



Australian
Orthopaedic
Association
National
Joint
Replacement
Registry

Automated Industry Report 9078

Depuy Synthes Australia

Attune PS Total Knee

Report Generated: 8 February 2023

Data Period: 1 September 1999 - 7 February 2023

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.

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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	9671
Attune PS	150410123 - 150410226	PS Narrow Femoral Component	3144

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	207	9671	35899	0.58 (0.50, 0.66)
150410123 - 150410226	52	3144	11399	0.46 (0.34, 0.60)
TOTAL	259	12815	47298	0.55 (0.48, 0.62)

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	20 December 2022
N Procedures	12815
N Patients	10793
N Hospitals Implanting	151
N Surgeons Implanting*	218
Outcome	
N Revised	259
N Deceased**	393

*358 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	12815	0.00	9.87	3.37	3.69	2.40
TOTAL	12815	0.00	9.87	3.37	3.69	2.40

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

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	5402	42.2%	31	95	68	68.2	8.9
Female	7413	57.8%	26	97	69	69.0	9.1
TOTAL	12815	100.0%	26	97	69	68.6	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	839	6.5	58552	6.7
55-64	3237	25.3	229493	26.4
65-74	5227	40.8	345690	39.8
≥75	3512	27.4	235524	27.1
TOTAL	12815	100.0	869259	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	5402	42.2	383208	44.1
Female	7413	57.8	486051	55.9
TOTAL	12815	100.0	869259	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	656	5.2	28064	5.6
2	6916	54.3	271513	54.2
3	5059	39.7	196333	39.2
4	105	0.8	5416	1.1
5	.	.	15	0.0
TOTAL	12736	100.0	501341	100.0

Note: The AOANJRR commenced collection of ASA data in 2013. 79 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)	33	0.3	828	0.2
Normal (18.50-24.99)	1332	11.9	42945	10.5
Pre Obese (25.00-29.99)	3619	32.3	127455	31.2
Obese Class 1 (30.00-34.99)	3319	29.6	125985	30.9
Obese Class 2 (35.00-39.99)	1769	15.8	68952	16.9
Obese Class 3 (\geq 40.00)	1126	10.1	41749	10.2
TOTAL	11198	100.0	407914	100.0

Note: The AOANJRR commenced collection of BMI data in 2015. 1617 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	12610	98.4	850107	97.8
Rheumatoid Arthritis	117	0.9	10081	1.2
Other Inflammatory Arthritis	39	0.3	4403	0.5
Osteonecrosis	27	0.2	2619	0.3
Tumour	1	0.0	1052	0.1
Fracture	18	0.1	733	0.1
Chondrocalcinosis	.	.	15	0.0
Osteochondritis Dissecans	.	.	2	0.0
Other	3	0.0	247	0.0
TOTAL	12815	100.0	869259	100.0

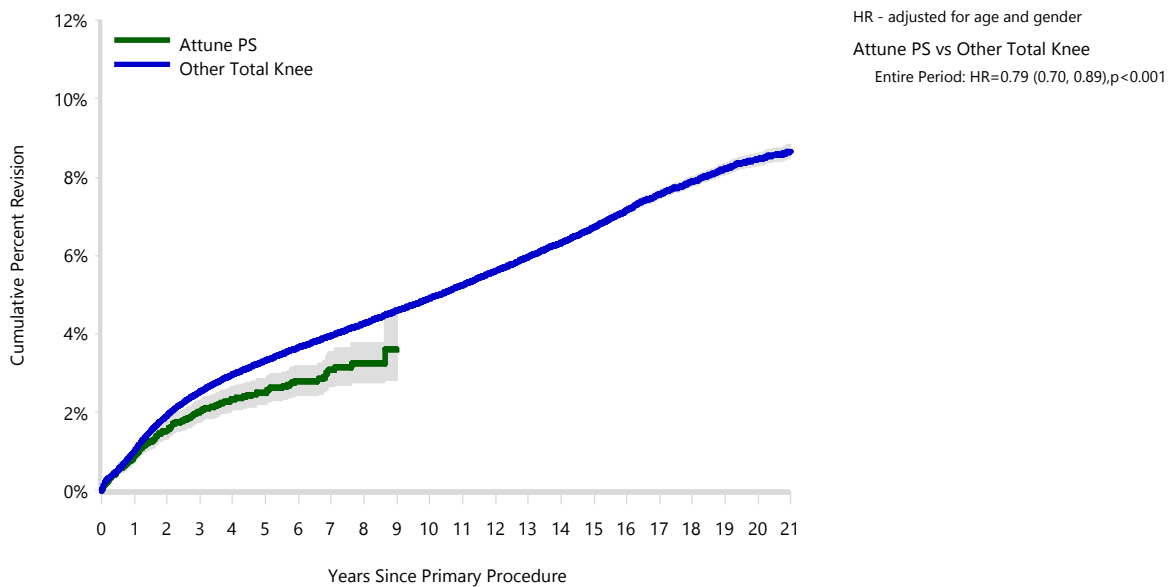
Table 10: Revision Rates of Primary Total Knee Replacement by Model (All Diagnoses)

Model	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Attune PS	259	12815	47298	0.55 (0.48, 0.62)
Other Total Knee	35774	869259	6581904	0.54 (0.54, 0.55)
TOTAL	36033	882074	6629203	0.54 (0.54, 0.55)

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	7 Yrs
Attune PS	0.9 (0.7, 1.0)	1.5 (1.3, 1.8)	2.0 (1.7, 2.3)	2.3 (2.1, 2.7)	2.5 (2.2, 2.8)	2.8 (2.4, 3.2)	3.1 (2.7, 3.6)
Other Total Knee	1.0 (1.0, 1.0)	1.9 (1.9, 1.9)	2.5 (2.5, 2.6)	3.0 (2.9, 3.0)	3.3 (3.3, 3.4)	3.7 (3.6, 3.7)	4.0 (3.9, 4.0)
CPR	8 Yrs	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs
Attune PS	3.2 (2.8, 3.8)	3.6 (2.8, 4.6)					
Other Total Knee	4.3 (4.2, 4.3)	4.6 (4.5, 4.6)	4.9 (4.9, 5.0)	5.2 (5.2, 5.3)	5.6 (5.5, 5.7)	6.0 (5.9, 6.0)	6.3 (6.2, 6.4)
CPR	15 Yrs	16 Yrs	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs
Attune PS							
Other Total Knee	6.7 (6.6, 6.8)	7.2 (7.1, 7.3)	7.6 (7.4, 7.7)	7.9 (7.8, 8.0)	8.2 (8.1, 8.3)	8.5 (8.3, 8.6)	8.6 (8.5, 8.8)

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	10 Yrs
Attune PS	12815	10966	8814	7024	5205	3833	2518	1520	680	153	0
Other Total Knee	869259	806912	738716	674321	608118	543166	480315	420242	363718	311311	262860
Number at Risk	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs
Attune PS	0	0	0	0	0	0	0	0	0	0	0
Other Total Knee	218663	178232	143116	113353	87210	65558	47715	32905	21243	12182	5326

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 9.9 Years)

Revision Diagnosis	Number	Attune PS		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	105	0.8	40.5	8207	0.9	26.0
Loosening	68	0.5	26.3	7329	0.8	23.2
Instability	27	0.2	10.4	2897	0.3	9.2
Patellofemoral Pain	3	0.0	1.2	2664	0.3	8.4
Pain	13	0.1	5.0	2557	0.3	8.1
Patella Erosion	2	0.0	0.8	1891	0.2	6.0
Arthrofibrosis	15	0.1	5.8	1244	0.1	3.9
Fracture	15	0.1	5.8	1022	0.1	3.2
Malalignment	4	0.0	1.5	706	0.1	2.2
Lysis				430	0.0	1.4
Metal Related Pathology				356	0.0	1.1
Wear Tibial Insert	1	0.0	0.4	355	0.0	1.1
Incorrect Sizing				329	0.0	1.0
Patella Maltracking	1	0.0	0.4	246	0.0	0.8
Bearing Dislocation	1	0.0	0.4	193	0.0	0.6
Implant Breakage Tibial Insert				190	0.0	0.6
Implant Breakage Patella				154	0.0	0.5
Prosthesis Dislocation				102	0.0	0.3
Synovitis	1	0.0	0.4	99	0.0	0.3
Osteonecrosis	1	0.0	0.4	64	0.0	0.2
Implant Breakage Tibial				58	0.0	0.2
Implant Breakage Femoral				44	0.0	0.1
Wear Patella				39	0.0	0.1
Tumour	1	0.0	0.4	34	0.0	0.1
Heterotopic Bone				15	0.0	0.0
Wear Tibial				11	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
Patella Dislocation				2	0.0	0.0
Other	1	0.0	0.4	352	0.0	1.1
N Revision	259	2.0	100.0	31600	3.6	100.0
N Primary	12815			869259		

Note: This table is restricted to revisions within 9.9 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	105	0.4 (0.3, 0.6)	0.7 (0.6, 0.9)	0.8 (0.7, 1.0)	0.9 (0.8, 1.1)		
	Loosening	68	0.1 (0.1, 0.2)	0.3 (0.2, 0.4)	0.5 (0.4, 0.6)	0.7 (0.5, 0.9)		
	Instability	27	0.1 (0.1, 0.2)	0.2 (0.2, 0.3)	0.2 (0.2, 0.3)	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	13	0.0 (0.0, 0.1)	0.0 (0.0, 0.1)	0.1 (0.1, 0.2)	0.1 (0.1, 0.2)		
	Other	43	0.1 (0.1, 0.2)	0.2 (0.1, 0.3)	0.3 (0.2, 0.4)	0.4 (0.3, 0.6)		
	Deceased	393	0.5 (0.4, 0.6)	1.2 (1.0, 1.4)	2.1 (1.8, 2.4)	4.2 (3.7, 4.7)		
	All Revision	259	0.9 (0.7, 1.0)	1.5 (1.3, 1.8)	2.0 (1.7, 2.3)	2.5 (2.2, 2.8)		
Other Total Knee	Infection	8758	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	8552	0.1 (0.1, 0.2)	0.4 (0.4, 0.4)	0.5 (0.5, 0.5)	0.7 (0.7, 0.7)	1.1 (1.1, 1.1)	1.5 (1.5, 1.5)
	Instability	3194	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	2825	0.1 (0.0, 0.1)	0.2 (0.1, 0.2)	0.2 (0.2, 0.2)	0.3 (0.3, 0.3)	0.4 (0.4, 0.4)	0.4 (0.4, 0.5)
	Pain	2770	0.0 (0.0, 0.0)	0.1 (0.1, 0.1)	0.2 (0.2, 0.2)	0.3 (0.3, 0.3)	0.4 (0.4, 0.4)	0.4 (0.4, 0.5)
	Other	9675	0.2 (0.2, 0.2)	0.4 (0.4, 0.5)	0.6 (0.6, 0.6)	0.8 (0.8, 0.8)	1.2 (1.2, 1.2)	1.8 (1.7, 1.8)
	Deceased	15146 7	0.7 (0.7, 0.7)	1.6 (1.6, 1.6)	2.8 (2.8, 2.8)	6.0 (5.9, 6.1)	18.5 (18.3, 18.6)	34.9 (34.7, 35.1)
	All Revision	35774	1.0 (1.0, 1.0)	1.9 (1.9, 1.9)	2.5 (2.5, 2.5)	3.3 (3.2, 3.3)	4.7 (4.6, 4.7)	6.0 (5.9, 6.0)

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

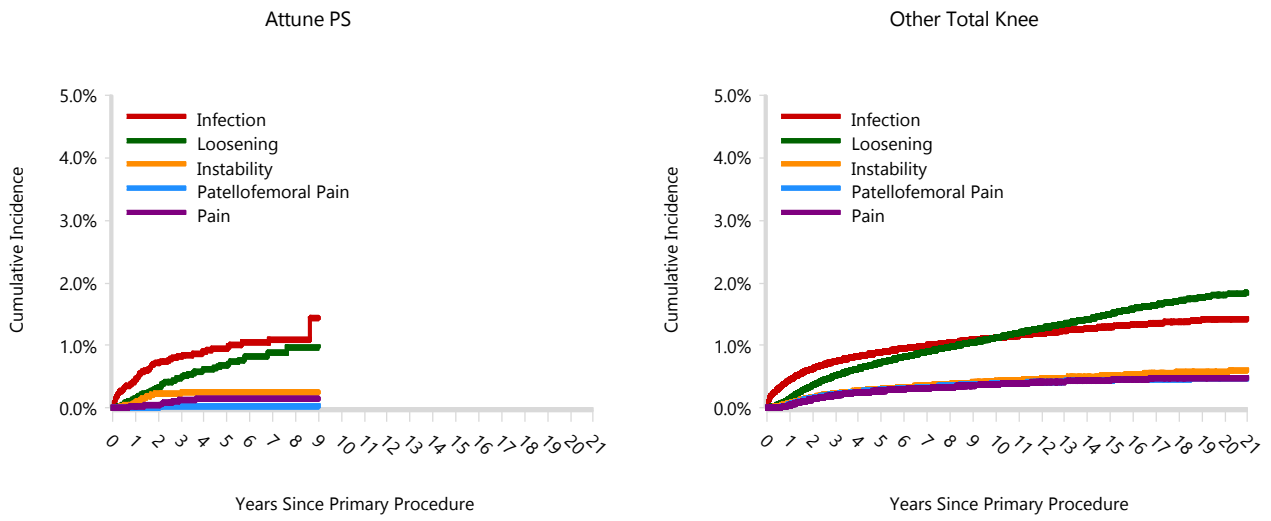


TABLE 14

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 9.9 Years)

Type of Revision	Number	Attune PS		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Insert Only	116	0.9	44.8	8234	0.9	26.1
TKR (Tibial/Femoral)	69	0.5	26.6	7907	0.9	25.0
Patella Only	10	0.1	3.9	6095	0.7	19.3
Insert/Patella	3	0.0	1.2	2989	0.3	9.5
Tibial Component	34	0.3	13.1	2626	0.3	8.3
Femoral Component	14	0.1	5.4	1737	0.2	5.5
Cement Spacer	12	0.1	4.6	1689	0.2	5.3
Removal of Prostheses				187	0.0	0.6
Minor Components	1	0.0	0.4	76	0.0	0.2
Total Femoral				23	0.0	0.1
Cement Only				21	0.0	0.1
Reinsertion of Components				16	0.0	0.1
N Revision	259	2.0	100.0	31600	3.6	100.0
N Primary	12815			869259		

Note: This table is restricted to revisions within 9.9 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	242	11964	46199	0.52 (0.46, 0.59)
Hybrid (Tibial Cementless)	17	851	1099	1.55 (0.90, 2.48)
TOTAL	259	12815	47298	0.55 (0.48, 0.62)

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	3	0.00 (0.00, 146.8)
XLPE + Antioxidant	259	12811	47290	0.55 (0.48, 0.62)
Unknown	0	3	5	0.00 (0.00, 68.67)
TOTAL	259	12815	47298	0.55 (0.48, 0.62)

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	107	5062	23773	0.45 (0.37, 0.54)
Rotating	152	7750	23520	0.65 (0.55, 0.76)
Unknown	0	3	5	0.00 (0.00, 68.67)
TOTAL	259	12815	47298	0.55 (0.48, 0.62)

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	8	25	0.00 (0.00, 14.68)
Posterior Stabilised	259	12804	47268	0.55 (0.48, 0.62)
Unknown	0	3	5	0.00 (0.00, 68.67)
TOTAL	259	12815	47298	0.55 (0.48, 0.62)

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	234	12362	44991	0.52 (0.46, 0.59)
No Patella	25	453	2307	1.08 (0.70, 1.60)
TOTAL	259	12815	47298	0.55 (0.48, 0.62)

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	94	5609	17901	0.53 (0.42, 0.64)
Non-Navigated	165	7206	29397	0.56 (0.48, 0.65)
TOTAL	259	12815	47298	0.55 (0.48, 0.62)

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	4	111	452	0.88 (0.24, 2.26)
IDI Not Used	255	12704	46846	0.54 (0.48, 0.62)
TOTAL	259	12815	47298	0.55 (0.48, 0.62)

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	1	220	99	1.01 (0.03, 5.61)
Non-Robotic	258	12595	47199	0.55 (0.48, 0.62)
TOTAL	259	12815	47298	0.55 (0.48, 0.62)

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	3	154
2014	12	564
2015	31	931
2016	28	1048
2017	40	1353
2018	40	1365
2019	40	1777
2020	29	1695
2021	29	2135
2022	7	1793
TOTAL	259	12815

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	259	12814	47296	0.55 (0.48, 0.62)
Other Tibial Components*	0	1	3	0.00 (0.00, 146.8)
TOTAL	259	12815	47298	0.55 (0.48, 0.62)

*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	2	0.00 (0.00, 191.4)
150410102	0	11	38	0.00 (0.00, 9.66)
150410103	1	143	681	0.15 (0.00, 0.82)
150410104	12	509	2130	0.56 (0.29, 0.98)
150410105	8	863	3259	0.25 (0.11, 0.48)
150410106	20	959	3748	0.53 (0.33, 0.82)
150410107	17	1058	3854	0.44 (0.26, 0.71)
150410108	15	690	2302	0.65 (0.36, 1.07)
150410109	4	208	723	0.55 (0.15, 1.42)
150410110	2	33	113	1.78 (0.22, 6.42)
150410123	1	31	104	0.96 (0.02, 5.36)
150410124	7	225	895	0.78 (0.31, 1.61)
150410125	6	573	2153	0.28 (0.10, 0.61)
150410126	11	629	2170	0.51 (0.25, 0.91)
150410201	0	2	9	0.00 (0.00, 43.13)
150410202	0	7	32	0.00 (0.00, 11.71)
150410203	4	162	721	0.55 (0.15, 1.42)
150410204	8	586	2319	0.34 (0.15, 0.68)
150410205	23	1009	3841	0.60 (0.38, 0.90)
150410206	30	1079	4060	0.74 (0.50, 1.05)
150410207	30	1254	4448	0.67 (0.46, 0.96)
150410208	21	804	2703	0.78 (0.48, 1.19)
150410209	7	250	776	0.90 (0.36, 1.86)
150410210	5	43	142	3.52 (1.14, 8.22)
150410223	0	33	134	0.00 (0.00, 2.75)
150410224	5	225	912	0.55 (0.18, 1.28)
150410225	13	716	2630	0.49 (0.26, 0.85)
150410226	9	712	2402	0.37 (0.17, 0.71)
TOTAL	259	12815	47298	0.55 (0.48, 0.62)