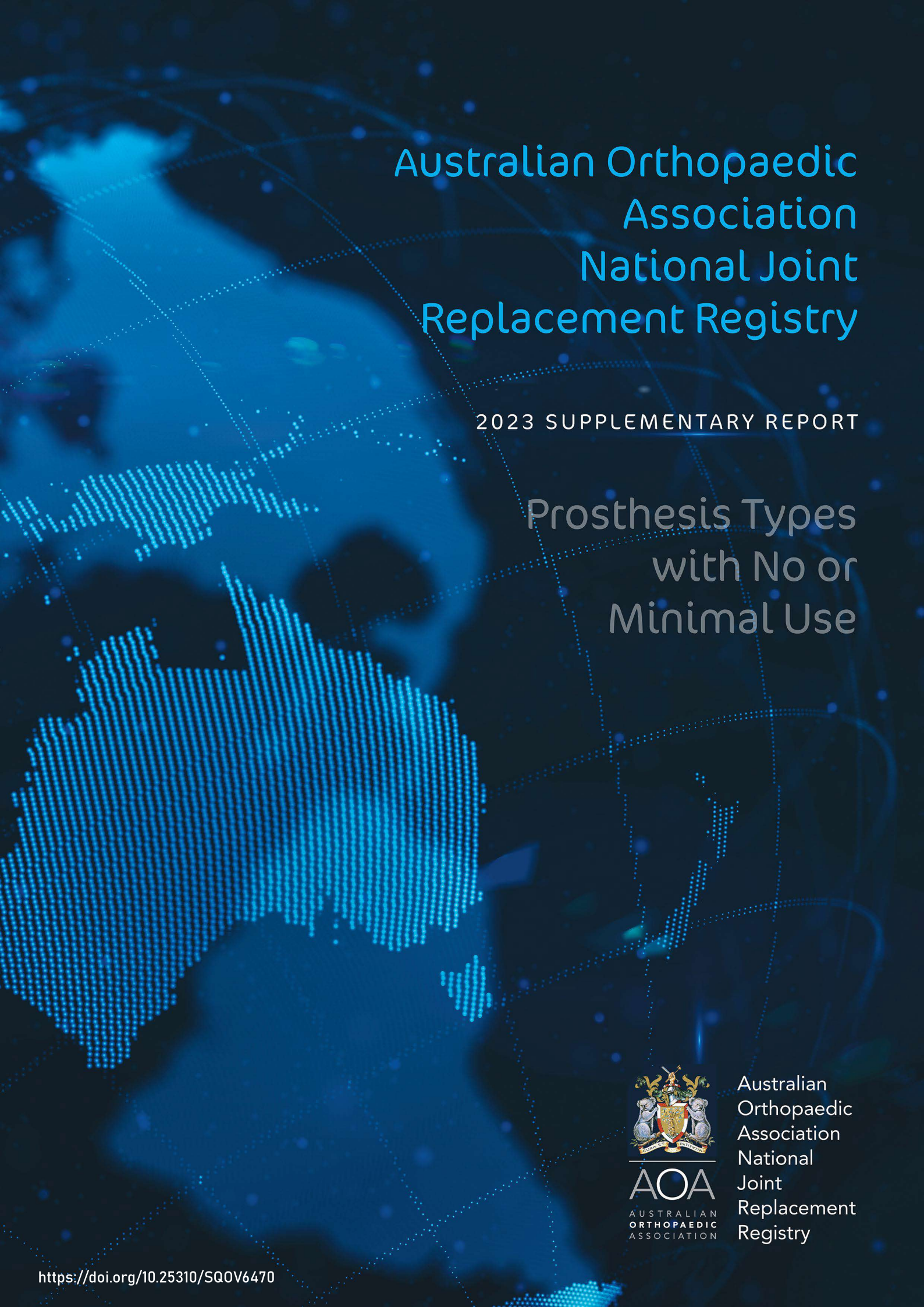
Australian Orthopaedic Association National Joint Replacement Registry

2023 SUPPLEMENTARY REPORT

Prosthesis Types with No or Minimal Use



Australian Orthopaedic Association National Joint Replacement Registry

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Prosthesis Types with No or Minimal Use

2023 Supplementary Report

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National Joint Replacement Registry

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The Registry greatly appreciates the participation of all joint replacement patients throughout Australia. Their contribution allows ongoing improvements in arthroplasty outcomes to be achieved.

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Summary

This report provides summary data and outcomes for hip, knee and shoulder prosthesis types with no or minimal use in Australia.

There are two classes of hip replacement no longer used: partial resurfacing and thrust plate. These are defined in the following section on hip replacement. These two classes of implants have not been used since 2014 and 2012, respectively.

There are two bearing surfaces used in total conventional hip replacement that are no longer used: procedures performed with ceramic heads on metal bearings and procedures performed with metal heads on ceramic bearings.

The rates of revision, reasons for revision and types of revision for procedures using ceramic head/metal bearings are provided. The number of procedures using metal heads/ceramic bearings is very low, so only a summary is provided for this combination.

There is one prosthesis type used in total conventional hip replacement that has minimal use: exchangeable neck prostheses. The proportion of procedures using exchangeable necks continues to decline.

There are two classes of partial knee replacement that are no longer used: Unispacer and bicompartmental. These are defined in the second section of this report on knee replacement. Unispacer and bicompartmental have not been used since 2005 and 2012, respectively. There was one procedure for partial resurfacing undertaken in 2022.

There is one class of shoulder replacement no longer used: total resurfacing anatomic. This class is defined in the section on shoulder replacement. Total resurfacing anatomic shoulder replacement was last used in 2020.

Hip Replacement

Partial Resurfacing

Partial resurfacing is a subcategory of partial hip replacement. It involves the use of one or more button prostheses to replace part of the natural articulating surface on one or both sides of the hip joint.

The Registry has recorded 15 partial resurfacing hip procedures and 9 of these have been revised. The last recorded procedure was in 2014 (Table SNU1).

Osteonecrosis was the principal diagnosis (46.7%) (Table SNU2). The majority of procedures were undertaken in males (80.0%) (Table SNU3).

All but one of these prostheses were used to replace part of the femoral articular surface. The remaining procedure was a partial acetabular surface replacement.

The cumulative percent revision is 6.7% at 1 year and 55.0% at 13 years (Table SNU4 and Figure SNU1).

Of the 9 revisions, 4 were for osteonecrosis, 2 were for erosion, 1 was for loosening, 1 for lysis and 1 was for progression of disease (Table SNU5). All were revised to a total hip replacement (Table SNU6).

Table SNU1 Number of Revisions of Primary Partial Resurfacing Hip Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2004	1	1
2005	1	2
2006	1	1
2007	2	5
2008	2	3
2009	2	2
2014	0	1
TOTAL	**9**	**15**

Table SNU2 Primary Partial Resurfacing Hip Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteonecrosis	7	46.7
Osteoarthritis	5	33.3
Osteochondritis Dissecans	1	6.7
Other	2	13.3
TOTAL	**15**	**100.0**

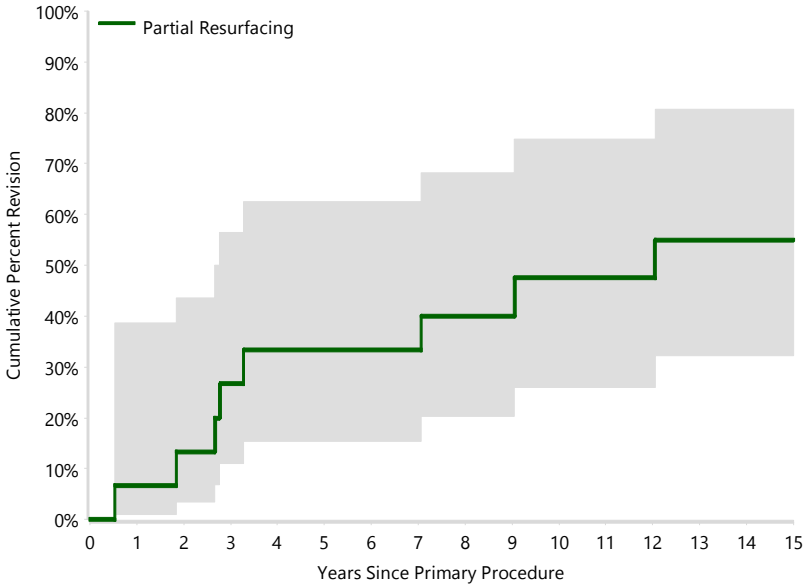
Table SNU3 Age and Gender of Primary Partial Resurfacing Hip Replacement

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	12	80.0%	18	39	27	26.6	6.6
Female	3	20.0%	17	53	23	31.0	19.3
TOTAL	**15**	**100.0%**	**17**	**53**	**25**	**27.5**	**9.5**

Table SNU4 Cumulative Percent Revision of Primary Partial Resurfacing Hip Replacement

Class	N Revised	N Total	1 Yr	2 Yrs	3 Yrs	6 Yrs	9 Yrs	13 Yrs
Partial Resurfacing	9	15	6.7 (1.0, 38.7)	13.3 (3.5, 43.6)	26.7 (10.9, 56.4)	33.3 (15.4, 62.5)	40.0 (20.3, 68.2)	55.0 (32.2, 80.6)
TOTAL	**9**	**15**						

Figure SNU1 Cumulative Percent Revision of Primary Partial Resurfacing Hip Replacement



Number at Risk	0 Yr	1 Yr	2 Yrs	3 Yrs	6 Yrs	9 Yrs	13 Yrs
Partial Resurfacing	15	14	13	11	10	8	6

Table SNU5 Primary Partial Resurfacing Hip Replacement by Reason for Revision

Reason for Revision	Partial Resurfacing	
	N	Col%
Osteonecrosis	4	44.4
Chondrolysis/Acetab. Erosion	2	22.2
Loosening	1	11.1
Lysis	1	11.1
Progression of Disease	1	11.1
TOTAL	**9**	**100.0**

Table SNU6 Primary Partial Resurfacing Hip Replacement by Type of Revision

Type of Revision	Partial Resurfacing	
	N	Col%
THR (Femoral/Acetabular)	9	100.0
TOTAL	**9**	**100.0**

Thrust Plate

Thrust plate is a subcategory of total hip replacement. It involves acetabular replacement combined with resection of the femoral head and replacement with a femoral component that has a lateral fixation plate and femoral head prosthesis.

The Registry has recorded 258 thrust plate hip procedures, 29 of which have been revised. The last recorded procedure was in 2012 (Table SNU7).

Osteoarthritis was the principal diagnosis (94.2%) (Table SNU8). The majority of procedures were undertaken in males (71.3%) (Table SNU9). The cumulative percent revision is 9.9% at 13 years (Table SNU10 and Figure SNU2).

Of the 29 revisions, 37.9% were for loosening (Table SNU11). The most common type of revision was of the femoral component (48.3%) (Table SNU12).

Table SNU7 Number of Revisions of Primary Thrust Plate Hip Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2000	2	15
2001	2	25
2002	4	31
2003	4	20
2004	2	22
2005	2	23
2006	5	14
2007	1	23
2008	2	20
2009	2	26
2010	0	15
2011	3	18
2012	0	6
TOTAL	**29**	**258**

Table SNU8 Primary Thrust Plate Hip Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteoarthritis	243	94.2
Rheumatoid Arthritis	6	2.3
Osteonecrosis	5	1.9
Developmental Dysplasia	3	1.2
Other Inflammatory Arthritis	1	0.4
TOTAL	**258**	**100.0**

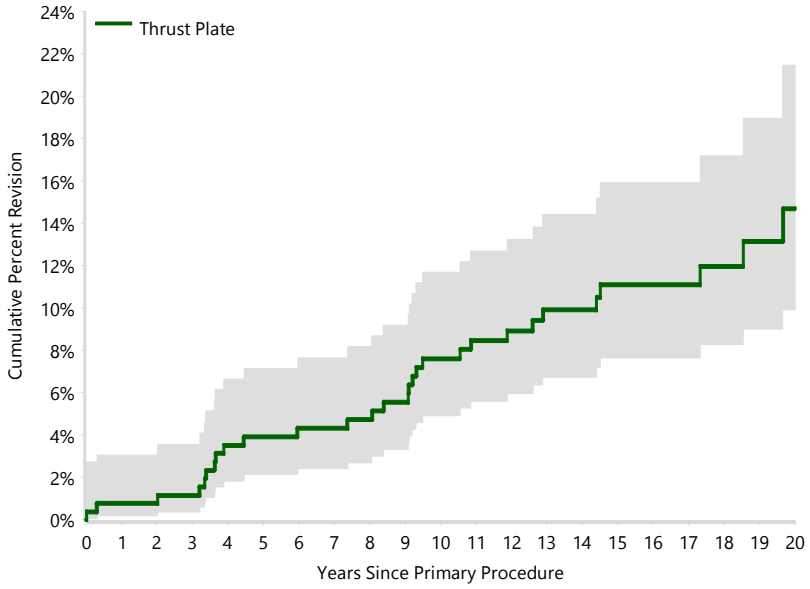
Table SNU9 Age and Gender of Primary Thrust Plate Hip Replacement

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	184	71.3%	33	75	59	58.5	8.7
Female	74	28.7%	27	71	56	54.5	9.9
TOTAL	**258**	**100.0%**	**27**	**75**	**58**	**57.3**	**9.2**

Table SNU10 Cumulative Percent Revision of Primary Thrust Plate Hip Replacement

Class	N Revised	N Total	1 Yr	2 Yrs	3 Yrs	6 Yrs	9 Yrs	13 Yrs
Thrust Plate	29	258	0.8 (0.2, 3.1)	0.8 (0.2, 3.1)	1.2 (0.4, 3.6)	4.3 (2.4, 7.7)	5.5 (3.3, 9.2)	9.9 (6.7, 14.4)
TOTAL	**29**	**258**						

Figure SNU2 Cumulative Percent Revision of Primary Thrust Plate Hip Replacement



Number at Risk	0 Yr	1 Yr	2 Yrs	3 Yrs	6 Yrs	9 Yrs	13 Yrs
Thrust Plate	258	255	255	253	237	228	183

Table SNU11 Primary Thrust Plate Hip Replacement by Reason for Revision

Reason for Revision	Thrust Plate	
	N	Col%
Loosening	11	37.9
Fracture	4	13.8
Pain	4	13.8
Lysis	3	10.3
Metal Related Pathology	2	6.9
Infection	2	6.9
Wear Acetabular Insert	1	3.4
Prosthesis Dislocation/Instability	1	3.4
Malposition	1	3.4
TOTAL	**29**	**100.0**

Table SNU12 Primary Thrust Plate Hip Replacement by Type of Revision

Type of Revision	Thrust Plate	
	N	Col%
Femoral Component	14	48.3
THR (Femoral/Acetabular)	9	31.0
Head/Insert	2	6.9
Acetabular Component	1	3.4
Minor Components	1	3.4
Thrust Plate	1	3.4
Cement Spacer	1	3.4
TOTAL	**29**	**100.0**

Ceramic on Metal Outcomes

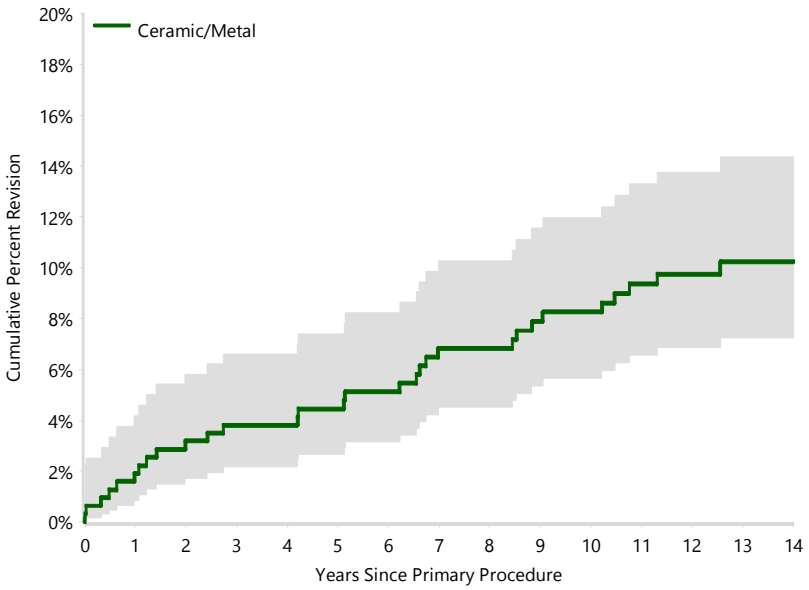
The Registry has information on 316 primary total conventional hip replacement procedures using ceramic head/metal bearings. All have been used with cementless acetabular components and the majority have been used with a head size of 36mm (82.6%).

The cumulative percent revision at 14 years is 10.2% (Table SNU13 and Figure SNU3).

Table SNU13 Cumulative Percent Revision of Ceramic/Metal Primary Total Conventional Hip Replacement (All Diagnoses)

Bearing Surface	N Revised	N Total	1 Yr	2 Yrs	3 Yrs	6 Yrs	10 Yrs	14 Yrs
Ceramic/Metal	31	316	1.9 (0.9, 4.2)	3.2 (1.7, 5.8)	3.8 (2.2, 6.6)	5.1 (3.2, 8.2)	8.2 (5.6, 12.0)	10.2 (7.3, 14.4)
TOTAL	**31**	**316**						

Figure SNU3 Cumulative Percent Revision of Ceramic/Metal Primary Total Conventional Hip Replacement (All Diagnoses)



Number at Risk	0 Yr	1 Yr	2 Yrs	3 Yrs	6 Yrs	10 Yrs	14 Yrs
Ceramic/Metal	316	309	305	301	280	251	56

Table SNU14 Number of Revisions of Ceramic/Metal Primary Total Conventional Hip Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2007	1	16
2008	7	55
2009	12	124
2010	6	84
2011	5	35
2012	0	2
TOTAL	**31**	**316**

Table SNU15 Ceramic/Metal Primary Total Conventional Hip Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteoarthritis	299	94.6
Fractured Neck Of Femur	5	1.6
Osteonecrosis	5	1.6
Other Inflammatory Arthritis	3	0.9
Rheumatoid Arthritis	2	0.6
Developmental Dysplasia	2	0.6
TOTAL	**316**	**100.0**

Table SNU16 Ceramic/Metal Primary Total Conventional Hip Replacement by Revision Diagnosis

Revision Diagnosis	Ceramic/Metal		
	Number	% Primaries Revised	% Revisions
Fracture	7	2.2	22.6
Loosening	7	2.2	22.6
Prosthesis Dislocation/Instability	5	1.6	16.1
Infection	4	1.3	12.9
Pain	3	0.9	9.7
Lysis	2	0.6	6.5
Metal Related Pathology	2	0.6	6.5
Malposition	1	0.3	3.2
N Revision	**31**	**9.8**	**100.0**
N Primary	**316**		

Table SNU17 Ceramic/Metal Primary Total Conventional Hip Replacement by Type of Revision

Type of Revision	Ceramic/Metal		
	Number	% Primaries Revised	% Revisions
Femoral Component	14	4.4	45.2
Acetabular Component	6	1.9	19.4
Head/Insert	5	1.6	16.1
Cement Spacer	2	0.6	6.5
Minor Components	2	0.6	6.5
THR (Femoral/Acetabular)	2	0.6	6.5
N Revision	**31**	**9.8**	**100.0**
N Primary	**316**		

Metal on Ceramic Outcomes

Metal head/ceramic bearings have only been used in a small number of procedures. The Registry has information on 8 primary total conventional hip replacements using metal head/ceramic bearings. None have been revised. All have been used with cementless acetabular components.

Table SNU18 Cumulative Percent Revision of Metal/Ceramic Primary Total Conventional Hip Replacement (Primary Diagnosis OA)

Bearing Surface	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs
Metal/Ceramic	0	8	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
TOTAL	**0**	**8**					

Table SNU19 Number of Revisions of Metal/Ceramic Primary Total Conventional Hip Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2001	0	1
2003	0	1
2006	0	2
2008	0	1
2011	0	1
2014	0	1
2015	0	1
TOTAL	**0**	**8**

Table SNU20 Metal/Ceramic Primary Total Conventional Hip Replacement by Primary Diagnosis

Primary Diagnosis	Total Conventional	
	N	Col%
Osteoarthritis	8	100.0
TOTAL	**8**	**100.0**

Exchangeable Neck Prostheses

A femoral stem with an exchangeable neck has a separate neck that connects proximally to the stem. Femoral stems with exchangeable necks were introduced to enable surgeons to have increased choice with respect to determining femoral neck version, offset and length during primary total conventional hip replacement.

The Registry has recorded 11,514 primary procedures using femoral stems with exchangeable necks (Table SNU21). There were 29 procedures reported in 2022 which comprised 0.1% of all primary total conventional hip procedures (Table SNU22). The proportion of procedures using exchangeable necks continues to decline and peaked in 2010 at 6.2% of all primary total conventional hip procedures.

The cumulative percent revision at 20 years is 15.1% for stems with exchangeable necks compared to 10.1% for fixed neck stems (Table SNU23).
Femoral stems with exchangeable necks have more than 1.7 times the rate of revision compared to fixed neck stems (Figure SNU4). The increase in the rate of revision is due to a higher cumulative incidence of loosening (2.8% compared to 1.9%, at 20 years), prosthesis dislocation/instability (2.2% compared to 1.4%) and fracture (2.5% compared to 1.8%) (Figure SNU5).

Of the reasons for revision of femoral stems with exchangeable necks, 3.3% are for implant breakage of the femoral component compared to 1.1% for fixed neck stems (Table SNU24).

The Registry has information on 13 different exchangeable femoral neck prostheses that have been used in >100 procedures. The outcomes of each of these stems are detailed in Table SNU25.

Table SNU21 Exchangeable Necks Used in Total Conventional Hip Replacement by Primary Diagnosis

	Exchangeable		Fixed	
Primary Diagnosis	N	Col%	N	Col%
Osteoarthritis	10382	90.2	518112	87.9
Fractured Neck Of Femur	396	3.4	30459	5.2
Osteonecrosis	334	2.9	18885	3.2
Developmental Dysplasia	178	1.5	7686	1.3
Rheumatoid Arthritis	83	0.7	4946	0.8
Tumour	17	0.1	3339	0.6
Other Inflammatory Arthritis	78	0.7	2416	0.4
Failed Internal Fixation	35	0.3	2447	0.4
Fracture/Dislocation	4	0.0	792	0.1
Arthrodesis Takedown	6	0.1	128	0.0
Other	1	0.0	121	0.0
TOTAL	**11514**	**100.0**	**589331**	**100.0**

Note: All procedures using metal/metal prostheses have been excluded

Table SNU22 Number of Revisions of Exchangeable Necks in Primary Total Conventional Hip Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2000	10	45
2001	27	177
2002	47	395
2003	61	390
2004	56	409
2005	61	424
2006	60	498
2007	66	524
2008	90	711
2009	100	923
2010	172	1514
2011	125	1572
2012	47	959
2013	39	788
2014	35	633
2015	20	508
2016	17	412
2017	15	301
2018	6	174
2019	2	54
2020	1	40
2021	3	34
2022	2	29
TOTAL	**1062**	**11514**

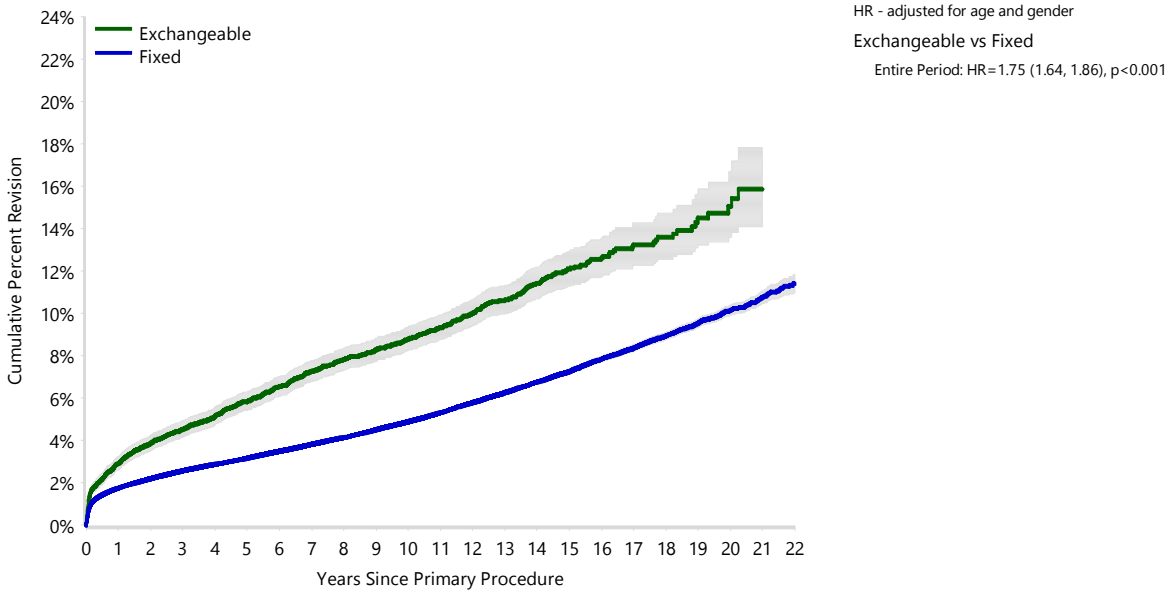
Note: All procedures using metal/metal prostheses have been excluded

Table SNU23 Cumulative Percent Revision of Primary Total Conventional Hip Replacement by Type of Femoral Neck (All Diagnoses)

Femoral Neck	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Exchangeable	1062	11514	2.9 (2.6, 3.2)	4.5 (4.2, 4.9)	5.8 (5.4, 6.3)	8.8 (8.3, 9.4)	12.1 (11.3, 12.9)	15.1 (13.6, 16.7)
Fixed	24127	589331	1.7 (1.7, 1.8)	2.6 (2.5, 2.6)	3.2 (3.1, 3.2)	4.9 (4.8, 5.0)	7.3 (7.1, 7.4)	10.1 (9.9, 10.4)
TOTAL	25189	600845						

Note: All procedures using metal/metal prostheses have been excluded

Figure SNU4 Cumulative Percent Revision of Primary Total Conventional Hip Replacement by Type of Femoral Neck (All Diagnoses)



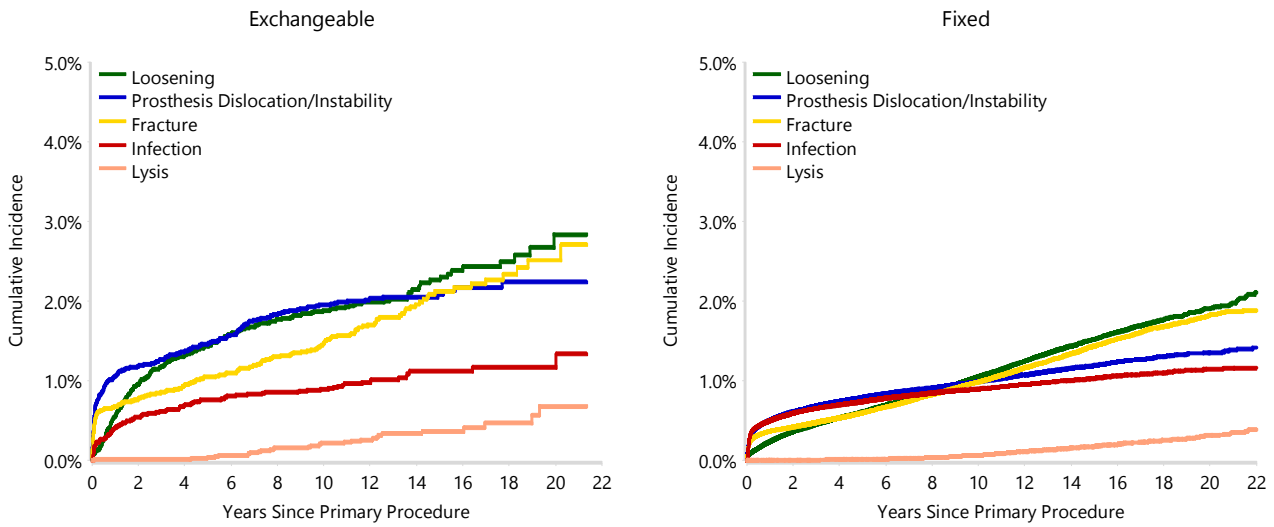
Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Exchangeable	11514	11026	10451	9688	6002	1466	241
Fixed	589331	529521	431916	339434	155268	53741	9307

Table SNU24 Reason for Revision of Primary Total Conventional Hip Replacement by Type of Femoral Neck (All Diagnoses)

Revision Diagnosis	Exchangeable			Fixed		
	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Loosening	236	2.0	22.2	5428	0.9	22.5
Prosthesis Dislocation/Instability	229	2.0	21.6	5324	0.9	22.1
Fracture	202	1.8	19.0	5291	0.9	21.9
Infection	115	1.0	10.8	4821	0.8	20.0
Lysis	34	0.3	3.2	476	0.1	2.0
Pain	27	0.2	2.5	426	0.1	1.8
Leg Length Discrepancy	12	0.1	1.1	352	0.1	1.5
Malposition	15	0.1	1.4	332	0.1	1.4
Implant Breakage Stem	35	0.3	3.3	270	0.0	1.1
Wear Acetabular Insert	3	0.0	0.3	219	0.0	0.9
Implant Breakage Acetabular Insert	16	0.1	1.5	192	0.0	0.8
Implant Breakage Acetabular	19	0.2	1.8	141	0.0	0.6
Incorrect Sizing	6	0.1	0.6	133	0.0	0.6
Metal Related Pathology	96	0.8	9.0	120	0.0	0.5
Wear Head	3	0.0	0.3	88	0.0	0.4
Implant Breakage Head	4	0.0	0.4	57	0.0	0.2
Tumour	1	0.0	0.1	56	0.0	0.2
Heterotopic Bone	2	0.0	0.2	36	0.0	0.1
Wear Acetabulum				19	0.0	0.1
Progression Of Disease				2	0.0	0.0
Synovitis	1	0.0	0.1	2	0.0	0.0
Osteonecrosis				1	0.0	0.0
Other	6	0.1	0.6	341	0.1	1.4
N Revision	**1062**	**9.2**	**100.0**	**24127**	**4.1**	**100.0**
N Primary	**11514**			**589331**		

Note: All procedures using metal/metal prostheses have been excluded

Figure SNU5 Cumulative Incidence Revision Diagnosis of Primary Total Conventional Hip Replacement by Type of Femoral Neck (All Diagnoses)



Note: All procedures using metal/metal prostheses have been excluded

Table SNU25 Cumulative Percent Revision of Primary Total Conventional Hip Replacement Using an Exchangeable Femoral Neck (All Diagnoses)

Femoral Neck	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
ABGII	105	244	4.5 (2.5, 8.0)	11.2 (7.8, 15.9)	20.7 (16.1, 26.4)	37.5 (31.5, 44.3)		
Adapter	71	428	3.3 (2.0, 5.5)	7.2 (5.1, 10.1)	10.0 (7.5, 13.4)	17.0 (13.5, 21.3)	19.9 (16.0, 24.8)	
Apex	225	2977	2.8 (2.3, 3.5)	4.1 (3.4, 4.8)	5.2 (4.4, 6.0)	7.6 (6.6, 8.6)	10.0 (8.6, 11.7)	
F2L	87	735	3.4 (2.3, 5.0)	5.5 (4.1, 7.4)	6.8 (5.2, 8.9)	8.6 (6.8, 10.9)	12.1 (9.8, 14.9)	14.3 (11.6, 17.5)
Femoral Neck (Amplitude)	31	607	0.8 (0.3, 2.0)	2.0 (1.1, 3.5)	3.4 (2.2, 5.2)	4.3 (2.9, 6.3)		
M-Cor	16	124	0.0 (0.0, 0.0)	2.5 (0.8, 7.5)	4.2 (1.8, 9.7)	9.8 (5.5, 17.0)		
M/L Taper Kinectiv	165	3234	2.3 (1.9, 2.9)	3.2 (2.7, 3.9)	3.8 (3.2, 4.5)	5.4 (4.6, 6.3)		
MBA	85	719	2.4 (1.5, 3.8)	4.1 (2.9, 5.9)	6.3 (4.7, 8.4)	10.6 (8.4, 13.3)	14.4 (11.5, 18.0)	
MSA	25	185	7.1 (4.2, 11.8)	9.3 (5.9, 14.5)	10.4 (6.8, 15.8)	14.1 (9.8, 20.2)		
Margron	117	670	5.6 (4.1, 7.6)	8.3 (6.5, 10.7)	10.2 (8.1, 12.8)	15.4 (12.8, 18.4)	18.0 (15.2, 21.3)	19.7 (16.6, 23.4)
Modula	11	125	5.8 (2.8, 11.8)	10.1 (5.4, 18.6)	10.1 (5.4, 18.6)			
Profemur	78	971	3.1 (2.2, 4.4)	4.8 (3.6, 6.4)	5.6 (4.3, 7.3)	7.7 (6.1, 9.6)	9.6 (7.4, 12.5)	
R120	10	217	0.9 (0.2, 3.6)	1.9 (0.7, 5.0)	1.9 (0.7, 5.0)	5.9 (3.0, 11.3)		
Other (6)	36	278	5.0 (3.0, 8.4)	6.5 (4.1, 10.1)	8.0 (5.4, 11.9)	11.4 (8.1, 15.9)		
TOTAL	**1062**	**11514**						

Note: All procedures using metal/metal prostheses have been excluded
Only prostheses with >100 procedures have been listed

Knee Replacement

Partial Resurfacing

Partial resurfacing is a subcategory of partial knee replacement. It involves the use of one or more button prostheses to replace part of the natural articulating surface on one or more sides of the joint, in one or more articular compartments of the knee.

The Registry has recorded 246 partial resurfacing knee procedures and 112 of these have been revised (Table SNU26). One procedure was recorded in 2022.

Osteoarthritis was the principal diagnosis (91.5%) (Table SNU27). The majority of procedures were undertaken in males (50.8%) (Table SNU28).

The cumulative percent revision is 6.1% at 1 year and 38.8% at 10 years (Table SNU29 and Figure SNU6).

The most common reason for revision is progression of disease (68.8%), followed by loosening (8.9%) and pain (6.3%) (Table SNU30). Most (66.1%) were revised to a total knee replacement (Table SNU31).

Table SNU26 Number of Revisions of Primary Partial Resurfacing Knee Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2004	1	1
2005	9	15
2006	25	42
2007	15	35
2008	17	31
2009	15	25
2010	2	9
2011	5	8
2012	4	11
2013	8	25
2014	7	21
2015	2	10
2016	0	5
2017	1	4
2018	1	3
2022	0	1
TOTAL	**112**	**246**

Table SNU27 Primary Partial Resurfacing Knee Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteoarthritis	225	91.5
Osteonecrosis	11	4.5
Osteochondritis Dissecans	4	1.6
Other Inflammatory Arthritis	2	0.8
Chondrocalcinosis	1	0.4
Other	3	1.2
TOTAL	**246**	**100.0**

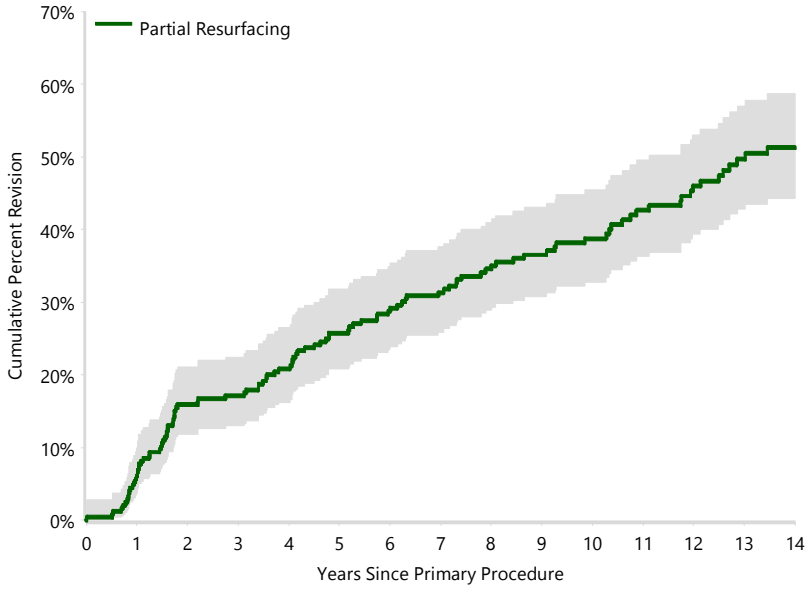
Table SNU28 Age and Gender of Primary Partial Resurfacing Knee Replacement

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	125	50.8%	17	85	49	48.9	14.4
Female	121	49.2%	30	88	51	51.3	11.7
TOTAL	**246**	**100.0%**	**17**	**88**	**50**	**50.1**	**13.2**

Table SNU29 Cumulative Percent Revision of Primary Partial Resurfacing Knee Replacement

	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Partial Resurfacing	112	246	6.1 (3.7, 9.9)	17.1 (13.0, 22.5)	25.8 (20.8, 31.8)	38.8 (32.8, 45.4)		
TOTAL	**112**	**246**						

Figure SNU6 Cumulative Percent Revision of Primary Partial Resurfacing Knee Replacement



Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Partial Resurfacing	246	230	202	178	102	39	0

Table SNU30 Primary Partial Resurfacing Knee Replacement by Reason for Revision

Reason for Revision	Partial Resurfacing	
	N	Col%
Progression Of Disease	77	68.8
Loosening	10	8.9
Pain	7	6.3
Patella Maltracking	3	2.7
Infection	2	1.8
Malalignment	2	1.8
Incorrect Sizing	1	0.9
Implant Breakage Patella	1	0.9
Metal Related Pathology	1	0.9
Wear Tibial	1	0.9
Osteonecrosis	1	0.9
Patellofemoral Pain	1	0.9
Wear Patella	1	0.9
Prosthesis Dislocation	1	0.9
Patella Erosion	1	0.9
Other	2	1.8
TOTAL	**112**	**100.0**

Table SNU31 Primary Partial Resurfacing Knee Replacement by Type of Revision

Type of Revision	Partial Resurfacing	
	N	Col%
TKR (Tibial/Femoral)	74	66.1
UKR (Uni Tibial/Uni Femoral)	21	18.8
Patella Only	5	4.5
Patella/Trochlear Resurfacing	4	3.6
Partial Resurfacing	4	3.6
Removal of Prostheses	3	2.7
Cement Spacer	1	0.9
TOTAL	**112**	**100.0**

Unispacer

Unispacer knee replacement involves the use of a medial or lateral femorotibial compartment articular spacer.

There have been 40 unispacer procedures reported to the Registry. The last recorded procedure was in 2005 (Table SNU32).

Osteoarthritis was the sole diagnosis reported for all unispacer procedures (Table SNU33). The mean age of patients was 54.7 years, with the majority of patients being male (52.5%) (Table SNU34).

Two types of unispacer prostheses have been used: UniSpacer (Zimmer) (n=31) and InterCushion (Advance Biosurfaces Inc) (n=9). All InterCushion prostheses were revised within 1.5 years. The 14 year cumulative percent revision of the Zimmer UniSpacer prosthesis is 74.2% (Table SNU35 and Figure SNU7).

The main reason for revision was progression of disease (25.0%), followed by pain and loosening (Table SNU36).

Most unispacer procedures were revised to a unicompartmental knee replacement (55.6%) or a total knee replacement (33.3%). The remainder of the revisions involved a further unispacer replacement (Table SNU37).

Table SNU32 Number of Revisions of Primary Unispacer Knee Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2003	11	13
2004	24	26
2005	1	1
TOTAL	**36**	**40**

Table SNU33 Primary Unispacer Knee Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteoarthritis	40	100.0
TOTAL	**40**	**100.0**

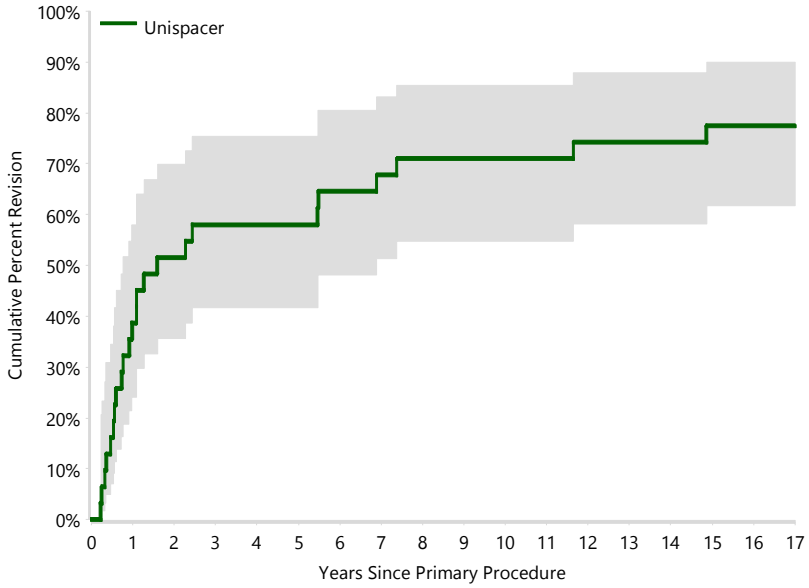
Table SNU34 Age and Gender of Primary Unispacer Knee Replacement

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	21	52.5%	41	75	55	55.2	9.2
Female	19	47.5%	40	69	56	54.1	8.4
TOTAL	**40**	**100.0%**	**40**	**75**	**55**	**54.7**	**8.7**

Table SNU35 Cumulative Percent Revision of Primary Unispacer Knee Replacement by Prosthesis Type

	N Revised	N Total	1 Yr	2 Yrs	6 Yrs	11 Yrs	14 Yrs	17 Yrs
InterCushion	9	9	55.6 (28.1, 86.4)					
Unispacer	27	31	38.7 (24.2, 58.0)	51.6 (35.6, 69.8)	64.5 (48.1, 80.6)	71.0 (54.7, 85.5)	74.2 (58.2, 87.8)	77.4 (61.7, 90.0)
TOTAL	**36**	**40**						

Figure SNU7 Cumulative Percent Revision of Primary Unispacer Knee Replacement



Number at Risk	0 Yr	1 Yr	2 Yrs	6 Yrs	11 Yrs	14 Yrs	17 Yrs
Unispacer	31	19	15	11	9	8	6

Table SNU36 Primary Unispacer Knee Replacement by Reason for Revision

Reason for Revision	Unispacer	
	N	Col%
Progression Of Disease	9	25.0
Pain	7	19.4
Loosening	6	16.7
Synovitis	4	11.1
Implant Breakage Tibial	3	8.3
Prosthesis Dislocation	2	5.6
Osteonecrosis	1	2.8
Incorrect Sizing	1	2.8
Infection	1	2.8
Malalignment	1	2.8
Wear Tibial	1	2.8
TOTAL	**36**	**100.0**

Table SNU37 Primary Unispacer Knee Replacement by Type of Revision

Type of Revision	Unispacer	
	N	Col%
UKR (Uni Tibial/Uni Femoral)	20	55.6
TKR (Tibial/Femoral)	12	33.3
Unispacer	4	11.1
TOTAL	**36**	**100.0**

Bicompartmental

Bicompartmental knee replacement involves the replacement of the medial femoral and trochlear articular surfaces of the knee with a single femoral prosthesis, as well as the medial tibial articular surface with a unicompartmental tibial prosthesis. It may also include the use of a patellar prosthesis.

The Registry has recorded 165 bicompartmental procedures. There have been no further procedures recorded since July 2012 (Table SNU38).

The principal diagnosis for bicompartmental knee replacement was osteoarthritis (97.0%) (Table SNU39). It was used more frequently in females (60.6%) and the mean age of patients was 64.3 years (Table SNU40).

The bicompartmental knee replacement is a single company product. One femoral component, the Journey Deuce, has been combined with two main tibial components, the Journey Uni All Poly (32.1%) and the Journey Uni (v1) (65.5%). The majority of primary bicompartmental procedures included resurfacing the patella (84.2%).

The cumulative percent revision of bicompartmental knee replacement is 6.1% at 1 year and 19.1% at 13 years (Table SNU41 and Figure SNU8).

The main reasons for revision were patellofemoral pain and loosening (18.8% and 15.6%, respectively) (Table SNU42). Of the 32 revisions, 17 were revised to a total knee replacement and 10 involved the addition of a patellar prosthesis (one was combined with a unicompartmental tibial insert) (Table SNU43).

Table SNU38 Number of Revisions of Primary Bicompartmental Knee Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2006	2	4
2007	11	38
2008	5	50
2009	6	35
2010	4	24
2011	3	10
2012	1	4
TOTAL	**32**	**165**

Table SNU39 Primary Bicompartmental Knee Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteoarthritis	160	97.0
Osteonecrosis	3	1.8
Other Inflammatory Arthritis	1	0.6
Rheumatoid Arthritis	1	0.6
TOTAL	**165**	**100.0**

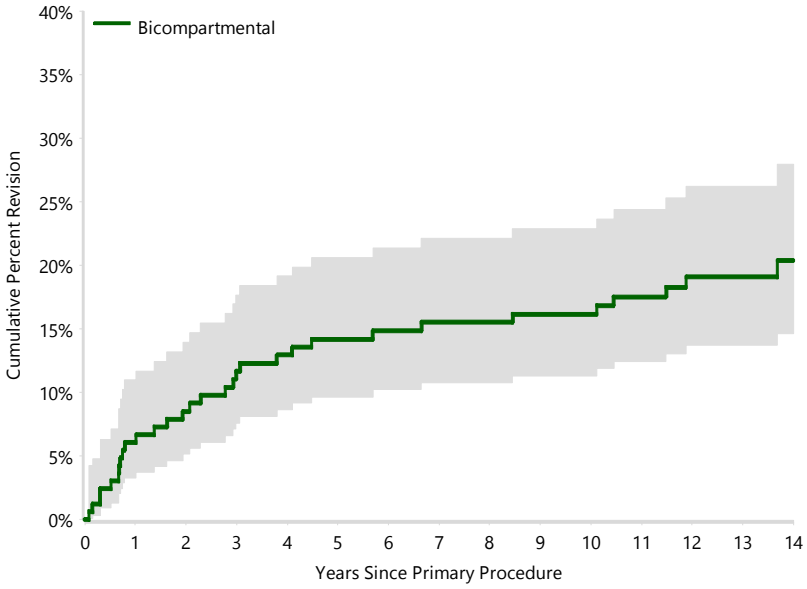
Table SNU40 Age and Gender of Primary Bicompartmental Knee Replacement

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	65	39.4%	45	86	62	65.1	9.9
Female	100	60.6%	46	84	61	63.8	10.6
TOTAL	**165**	**100.0%**	**45**	**86**	**62**	**64.3**	**10.3**

Table SNU41 Cumulative Percent Revision of Primary Bicompartmental Knee Replacement by Prosthesis Combination

Femoral	Tibial	N Revised	N Total	1 Yr	2 Yrs	3 Yrs	6 Yrs	10 Yrs	13 Yrs
Journey Deuce	Generic Uni Knee Tibial	1	1						
	Journey Uni (v1)	18	108	7.4 (3.8, 14.3)	9.3 (5.1, 16.6)	10.3 (5.8, 17.8)	12.2 (7.3, 20.2)	12.2 (7.3, 20.2)	15.5 (9.8, 24.1)
	Journey Uni (v2)	1	3	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	33.3 (5.5, 94.6)	33.3 (5.5, 94.6)	
	Journey Uni All Poly	12	53	3.8 (1.0, 14.3)	7.5 (2.9, 18.9)	13.3 (6.6, 25.9)	17.2 (9.3, 30.4)	21.1 (12.3, 34.9)	23.8 (14.2, 38.2)
TOTAL		**32**	**165**						

Figure SNU8 Cumulative Percent Revision of Primary Bicompartmental Knee Replacement



Number at Risk	0 Yr	1 Yr	2 Yrs	3 Yrs	6 Yrs	10 Yrs	13 Yrs
Bicompartmental	165	155	147	140	131	124	80

Table SNU42 Primary Bicompartmental Knee Replacement by Reason for Revision

Reason for Revision	Bicompartmental	
	N	Col%
Patellofemoral Pain	6	18.8
Loosening	5	15.6
Pain	5	15.6
Infection	4	12.5
Progression Of Disease	4	12.5
Patella Erosion	2	6.3
Fracture	2	6.3
Implant Breakage Patella	1	3.1
Patella Maltracking	1	3.1
Osteonecrosis	1	3.1
Wear Tibial Insert	1	3.1
TOTAL	**32**	**100.0**

Table SNU43 Primary Bicompartmental Knee Replacement by Type of Revision

Type of Revision	Bicompartmental	
	N	Col%
TKR (Tibial/Femoral)	17	53.1
Patella Only	10	31.3
Cement Spacer	2	6.3
Uni Insert Only	1	3.1
Uni Tibial Component	1	3.1
Uni Insert/Patella	1	3.1
TOTAL	**32**	**100.0**

Shoulder Replacement

Total Resurfacing Anatomic

Total resurfacing anatomic is a subcategory of primary total shoulder replacement. It involves glenoid replacement and the use of a humeral prosthesis that replaces the humeral articular surface without resecting the head.

There are 235 total resurfacing anatomic shoulder replacements. There have been no further procedures since 2020 (Table SNU44).

The majority of procedures were undertaken in males and the mean age for males is younger than for females (Table SNU46).

Osteoarthritis was the most common primary diagnosis (Table SNU45).

The most common reason for revision is loosening (Table SNU48). The most common type of revision is to a total shoulder replacement (Table SNU49).

Table SNU44 Number of Revisions of Primary Total Resurfacing Anatomic Shoulder Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2005	1	1
2006	2	4
2007	2	8
2008	2	12
2009	1	11
2010	5	14
2011	4	34
2012	1	37
2013	3	36
2014	2	24
2015	1	19
2016	0	11
2017	0	10
2018	0	9
2019	1	4
2020	0	1
TOTAL	**25**	**235**

Table SNU45 Primary Total Resurfacing Anatomic Shoulder Replacement by Primary Diagnosis

Primary Diagnosis	Number	Percent
Osteoarthritis	226	96.2
Rheumatoid Arthritis	3	1.3
Fracture	2	0.9
Other Inflammatory Arthritis	1	0.4
Instability	1	0.4
Rotator Cuff Arthropathy	1	0.4
Osteonecrosis	1	0.4
TOTAL	**235**	**100.0**

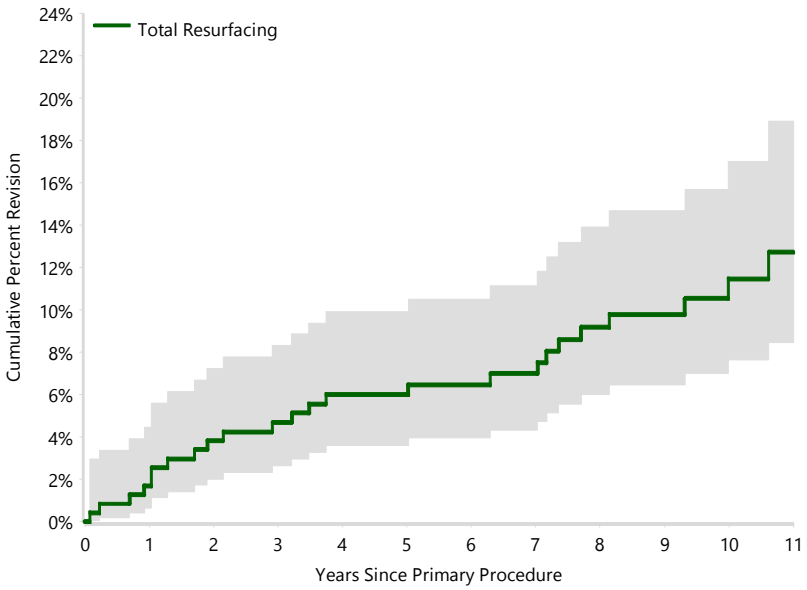
Table SNU46 Age and Gender of Primary Total Resurfacing Anatomic Shoulder Replacement

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	140	59.6%	35	83	63	62.2	9.8
Female	95	40.4%	46	86	67	67.0	6.7
TOTAL	**235**	**100.0%**	**35**	**86**	**65**	**64.1**	**9.0**

Table SNU47 Cumulative Percent Revision of Primary Total Resurfacing Anatomic Shoulder Replacement

Class	N Revised	N Total	1 Yr	2 Yrs	3 Yrs	6 Yrs	10 Yrs	14 Yrs
Total Resurfacing Anatomic	25	235	1.7 (0.6, 4.5)	3.8 (2.0, 7.2)	4.7 (2.6, 8.3)	6.5 (4.0, 10.5)	11.5 (7.7, 17.0)	
TOTAL	**25**	**235**						

Figure SNU9 Cumulative Percent Revision of Primary Total Resurfacing Anatomic Shoulder Replacement



Number at Risk	0 Yr	1 Yr	2 Yrs	3 Yrs	6 Yrs	10 Yrs	14 Yrs
Total Resurfacing Anatomic	235	231	226	220	187	93	14

Table SNU48 Primary Total Resurfacing Anatomic Shoulder Replacement by Reason for Revision

Reason for Revision	N	Col%
Loosening	11	44.0
Instability/Dislocation	3	12.0
Implant Breakage Glenoid Insert	3	12.0
Rotator Cuff Insufficiency	3	12.0
Infection	2	8.0
Wear Glenoid Insert	1	4.0
Fracture	1	4.0
Implant Breakage Glenoid	1	4.0
TOTAL	**25**	**100.0**

Table SNU49 Primary Total Resurfacing Anatomic Shoulder Replacement by Type of Revision

Type of Revision	N	Col%
Humeral/Glenoid	13	52.0
Humeral Component	7	28.0
Insert Only	2	8.0
Cement Spacer	1	4.0
Head Only	1	4.0
Reoperation	1	4.0
TOTAL	**25**	**100.0**

Note: Humeral heads are replaced when the humeral component is revised

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