Delta-One-TT Total Conventional Hip Investigation

Note: This analysis compares the Delta-One-TT acetabular 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-2025.

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 2024 are excluded from the comparator.

TABLE 1

Revision Rate of Primary Total Conventional Hip Replacement

The revision rate of the Delta-One-TT 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)
Delta-One-TT	17	208	1240	1.37 (0.80, 2.19)
Other Total Conventional Hip	19477	551974	3551378	0.55 (0.54, 0.56)
TOTAL	**19494**	**552182**	**3552618**	**0.55 (0.54, 0.56)**

Note: Prostheses no longer used in 2024 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 Delta-One-TT 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	7 Yrs	8 Yrs
Delta-One-TT	3.4 (1.6, 7.0)	5.0 (2.7, 9.0)	6.1 (3.5, 10.5)	6.1 (3.5, 10.5)	7.5 (4.5, 12.5)	8.4 (5.1, 13.6)	8.4 (5.1, 13.6)	8.4 (5.1, 13.6)
Other Total Conventional Hip	1.7 (1.7, 1.8)	2.2 (2.1, 2.2)	2.5 (2.4, 2.5)	2.8 (2.7, 2.8)	3.0 (3.0, 3.1)	3.3 (3.3, 3.4)	3.6 (3.5, 3.6)	3.9 (3.8, 3.9)

CPR	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs
Delta-One-TT	9.8 (5.9, 16.0)	9.8 (5.9, 16.0)						
Other Total Conventional Hip	4.2 (4.1, 4.2)	4.4 (4.4, 4.5)	4.8 (4.7, 4.8)	5.2 (5.1, 5.3)	5.5 (5.4, 5.6)	5.9 (5.8, 6.0)	6.3 (6.2, 6.4)	6.7 (6.6, 6.9)

CPR	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs	22 Yrs	23 Yrs
Delta-One-TT							
Other Total Conventional Hip	7.1 (6.9, 7.2)	7.4 (7.3, 7.6)	7.9 (7.7, 8.1)	8.3 (8.0, 8.5)	8.8 (8.5, 9.1)	9.3 (9.0, 9.7)	9.9 (9.4, 10.5)

Note: Prostheses no longer used in 2024 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

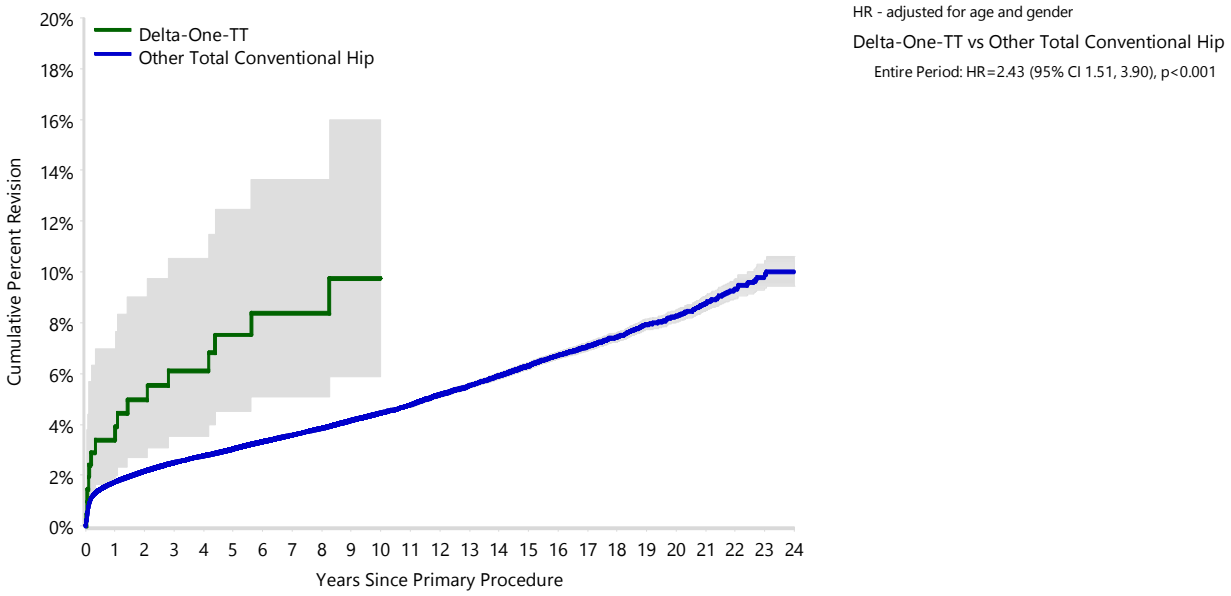
FIGURE 1

Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement

The yearly cumulative percent revision of the Delta-One-TT 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	8 Yrs	9 Yrs	10 Yrs	11 Yrs
Delta-One-TT	208	186	170	154	141	123	99	81	68	55	42	15
Other Total Conventional Hip	551974	487557	432674	384082	337098	295706	254861	217051	182172	150326	122111	99364

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
Delta-One-TT	6	2	1	0	0	0	0	0	0	0	0	0
Other Total Conventional Hip	80218	63998	49889	37936	28064	20581	15102	10871	7426	4536	2346	851

Note: Prostheses no longer used in 2024 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

	Delta-One-TT		Other Total Conventional Hip	
Primary Diagnosis	Number	Percent	Number	Percent
Osteoarthritis	9	52.9	16166	83.0
Fractured Neck Of Femur	1	5.9	1435	7.4
Osteonecrosis	2	11.8	855	4.4
Developmental Dysplasia	2	11.8	311	1.6
Rheumatoid Arthritis	1	5.9	209	1.1
Failed Internal Fixation			157	0.8
Tumour			148	0.8
Other Inflammatory Arthritis			112	0.6
Fracture/Dislocation	1	5.9	52	0.3
Other	1	5.9	18	0.1
Arthrodesis Takedown			14	0.1
TOTAL	**17**	**100.0**	**19477**	**100.0**

Note: Prostheses no longer used in 2024 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 14.1 Years)

	Delta-One-TT			Other Total Conventional Hip		
Revision Diagnosis	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	4	1.9	23.5	4695	0.9	24.9
Prosthesis Dislocation/Instability	5	2.4	29.4	4320	0.8	22.9
Fracture	2	1.0	11.8	4172	0.8	22.1
Loosening	5	2.4	29.4	3513	0.6	18.6
Pain				319	0.1	1.7
Leg Length Discrepancy				297	0.1	1.6
Malposition				266	0.0	1.4
Implant Breakage Stem				187	0.0	1.0
Lysis				171	0.0	0.9
Implant Breakage Acetabular Insert				122	0.0	0.6
Incorrect Sizing				98	0.0	0.5
Wear Acetabular Insert	1	0.5	5.9	79	0.0	0.4
Metal Related Pathology				75	0.0	0.4
Implant Breakage Acetabular				66	0.0	0.4
Wear Head				41	0.0	0.2
Tumour				40	0.0	0.2
Heterotopic Bone				27	0.0	0.1
Implant Breakage Head				27	0.0	0.1
Wear Acetabulum				9	0.0	0.0
Osteonecrosis				3	0.0	0.0
Synovitis				1	0.0	0.0
Other				309	0.1	1.6
N Revision	**17**	**8.2**	**100.0**	**18837**	**3.4**	**100.0**
N Primary	**208**			**551974**		

Note: This table is restricted to revisions within 14.1 years for all groups to allow a time-matched comparison of revisions.
Note: Prostheses no longer used in 2024 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 Delta-One-TT 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

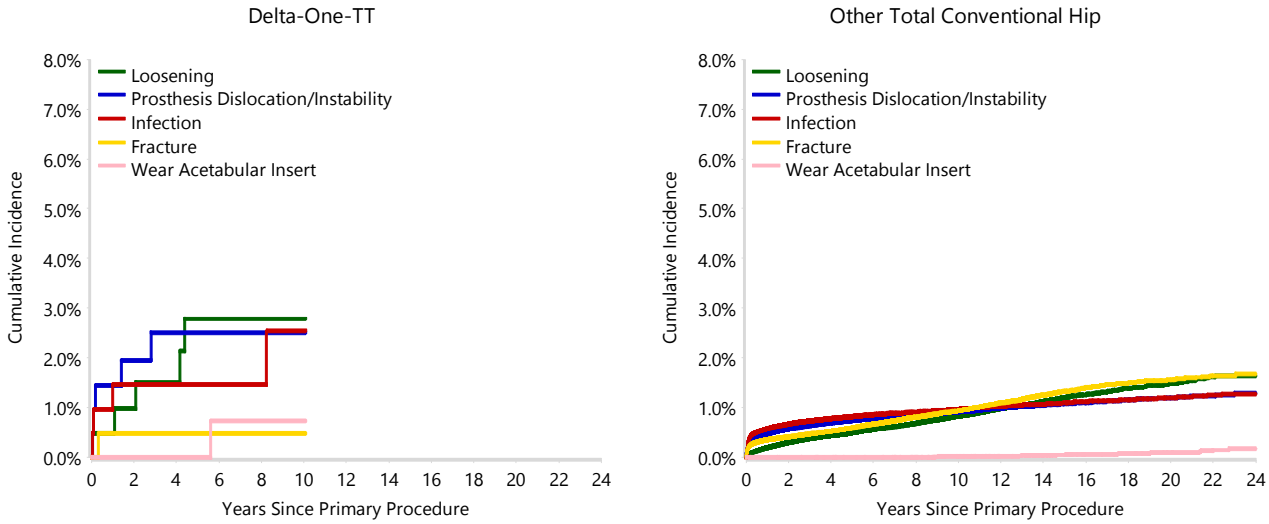


TABLE 5

Type of Revision Performed for Primary Total Conventional Hip Replacement

This analysis identifies the components used in the revision of the Delta-One-TT 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 Delta-One-TT 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 14.1 Years)

	Delta-One-TT		Other Total Conventional Hip	
Type of Revision	Number	Percent	Number	Percent
Femoral Component	3	17.6	6348	33.7
Acetabular Component	6	35.3	3244	17.2
THR (Femoral/Acetabular)	5	29.4	2126	11.3
Cement Spacer			587	3.1
Removal of Prostheses			95	0.5
Reinsertion of Components			29	0.2
Total Femoral			12	0.1
Bipolar Head and Femoral			9	0.0
N Major	**14**	**82.4**	**12450**	**66.1**
Head/Insert	3	17.6	5002	26.6
Head Only			912	4.8
Minor Components			294	1.6
Insert Only			176	0.9
Bipolar Only			1	0.0
Cement Only			1	0.0
Head/Neck			1	0.0
N Minor	**3**	**17.6**	**6387**	**33.9**
TOTAL	**17**	**100.0**	**18837**	**100.0**

Note: This table is restricted to revisions within 14.1 years for all groups to allow a time-matched comparison of revisions.
Note: Prostheses no longer used in 2024 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 Delta-One-TT 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 Delta-One-TT Primary Total Conventional Hip Replacement by Fixation

Fixation	N Revised	N Total
Cementless	15	168
Hybrid (Femur Cemented)	2	39
Reverse Hybrid (Femur Cementless)	0	1
TOTAL	**17**	**208**

TABLE 7

Revision Rates of Delta-One-TT 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 Delta-One-TT Primary Total Conventional Hip Replacement by Bearing Surface

Bearing Surface	N Revised	N Total
Ceramic/Ceramic	3	33
Ceramic/Non XLPE	4	51
Ceramic/XLPE	3	30
Metal/Non XLPE	3	47
Metal/XLPE	2	33
Ceramicised Metal/Non XLPE	1	12
Ceramicised Metal/XLPE	1	2
TOTAL	**17**	**208**

TABLE 8

Revision Rates of Delta-One-TT 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 Delta-One-TT Primary Total Conventional Hip Replacement by Approach

Approach	N Revised	N Total
Anterior	1	21
Lateral	0	20
Posterior	7	91
TOTAL	**8**	**132**

Note: Excludes 76 procedures with no approach recorded

TABLE 9

Number of Revisions of Delta-One-TT Primary Total Conventional Hip Replacement by Year of Implant

This analysis details the number of prostheses reported each year to the Registry for the Delta-One-TT 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 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 9: Number of Revisions of Delta-One-TT Primary Total Conventional Hip Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2010	0	4
2011	2	7
2012	0	7
2013	2	15
2014	5	37
2015	0	13
2016	1	12
2017	1	14
2018	0	14
2019	3	23
2020	0	15
2021	1	14
2022	0	13
2023	2	11
2024	0	9
TOTAL	**17**	**208**

TABLE 10

Revision Rates of Delta-One-TT 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 10: Revised Number of Delta-One-TT Primary Total Conventional Hip Replacement by Femoral Stem Component

Femoral Stem Component	N Revised	N Total
Apex	0	2
Arcos	0	1
C-Stem AMT	0	1
C2	0	5
CORAIL	3	17
CPCS	0	2
Custom Made (Biomet)	0	1
Echelon	0	1
Exacta S	1	1
Exeter V40	2	11
Friendly Hip	0	7
Furlong	0	2
Furlong Evolution	0	1
Furlong LOL	0	1
H-Max	5	64
H-Max (exch neck)	0	2
LPS	0	1
Metafix	0	3
Minima S	0	1
Modulus	0	15
Optimys	0	2
Paragon	0	2
Polarstem	0	2
Quadra-C	0	3
Quadra-H	0	7
Reclaim	0	1
Revision Hip	2	20
S-Rom	1	9
SL-Plus	2	10
Summit	0	6
Synergy	0	1
Taper Fit	0	2
Taperloc	0	1
UniSyn	1	1
twinSys (cless)	0	1
twinSys (ctd)	0	1
TOTAL	**17**	**208**