G7 Multihole Total Conventional Hip Investigation

Note: This analysis compares the G7 Multihole 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-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 G7 Multihole 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)
G7 Multihole	50	926	1690	2.96 (2.20, 3.90)
Other Total Conventional Hip	17402	493232	3079815	0.57 (0.56, 0.57)
TOTAL	**17452**	**494158**	**3081505**	**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 G7 Multihole 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
G7 Multihole	5.3 (4.0, 7.1)	5.5 (4.2, 7.3)	6.7 (4.9, 9.1)	6.7 (4.9, 9.1)				
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
G7 Multihole							
Other Total Conventional Hip	4.3 (4.2, 4.3)	4.6 (4.5, 4.6)	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
G7 Multihole							
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.

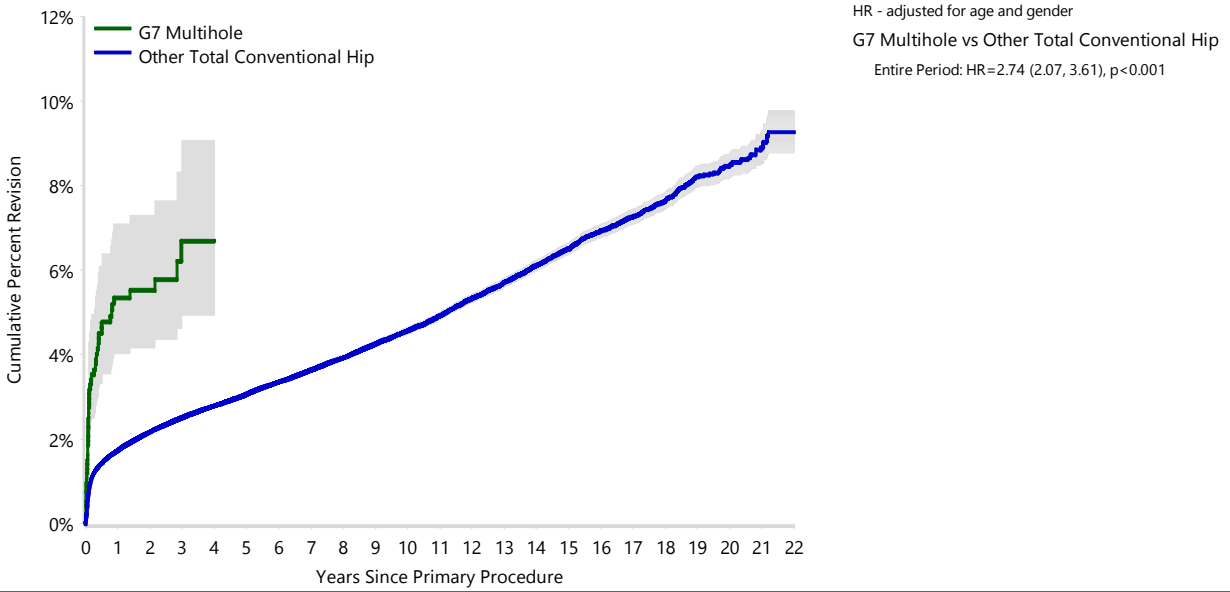
FIGURE 1

Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement

The yearly cumulative percent revision of the G7 Multihole 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
G7 Multihole	926	625	394	188	48	9	0	0	0	0	0	0
Other Total Conventional Hip	493232	436887	388335	344040	299615	258056	219311	183514	151369	124924	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
G7 Multihole	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

	G7 Multihole		Other Total Conventional Hip	
Primary Diagnosis	Number	Percent	Number	Percent
Osteoarthritis	22	44.0	14410	82.8
Fractured Neck Of Femur	9	18.0	1282	7.4
Osteonecrosis	3	6.0	794	4.6
Developmental Dysplasia	5	10.0	274	1.6
Rheumatoid Arthritis	1	2.0	185	1.1
Tumour	1	2.0	144	0.8
Failed Internal Fixation	6	12.0	141	0.8
Other Inflammatory Arthritis			99	0.6
Fracture/Dislocation	3	6.0	43	0.2
Arthrodesis Takedown			16	0.1
Other			14	0.1
TOTAL	**50**	**100.0**	**17402**	**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 5.4 Years)

	G7 Multihole			Other Total Conventional Hip		
Revision Diagnosis	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	17	1.8	34.0	3543	0.7	26.3
Prosthesis Dislocation/Instability	17	1.8	34.0	3459	0.7	25.6
Fracture	9	1.0	18.0	2719	0.6	20.1
Loosening	4	0.4	8.0	2353	0.5	17.4
Leg Length Discrepancy				261	0.1	1.9
Pain				252	0.1	1.9
Malposition	2	0.2	4.0	206	0.0	1.5
Incorrect Sizing				96	0.0	0.7
Implant Breakage Acetabular Insert				87	0.0	0.6
Implant Breakage Stem	1	0.1	2.0	69	0.0	0.5
Lysis				52	0.0	0.4
Implant Breakage Acetabular				47	0.0	0.3
Metal Related Pathology				33	0.0	0.2
Tumour				33	0.0	0.2
Heterotopic Bone				22	0.0	0.2
Wear Head				21	0.0	0.2
Wear Acetabular Insert				19	0.0	0.1
Implant Breakage Head				14	0.0	0.1
Progression Of Disease				2	0.0	0.0
Wear Acetabulum				2	0.0	0.0
Osteonecrosis				1	0.0	0.0
Synovitis				1	0.0	0.0
Other				205	0.0	1.5
N Revision	**50**	**5.4**	**100.0**	**13497**	**2.7**	**100.0**
N Primary	**926**			**493232**		

Note: This table is restricted to revisions within 5.4 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 G7 Multihole 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

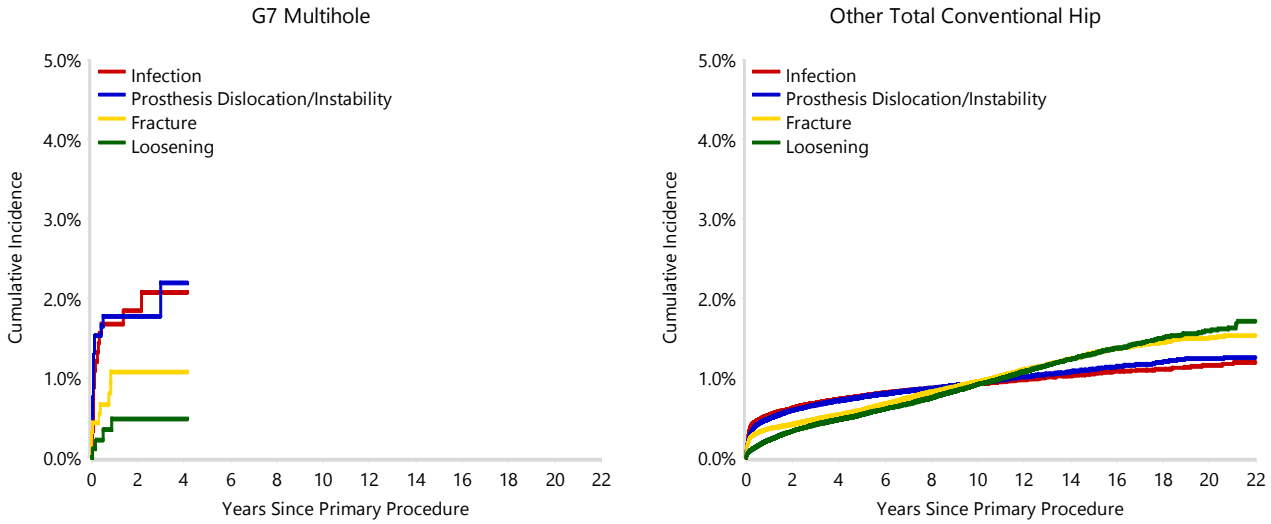


TABLE 5

Type of Revision Performed for Primary Total Conventional Hip Replacement

This analysis identifies the components used in the revision of the G7 Multihole 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 G7 Multihole 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 5.4 Years)

	G7 Multihole		Other Total Conventional Hip	
Type of Revision	Number	Percent	Number	Percent
Femoral Component	9	18.0	4094	30.3
Acetabular Component	9	18.0	2501	18.5
THR (Femoral/Acetabular)	6	12.0	1434	10.6
Cement Spacer	1	2.0	509	3.8
Removal of Prostheses			84	0.6
Reinsertion of Components			26	0.2
Bipolar Head and Femoral			4	0.0
Total Femoral			4	0.0
Saddle			1	0.0
N Major	**25**	**50.0**	**8657**	**64.1**
Head/Insert	23	46.0	3665	27.2
Head Only			781	5.8
Minor Components			223	1.7
Insert Only	2	4.0	167	1.2
Bipolar Only			2	0.0
Cement Only			1	0.0
Head/Neck			1	0.0
N Minor	**25**	**50.0**	**4840**	**35.9**
TOTAL	**50**	**100.0**	**13497**	**100.0**

Note: This table is restricted to revisions within 5.4 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 G7 Multihole 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 G7 Multihole Primary Total Conventional Hip Replacement by Fixation

Fixation	N Revised	N Total
Cemented	1	11
Cementless	27	544
Hybrid (Femur Cemented)	22	356
Reverse Hybrid (Femur Cementless)	0	15
TOTAL	**50**	**926**

TABLE 7

Revision Rates of G7 Multihole 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 G7 Multihole Primary Total Conventional Hip Replacement by Bearing Surface

Bearing Surface	N Revised	N Total
Ceramic/Ceramic	0	6
Ceramic/XLPE + Antioxidant	17	344
Metal/XLPE + Antioxidant	33	568
Ceramicised Metal/XLPE + Antioxidant	0	5
Unknown	0	3
TOTAL	**50**	**926**

TABLE 8

Revision Rates of G7 Multihole 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 G7 Multihole Primary Total Conventional Hip Replacement by Approach

Approach	N Revised	N Total
Anterior	4	109
Lateral	11	129
Posterior	35	682
TOTAL	**50**	**920**

Note: Excludes 6 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 G7 Multihole 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
G7 Multihole	NSW	8	163
	VIC	11	212
	QLD	4	116
	WA	18	333
	SA	7	65
	TAS	1	23
	ACT/NT	1	14
Other Total Conventional Hip	NSW	4720	144605
	VIC	4337	128112
	QLD	3447	86824
	WA	2371	58555
	SA	1614	45573
	TAS	404	16359
	ACT/NT	509	13204
TOTAL		**17452**	**494158**

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 G7 Multihole Primary Total Conventional Hip Replacement by Year of Implant

This analysis details the number of prostheses reported each year to the Registry for the G7 Multihole 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 G7 Multihole Primary Total Conventional Hip Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2017	1	15
2018	4	49
2019	13	169
2020	8	222
2021	19	242
2022	5	229
TOTAL	**50**	**926**

TABLE 11

Revision Rates of G7 Multihole 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 G7 Multihole 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				
G7	110010250-110010277	G7 OSSEO TI ACETABULAR SHELL MULTI HOLE CEMENTLESS	NO	METAL

Table 11: Revised Number of G7 Multihole Primary Total Conventional Hip Replacement by Catalogue Number Range

Acetabular Range	N Revised	N Total
110010250-110010277	50	926
TOTAL	**50**	**926**

TABLE 12

Revision Rates of G7 Multihole 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 G7 Multihole Primary Total Conventional Hip Replacement by Femoral Stem Component

Femoral Stem Component	N Revised	N Total
AMIStem H	0	1
Absolut	0	5
Accolade II	0	1
Arcos	6	40
Avenir	0	24
C-Stem AMT	0	9
CLS	0	8
CORAIL	0	32
CPCS	0	5
CPT	11	243
Echo	0	1
Evolve	1	5
Exeter V40	4	26
Generic Stem	0	1
KAR	0	1
M/L Taper	0	1
MS 30	2	25
Metafix	0	1
Modulus	0	1
Mutars	0	17
Optimys	0	1
Oss	2	4
Paragon	1	3
Polarstem	0	1
Quadra-C	1	5
Redapt	0	2
S-Rom	2	26
Segmental System	0	2
Short Exeter V40	1	2
Sirius	0	1
Spectron EF	0	3
Summit	0	7
Taper Fit	0	2
Taperloc	16	324
Taperloc Microplasty	1	61
VerSys	1	12
Wagner	0	6
X-Acta	0	3
ZMR	1	14
TOTAL	**50**	**926**