
Accolade II/Trident Tritanium (Shell)							
Other Total Conventional Hip	4.0 (3.9, 4.0)	4.3 (4.2, 4.4)	4.6 (4.6, 4.7)	5.0 (4.9, 5.1)	5.4 (5.3, 5.5)	5.8 (5.7, 5.9)	6.2 (6.1, 6.4)

CPR	15 Yrs	16 Yrs	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs
Accolade II/Trident Tritanium (Shell)							
Other Total Conventional Hip	6.7 (6.5, 6.8)	7.1 (6.9, 7.3)	7.5 (7.3, 7.7)	7.9 (7.6, 8.1)	8.6 (8.3, 8.9)	8.9 (8.5, 9.3)	9.8 (9.0, 10.8)

Note: Prostheses no longer used in 2021 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

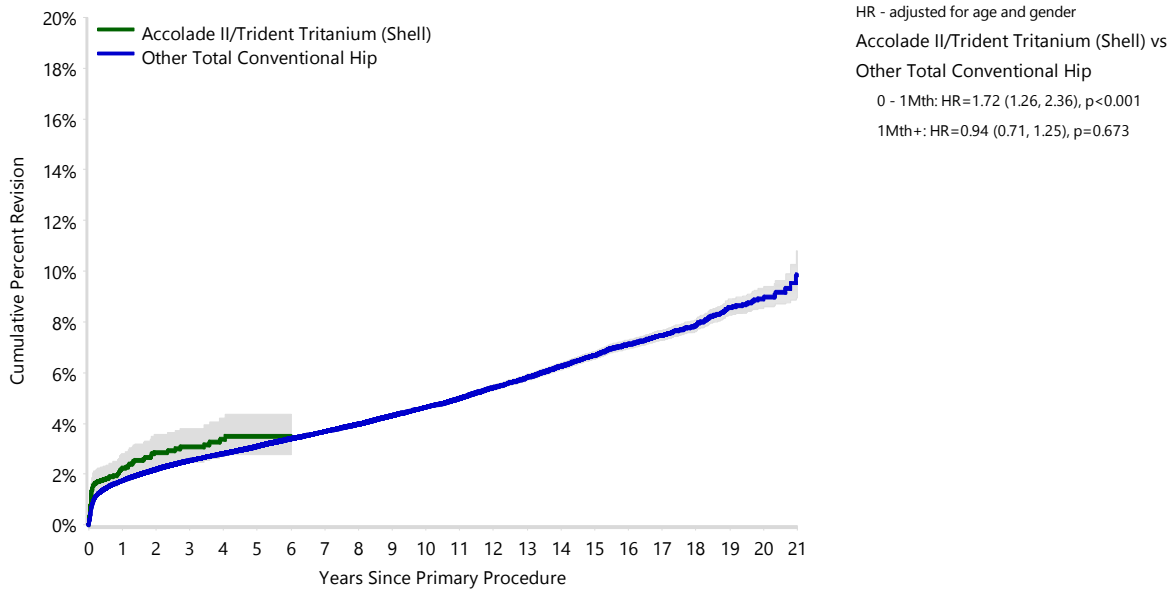
FIGURE 1

Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement

The yearly cumulative percent revision of the Accolade II/Trident Tritanium (Shell) total conventional hip combination 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	8 Yrs	9 Yrs	10 Yrs
Accolade II/Trident Tritanium (Shell)	3187	2321	1725	1226	838	377	140	29	2	1	0
Other Total Conventional Hip	450268	396362	352328	307951	266367	227683	191447	158554	131208	108025	88155

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
Accolade II/Trident Tritanium (Shell)	0	0	0	0	0	0	0	0	0	0	0
Other Total Conventional Hip	70603	55343	42208	31909	24032	17719	12212	7611	4006	1573	276

Note: Prostheses no longer used in 2021 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

Primary Diagnosis	Accolade II/Trident Tritanium (Shell)		Other Total Conventional Hip	
	Number	Percent	Number	Percent
Osteoarthritis	78	89.7	13034	82.6
Fractured Neck Of Femur	2	2.3	1162	7.4
Osteonecrosis	3	3.4	715	4.5
Developmental Dysplasia	3	3.4	244	1.5
Rheumatoid Arthritis	1	1.1	172	1.1
Failed Internal Fixation			140	0.9
Tumour			137	0.9
Other Inflammatory Arthritis			91	0.6
Fracture/Dislocation			47	0.3
Arthrodesis Takedown			16	0.1
Other			14	0.1
TOTAL	87	100.0	15772	100.0

Note: Prostheses no longer used in 2021 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 9.6 Years)

Revision Diagnosis	Accolade II/Trident Titanium (Shell)			Other Total Conventional Hip		
	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Prosthesis Dislocation/Instability	5	0.2	5.7	3507	0.8	24.5
Infection	39	1.2	44.8	3361	0.7	23.5
Fracture	21	0.7	24.1	3043	0.7	21.3
Loosening	14	0.4	16.1	2748	0.6	19.2
Pain	3	0.1	3.4	274	0.1	1.9
Leg Length Discrepancy	1	0.0	1.1	257	0.1	1.8
Malposition				216	0.0	1.5
Implant Breakage Stem				119	0.0	0.8
Lysis	1	0.0	1.1	96	0.0	0.7
Implant Breakage Acetabular Insert				93	0.0	0.7
Incorrect Sizing	2	0.1	2.3	92	0.0	0.6
Implant Breakage Acetabular				55	0.0	0.4
Metal Related Pathology				52	0.0	0.4
Wear Acetabular Insert				43	0.0	0.3
Tumour				36	0.0	0.3
Wear Head				36	0.0	0.3
Implant Breakage Head				24	0.0	0.2
Heterotopic Bone				22	0.0	0.2
Wear Acetabulum				5	0.0	0.0
Progression Of Disease				2	0.0	0.0
Osteonecrosis				1	0.0	0.0
Synovitis				1	0.0	0.0
Other	1	0.0	1.1	216	0.0	1.5
N Revision	87	2.7	100.0	14299	3.2	100.0
N Primary	3187			450268		

Note: This table is restricted to revisions within 9.6 years for all groups to allow a time-matched comparison of revisions.

Note: Prostheses no longer used in 2021 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 Accolade II/Trident Tritanium (Shell) total conventional hip combination. 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

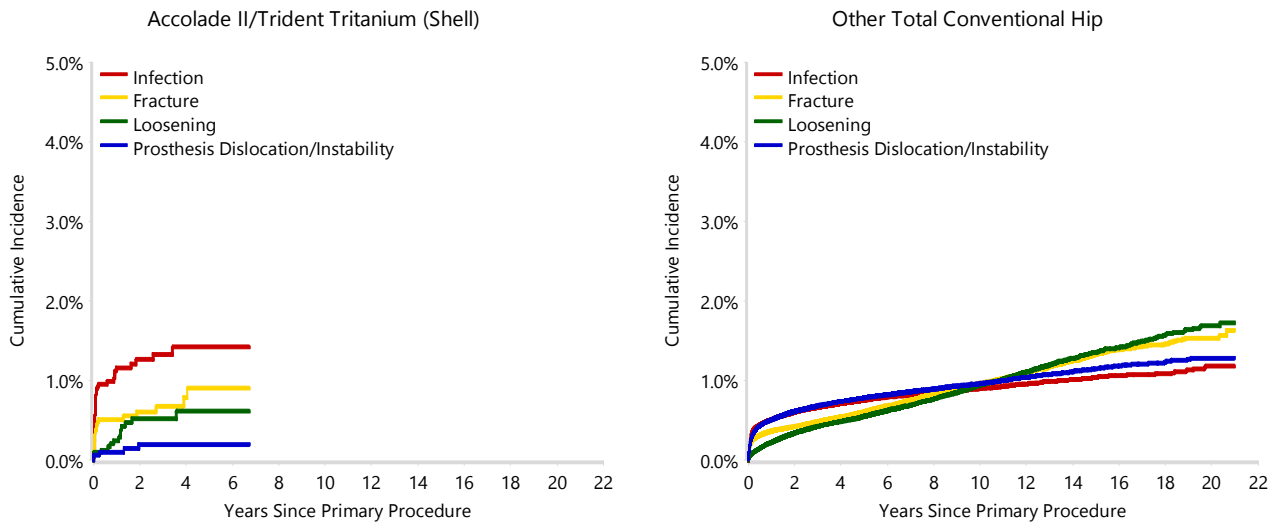


TABLE 5

Type of Revision Performed for Primary Total Conventional Hip Replacement

This analysis identifies the components used in the revision of the Accolade II/Trident Tritanium (Shell) total conventional hip combination 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 Accolade II/Trident Tritanium (Shell) total conventional hip combination compared to all other total conventional hip prostheses.

Table 5: Primary Total Conventional Hip Replacement - Type of Revision (Follow-up Limited to 9.6 Years)

Type of Revision	Accolade II/Trident Tritanium (Shell)		Other Total Conventional Hip	
	Number	Percent	Number	Percent
Femoral Component	28	32.2	4607	32.2
Acetabular Component	14	16.1	2705	18.9
THR (Femoral/Acetabular)	8	9.2	1533	10.7
Cement Spacer	2	2.3	560	3.9
Removal of Prostheses	1	1.1	89	0.6
Reinsertion of Components			25	0.2
Total Femoral			5	0.0
Bipolar Head and Femoral			4	0.0
Saddle			1	0.0
N Major	53	60.9	9529	66.6
Head/Insert	27	31.0	3589	25.1
Head Only	6	6.9	758	5.3
Minor Components	1	1.1	250	1.7
Insert Only			169	1.2
Bipolar Only			2	0.0
Cement Only			1	0.0
Head/Neck			1	0.0
N Minor	34	39.1	4770	33.4
TOTAL	87	100.0	14299	100.0

Note: This table is restricted to revisions within 9.6 years for all groups to allow a time-matched comparison of revisions.

Note: Prostheses no longer used in 2021 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 Accolade II/Trident Tritanium (Shell) 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 Accolade II/Trident Tritanium (Shell) Primary Total Conventional Hip Replacement by Fixation

Fixation	N Revised	N Total
Cementless	87	3183
Reverse Hybrid (Femur Cementless)	0	4
TOTAL	87	3187

TABLE 7

Revision Rates of Accolade II/Trident Tritanium (Shell) 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 combination are listed.

Table 7: Revised Number of Accolade II/Trident Tritanium (Shell) Primary Total Conventional Hip Replacement by Bearing Surface

Bearing Surface	N Revised	N Total
Ceramic/Ceramic	0	28
Ceramic/Non XLPE	0	1
Ceramic/XLPE	64	2594
Metal/XLPE	23	564
TOTAL	87	3187

TABLE 8**Revision Rates of Accolade II/Trident Tritanium (Shell) 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 combination are listed.

Table 8: Revised Number of Accolade II/Trident Tritanium (Shell) Primary Total Conventional Hip Replacement by Approach

Approach	N Revised	N Total
Anterior	13	722
Lateral	17	310
Posterior	56	2089
TOTAL	86	3121

Note: Excludes 66 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 Accolade II/Trident Tritanium (Shell) total conventional hip combination 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
Accolade II/Trident Tritanium (Shell)	NSW	14	752
	VIC	23	643
	QLD	8	227
	WA	31	1113
	SA	7	287
	TAS	3	145
	ACT/NT	1	20
Other Total Conventional Hip	NSW	4284	132217
	VIC	3959	116355
	QLD	3138	79895
	WA	2153	52839
	SA	1408	41642
	TAS	369	14953
	ACT/NT	461	12367
TOTAL		15859	453455

Note: Prostheses no longer used in 2021 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 Accolade II/Trident Tritanium (Shell) Primary Total Conventional Hip Replacement by Year of Implant**

This analysis details the number of prostheses reported each year to the Registry for the Accolade II/Trident Tritanium (Shell) total conventional hip 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 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 10: Number of Revisions of Accolade II/Trident Tritanium (Shell) Primary Total Conventional Hip Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2012	0	1
2013	0	1
2014	1	30
2015	5	119
2016	13	258
2017	15	484
2018	15	402
2019	15	510
2020	12	583
2021	11	799
TOTAL	87	3187

TABLE 11

Revision Rates of Accolade II/Trident Tritanium (Shell) 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 Accolade II/Trident Tritanium (Shell) 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	Coating	Fixation
Femoral Stem						
Accolade II	67200027-67201140	132 DEGREE NECK ANGLE V40 FEMORAL STEM	NO	METAL	HA COATED	
Accolade II	67210027-67211140	127 DEGREE NECK ANGLE V40 FEMORAL STEM	NO	METAL	HA COATED	
Acetabular						
Trident/Tritanium (Shell)	5000344A-5000366H	TRITANIUM HEMISPHERICAL SOLID SHELL	NO	METAL		HIGHLY POROUS
Trident/Tritanium (Shell)	5020344A-5020366H	TRITANIUM HEMISPHERICAL CLUSTER HOLE SHELL	NO	METAL		HIGHLY POROUS
Trident/Tritanium (Shell)	5090254E-5090280J	TRITANIUM REVISION HEMISPHERICAL CLUSTER HOLE SHELL	NO	METAL		HIGHLY POROUS

Table 11: Revised Number of Accolade II/Trident Tritanium (Shell) Primary Total Conventional Hip Replacement by Catalogue Number Range

Femoral Stem Range	Acetabular Range	N Revised	N Total
67200027-67201140	5000344A-5000366H	1	41
	5020344A-5020366H	19	576
	5090254E-5090280J	0	13
67210027-67211140	5000344A-5000366H	5	195
	5020344A-5020366H	61	2334
	5090254E-5090280J	1	28
TOTAL		87	3187