



Australian
Orthopaedic
Association
National
Joint
Replacement
Registry

Automated Industry Report 9156

Depuy Synthes Australia

Attune Total Knee

Report Generated: 11 February 2023

Data Period: 1 September 1999 - 10 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 tibial 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 Tibial Components included in this analysis

Model	Catalogue Range	Range Description	No. of Primary Procedures
Attune	150610001 - 150610010	Rotating Tibial Baseplate	6837
Attune	150680001 - 150680010	Tibial Baseplate Rotating Platform	9293

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

Model	Catalogue Range	Range Description
Attune	150600001 - 150600010	Fixed Tibial Baseplate
Attune	150611001 - 150611010	Rotating Tibial Baseplate Porocoat
Attune	150640002 - 150640010	Attune FB Cemented Revision Tibial Base
Attune	150660002 - 150660010	Revision Tibial Base Rotating Platform
Attune	150670001 - 150670010	Tibial Base Fixed Bearing Cemented w S+ technology

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

Tibial Range	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
150610001 - 150610010	221	6837	37943	0.58 (0.51, 0.66)
150680001 - 150680010	122	9293	19852	0.61 (0.51, 0.73)
TOTAL	343	16130	57795	0.59 (0.53, 0.66)

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

	N
Implant Usage	
Date First Used	8 April 2014
Date Last Used	30 December 2022
N Procedures	16130
N Patients	13702
N Hospitals Implanting	140
N Surgeons Implanting*	176
Outcome	
N Revised	343
N Deceased**	407

*284 Attune procedures have unknown surgeon

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

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

Model	N	Minimum	Maximum	Median	Mean	Std Dev
Attune	16130	0.00	8.84	3.36	3.58	2.18
TOTAL	16130	0.00	8.84	3.36	3.58	2.18

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

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	7199	44.6%	36	94	68	68.0	8.7
Female	8931	55.4%	26	97	69	68.6	9.1
TOTAL	16130	100.0%	26	97	69	68.3	8.9

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

Age	Attune		Other Total Knee	
	N	Col%	N	Col%
<55	1046	6.5	58394	6.7
55-64	4240	26.3	228716	26.4
65-74	6689	41.5	344556	39.8
≥75	4155	25.8	235057	27.1
TOTAL	16130	100.0	866723	100.0

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

Gender	Attune		Other Total Knee	
	N	Col%	N	Col%
Male	7199	44.6	381766	44.0
Female	8931	55.4	484957	56.0
TOTAL	16130	100.0	866723	100.0

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

ASA Grade	Attune		Other Total Knee	
	N	Col%	N	Col%
1	770	4.8	27982	5.6
2	9009	55.9	269835	54.1
3	6197	38.5	195520	39.2
4	127	0.8	5402	1.1
5	.	.	15	0.0
TOTAL	16103	100.0	498754	100.0

Note: The AOANJRR commenced collection of ASA data in 2013. 27 Attune 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		Other Total Knee	
	N	Col%	N	Col%
Underweight (<18.50)	31	0.2	836	0.2
Normal (18.50-24.99)	1530	10.4	42834	10.6
Pre Obese (25.00-29.99)	4628	31.3	126700	31.3
Obese Class 1 (30.00-34.99)	4631	31.3	124888	30.8
Obese Class 2 (35.00-39.99)	2540	17.2	68306	16.9
Obese Class 3 (\geq 40.00)	1417	9.6	41549	10.3
TOTAL	14777	100.0	405113	100.0

Note: The AOANJRR commenced collection of BMI data in 2015. 1353 Attune procedures with no BMI recorded are excluded from this table

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

Primary Diagnosis	Attune		Other Total Knee	
	N	Col%	N	Col%
Osteoarthritis	15948	98.9	847544	97.8
Rheumatoid Arthritis	101	0.6	10099	1.2
Other Inflammatory Arthritis	47	0.3	4398	0.5
Osteonecrosis	28	0.2	2620	0.3
Tumour	1	0.0	1052	0.1
Fracture	2	0.0	748	0.1
Chondrocalcinosis	.	.	15	0.0
Osteochondritis Dissecans	.	.	2	0.0
Other	3	0.0	245	0.0
TOTAL	16130	100.0	866723	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	343	16130	57795	0.59 (0.53, 0.66)
Other Total Knee	35700	866723	6577272	0.54 (0.54, 0.55)
TOTAL	36043	882853	6635067	0.54 (0.54, 0.55)

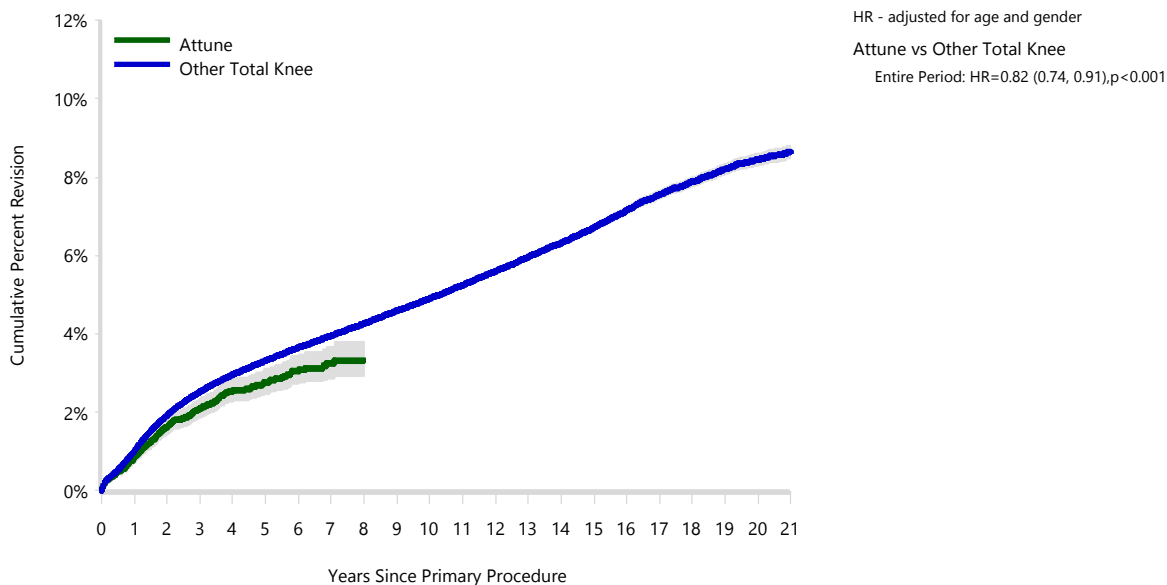
Table 11: Yearly Cumulative Percent Revision of Primary Total Knee Replacement by Model (All Diagnoses)

CPR	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs	7 Yrs
Attune	0.8 (0.7, 1.0)	1.6 (1.4, 1.8)	2.1 (1.9, 2.3)	2.5 (2.3, 2.8)	2.8 (2.5, 3.1)	3.1 (2.7, 3.4)	3.3 (2.9, 3.7)
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	3.3 (2.9, 3.8)						
Other Total Knee	4.3 (4.2, 4.3)	4.6 (4.5, 4.6)	4.9 (4.8, 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							
Other Total Knee	6.7 (6.6, 6.8)	7.1 (7.1, 7.2)	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	16130	13889	11622	9075	6348	4401	2577	1372	400	0	0
Other Total Knee	866723	804517	736558	672591	607333	543234	480976	421129	364243	311582	263120

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	0	0	0	0	0	0	0	0	0	0	0
Other Total Knee	218994	178683	143379	113456	87269	65717	47890	33085	21373	12198	5363

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 8.8 Years)

Revision Diagnosis	Number	Attune		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	105	0.7	30.6	8064	0.9	26.4
Loosening	70	0.4	20.4	7051	0.8	23.1
Instability	39	0.2	11.4	2806	0.3	9.2
Patellofemoral Pain	20	0.1	5.8	2585	0.3	8.5
Pain	26	0.2	7.6	2465	0.3	8.1
Patella Erosion	27	0.2	7.9	1781	0.2	5.8
Arthrofibrosis	29	0.2	8.5	1224	0.1	4.0
Fracture	6	0.0	1.7	973	0.1	3.2
Malalignment	3	0.0	0.9	691	0.1	2.3
Lysis				382	0.0	1.3
Metal Related Pathology				346	0.0	1.1
Incorrect Sizing	1	0.0	0.3	326	0.0	1.1
Wear Tibial Insert	1	0.0	0.3	304	0.0	1.0
Patella Maltracking	4	0.0	1.2	237	0.0	0.8
Bearing Dislocation	3	0.0	0.9	187	0.0	0.6
Implant Breakage Tibial Insert				158	0.0	0.5
Implant Breakage Patella				146	0.0	0.5
Synovitis	1	0.0	0.3	98	0.0	0.3
Prosthesis Dislocation	1	0.0	0.3	96	0.0	0.3
Osteonecrosis				64	0.0	0.2
Implant Breakage Tibial				52	0.0	0.2
Implant Breakage Femoral				43	0.0	0.1
Tumour				35	0.0	0.1
Wear Patella				35	0.0	0.1
Heterotopic Bone				15	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
Patella Dislocation				2	0.0	0.0
Other	7	0.0	2.0	342	0.0	1.1
N Revision	343	2.1	100.0	30526	3.5	100.0
N Primary	16130			866723		

Note: This table is restricted to revisions within 8.8 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	Infection	105	0.4 (0.3, 0.5)	0.6 (0.5, 0.7)	0.7 (0.6, 0.8)	0.8 (0.6, 0.9)		
	Loosening	70	0.1 (0.1, 0.2)	0.3 (0.2, 0.3)	0.4 (0.3, 0.5)	0.6 (0.5, 0.8)		
	Instability	39	0.1 (0.1, 0.2)	0.2 (0.1, 0.3)	0.2 (0.2, 0.3)	0.3 (0.2, 0.4)		
	Patellofemoral Pain	20	0.0 (0.0, 0.1)	0.1 (0.0, 0.1)	0.1 (0.1, 0.2)	0.2 (0.1, 0.3)		
	Pain	26	0.0 (0.0, 0.1)	0.1 (0.1, 0.2)	0.2 (0.1, 0.3)	0.2 (0.2, 0.3)		
	Other	83	0.2 (0.1, 0.2)	0.4 (0.3, 0.5)	0.5 (0.4, 0.6)	0.6 (0.5, 0.8)		
	Deceased	407	0.3 (0.3, 0.4)	1.0 (0.8, 1.1)	1.6 (1.4, 1.9)	3.6 (3.2, 4.0)		
	All Revision	343	0.8 (0.7, 1.0)	1.6 (1.4, 1.8)	2.1 (1.8, 2.3)	2.7 (2.4, 3.1)		
Other Total Knee	Infection	8763	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, 1.2)	1.3 (1.3, 1.3)
	Loosening	8550	0.2 (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	3182	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	2809	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	2757	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	9639	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)	1.7 (1.7, 1.8)
	Deceased	15145 2	0.7 (0.7, 0.7)	1.6 (1.6, 1.6)	2.8 (2.8, 2.8)	6.0 (6.0, 6.1)	18.5 (18.3, 18.6)	34.9 (34.7, 35.0)
	All Revision	35700	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)

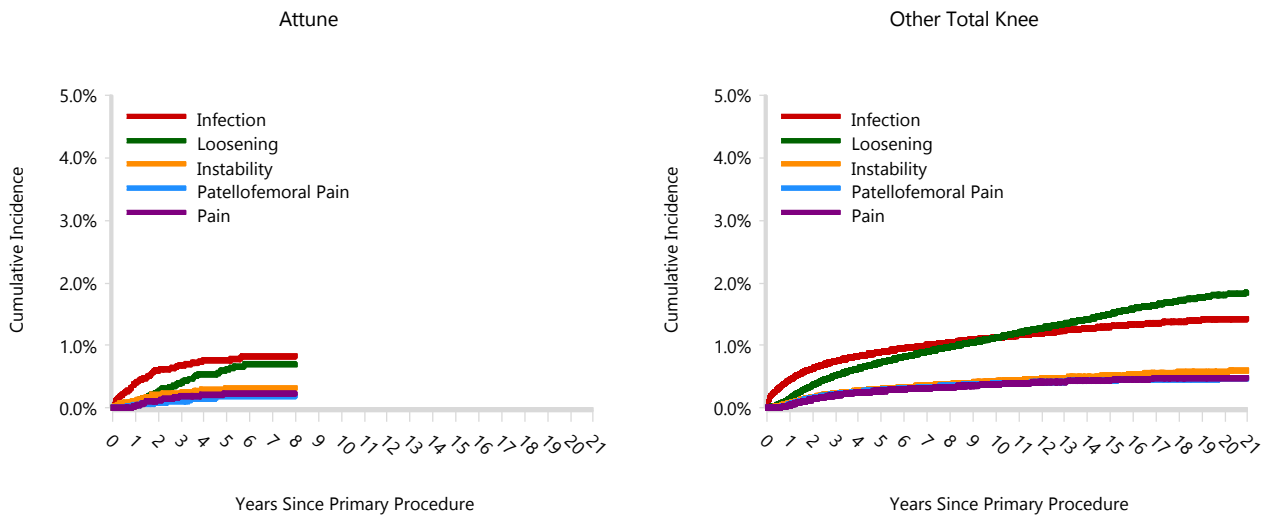


TABLE 14

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 8.8 Years)

Type of Revision	Number	Attune		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Insert Only	123	0.8	35.9	8068	0.9	26.4
TKR (Tibial/Femoral)	82	0.5	23.9	7514	0.9	24.6
Patella Only	74	0.5	21.6	5887	0.7	19.3
Insert/Patella	8	0.0	2.3	2794	0.3	9.2
Tibial Component	21	0.1	6.1	2580	0.3	8.5
Femoral Component	22	0.1	6.4	1706	0.2	5.6
Cement Spacer	12	0.1	3.5	1657	0.2	5.4
Removal of Prostheses				186	0.0	0.6
Minor Components	1	0.0	0.3	75	0.0	0.2
Total Femoral				22	0.0	0.1
Cement Only				21	0.0	0.1
Reinsertion of Components				16	0.0	0.1
N Revision	343	2.1	100.0	30526	3.5	100.0
N Primary	16130			866723		

Note: This table is restricted to revisions within 8.8 years for all groups to allow a time-matched comparison of revisions.

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

Fixation	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Cemented	336	15385	56906	0.59 (0.53, 0.66)
Hybrid (Tibial Cemented)	7	743	888	0.79 (0.32, 1.62)
Hybrid (Tibial Cementless)	0	2	1	0.00 (0.00, 287.9)
TOTAL	343	16130	57795	0.59 (0.53, 0.66)

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

Polyethylene Type	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
XLPE + Antioxidant	343	16126	57786	0.59 (0.53, 0.66)
Unknown	0	4	9	0.00 (0.00, 42.58)
TOTAL	343	16130	57795	0.59 (0.53, 0.66)

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

Bearing Mobility	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Fixed	1	12	44	2.29 (0.06, 12.76)
Rotating	342	16114	57743	0.59 (0.53, 0.66)
Unknown	0	4	9	0.00 (0.00, 42.58)
TOTAL	343	16130	57795	0.59 (0.53, 0.66)

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

Stability	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Fully Stabilised	0	1	1	0.00 (0.00, 516.2)
Minimally Stabilised	218	9522	35845	0.61 (0.53, 0.69)
Posterior Stabilised	125	6603	21940	0.57 (0.47, 0.68)
Unknown	0	4	9	0.00 (0.00, 42.58)
TOTAL	343	16130	57795	0.59 (0.53, 0.66)

Table 19: Revision Rates of Attune 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	222	12759	43176	0.51 (0.45, 0.59)
No Patella	121	3371	14619	0.83 (0.69, 0.99)
TOTAL	343	16130	57795	0.59 (0.53, 0.66)

Table 20: Revision Rates of Attune 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	140	7426	25067	0.56 (0.47, 0.66)
Non-Navigated	203	8704	32728	0.62 (0.54, 0.71)
TOTAL	343	16130	57795	0.59 (0.53, 0.66)

Table 21: Revision Rates of Attune 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	10	256	1155	0.87 (0.42, 1.59)
IDI Not Used	333	15874	56640	0.59 (0.53, 0.65)
TOTAL	343	16130	57795	0.59 (0.53, 0.66)

Table 22: Revision Rates of Attune 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	92	41	0.00 (0.00, 8.97)
Non-Robotic	343	16038	57754	0.59 (0.53, 0.66)
TOTAL	343	16130	57795	0.59 (0.53, 0.66)

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

Year of Implant	Number Revised	Total Number
2014	5	363
2015	32	1078
2016	31	1240
2017	66	1883
2018	84	2015
2019	58	2575
2020	40	2567
2021	17	2183
2022	10	2226
TOTAL	343	16130

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

Femoral	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Attune CR	218	9521	35844	0.61 (0.53, 0.69)
Attune CRS	0	7	14	0.00 (0.00, 26.03)
Attune PS	125	6601	21932	0.57 (0.47, 0.68)
Other Femoral Components*	0	1	5	0.00 (0.00, 81.07)
TOTAL	343	16130	57795	0.59 (0.53, 0.66)

*denotes femoral components distributed by other companies

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

Tibial Catalogue Number	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
150610001	0	3	13	0.00 (0.00, 28.15)
150610002	4	47	206	1.95 (0.53, 4.98)
150610003	26	541	3013	0.86 (0.56, 1.26)
150610004	50	1469	8214	0.61 (0.45, 0.80)
150610005	32	1450	8103	0.39 (0.27, 0.56)
150610006	35	1164	6468	0.54 (0.38, 0.75)
150610007	45	1074	5858	0.77 (0.56, 1.03)
150610008	20	827	4631	0.43 (0.26, 0.67)
150610009	6	217	1194	0.50 (0.18, 1.09)
150610010	3	45	242	1.24 (0.26, 3.62)
150680001	0	1	2	0.00 (0.00, 190.6)
150680002	2	83	139	1.44 (0.17, 5.21)
150680003	5	675	1385	0.36 (0.12, 0.84)
150680004	13	1842	3823	0.34 (0.18, 0.58)
150680005	28	2018	4251	0.66 (0.44, 0.95)
150680006	21	1500	3154	0.67 (0.41, 1.02)
150680007	26	1481	3250	0.80 (0.52, 1.17)
150680008	17	1170	2620	0.65 (0.38, 1.04)
150680009	9	447	1044	0.86 (0.39, 1.64)
150680010	1	76	185	0.54 (0.01, 3.02)
TOTAL	343	16130	57795	0.59 (0.53, 0.66)