



Australian
Orthopaedic
Association
National
Joint
Replacement
Registry

Automated Industry Report 4156

Depuy Synthes Australia

Attune PS Total Knee

Report Generated: 6 May 2021

Data Period: 1 September 1999 - 4 May 2021

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	6957
Attune PS	150410123 - 150410226	PS Narrow Femoral Component	2232

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	150411103 - 150411209	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	129	6957	21522	0.60 (0.50, 0.71)
150410123 - 150410226	33	2232	6676	0.49 (0.34, 0.69)
TOTAL	162	9189	28198	0.57 (0.49, 0.67)

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	16 March 2021
N Procedures	9189
N Patients	7815
N Hospitals Implanting	126
N Surgeons Implanting*	192
Outcome	
N Revised	162
N Deceased**	278

*356 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	9189	0.02	8.11	2.80	3.07	1.96
TOTAL	9189	0.02	8.11	2.80	3.07	1.96

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

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	3848	41.9%	31	95	68	68.3	9.0
Female	5341	58.1%	33	97	69	69.0	9.2
TOTAL	9189	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	596	6.5	51951	6.8
55-64	2292	24.9	203291	26.4
65-74	3786	41.2	304320	39.6
≥75	2515	27.4	209164	27.2
TOTAL	9189	100.0	768726	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	3848	41.9	336888	43.8
Female	5341	58.1	431838	56.2
TOTAL	9189	100.0	768726	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	468	5.1	23411	5.8
2	5030	55.2	219505	54.7
3	3533	38.8	153648	38.3
4	83	0.9	4371	1.1
5	.	.	11	0.0
TOTAL	9114	100.0	400946	100.0

Note: The AOANJRR commenced collection of ASA data in 2013. 75 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)	23	0.3	630	0.2
Normal (18.50-24.99)	907	11.9	32215	10.5
Pre Obese (25.00-29.99)	2444	32.2	95967	31.1
Obese Class 1 (30.00-34.99)	2226	29.3	95012	30.8
Obese Class 2 (35.00-39.99)	1214	16.0	52297	17.0
Obese Class 3 (\geq 40.00)	781	10.3	32052	10.4
TOTAL	7595	100.0	308173	100.0

Note: The AOANJRR commenced collection of BMI data in 2015. 1594 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	9051	98.5	751289	97.7
Rheumatoid Arthritis	82	0.9	9389	1.2
Other Inflammatory Arthritis	23	0.3	3869	0.5
Osteonecrosis	22	0.2	2365	0.3
Tumour	1	0.0	945	0.1
Fracture	9	0.1	619	0.1
Chondrocalcinosis	.	.	18	0.0
Osteochondritis Dissecans	.	.	2	0.0
Other	1	0.0	230	0.0
TOTAL	9189	100.0	768726	100.0

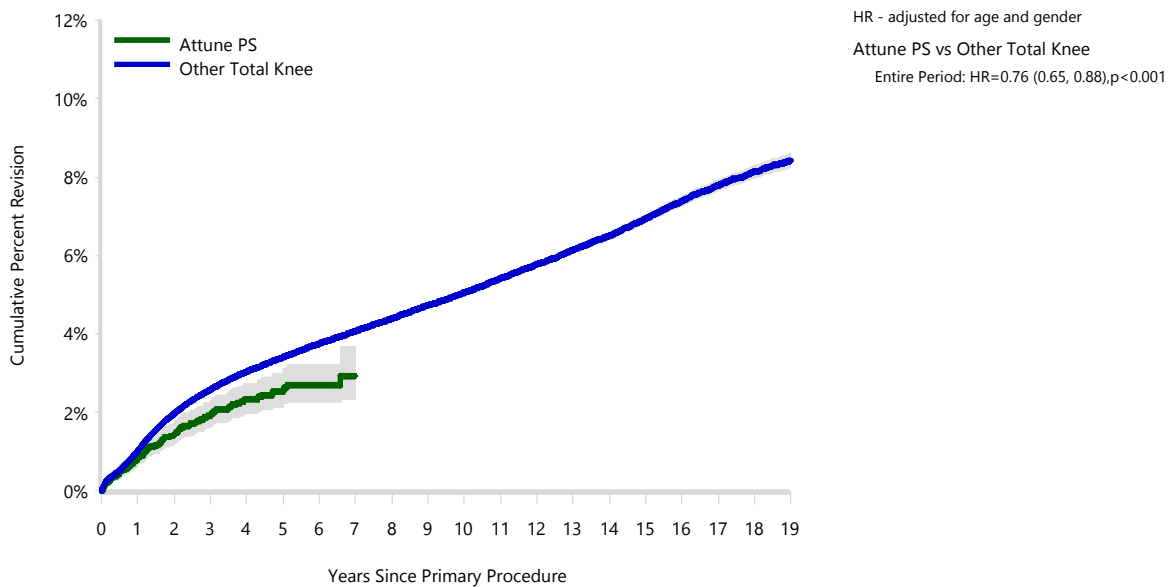
Table 10: Revision Rates of Primary Total Knee Replacement by Model (All Diagnoses)

Model	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Attune PS	162	9189	28198	0.57 (0.49, 0.67)
Other Total Knee	31059	768726	5441317	0.57 (0.56, 0.58)
TOTAL	31221	777915	5469515	0.57 (0.56, 0.58)

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 (0.6, 1.0)	1.4 (1.2, 1.7)	1.9 (1.6, 2.2)	2.3 (2.0, 2.7)	2.5 (2.1, 3.0)	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 (3.4, 3.4)	3.8 (3.7, 3.8)	
CPR	7 Yrs	8 Yrs	9 Yrs	10 Yrs	11 Yrs	12 Yrs	
Attune PS	2.9 (2.3, 3.7)						
Other Total Knee	4.1 (4.0, 4.1)	4.4 (4.3, 4.4)	4.7 (4.7, 4.8)	5.0 (5.0, 5.1)	5.4 (5.3, 5.5)	5.8 (5.7, 5.9)	
CPR	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs	19 Yrs
Attune PS							
Other Total Knee	6.1 (6.1, 6.2)	6.5 (6.4, 6.6)	6.9 (6.8, 7.0)	7.4 (7.3, 7.5)	7.8 (7.7, 7.9)	8.1 (8.0, 8.3)	8.4 (8.2, 8.6)

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	9189	7513	5796	4297	2957	1808	894	226	11	0
Other Total Knee	768726	710374	646776	582139	518530	457695	400005	345715	295623	249109
Number at Risk	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs	19 Yrs
Attune PS	0	0	0	0	0	0	0	0	0	0
Other Total Knee	205869	167362	133885	104854	80144	59135	41708	27449	16441	7861

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 8.1 Years)

Revision Diagnosis	Number	Attune PS		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	68	0.7	42.0	6870	0.9	25.9
Loosening	34	0.4	21.0	6207	0.8	23.4
Patellofemoral Pain	3	0.0	1.9	2455	0.3	9.3
Instability	18	0.2	11.1	2365	0.3	8.9
Pain	6	0.1	3.7	2207	0.3	8.3
Patella Erosion	1	0.0	0.6	1461	0.2	5.5
Arthrofibrosis	13	0.1	8.0	1044	0.1	3.9
Fracture	10	0.1	6.2	782	0.1	3.0
Malalignment	4	0.0	2.5	619	0.1	2.3
Metal Related Pathology				324	0.0	1.2
Lysis				309	0.0	1.2
Incorrect Sizing				305	0.0	1.2
Wear Tibial Insert				230	0.0	0.9
Patella Maltracking	1	0.0	0.6	203	0.0	0.8
Bearing Dislocation				173	0.0	0.7
Implant Breakage Patella				123	0.0	0.5
Implant Breakage Tibial Insert				115	0.0	0.4
Synovitis	1	0.0	0.6	91	0.0	0.3
Prosthesis Dislocation				77	0.0	0.3
Osteonecrosis	1	0.0	0.6	59	0.0	0.2
Implant Breakage Tibial				45	0.0	0.2
Implant Breakage Femoral				36	0.0	0.1
Tumour	1	0.0	0.6	28	0.0	0.1
Wear Patella				21	0.0	0.1
Heterotopic Bone				11	0.0	0.0
Wear Tibial				7	0.0	0.0
Wear Femoral				4	0.0	0.0
Progression Of Disease				3	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	0.6	298	0.0	1.1
N Revision	162	1.8	100.0	26477	3.4	100.0
N Primary	9189			768726		

Note: This table is restricted to revisions within 8.1 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	Loosening	34	0.1 (0.0, 0.2)	0.2 (0.1, 0.3)	0.4 (0.3, 0.6)	0.6 (0.4, 0.9)		
	Infection	68	0.4 (0.3, 0.6)	0.7 (0.5, 0.9)	0.8 (0.6, 1.0)	0.9 (0.7, 1.2)		
	Instability	18	0.1 (0.1, 0.2)	0.2 (0.1, 0.4)	0.2 (0.1, 0.4)	0.2 (0.1, 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	6	0.0 (0.0, 0.1)	0.0 (0.0, 0.1)	0.1 (0.0, 0.2)	0.1 (0.0, 0.2)		
	Other	33	0.1 (0.1, 0.3)	0.2 (0.2, 0.4)	0.3 (0.2, 0.5)	0.6 (0.4, 0.8)		
	Deceased	278	0.5 (0.4, 0.7)	1.4 (1.2, 1.7)	2.6 (2.2, 3.0)	5.2 (4.5, 5.9)		
	All Revision	162	0.8 (0.6, 1.0)	1.4 (1.2, 1.7)	1.9 (1.6, 2.2)	2.5 (2.1, 2.9)		
	Other Total Knee	Loosening	7576	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)
Infection		7466	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 (1.2, 1.3)
Instability		2702	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		2679	0.1 (0.1, 0.1)	0.2 (0.2, 0.2)	0.2 (0.2, 0.3)	0.3 (0.3, 0.3)	0.4 (0.4, 0.4)	0.5 (0.5, 0.5)
Pain		2475	0.0 (0.0, 0.1)	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		8161	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, 1.3)	1.8 (1.7, 1.8)
Deceased		13341 3	0.7 (0.7, 0.7)	1.7 (1.7, 1.8)	3.0 (3.0, 3.1)	6.5 (6.4, 6.5)	20.1 (20.0, 20.2)	38.4 (38.2, 38.6)
All Revision		31059	1.0 (1.0, 1.0)	1.9 (1.9, 2.0)	2.5 (2.5, 2.6)	3.3 (3.3, 3.4)	4.8 (4.7, 4.8)	6.1 (6.0, 6.2)

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

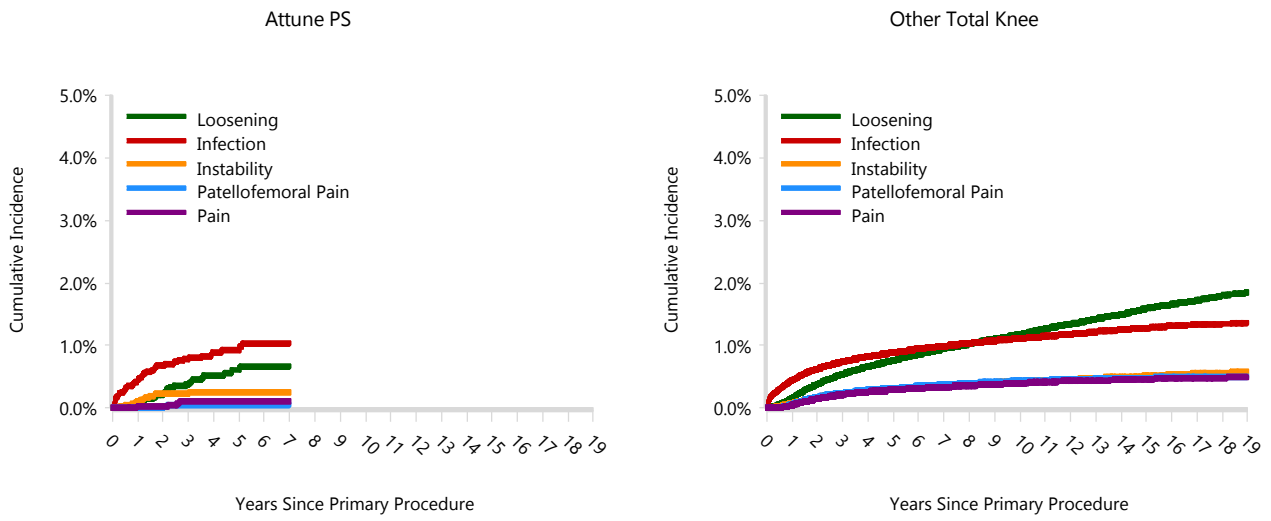


TABLE 14

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 8.1 Years)

Type of Revision	Number	Attune PS		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Insert Only	80	0.9	49.4	6783	0.9	25.6
TKR (Tibial/Femoral)	44	0.5	27.2	6381	0.8	24.1
Patella Only	8	0.1	4.9	5266	0.7	19.9
Insert/Patella	2	0.0	1.2	2401	0.3	9.1
Tibial Component	13	0.1	8.0	2341	0.3	8.8
Femoral Component	8	0.1	4.9	1545	0.2	5.8
Cement Spacer	6	0.1	3.7	1478	0.2	5.6
Removal of Prostheses				173	0.0	0.7
Minor Components	1	0.0	0.6	66	0.0	0.2
Cement Only				16	0.0	0.1
Total Femoral				14	0.0	0.1
Reinsertion of Components				13	0.0	0.0
N Revision	162	1.8	100.0	26477	3.4	100.0
N Primary	9189			768726		

Note: This table is restricted to revisions within 8.1 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	162	9102	28167	0.58 (0.49, 0.67)
Hybrid (Tibial Cementless)	0	87	31	0.00 (0.00, 11.84)
TOTAL	162	9189	28198	0.57 (0.49, 0.67)

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	1	0.00 (0.00, 491.7)
XLPE + Antioxidant	162	9188	28197	0.57 (0.49, 0.67)
TOTAL	162	9189	28198	0.57 (0.49, 0.67)

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	86	4213	16072	0.54 (0.43, 0.66)
Rotating	76	4976	12126	0.63 (0.49, 0.78)
TOTAL	162	9189	28198	0.57 (0.49, 0.67)

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	14	0.00 (0.00, 25.50)
Posterior Stabilised	162	9184	28183	0.57 (0.49, 0.67)
TOTAL	162	9189	28198	0.57 (0.49, 0.67)

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	143	8798	26553	0.54 (0.45, 0.63)
No Patella	19	391	1644	1.16 (0.70, 1.80)
TOTAL	162	9189	28198	0.57 (0.49, 0.67)

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	50	3700	9560	0.52 (0.39, 0.69)
Non-Navigated	112	5489	18638	0.60 (0.49, 0.72)
TOTAL	162	9189	28198	0.57 (0.49, 0.67)

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	94	274	0.73 (0.09, 2.63)
IDI Not Used	160	9095	27924	0.57 (0.49, 0.67)
TOTAL	162	9189	28198	0.57 (0.49, 0.67)

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	3	3	0.00 (0.00, 113.5)
Non-Robotic	162	9186	28195	0.57 (0.49, 0.67)
TOTAL	162	9189	28198	0.57 (0.49, 0.67)

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	8	564
2015	29	931
2016	21	1048
2017	38	1353
2018	33	1365
2019	23	1777
2020	8	1688
2021	0	309
TOTAL	162	9189

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	162	9188	28197	0.57 (0.49, 0.67)
Other Tibial Components*	0	1	1	0.00 (0.00, 491.7)
TOTAL	162	9189	28198	0.57 (0.49, 0.67)

*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	0	0.00 (0.00, 2246)
150410102	0	8	23	0.00 (0.00, 16.27)
150410103	1	120	449	0.22 (0.01, 1.24)
150410104	10	394	1344	0.74 (0.36, 1.37)
150410105	5	617	1970	0.25 (0.08, 0.59)
150410106	10	723	2298	0.44 (0.21, 0.80)
150410107	15	752	2294	0.65 (0.37, 1.08)
150410108	10	466	1299	0.77 (0.37, 1.42)
150410109	2	150	409	0.49 (0.06, 1.77)
150410110	1	22	63	1.59 (0.04, 8.85)
150410123	0	20	62	0.00 (0.00, 5.96)
150410124	3	178	558	0.54 (0.11, 1.57)
150410125	5	414	1266	0.39 (0.13, 0.92)
150410126	9	436	1231	0.73 (0.33, 1.39)
150410201	0	2	7	0.00 (0.00, 54.33)
150410202	0	7	19	0.00 (0.00, 19.25)
150410203	2	134	466	0.43 (0.05, 1.55)
150410204	5	443	1437	0.35 (0.11, 0.81)
150410205	13	728	2331	0.56 (0.30, 0.95)
150410206	18	767	2493	0.72 (0.43, 1.14)
150410207	18	899	2597	0.69 (0.41, 1.10)
150410208	11	542	1528	0.72 (0.36, 1.29)
150410209	6	153	417	1.44 (0.53, 3.13)
150410210	2	29	79	2.54 (0.31, 9.17)
150410223	0	26	82	0.00 (0.00, 4.48)
150410224	2	168	574	0.35 (0.04, 1.26)
150410225	8	510	1556	0.51 (0.22, 1.01)
150410226	6	480	1347	0.45 (0.16, 0.97)
TOTAL	162	9189	28198	0.57 (0.49, 0.67)