



Australian
Orthopaedic
Association
National
Joint
Replacement
Registry

Automated Industry Report 5899

Depuy Synthes Australia

Attune PS Total Knee

Report Generated: 8 February 2022

Data Period: 1 September 1999 - 4 February 2022

This report has been prepared by the Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR). The report provides information on the usage and outcomes of the Attune PS femoral compared to all other total knee replacements, based on data collected by the AOANJRR.

Disclaimer

The AOANJRR has taken every care to ensure that the data supplied are accurate but does not warrant that the data are error free and does not accept any liability for errors or omissions in the data.

**AOANJRR Automated Industry Report 5899 - Depuy Synthes Australia
Attune PS Total Knee**

Data Period: 1 September 1999 - 4 February 2022

Report Generated: 8 February 2022

Catalogue Numbers of Attune PS Femoral Components included in this analysis

Model	Catalogue Range	Range Description	No. of Primary Procedures
Attune PS	150410101 - 150410210	PS Femoral Component	8239
Attune PS	150410123 - 150410226	PS Narrow Femoral Component	2639

The AOANJRR also reports these catalogue numbers as Attune PS Femoral Components. These are not included in the analysis.

Model	Catalogue Range	Range Description
Attune PS	150411102 - 150411210	PS Femoral Component Porocoat
Attune PS	150411123 - 150411226	PS Narrow Femoral Component Porocoat

Table 1: Revision Rates of Attune PS Primary Total Knee Replacement by Femoral Catalogue Number Range (All Diagnoses)

Femoral Range	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
150410101 - 150410210	162	8239	27179	0.60 (0.51, 0.70)
150410123 - 150410226	41	2639	8519	0.48 (0.35, 0.65)
TOTAL	203	10878	35698	0.57 (0.49, 0.65)

Table 2: Implant Usage of Attune PS in Primary Total Knee Replacement (All Diagnoses)

	N
Implant Usage	
Date First Used	13 March 2013
Date Last Used	10 January 2022
N Procedures	10878
N Patients	9210
N Hospitals Implanting	139
N Surgeons Implanting*	203
Outcome	
N Revised	203
N Deceased**	351

*349 Attune PS procedures have unknown surgeon

**N Deceased' does not include patient deaths that occurred after the Attune PS implant was revised

Table 3: Follow Up Years of Attune PS in Primary Total Knee Replacement (All Diagnoses)

Model	N	Minimum	Maximum	Median	Mean	Std Dev
Attune PS	10878	0.02	8.87	2.92	3.28	2.16
TOTAL	10878	0.02	8.87	2.92	3.28	2.16

Table 4: Age and Gender of Attune PS Primary Total Knee Replacement (All Diagnoses)

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	4588	42.2%	31	95	68	68.2	9.0
Female	6290	57.8%	33	97	70	69.0	9.2
TOTAL	10878	100.0%	31	97	69	68.7	9.1

Table 5: Primary Total Knee Replacement by Model and Age (All Diagnoses)

Age	Attune PS		Other Total Knee	
	N	Col%	N	Col%
<55	707	6.5	54992	6.7
55-64	2724	25.0	215521	26.4
65-74	4475	41.1	323526	39.7
≥75	2972	27.3	220852	27.1
TOTAL	10878	100.0	814891	100.0

Table 6: Primary Total Knee Replacement by Model and Gender (All Diagnoses)

Gender	Attune PS		Other Total Knee	
	N	Col%	N	Col%
Male	4588	42.2	358182	44.0
Female	6290	57.8	456709	56.0
TOTAL	10878	100.0	814891	100.0

Table 7: Primary Total Knee Replacement by Model and ASA Grade (All Diagnoses)

ASA Grade	Attune PS		Other Total Knee	
	N	Col%	N	Col%
1	560	5.2	25574	5.7
2	5894	54.6	243588	54.5
3	4258	39.4	173046	38.7
4	89	0.8	4842	1.1
5	.	.	14	0.0
TOTAL	10801	100.0	447064	100.0

Note: The AOANJRR commenced collection of ASA data in 2013. 77 Attune PS procedures with no ASA Grade recorded are excluded from this table

Table 8: Primary Total Knee Replacement by Model and BMI (All Diagnoses)

BMI	Attune PS		Other Total Knee	
	N	Col%	N	Col%
Underweight (<18.50)	27	0.3	718	0.2
Normal (18.50-24.99)	1097	11.8	37034	10.5
Pre Obese (25.00-29.99)	2974	32.1	110235	31.1
Obese Class 1 (30.00-34.99)	2728	29.4	109277	30.9
Obese Class 2 (35.00-39.99)	1494	16.1	60058	17.0
Obese Class 3 (\geq 40.00)	949	10.2	36624	10.3
TOTAL	9269	100.0	353946	100.0

Note: The AOANJRR commenced collection of BMI data in 2015. 1609 Attune PS procedures with no BMI recorded are excluded from this table

Table 9: Primary Total Knee Replacement by Model and Primary Diagnosis

Primary Diagnosis	Attune PS		Other Total Knee	
	N	Col%	N	Col%
Osteoarthritis	10709	98.4	796631	97.8
Rheumatoid Arthritis	95	0.9	9723	1.2
Other Inflammatory Arthritis	33	0.3	4128	0.5
Osteonecrosis	22	0.2	2484	0.3
Tumour	1	0.0	991	0.1
Fracture	16	0.1	665	0.1
Chondrocalcinosis	.	.	18	0.0
Osteochondritis Dissecans	.	.	3	0.0
Other	2	0.0	248	0.0
TOTAL	10878	100.0	814891	100.0

Table 10: Revision Rates of Primary Total Knee Replacement by Model (All Diagnoses)

Model	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Attune PS	203	10878	35698	0.57 (0.49, 0.65)
Other Total Knee	33329	814891	5915125	0.56 (0.56, 0.57)
TOTAL	33532	825769	5950823	0.56 (0.56, 0.57)

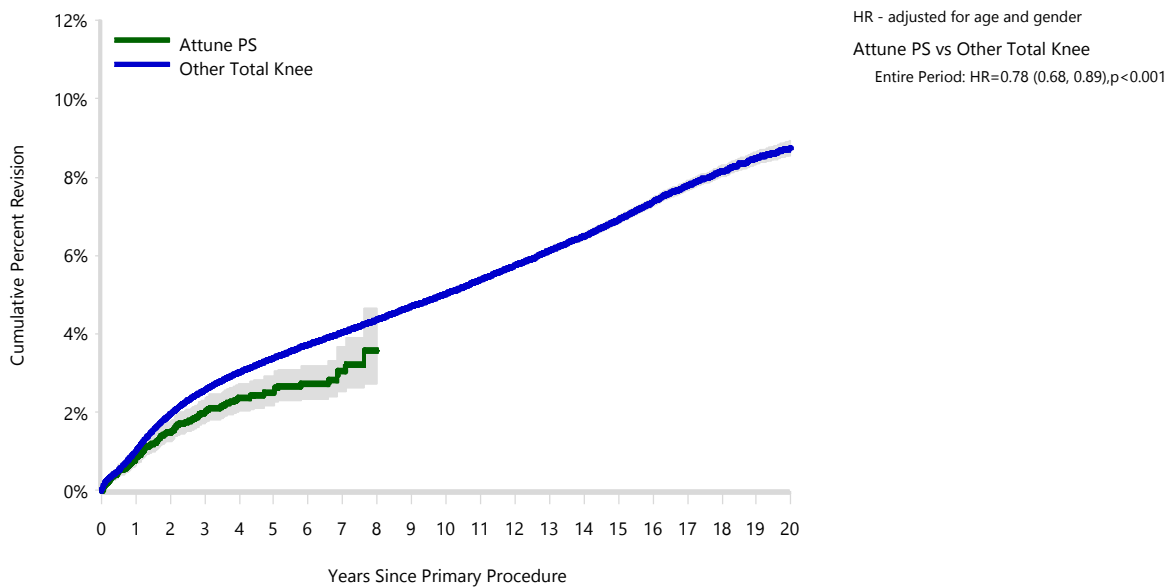
Table 11: Yearly Cumulative Percent Revision of Primary Total Knee Replacement by Model (All Diagnoses)

CPR	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs
Attune PS	0.8 (0.7, 1.0)	1.5 (1.3, 1.8)	2.0 (1.7, 2.3)	2.4 (2.0, 2.7)	2.5 (2.2, 2.9)	2.7 (2.3, 3.2)
Other Total Knee	1.0 (1.0, 1.0)	2.0 (1.9, 2.0)	2.6 (2.5, 2.6)	3.0 (3.0, 3.1)	3.4 (3.3, 3.4)	3.7 (3.7, 3.8)

CPR	7 Yrs	8 Yrs	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs
Attune PS	3.1 (2.5, 3.7)	3.6 (2.7, 4.6)					
Other Total Knee	4.0 (4.0, 4.1)	4.4 (4.3, 4.4)	4.7 (4.6, 4.8)	5.0 (5.0, 5.1)	5.4 (5.3, 5.4)	5.8 (5.7, 5.8)	6.1 (6.1, 6.2)

CPR	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs	19 Yrs	20 Yrs
Attune PS							
Other Total Knee	6.5 (6.4, 6.6)	6.9 (6.8, 7.0)	7.4 (7.3, 7.5)	7.8 (7.7, 7.9)	8.2 (8.0, 8.3)	8.5 (8.3, 8.7)	8.7 (8.5, 8.9)

Figure 1: Cumulative Percent Revision of Primary Total Knee Replacement by Model (All Diagnoses)



Number at Risk	0 Yr	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs	7 Yrs	8 Yrs	9 Yrs
Attune PS	10878	8939	7120	5273	3877	2562	1539	686	152	0
Other Total Knee	814891	752659	686903	620500	555590	493178	433305	376162	323267	274209

Number at Risk	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs	19 Yrs	20 Yrs
Attune PS	0	0	0	0	0	0	0	0	0	0	0
Other Total Knee	229282	187931	151473	120316	93076	70191	51255	35391	22816	13023	5588

TABLE 12

Reasons for Revision

This is reported in two ways: a percentage of primaries 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 primaries. 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 12: Revision Diagnosis of Primary Total Knee Replacement by Model (All Diagnoses) (Follow-up Limited to 8.9 Years)

Revision Diagnosis	Number	Attune PS		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	82	0.8	40.4	7476	0.9	25.9
Loosening	47	0.4	23.2	6717	0.8	23.3
Instability	24	0.2	11.8	2617	0.3	9.1
Patellofemoral Pain	3	0.0	1.5	2552	0.3	8.8
Pain	9	0.1	4.4	2386	0.3	8.3
Patella Erosion	2	0.0	1.0	1676	0.2	5.8
Arthrofibrosis	14	0.1	6.9	1147	0.1	4.0
Fracture	12	0.1	5.9	877	0.1	3.0
Malalignment	4	0.0	2.0	664	0.1	2.3
Lysis				370	0.0	1.3
Metal Related Pathology				336	0.0	1.2
Incorrect Sizing				318	0.0	1.1
Wear Tibial Insert	1	0.0	0.5	287	0.0	1.0
Patella Maltracking	1	0.0	0.5	227	0.0	0.8
Bearing Dislocation				184	0.0	0.6
Implant Breakage Tibial Insert				139	0.0	0.5
Implant Breakage Patella				138	0.0	0.5
Synovitis	1	0.0	0.5	96	0.0	0.3
Prosthesis Dislocation				89	0.0	0.3
Osteonecrosis	1	0.0	0.5	63	0.0	0.2
Implant Breakage Tibial				51	0.0	0.2
Implant Breakage Femoral				41	0.0	0.1
Tumour	1	0.0	0.5	31	0.0	0.1
Wear Patella				28	0.0	0.1
Heterotopic Bone				14	0.0	0.0
Wear Tibial				8	0.0	0.0
Progression Of Disease				4	0.0	0.0
Wear Femoral				4	0.0	0.0
Incorrect Side				2	0.0	0.0
Osteoarthritis				1	0.0	0.0
Patella Dislocation				1	0.0	0.0
Post Operative Haematoma				1	0.0	0.0
Other	1	0.0	0.5	330	0.0	1.1
N Revision	203	1.9	100.0	28875	3.5	100.0
N Primary	10878			814891		

Note: This table is restricted to revisions within 8.9 years for all groups to allow a time-matched comparison of revisions.

Table 13: Yearly Cumulative Incidence Revision Diagnosis of Primary Total Knee Replacement by Model (All Diagnoses)

Model	Event	N Events	1 Yr	2 Yrs	3 Yrs	5 Yrs	10 Yrs	15 Yrs
Attune PS	Infection	82	0.4 (0.3, 0.6)	0.7 (0.5, 0.9)	0.8 (0.6, 1.0)	0.9 (0.7, 1.1)		
	Loosening	47	0.1 (0.1, 0.2)	0.3 (0.2, 0.4)	0.4 (0.3, 0.6)	0.6 (0.5, 0.9)		
	Instability	24	0.1 (0.1, 0.2)	0.2 (0.2, 0.4)	0.3 (0.2, 0.4)	0.3 (0.2, 0.4)		
	Patellofemoral Pain	3	0.0 (0.0, 0.1)	0.0 (0.0, 0.1)	0.0 (0.0, 0.1)	0.0 (0.0, 0.1)		
	Pain	9	0.0 (0.0, 0.1)	0.0 (0.0, 0.1)	0.1 (0.1, 0.2)	0.1 (0.1, 0.3)		
	Other	38	0.1 (0.1, 0.2)	0.2 (0.2, 0.4)	0.3 (0.2, 0.5)	0.5 (0.3, 0.7)		
	Deceased	351	0.5 (0.4, 0.6)	1.4 (1.2, 1.7)	2.4 (2.1, 2.8)	4.9 (4.3, 5.5)		
	All Revision	203	0.8 (0.7, 1.0)	1.5 (1.2, 1.7)	2.0 (1.7, 2.3)	2.5 (2.1, 2.9)		
Other Total Knee	Infection	8061	0.4 (0.4, 0.5)	0.6 (0.6, 0.6)	0.7 (0.7, 0.8)	0.9 (0.9, 0.9)	1.1 (1.1, 1.1)	1.3 (1.3, 1.3)
	Loosening	8037	0.2 (0.1, 0.2)	0.4 (0.4, 0.4)	0.5 (0.5, 0.6)	0.8 (0.7, 0.8)	1.2 (1.1, 1.2)	1.6 (1.5, 1.6)
	Instability	2946	0.1 (0.1, 0.1)	0.2 (0.2, 0.2)	0.2 (0.2, 0.2)	0.3 (0.3, 0.3)	0.4 (0.4, 0.4)	0.5 (0.5, 0.5)
	Patellofemoral Pain	2741	0.1 (0.1, 0.1)	0.2 (0.2, 0.2)	0.2 (0.2, 0.2)	0.3 (0.3, 0.3)	0.4 (0.4, 0.4)	0.5 (0.4, 0.5)
	Pain	2640	0.0 (0.0, 0.0)	0.1 (0.1, 0.2)	0.2 (0.2, 0.2)	0.3 (0.3, 0.3)	0.4 (0.4, 0.4)	0.5 (0.4, 0.5)
	Other	8904	0.2 (0.2, 0.2)	0.5 (0.4, 0.5)	0.6 (0.6, 0.6)	0.8 (0.8, 0.8)	1.2 (1.2, 1.3)	1.8 (1.7, 1.8)
	Deceased	14527 4	0.7 (0.7, 0.7)	1.7 (1.7, 1.7)	3.0 (2.9, 3.0)	6.3 (6.3, 6.4)	19.7 (19.6, 19.8)	37.7 (37.5, 37.9)
	All Revision	33329	1.0 (1.0, 1.0)	1.9 (1.9, 2.0)	2.5 (2.5, 2.6)	3.3 (3.3, 3.4)	4.7 (4.7, 4.8)	6.1 (6.0, 6.1)

Figure 2: Cumulative Incidence Revision Diagnosis of Primary Total Knee Replacement by Model (All Diagnoses)

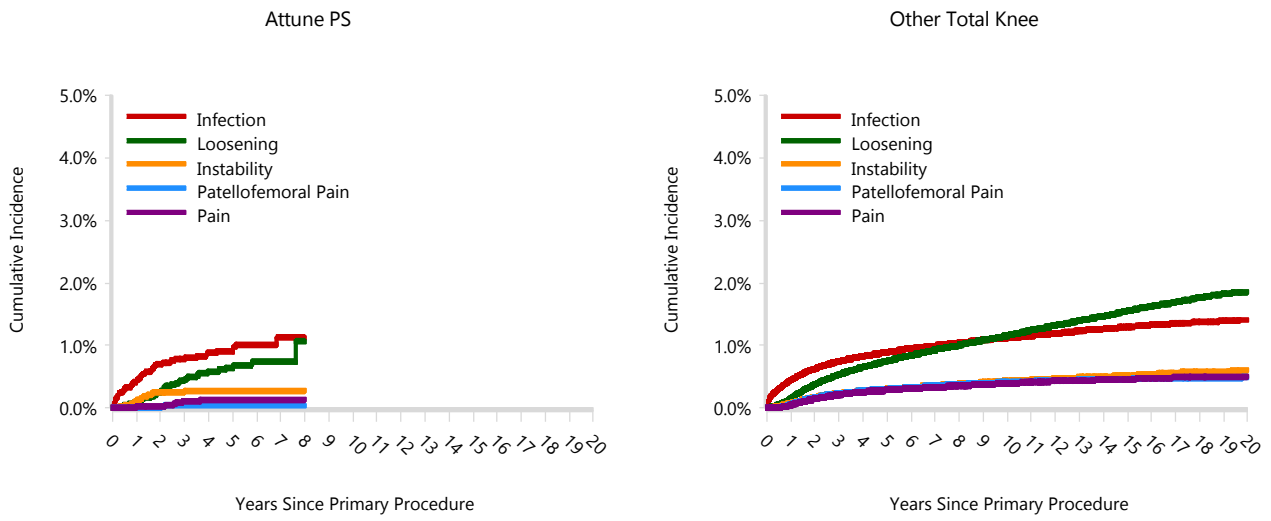


TABLE 14

Type of 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 type of revision as a percentage of the total number of primary procedures. This percentage can be used to approximate the risk of having that type of revision. Differing percentages between groups, with the same distribution of follow up time, may identify problems of concern.

% Revisions: The number of revisions for each type of revision is expressed as a percentage of the total number of revisions. This shows the distribution of types of revision within a group but cannot be used as a comparison between groups.

Table 14: Type of Revision of Primary Total Knee Replacement by Model (All Diagnoses) (Follow-up Limited to 8.9 Years)

Type of Revision	Number	Attune PS		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Insert Only	93	0.9	45.8	7454	0.9	25.8
TKR (Tibial/Femoral)	54	0.5	26.6	7074	0.9	24.5
Patella Only	10	0.1	4.9	5683	0.7	19.7
Insert/Patella	3	0.0	1.5	2671	0.3	9.3
Tibial Component	21	0.2	10.3	2477	0.3	8.6
Femoral Component	9	0.1	4.4	1634	0.2	5.7
Cement Spacer	12	0.1	5.9	1584	0.2	5.5
Removal of Prostheses				181	0.0	0.6
Minor Components	1	0.0	0.5	71	0.0	0.2
Cement Only				16	0.0	0.1
Total Femoral				16	0.0	0.1
Reinsertion of Components				14	0.0	0.0
N Revision	203	1.9	100.0	28875	3.5	100.0
N Primary	10878			814891		

Note: This table is restricted to revisions within 8.9 years for all groups to allow a time-matched comparison of revisions.

Table 15: Revision Rates of Attune PS Primary Total Knee Replacement by Fixation (All Diagnoses)

Fixation	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Cemented	199	10350	35362	0.56 (0.49, 0.65)
Cementless	0	1	0	0.00 (0.00, 1283)
Hybrid (Tibial Cemented)	0	2	0	0.00 (0.00, 752.7)
Hybrid (Tibial Cementless)	4	525	335	1.19 (0.33, 3.06)
TOTAL	203	10878	35698	0.57 (0.49, 0.65)

Table 16: Revision Rates of Attune PS Primary Total Knee Replacement by Polyethylene Type (All Diagnoses)

Polyethylene Type	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
XLPE	0	1	2	0.00 (0.00, 245.0)
XLPE + Antioxidant	203	10876	35697	0.57 (0.49, 0.65)
Unknown	0	1	0	0.00 (0.00, 2807)
TOTAL	203	10878	35698	0.57 (0.49, 0.65)

Table 17: Revision Rates of Attune PS Primary Total Knee Replacement by Bearing Mobility (All Diagnoses)

Bearing Mobility	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Fixed	96	4552	19213	0.50 (0.40, 0.61)
Rotating	107	6325	16486	0.65 (0.53, 0.78)
Unknown	0	1	0	0.00 (0.00, 2807)
TOTAL	203	10878	35698	0.57 (0.49, 0.65)

Table 18: Revision Rates of Attune PS Primary Total Knee Replacement by Stability (All Diagnoses)

Stability	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Minimally Stabilised	0	5	18	0.00 (0.00, 20.22)
Posterior Stabilised	203	10872	35680	0.57 (0.49, 0.65)
Unknown	0	1	0	0.00 (0.00, 2807)
TOTAL	203	10878	35698	0.57 (0.49, 0.65)

Table 19: Revision Rates of Attune PS Primary Total Knee Replacement by Patella Usage (All Diagnoses)

Patella Usage	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Patella Used	180	10456	33779	0.53 (0.46, 0.62)
No Patella	23	422	1920	1.20 (0.76, 1.80)
TOTAL	203	10878	35698	0.57 (0.49, 0.65)

Table 20: Revision Rates of Attune PS Primary Total Knee Replacement by Computer Navigation (All Diagnoses)

Computer Navigation	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Computer Navigated	68	4696	12771	0.53 (0.41, 0.68)
Non-Navigated	135	6182	22928	0.59 (0.49, 0.70)
TOTAL	203	10878	35698	0.57 (0.49, 0.65)

Table 21: Revision Rates of Attune PS Primary Total Knee Replacement by IDI Usage (All Diagnoses)

IDI Usage	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
IDI Used	2	106	349	0.57 (0.07, 2.07)
IDI Not Used	201	10772	35349	0.57 (0.49, 0.65)
TOTAL	203	10878	35698	0.57 (0.49, 0.65)

Table 22: Revision Rates of Attune PS Primary Total Knee Replacement by Robotic Assistance (All Diagnoses)

Robotic Assistance	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Robotically Assisted	0	1	2	0.00 (0.00, 149.2)
Non-Robotic	203	10877	35696	0.57 (0.49, 0.65)
TOTAL	203	10878	35698	0.57 (0.49, 0.65)

Table 23: Number of Revisions of Attune PS Primary Total Knee Replacement by Year of Implant (All Diagnoses)

Year of Implant	Number Revised	Total Number
2013	2	154
2014	12	564
2015	30	931
2016	22	1048
2017	40	1353
2018	36	1365
2019	35	1777
2020	18	1694
2021	8	1991
2022	0	1
TOTAL	203	10878

Table 24: Revision Rates of Attune PS Primary Total Knee Replacement by Tibial Component (All Diagnoses)

Tibial	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Attune	203	10877	35697	0.57 (0.49, 0.65)
Other Tibial Components*	0	1	2	0.00 (0.00, 245.0)
TOTAL	203	10878	35698	0.57 (0.49, 0.65)

*denotes tibial components distributed by other companies

Table 25: Revision Rates of Attune PS Primary Total Knee Replacement by Femoral Catalogue Number (All Diagnoses)

Femoral Catalogue Number	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
150410101	0	1	1	0.00 (0.00, 401.0)
150410102	0	9	28	0.00 (0.00, 13.11)
150410103	1	136	546	0.18 (0.00, 1.02)
150410104	10	447	1661	0.60 (0.29, 1.11)
150410105	6	727	2475	0.24 (0.09, 0.53)
150410106	13	846	2878	0.45 (0.24, 0.77)
150410107	16	888	2904	0.55 (0.31, 0.89)
150410108	12	566	1686	0.71 (0.37, 1.24)
150410109	3	179	534	0.56 (0.12, 1.64)
150410110	1	28	83	1.21 (0.03, 6.75)
150410123	1	22	77	1.29 (0.03, 7.19)
150410124	6	193	692	0.87 (0.32, 1.89)
150410125	5	497	1617	0.31 (0.10, 0.72)
150410126	9	514	1595	0.56 (0.26, 1.07)
150410201	0	2	8	0.00 (0.00, 48.89)
150410202	0	7	24	0.00 (0.00, 15.08)
150410203	3	149	571	0.53 (0.11, 1.53)
150410204	6	503	1785	0.34 (0.12, 0.73)
150410205	17	869	2931	0.58 (0.34, 0.93)
150410206	24	904	3105	0.77 (0.50, 1.15)
150410207	23	1065	3323	0.69 (0.44, 1.04)
150410208	18	670	1982	0.91 (0.54, 1.44)
150410209	6	205	553	1.08 (0.40, 2.36)
150410210	3	38	103	2.91 (0.60, 8.50)
150410223	0	30	103	0.00 (0.00, 3.58)
150410224	2	197	707	0.28 (0.03, 1.02)
150410225	11	608	1977	0.56 (0.28, 1.00)
150410226	7	578	1750	0.40 (0.16, 0.82)
TOTAL	203	10878	35698	0.57 (0.49, 0.65)