Dynasty Total Conventional Hip Investigation

Note: This analysis compares the Dynasty 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-2024.

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 2023 are excluded from the comparator.

TABLE 1

Revision Rate of Primary Total Conventional Hip Replacement

The revision rate of the Dynasty 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)
Dynasty	115	2127	12578	0.91 (0.75, 1.10)
Other Total Conventional Hip	19143	536512	3442993	0.56 (0.55, 0.56)
TOTAL	**19258**	**538639**	**3455571**	**0.56 (0.55, 0.57)**

Note: Prostheses no longer used in 2023 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 Dynasty total conventional hip prosthesis 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	8 Yrs
Dynasty	3.3 (2.7, 4.2)	3.9 (3.2, 4.8)	4.5 (3.7, 5.4)	4.6 (3.8, 5.6)	5.1 (4.2, 6.1)	5.4 (4.5, 6.5)	5.8 (4.8, 6.9)	6.0 (5.0, 7.2)
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)	3.1 (3.0, 3.1)	3.3 (3.3, 3.4)	3.6 (3.6, 3.7)	3.9 (3.8, 4.0)

CPR	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs
Dynasty	6.0 (5.0, 7.2)	6.0 (5.0, 7.2)	7.2 (5.0, 10.2)					
Other Total Conventional Hip	4.2 (4.1, 4.3)	4.5 (4.5, 4.6)	4.9 (4.8, 4.9)	5.3 (5.2, 5.4)	5.7 (5.6, 5.8)	6.0 (5.9, 6.2)	6.5 (6.3, 6.6)	6.9 (6.7, 7.0)

CPR	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs	22 Yrs	23 Yrs
Dynasty							
Other Total Conventional Hip	7.3 (7.1, 7.4)	7.6 (7.5, 7.8)	8.2 (8.0, 8.4)	8.5 (8.2, 8.7)	9.0 (8.7, 9.3)	9.6 (9.2, 10.1)	10.3 (9.5, 11.2)

Note: Prostheses no longer used in 2023 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

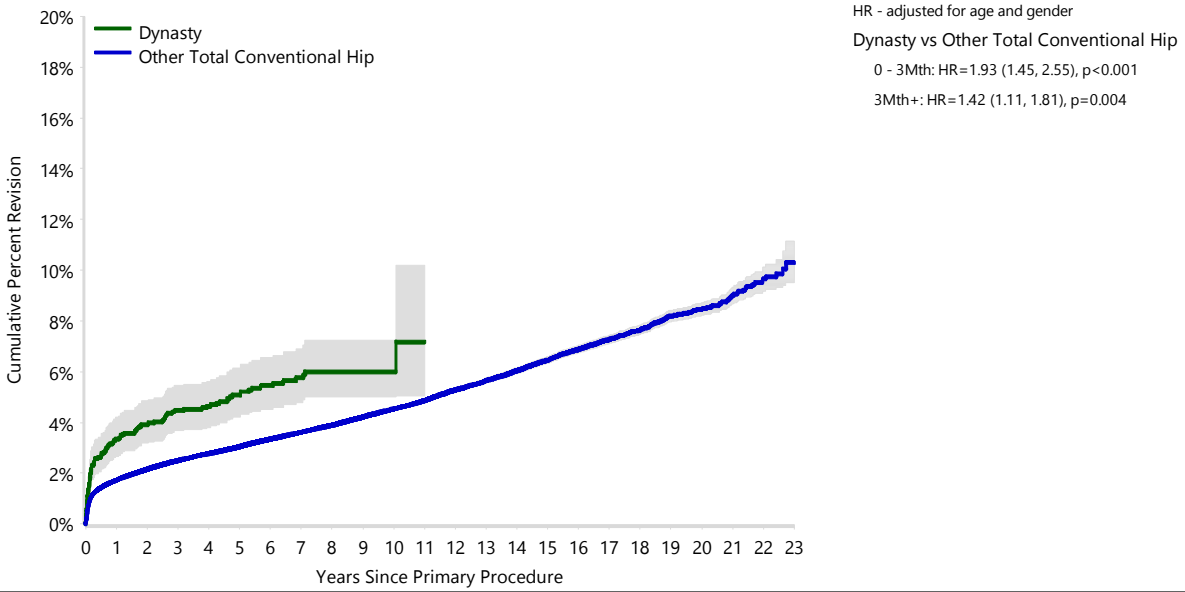
FIGURE 1

Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement

The yearly cumulative percent revision of the Dynasty 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
Dynasty	2127	2028	1966	1892	1645	1366	1062	766	467	221	86	42
Other Total Conventional Hip	536512	473713	423935	375369	331356	287700	246809	208932	174179	143148	117803	96251

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
Dynasty	17	0	0	0	0	0	0	0	0	0	0	0
Other Total Conventional Hip	77815	61602	47695	35979	26857	20094	14821	10048	6170	3221	1205	203

Note: Prostheses no longer used in 2023 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

	Dynasty		Other Total Conventional Hip	
Primary Diagnosis	Number	Percent	Number	Percent
Osteoarthritis	107	93.0	15852	82.8
Fractured Neck Of Femur	2	1.7	1418	7.4
Osteonecrosis	4	3.5	856	4.5
Developmental Dysplasia	2	1.7	318	1.7
Rheumatoid Arthritis			208	1.1
Failed Internal Fixation			151	0.8
Tumour			149	0.8
Other Inflammatory Arthritis			106	0.6
Fracture/Dislocation			53	0.3
Other			17	0.1
Arthrodesis Takedown			15	0.1
TOTAL	**115**	**100.0**	**19143**	**100.0**

Note: Prostheses no longer used in 2023 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 12.9 Years)

	Dynasty			Other Total Conventional Hip		
Revision Diagnosis	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	10	0.5	8.7	4408	0.8	24.2
Prosthesis Dislocation/Instability	29	1.4	25.2	4248	0.8	23.3
Fracture	33	1.6	28.7	3987	0.7	21.9
Loosening	27	1.3	23.5	3515	0.7	19.3
Pain	5	0.2	4.3	320	0.1	1.8
Leg Length Discrepancy	4	0.2	3.5	286	0.1	1.6
Malposition	2	0.1	1.7	263	0.0	1.4
Implant Breakage Stem				173	0.0	0.9
Lysis	1	0.0	0.9	162	0.0	0.9
Implant Breakage Acetabular Insert	1	0.0	0.9	124	0.0	0.7
Incorrect Sizing				103	0.0	0.6
Wear Acetabular Insert	2	0.1	1.7	71	0.0	0.4
Implant Breakage Acetabular				70	0.0	0.4
Metal Related Pathology	1	0.0	0.9	68	0.0	0.4
Wear Head				45	0.0	0.2
Tumour				42	0.0	0.2
Implant Breakage Head				29	0.0	0.2
Heterotopic Bone				26	0.0	0.1
Wear Acetabulum				9	0.0	0.0
Osteonecrosis				2	0.0	0.0
Progression Of Disease				2	0.0	0.0
Synovitis				1	0.0	0.0
Other				290	0.1	1.6
N Revision	**115**	**5.4**	**100.0**	**18244**	**3.4**	**100.0**
N Primary	**2127**			**536512**		

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 2023 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 Dynasty 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

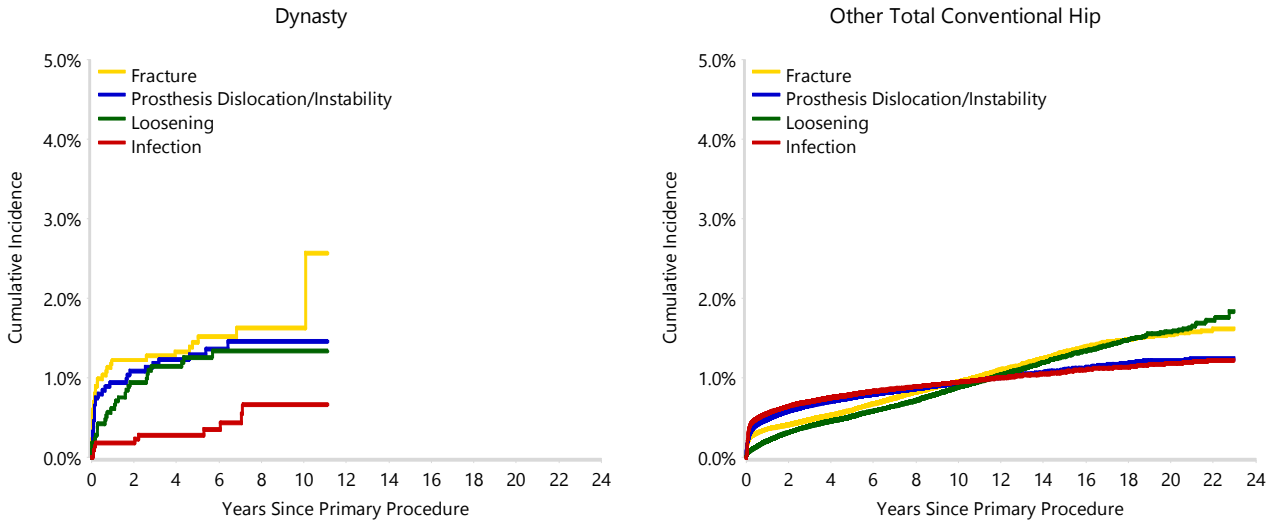


TABLE 5

Type of Revision Performed for Primary Total Conventional Hip Replacement

This analysis identifies the components used in the revision of the Dynasty 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 Dynasty 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 12.9 Years)

	Dynasty		Other Total Conventional Hip	
Type of Revision	Number	Percent	Number	Percent
Femoral Component	28	24.3	6027	33.0
Acetabular Component	47	40.9	3330	18.3
THR (Femoral/Acetabular)	14	12.2	2056	11.3
Cement Spacer	3	2.6	608	3.3
Removal of Prostheses	1	0.9	95	0.5
Reinsertion of Components	1	0.9	27	0.1
Bipolar Head and Femoral			7	0.0
Total Femoral			7	0.0
Saddle			1	0.0
N Major	**94**	**81.7**	**12158**	**66.6**
Head/Insert	10	8.7	4696	25.7
Head Only	6	5.2	906	5.0
Minor Components	2	1.7	298	1.6
Insert Only	2	1.7	182	1.0
Bipolar Only			2	0.0
Cement Only			1	0.0
Head/Neck			1	0.0
Head/Neck/Insert	1	0.9		
N Minor	**21**	**18.3**	**6086**	**33.4**
TOTAL	**115**	**100.0**	**18244**	**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 2023 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 Dynasty 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 Dynasty Primary Total Conventional Hip Replacement by Fixation

Fixation	N Revised	N Total
Cementless	115	2113
Hybrid (Femur Cemented)	0	14
TOTAL	**115**	**2127**

TABLE 7

Revision Rates of Dynasty 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 Dynasty Primary Total Conventional Hip Replacement by Bearing Surface

Bearing Surface	N Revised	N Total
Ceramic/XLPE	77	1437
Metal/Metal	0	1
Metal/XLPE	37	686
Ceramicised Metal/XLPE	1	2
Unknown	0	1
TOTAL	**115**	**2127**

TABLE 8

Revision Rates of Dynasty 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 Dynasty Primary Total Conventional Hip Replacement by Approach

Approach	N Revised	N Total
Anterior	37	368
Lateral	10	167
Posterior	42	1238
TOTAL	**89**	**1773**

Note: Excludes 354 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 Dynasty 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
Dynasty	NSW	96	1926
	VIC	0	1
	QLD	7	69
	WA	12	131
Other Total Conventional Hip	NSW	5113	155808
	VIC	4859	140680
	QLD	3784	94513
	WA	2541	63205
	SA	1825	49398
	TAS	452	18198
	ACT/NT	569	14710
TOTAL		**19258**	**538639**

Note: Prostheses no longer used in 2023 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 Dynasty Primary Total Conventional Hip Replacement by Year of Implant

This analysis details the number of prostheses reported each year to the Registry for the Dynasty 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 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 10: Number of Revisions of Dynasty Primary Total Conventional Hip Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2011	3	40
2012	4	31
2013	3	49
2014	12	178
2015	17	298
2016	22	317
2017	16	306
2018	14	307
2019	14	272
2020	10	241
2021	0	39
2022	0	32
2023	0	17
TOTAL	**115**	**2127**

TABLE 11

Revision Rates of Dynasty 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 Dynasty 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
Acetabular				
Dynasty	DSBFGB46-DSBFGK76	DYNASTY BIOFOAM SHELL TI6AL4V TI	NO	METAL
Dynasty	DSPCGA42-DSPCGH68	DYNASTY PC SHELL TI6AL4V	NO	METAL

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

Acetabular Range	N Revised	N Total
DSBFGB46-DSBFGK76	94	1357
DSPCGA42-DSPCGH68	21	770
TOTAL	**115**	**2127**

TABLE 12

Revision Rates of Dynasty 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 Dynasty Primary Total Conventional Hip Replacement by Femoral Stem Component

Femoral Stem Component	N Revised	N Total
CORAIL	0	2
CPCS	0	1
CPT	0	1
Exeter V40	0	9
Guardian	0	1
Profemur	0	1
Profemur E	0	11
Profemur Gladiator	6	105
Profemur L	102	1924
Profemur L (exch neck)	0	14
Profemur TL	7	56
Profemur XM	0	2
TOTAL	**115**	**2127**