

Furlong Evolution Total Conventional Hip Investigation

Note: This analysis compares the Furlong Evolution 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-2023>.

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 2022 are excluded from the comparator.

TABLE 1

Revision Rate of Primary Total Conventional Hip Replacement

The revision rate of the Furlong Evolution 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)
Furlong Evolution	39	521	2052	1.90 (1.35, 2.60)
Other Total Conventional Hip	17418	493670	3079727	0.57 (0.56, 0.57)
TOTAL	17457	494191	3081779	0.57 (0.56, 0.57)

Note: Prostheses no longer used in 2022 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 Furlong Evolution 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
Furlong Evolution	5.0 (3.4, 7.2)	6.4 (4.6, 9.0)	7.5 (5.5, 10.2)	7.8 (5.7, 10.7)	8.3 (6.1, 11.2)	8.3 (6.1, 11.2)	8.3 (6.1, 11.2)	8.3 (6.1, 11.2)
Other Total Conventional Hip	1.7 (1.7, 1.8)	2.2 (2.1, 2.2)	2.5 (2.5, 2.6)	2.8 (2.7, 2.8)	3.1 (3.0, 3.1)	3.4 (3.3, 3.4)	3.6 (3.6, 3.7)	3.9 (3.9, 4.0)

CPR	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs
Furlong Evolution							
Other Total Conventional Hip	4.3 (4.2, 4.3)	4.6 (4.5, 4.7)	4.9 (4.8, 5.0)	5.3 (5.2, 5.4)	5.7 (5.6, 5.8)	6.1 (6.0, 6.2)	6.5 (6.4, 6.6)

CPR	16 Yrs	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs	22 Yrs
Furlong Evolution							
Other Total Conventional Hip	6.9 (6.8, 7.1)	7.3 (7.1, 7.4)	7.6 (7.4, 7.8)	8.2 (8.0, 8.5)	8.5 (8.2, 8.8)	8.9 (8.5, 9.3)	9.3 (8.8, 9.8)

Note: Prostheses no longer used in 2022 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

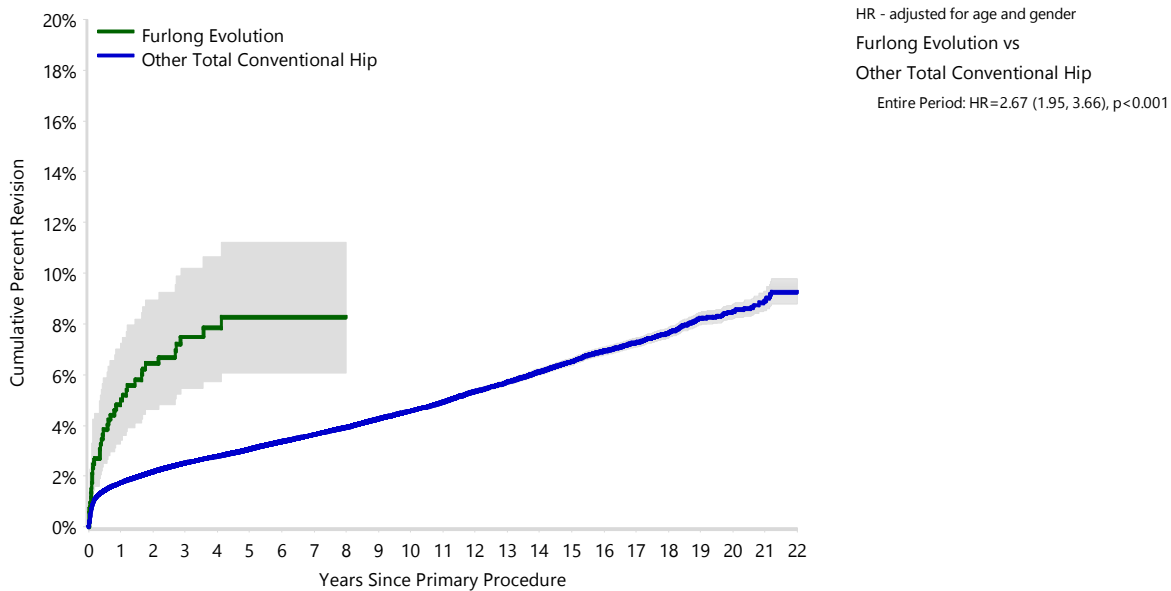
FIGURE 1

Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement

The yearly cumulative percent revision of the Furlong Evolution 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
Furlong Evolution	521	490	407	324	227	135	86	72	45	25	0	0
Other Total Conventional Hip	493670	437053	388352	343937	299474	257969	219261	183470	151343	124905	102632	83483

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
Furlong Evolution	0	0	0	0	0	0	0	0	0	0	0
Other Total Conventional Hip	66659	51987	39538	29740	22330	16535	11402	7013	3737	1435	252

Note: Prostheses no longer used in 2022 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	Furlong Evolution		Other Total Conventional Hip	
	Number	Percent	Number	Percent
Osteoarthritis	36	92.3	14400	82.7
Fractured Neck Of Femur	1	2.6	1291	7.4
Osteonecrosis	2	5.1	795	4.6
Developmental Dysplasia			279	1.6
Rheumatoid Arthritis			186	1.1
Failed Internal Fixation			147	0.8
Tumour			145	0.8
Other Inflammatory Arthritis			99	0.6
Fracture/Dislocation			46	0.3
Arthrodesis Takedown			16	0.1
Other			14	0.1
TOTAL	39	100.0	17418	100.0

Note: Prostheses no longer used in 2022 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 9.9 Years)

Revision Diagnosis	Furlong Evolution			Other Total Conventional Hip		
	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	12	2.3	30.8	3830	0.8	24.2
Prosthesis Dislocation/Instability	2	0.4	5.1	3798	0.8	24.0
Fracture	6	1.2	15.4	3382	0.7	21.4
Loosening	12	2.3	30.8	3031	0.6	19.2
Pain				294	0.1	1.9
Leg Length Discrepancy	3	0.6	7.7	265	0.1	1.7
Malposition	3	0.6	7.7	232	0.0	1.5
Implant Breakage Stem				128	0.0	0.8
Lysis				105	0.0	0.7
Implant Breakage Acetabular Insert				101	0.0	0.6
Incorrect Sizing	1	0.2	2.6	100	0.0	0.6
Implant Breakage Acetabular				59	0.0	0.4
Metal Related Pathology				58	0.0	0.4
Wear Acetabular Insert				46	0.0	0.3
Tumour				40	0.0	0.3
Wear Head				37	0.0	0.2
Heterotopic Bone				25	0.0	0.2
Implant Breakage Head				25	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				245	0.0	1.5
N Revision	39	7.5	100.0	15810	3.2	100.0
N Primary	521			493670		

Note: This table is restricted to revisions within 9.9 years for all groups to allow a time-matched comparison of revisions.

Note: Prostheses no longer used in 2022 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 Furlong Evolution 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

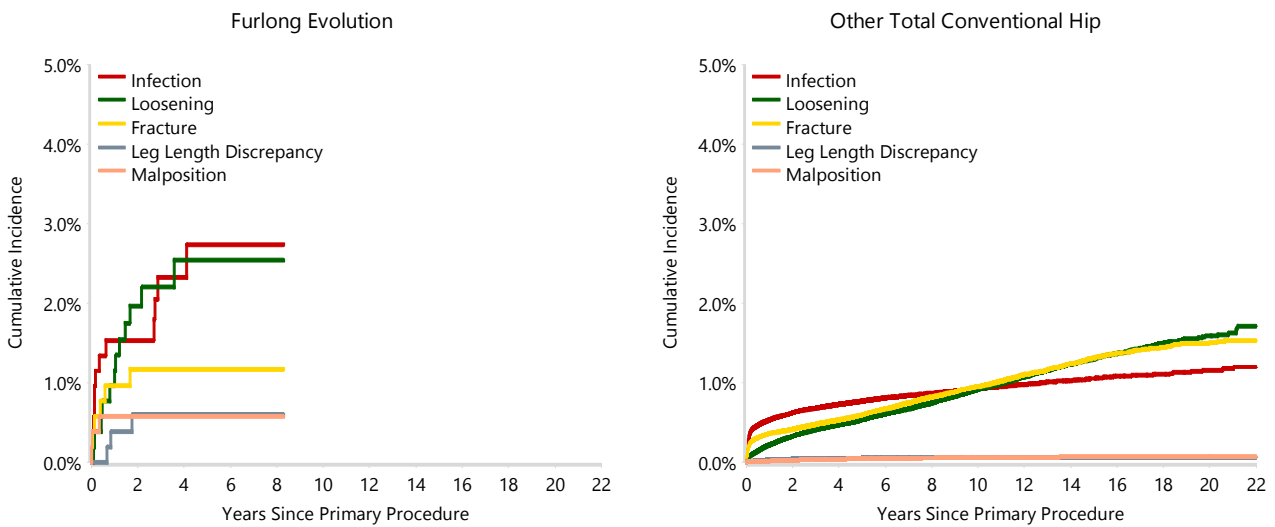


TABLE 5

Type of Revision Performed for Primary Total Conventional Hip Replacement

This analysis identifies the components used in the revision of the Furlong Evolution 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 Furlong Evolution 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 9.9 Years)

Type of Revision	Furlong Evolution		Other Total Conventional Hip	
	Number	Percent	Number	Percent
Femoral Component	15	38.5	5103	32.3
Acetabular Component	6	15.4	2945	18.6
THR (Femoral/Acetabular)	6	15.4	1735	11.0
Cement Spacer	3	7.7	584	3.7
Removal of Prostheses	1	2.6	88	0.6
Reinsertion of Components			27	0.2
Total Femoral			6	0.0
Bipolar Head and Femoral			5	0.0
Saddle			1	0.0
N Major	31	79.5	10494	66.4
Head/Insert	4	10.3	4041	25.6
Head Only	3	7.7	825	5.2
Minor Components	1	2.6	270	1.7
Insert Only			176	1.1
Bipolar Only			2	0.0
Cement Only			1	0.0
Head/Neck			1	0.0
N Minor	8	20.5	5316	33.6
TOTAL	39	100.0	15810	100.0

Note: This table is restricted to revisions within 9.9 years for all groups to allow a time-matched comparison of revisions.

Note: Prostheses no longer used in 2022 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 Furlong Evolution 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 Furlong Evolution Primary Total Conventional Hip Replacement by Fixation

Fixation	N Revised	N Total
Cementless	39	521
TOTAL	39	521

TABLE 7**Revision Rates of Furlong Evolution 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 Furlong Evolution Primary Total Conventional Hip Replacement by Bearing Surface

Bearing Surface	N Revised	N Total
Ceramic/Ceramic	22	253
Ceramic/Non XLPE	11	211
Ceramic/XLPE	1	17
Ceramic/XLPE + Antioxidant	0	4
Metal/Non XLPE	4	35
Metal/XLPE	1	1
TOTAL	39	521

TABLE 8**Revision Rates of Furlong Evolution 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 Furlong Evolution Primary Total Conventional Hip Replacement by Approach

Approach	N Revised	N Total
Anterior	21	271
Lateral	5	27
Posterior	7	162
TOTAL	33	460

Note: Excludes 61 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 Furlong Evolution 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
Furlong Evolution	NSW	4	35
	VIC	11	201
	QLD	5	69
	WA	19	211
	SA	0	2
	ACT/NT	0	3
Other Total Conventional Hip	NSW	4724	144733
	VIC	4337	128125
	QLD	3451	86902
	WA	2370	58677
	SA	1621	45636
	TAS	405	16382
	ACT/NT	510	13215
TOTAL		17457	494191

Note: Prostheses no longer used in 2022 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 Furlong Evolution Primary Total Conventional Hip Replacement by Year of Implant**

This analysis details the number of prostheses reported each year to the Registry for the Furlong Evolution 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 2022 has a maximum of one year to be revised, whereas a primary procedure performed in 2020 has a maximum of three years to be revised.

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

Year of Implant	Number Revised	Total Number
2013	2	29
2014	4	25
2015	2	32
2016	0	11
2017	3	54
2018	11	102
2019	10	106
2020	5	83
2021	1	75
2022	1	4
TOTAL	39	521

TABLE 11

Revision Rates of Furlong Evolution 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 Furlong Evolution 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 Stem				
Furlong Evolution	4260106-4260117	FURLONG EVOLUTION COLLARED 126° NECK ANGLE STD OFFSET	NO	METAL
Furlong Evolution	4260210-4260212	FURLONG EVOLUTION COLLARLESS 126° NECK ANGLE STD OFFSET Ti6AL4V	NO	METAL
Furlong Evolution	4265106-4265117	FURLONG EVOLUTION COLLARED 126° NECK ANGLE HIGH OFFSET Ti6AL4V	NO	METAL
Furlong Evolution	4265111-4265211	FURLONG EVOLUTION COLLARLESS 126° NECK ANGLE HIGH OFFSET Ti6AL4V	NO	METAL
Furlong Evolution	4330106-4330117	FURLONG EVOLUTION COLLARED 133° NECK ANGLE STD OFFSET Ti6AL4V	NO	METAL
Furlong Evolution	4330206-4330214	FURLONG EVOLUTION COLLARLESS 133° NECK ANGLE STD OFFSET Ti6AL4V	NO	METAL
Furlong Evolution	4335106-4335117	FURLONG EVOLUTION COLLARED 133° NECK ANGLE HIGH OFFSET Ti6AL4V	NO	METAL
Furlong Evolution	4335208-4335217	FURLONG EVOLUTION COLLARLESS 133° NECK ANGLE HIGH OFFSET Ti6AL4V	NO	METAL

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

Femoral Stem Range	N Revised	N Total
4260106-4260117	7	39
4260210-4260212	0	2
4265106-4265117	5	45
4265111-4265211	1	15
4330106-4330117	15	244
4330206-4330214	4	39
4335106-4335117	4	115
4335208-4335217	3	22
TOTAL	39	521

TABLE 12

Revision Rates of Furlong Evolution 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 Furlong Evolution Primary Total Conventional Hip Replacement by Acetabular Component

Acetabular Component	N Revised	N Total
Acetabular Shell (Global)	1	6
Adaptive	0	9
Delta-One-TT	0	1
Delta-TT	0	3
Furlong	33	437
Logical G	0	17
Mpact	4	41
PINNACLE	0	2
R3	1	1
Trident/Tritanium (Shell)	0	1
Versafitcup CC	0	3
TOTAL	39	521