Echelon Total Conventional Hip Investigation

Note: This analysis compares the Echelon 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-2026.

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 2025 are excluded from the comparator.

TABLE 1

Revision Rate of Primary Total Conventional Hip Replacement

The revision rate of the Echelon 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)
Echelon	37	480	2563	1.44 (1.02, 1.99)
Other Total Conventional Hip	19669	568169	3620746	0.54 (0.54, 0.55)
TOTAL	**19706**	**568649**	**3623309**	**0.54 (0.54, 0.55)**

Note: Prostheses no longer used in 2025 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 Echelon 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
Echelon	5.2 (3.5, 7.7)	7.4 (5.3, 10.4)	8.0 (5.8, 11.2)	8.4 (6.0, 11.6)	8.4 (6.0, 11.6)	9.9 (7.2, 13.6)
Other Total Conventional Hip	1.7 (1.7, 1.8)	2.1 (2.1, 2.2)	2.5 (2.4, 2.5)	2.7 (2.7, 2.8)	3.0 (3.0, 3.1)	3.3 (3.2, 3.3)

CPR	7 Yrs	8 Yrs	9 Yrs	10 Yrs	11 Yrs	12 Yrs
Echelon	9.9 (7.2, 13.6)	9.9 (7.2, 13.6)	9.9 (7.2, 13.6)	9.9 (7.2, 13.6)	9.9 (7.2, 13.6)	9.9 (7.2, 13.6)
Other Total Conventional Hip	3.5 (3.5, 3.6)	3.8 (3.7, 3.9)	4.1 (4.0, 4.2)	4.4 (4.3, 4.5)	4.7 (4.6, 4.8)	5.1 (5.0, 5.2)

CPR	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs
Echelon	9.9 (7.2, 13.6)					
Other Total Conventional Hip	5.4 (5.3, 5.5)	5.8 (5.7, 5.9)	6.2 (6.1, 6.3)	6.6 (6.5, 6.7)	7.0 (6.8, 7.1)	7.3 (7.1, 7.5)

CPR	19 Yrs	20 Yrs	21 Yrs	22 Yrs	23 Yrs	24 Yrs	25 Yrs
Echelon							
Other Total Conventional Hip	7.7 (7.5, 7.9)	8.0 (7.8, 8.2)	8.6 (8.3, 8.9)	9.0 (8.7, 9.4)	9.6 (9.1, 10.0)	9.6 (9.2, 10.1)	10.3 (9.4, 11.2)

Note: Prostheses no longer used in 2025 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

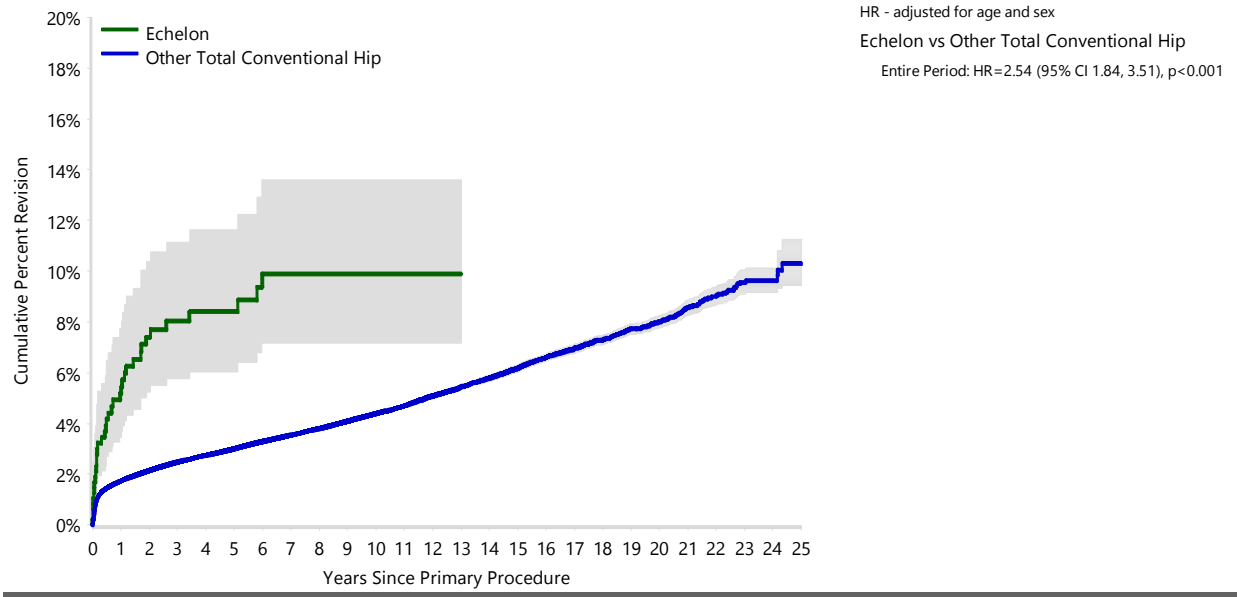
FIGURE 1

Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement

The yearly cumulative percent revision of the Echelon 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
Echelon	480	361	311	262	230	200	173	149
Other Total Conventional Hip	568169	501270	445149	391324	344179	299172	259358	220812

Number at Risk	8 Yrs	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs
Echelon	129	96	78	65	53	47	37	33	29
Other Total Conventional Hip	185680	153652	124776	99516	79755	63302	49698	38005	28331

Number at Risk	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs	22 Yrs	23 Yrs	24 Yrs	25 Yrs
Echelon	23	19	19	13	10	7	3	0	0
Other Total Conventional Hip	20418	14622	10384	7385	4851	2857	1453	560	95

Note: Prostheses no longer used in 2025 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

	Echelon		Other Total Conventional Hip	
Primary Diagnosis	Number	Percent	Number	Percent
Osteoarthritis	7	18.9	16290	82.8
Fractured Neck Of Femur	8	21.6	1513	7.7
Osteonecrosis	1	2.7	843	4.3
Developmental Dysplasia			321	1.6
Rheumatoid Arthritis			201	1.0
Failed Internal Fixation	10	27.0	156	0.8
Tumour	7	18.9	152	0.8
Other Inflammatory Arthritis			102	0.5
Fracture/Dislocation	3	8.1	57	0.3
Other			21	0.1
Arthrodesis Takedown	1	2.7	13	0.1
TOTAL	**37**	**100.0**	**19669**	**100.0**

Note: Prostheses no longer used in 2025 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 23.6 Years)

Revision Diagnosis	Echelon			Other Total Conventional Hip		
	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	6	1.3	16.2	5011	0.9	25.5
Prosthesis Dislocation/Instability	12	2.5	32.4	4372	0.8	22.2
Fracture	3	0.6	8.1	4345	0.8	22.1
Loosening	10	2.1	27.0	3618	0.6	18.4
Pain				340	0.1	1.7
Leg Length Discrepancy				307	0.1	1.6
Malposition				282	0.0	1.4
Implant Breakage Stem	3	0.6	8.1	208	0.0	1.1
Lysis				200	0.0	1.0
Implant Breakage Acetabular Insert				128	0.0	0.7
Wear Acetabular Insert				112	0.0	0.6
Incorrect Sizing				96	0.0	0.5
Metal Related Pathology	2	0.4	5.4	93	0.0	0.5
Implant Breakage Acetabular				73	0.0	0.4
Wear Head				49	0.0	0.2
Tumour				46	0.0	0.2
Heterotopic Bone				26	0.0	0.1
Implant Breakage Head				26	0.0	0.1
Wear Acetabulum	1	0.2	2.7	5	0.0	0.0
Osteonecrosis				4	0.0	0.0
Synovitis				2	0.0	0.0
Progression Of Disease				1	0.0	0.0
Other				322	0.1	1.6
N Revision	**37**	**7.7**	**100.0**	**19666**	**3.5**	**100.0**
N Primary	**480**			**568169**		

Note: This table is restricted to revisions within 23.6 years for all groups to allow a time-matched comparison of revisions.
Note: Prostheses no longer used in 2025 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 Echelon 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

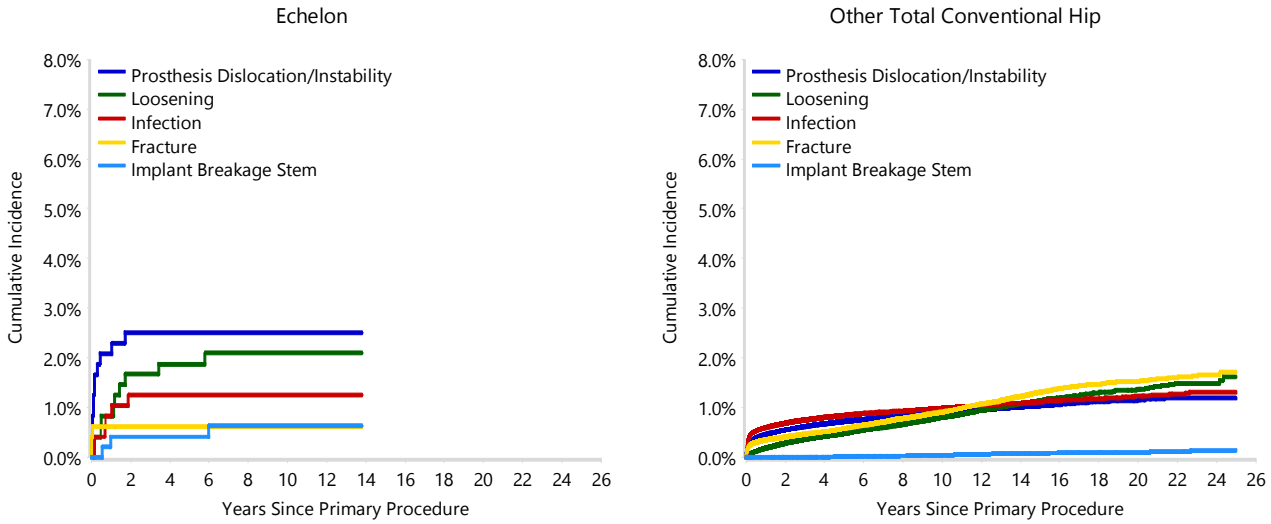


TABLE 5

Type of Revision Performed for Primary Total Conventional Hip Replacement

This analysis identifies the components used in the revision of the Echelon 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 Echelon 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 23.6 Years)

	Echelon		Other Total Conventional Hip	
Type of Revision	Number	Percent	Number	Percent
Femoral Component	12	32.4	6633	33.7
Acetabular Component	12	32.4	3299	16.8
THR (Femoral/Acetabular)	1	2.7	2302	11.7
Cement Spacer	2	5.4	554	2.8
Removal of Prostheses	2	5.4	91	0.5
Reinsertion of Components			27	0.1
Total Femoral			12	0.1
Bipolar Head and Femoral			10	0.1
N Major	**29**	**78.4**	**12928**	**65.7**
Head/Insert	6	16.2	5370	27.3
Head Only	1	2.7	913	4.6
Minor Components	1	2.7	284	1.4
Insert Only			168	0.9
Bipolar Only			1	0.0
Cement Only			1	0.0
Head/Neck/Insert			1	0.0
N Minor	**8**	**21.6**	**6738**	**34.3**
TOTAL	**37**	**100.0**	**19666**	**100.0**

Note: This table is restricted to revisions within 23.6 years for all groups to allow a time-matched comparison of revisions.
Note: Prostheses no longer used in 2025 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 Echelon 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 Echelon Primary Total Conventional Hip Replacement by Fixation

Fixation	N Revised	N Total
Cemented	10	167
Cementless	17	180
Hybrid (Femur Cemented)	10	117
Reverse Hybrid (Femur Cementless)	0	16
TOTAL	**37**	**480**

TABLE 7

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

Bearing Surface	N Revised	N Total
Ceramic/Ceramic	1	15
Ceramic/Non XLPE	0	2
Ceramic/XLPE	0	3
Metal/Metal	3	21
Metal/Non XLPE	3	61
Metal/XLPE	16	260
Metal/XLPE + Antioxidant	1	3
Ceramicised Metal/Non XLPE	0	15
Ceramicised Metal/XLPE	13	96
Ceramicised Metal/XLPE + Antioxidant	0	2
Unknown	0	2
TOTAL	**37**	**480**

TABLE 8

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

Approach	N Revised	N Total
Anterior	0	5
Lateral	3	36
Posterior	12	134
TOTAL	**15**	**175**

Note: Excludes 305 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 Echelon 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
Echelon	NSW	8	127
	VIC	2	26
	QLD	17	180
	WA	0	4
	SA	7	106
	ACT/NT	3	37
Other Total Conventional Hip	NSW	5499	166888
	VIC	4851	146533
	QLD	3955	104196
	WA	2510	64942
	SA	1881	51982
	TAS	439	18269
	ACT/NT	534	15359
TOTAL		**19706**	**568649**

Note: Prostheses no longer used in 2025 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 Echelon Primary Total Conventional Hip Replacement by Year of Implant

This analysis details the number of prostheses reported each year to the Registry for the Echelon 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 2025 has a maximum of one year to be revised, whereas a primary procedure performed in 2023 has a maximum of three years to be revised.

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

Year of Implant	Number Revised	Total Number
2001	0	2
2002	1	10
2003	0	13
2004	0	16
2005	1	13
2006	1	25
2007	1	18
2008	1	27
2009	2	19
2010	4	30
2011	2	21
2012	3	40
2013	3	31
2014	2	30
2015	4	32
2016	3	47
2017	3	43
2018	5	41
2019	0	10
2020	0	3
2021	0	3
2022	0	2
2023	0	1
2024	1	2
2025	0	1
TOTAL	**37**	**480**

TABLE 11

Revision Rates of Echelon 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 Echelon 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						
Echelon	71310112-71310116	NONPOROUS STANDARD COLLAR FEMORAL COMPONENT	YES	METAL		MATT
Echelon	71310212-71310216	NONPOROUS STANDARD COLLAR FEMORAL COMPONENT >200MM	YES	METAL		MATT
Echelon	71310312-71310316	NONPOROUS 15 CALCAR FEMORAL COMPONENT	YES	METAL		MATT
Echelon	71310412-71310416	NONPOROUS 15 CALCAR FEMORAL COMPONENT > 200MM	YES	METAL		MATT
Echelon	71310612-71310616	NONPOROUS 30 CALCAR FEMORAL COMPONENT	YES	METAL		MATT
Echelon	71310712-71310716	NONPOROUS 30 CALCAR FEMORAL COMPONENT >200MM	YES	METAL		MATT
Echelon	71314112-71315114	NONPOROUS STANDARD COLLAR BOWED FEMORAL COMPONENT	YES	METAL		MATT
Echelon	71340111-71340120	POROUS STRAIGHT FEMORAL COMPONENT	NO	METAL	HA COATED	
Echelon	71340211-71340220	POROUS STRAIGHT 15 CALCAR FEMORAL COMPONENT	NO	METAL	HA COATED	
Echelon	71340412-71340520	POROUS STANDARD COLLAR BOWED FEMORAL COMPONENT	NO	METAL	HA COATED	
Echelon	71340612-71340721	POROUS BOWED 15 CALCAR FEMORAL COMPONENT	NO	METAL	HA COATED	
Echelon	71340814-71340921	POROUS BOWED 30 CALCAR FEMORAL COMPONENT	NO	METAL	HA COATED	
Echelon	71341011-71341019	PRIMARY STANDARD OFFSET FEMORAL COMPONENT	NO	METAL	HA COATED	
Echelon	71341022-71341029	PRIMARY HIGH OFFSET FEMORAL COMPONENT	NO	METAL	HA COATED	
Echelon	71341111-71341120	HA COATED STRAIGHT FEMORAL COMPONENT	NO	METAL	HA COATED	
Echelon	71342011-71342020	POROUS PLUS HA FEMORAL COMPONENT	NO	METAL	HA COATED	
Echelon	71342211-71342312	HA COATED 15 CALCAR STRAIGHT FEMORAL COMPONENT	NO	METAL	HA COATED	
Echelon	71343011-71343020	POROUS PLUS HA 15 CALCAR FEMORAL COMPONENT	NO	METAL	HA COATED	
Echelon	71344412-71345522	HA COATED STANDARD COLLAR BOWED FEMORAL COMPONENT	NO	METAL	HA COATED	
Echelon	71346612-71347722	HA COATED 15 CALCAR BOWED FEMORAL COMPONENT	NO	METAL	HA COATED	
Echelon	71348812-71349922	HA COATED 30 CALCAR BOWED FEMORAL COMPONENT	NO	METAL	HA COATED	

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

Femoral Stem Range	N Revised	N Total
71310112-71310116	3	67
71310212-71310216	6	37
71310312-71310316	4	39
71310412-71310416	0	9
71310612-71310616	0	5
71310712-71310716	0	2
71314112-71315114	7	123
71340111-71340120	2	16
71340211-71340220	0	3
71340412-71340520	0	4
71340612-71340721	0	1
71340814-71340921	0	1
71341011-71341019	0	2
71341022-71341029	0	3
71341111-71341120	4	64
71342011-71342020	2	32
71342211-71342312	2	15
71343011-71343020	2	5
71344412-71345522	3	39
71346612-71347722	1	11
71348812-71349922	1	2
TOTAL	**37**	**480**

TABLE 12

Revision Rates of Echelon 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 Echelon Primary Total Conventional Hip Replacement by Acetabular Component

Acetabular Component	N Revised	N Total
ASR	0	1
Avantage	0	1
BHR	1	14
Brunswick	0	4
Contemporary	0	2
Continuum	0	3
Delta-One-TT	0	1
Delta-TT	0	1
Equator+ Cup	0	3
Exeter X3 Rimfit	1	1
G7	0	1
Low Profile Cup	0	1
Mallory-Head	0	2
Muller	1	6
No Acetabular	0	1
Novae E	0	2
PINNACLE	0	3
Polarcup	7	48
R3	16	169
Reflection (Cup)	5	126
Reflection (Shell)	3	68
Trabecular Metal (Shell)	0	5
Tri-Flange	1	1
Trident (Cup)	0	1
Trident (Shell)	1	8
Trident/Tritanium (Shell)	0	1
Trilogy	1	2
Trinity	0	1
ZCA	0	3
TOTAL	**37**	**480**