



Australian  
Orthopaedic  
Association  
National  
Joint  
Replacement  
Registry

# Automated Industry Report 3042

## Depuy Synthes Australia

### Attune PS Total Knee

Report Generated: 15 September 2020

Data Period: 1 September 1999 - 14 September 2020

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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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## Attune PS Total Knee

Data Period: 1 September 1999 - 14 September 2020

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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	6091
Attune PS	150410123 - 150410226	PS Narrow Femoral Component	1910

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	108	6091	17466	0.62 (0.51, 0.75)
150410123 - 150410226	29	1910	5356	0.54 (0.36, 0.78)
<b>TOTAL</b>	<b>137</b>	<b>8001</b>	<b>22822</b>	<b>0.60 (0.50, 0.71)</b>

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

	N
<b>Implant Usage</b>	
Date First Used	13 March 2013
Date Last Used	26 August 2020
N Procedures	8001
N Patients	6827
N Hospitals Implanting	115
N Surgeons Implanting*	176
<b>Outcome</b>	
N Revised	137
N Deceased**	191

\*350 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 Primary Total Knee Replacement (All Diagnoses)**

Model	N	Minimum	Maximum	Median	Mean	Std Dev
Attune PS	8001	0.02	7.47	2.60	2.85	1.80
<b>TOTAL</b>	<b>8001</b>	<b>0.02</b>	<b>7.47</b>	<b>2.60</b>	<b>2.85</b>	<b>1.80</b>

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

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	3396	42.4%	31	95	68	68.3	9.0
Female	4605	57.6%	33	97	69	68.9	9.3
<b>TOTAL</b>	<b>8001</b>	<b>100.0%</b>	<b>31</b>	<b>97</b>	<b>69</b>	<b>68.6</b>	<b>9.1</b>

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

Age	Attune PS		Other Total Knee	
	N	Col%	N	Col%
<55	526	6.6	49678	6.8
55-64	2007	25.1	194046	26.4
65-74	3285	41.1	290421	39.5
≥75	2183	27.3	200787	27.3
<b>TOTAL</b>	<b>8001</b>	<b>100.0</b>	<b>734932</b>	<b>100.0</b>

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

Gender	Attune PS		Other Total Knee	
	N	Col%	N	Col%
Male	3396	42.4	321213	43.7
Female	4605	57.6	413719	56.3
<b>TOTAL</b>	<b>8001</b>	<b>100.0</b>	<b>734932</b>	<b>100.0</b>

**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	404	5.1	21621	5.9
2	4388	55.4	201666	54.9
3	3057	38.6	139845	38.1
4	77	1.0	4051	1.1
5	.	.	11	0.0
<b>TOTAL</b>	<b>7926</b>	<b>100.0</b>	<b>367194</b>	<b>100.0</b>

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)	19	0.3	556	0.2
Normal (18.50-24.99)	747	11.6	28647	10.4
Pre Obese (25.00-29.99)	2054	32.0	85594	31.2
Obese Class 1 (30.00-34.99)	1879	29.3	84460	30.8
Obese Class 2 (35.00-39.99)	1045	16.3	46651	17.0
Obese Class 3 (≥40.00)	672	10.5	28748	10.5
<b>TOTAL</b>	<b>6416</b>	<b>100.0</b>	<b>274656</b>	<b>100.0</b>

Note: The AOANJRR commenced collection of BMI data in 2015. 1585 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	7872	98.4	718058	97.7
Rheumatoid Arthritis	75	0.9	9153	1.2
Other Inflammatory Arthritis	23	0.3	3713	0.5
Osteonecrosis	21	0.3	2288	0.3
Tumour	1	0.0	904	0.1
Fracture	8	0.1	578	0.1
Chondrocalcinosis	.	.	18	0.0
Osteochondritis Dissecans	.	.	2	0.0
Other	1	0.0	218	0.0
<b>TOTAL</b>	<b>8001</b>	<b>100.0</b>	<b>734932</b>	<b>100.0</b>

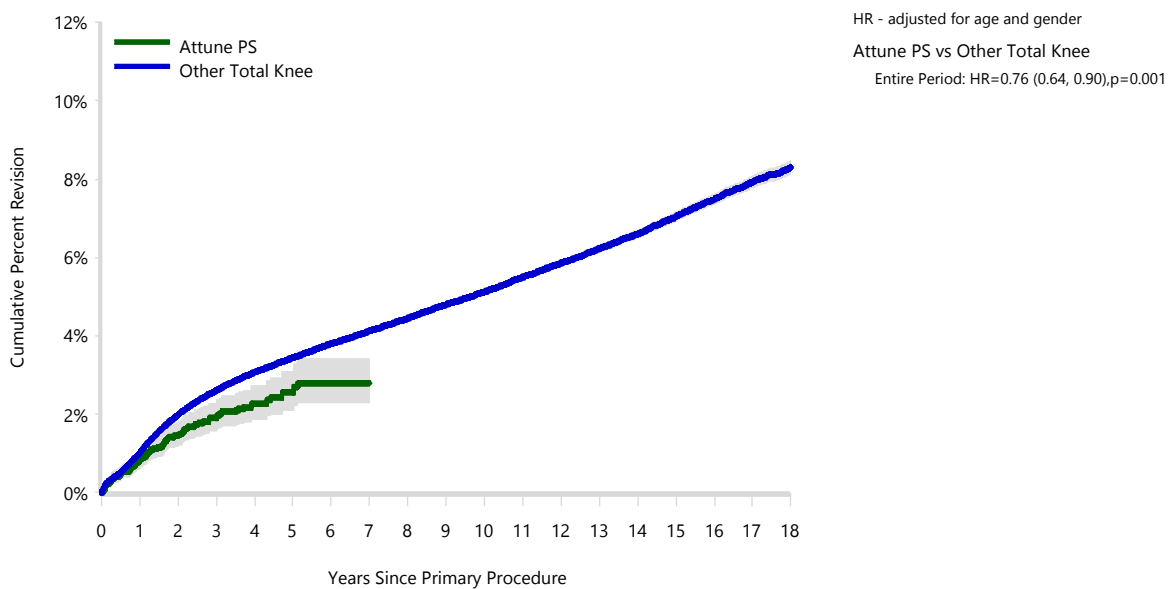
**Table 10: Revision Rates of Primary Total Knee Replacement by Model (All Diagnoses)**

Model	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Attune PS	137	8001	22822	0.60 (0.50, 0.71)
Other Total Knee	29541	734932	5064156	0.58 (0.58, 0.59)
<b>TOTAL</b>	<b>29678</b>	<b>742933</b>	<b>5086978</b>	<b>0.58 (0.58, 0.59)</b>

**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)	1.5 (1.2, 1.8)	1.9 (1.6, 2.3)	2.3 (1.9, 2.7)	2.6 (2.1, 3.1)	2.8 (2.3, 3.4)
Other Total Knee	1.0 (1.0, 1.0)	2.0 (1.9, 2.0)	2.6 (2.6, 2.6)	3.1 (3.0, 3.1)	3.4 (3.4, 3.5)	3.8 (3.8, 3.9)
CPR	7 Yrs	8 Yrs	9 Yrs	10 Yrs	11 Yrs	12 Yrs
Attune PS	2.8 (2.3, 3.4)					
Other Total Knee	4.1 (4.1, 4.2)	4.5 (4.4, 4.5)	4.8 (4.7, 4.9)	5.1 (5.1, 5.2)	5.5 (5.4, 5.6)	5.9 (5.8, 5.9)
CPR	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs
Attune PS						
Other Total Knee	6.2 (6.1, 6.3)	6.6 (6.5, 6.7)	7.0 (6.9, 7.2)	7.5 (7.4, 7.6)	7.9 (7.8, 8.1)	8.3 (8.1, 8.5)

**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	
Attune PS	8001	6593	4879	3485	2199	1282	365	69	0	
Other Total Knee	734932	680352	613845	549657	487681	428822	373187	321274	273456	
Number at Risk	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs
Attune PS	0	0	0	0	0	0	0	0	0	0
Other Total Knee	228636	187725	151382	120456	92898	70113	50748	34482	21630	11631



**TABLE 12**

**Reasons for 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 revision diagnosis as a percentage of the total number of primary procedures. 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 7.5 Years)**

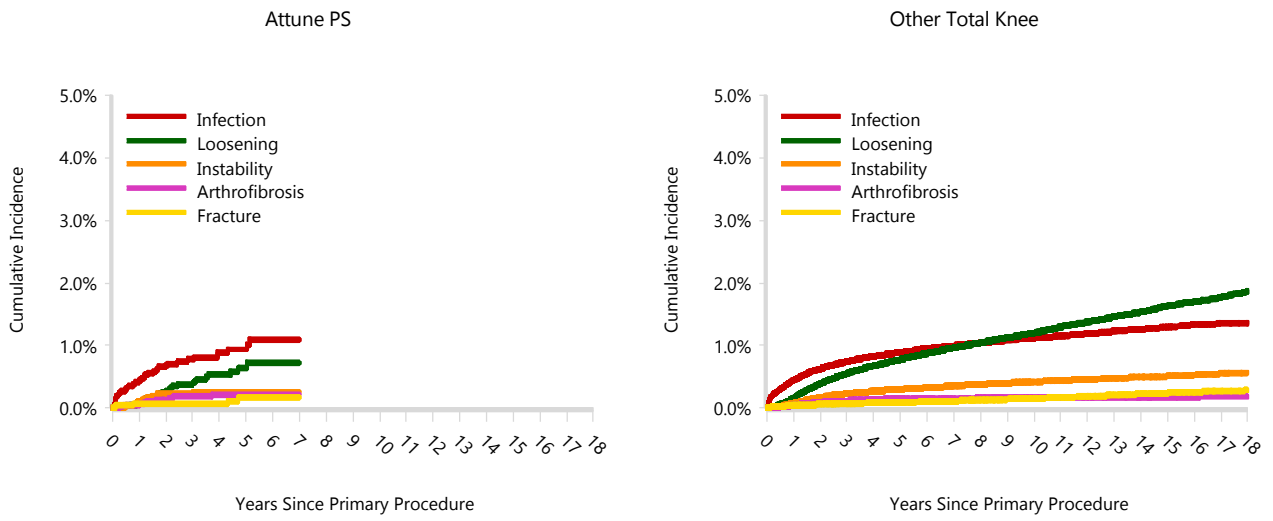
Revision Diagnosis	Number	Attune PS		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	58	0.7	42.3	6453	0.9	26.0
Loosening	30	0.4	21.9	5793	0.8	23.4
Patellofemoral Pain	2	0.0	1.5	2361	0.3	9.5
Instability	16	0.2	11.7	2175	0.3	8.8
Pain	5	0.1	3.6	2100	0.3	8.5
Patella Erosion				1327	0.2	5.4
Arthrofibrosis	12	0.1	8.8	987	0.1	4.0
Fracture	7	0.1	5.1	714	0.1	2.9
Malalignment	2	0.0	1.5	583	0.1	2.4
Metal Related Pathology				312	0.0	1.3
Incorrect Sizing				296	0.0	1.2
Lysis				273	0.0	1.1
Wear Tibial Insert				201	0.0	0.8
Patella Maltracking	1	0.0	0.7	193	0.0	0.8
Bearing Dislocation				171	0.0	0.7
Implant Breakage Patella				114	0.0	0.5
Implant Breakage Tibial Insert				103	0.0	0.4
Synovitis	1	0.0	0.7	81	0.0	0.3
Prosthesis Dislocation				69	0.0	0.3
Osteonecrosis	1	0.0	0.7	56	0.0	0.2
Implant Breakage Tibial				39	0.0	0.2
Implant Breakage Femoral				34	0.0	0.1
Tumour	1	0.0	0.7	24	0.0	0.1
Wear Patella				20	0.0	0.1
Heterotopic Bone				9	0.0	0.0
Wear Tibial				7	0.0	0.0
Wear Femoral				3	0.0	0.0
Incorrect Side				2	0.0	0.0
Progression Of Disease				2	0.0	0.0
Patella Dislocation				1	0.0	0.0
Post Operative Haematoma				1	0.0	0.0
Other	1	0.0	0.7	272	0.0	1.1
<b>N Revision</b>	<b>137</b>	<b>1.7</b>	<b>100.0</b>	<b>24776</b>	<b>3.4</b>	<b>100.0</b>
<b>N Primary</b>	<b>8001</b>			<b>734932</b>		

Note: This table is restricted to revisions within 7.5 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	58	0.4 (0.3, 0.6)	0.7 (0.5, 0.9)	0.8 (0.6, 1.0)	0.9 (0.7, 1.2)		
	Loosening	30	0.1 (0.0, 0.2)	0.3 (0.2, 0.4)	0.4 (0.2, 0.6)	0.6 (0.4, 1.0)		
	Instability	16	0.1 (0.1, 0.2)	0.2 (0.1, 0.4)	0.2 (0.1, 0.4)	0.3 (0.2, 0.4)		
	Arthrofibrosis	12	0.1 (0.0, 0.1)	0.1 (0.1, 0.3)	0.2 (0.1, 0.3)	0.2 (0.1, 0.4)		
	Fracture	7	0.1 (0.0, 0.1)	0.1 (0.0, 0.1)	0.1 (0.0, 0.1)	0.2 (0.1, 0.4)		
	Other	14	0.1 (0.0, 0.2)	0.1 (0.0, 0.2)	0.3 (0.1, 0.4)	0.3 (0.2, 0.5)		
	Deceased	191	0.4 (0.3, 0.6)	1.4 (1.1, 1.7)	2.3 (1.9, 2.7)	4.6 (3.9, 5.4)		
	All Revision	137	0.8 (0.6, 1.0)	1.5 (1.2, 1.8)	1.9 (1.6, 2.3)	2.5 (2.1, 3.0)		
	Other Total Knee	Infection	7095	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)
Loosening		7226	0.2 (0.2, 0.2)	0.4 (0.4, 0.4)	0.6 (0.5, 0.6)	0.8 (0.8, 0.8)	1.2 (1.2, 1.2)	1.6 (1.6, 1.7)
Instability		2521	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)
Arthrofibrosis		1029	0.0 (0.0, 0.0)	0.1 (0.1, 0.1)	0.1 (0.1, 0.1)	0.1 (0.1, 0.2)	0.2 (0.2, 0.2)	0.2 (0.2, 0.2)
Fracture		981	0.0 (0.0, 0.0)	0.1 (0.1, 0.1)	0.1 (0.1, 0.1)	0.1 (0.1, 0.1)	0.2 (0.1, 0.2)	0.2 (0.2, 0.3)
Other		10689	0.3 (0.2, 0.3)	0.6 (0.6, 0.7)	0.9 (0.8, 0.9)	1.2 (1.2, 1.2)	1.8 (1.7, 1.8)	2.3 (2.3, 2.4)
Deceased		11834 3	0.7 (0.7, 0.7)	1.7 (1.7, 1.7)	3.0 (2.9, 3.0)	6.4 (6.3, 6.5)	19.8 (19.7, 19.9)	37.3 (37.1, 37.6)
All Revision		29541	1.0 (1.0, 1.0)	2.0 (1.9, 2.0)	2.6 (2.5, 2.6)	3.4 (3.3, 3.4)	4.8 (4.8, 4.9)	6.2 (6.1, 6.3)

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 7.5 Years)**

Type of Revision	Number	Attune PS		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Insert Only	70	0.9	51.1	6304	0.9	25.4
TKR (Tibial/Femoral)	36	0.4	26.3	5885	0.8	23.8
Patella Only	7	0.1	5.1	5006	0.7	20.2
Tibial Component	10	0.1	7.3	2244	0.3	9.1
Insert/Patella	1	0.0	0.7	2187	0.3	8.8
Femoral Component	6	0.1	4.4	1481	0.2	6.0
Cement Spacer	6	0.1	4.4	1411	0.2	5.7
Removal of Prostheses				160	0.0	0.6
Minor Components	1	0.0	0.7	61	0.0	0.2
Cement Only				16	0.0	0.1
Total Femoral				11	0.0	0.0
Reinsertion of Components				10	0.0	0.0
<b>N Revision</b>	<b>137</b>	<b>1.7</b>	<b>100.0</b>	<b>24776</b>	<b>3.4</b>	<b>100.0</b>
<b>N Primary</b>	<b>8001</b>			<b>734932</b>		

Note: This table is restricted to revisions within 7.5 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	137	7999	22821	0.60 (0.50, 0.71)
Hybrid (Tibial Cementless)	0	2	1	0.00 (0.00, 335.2)
<b>TOTAL</b>	<b>137</b>	<b>8001</b>	<b>22822</b>	<b>0.60 (0.50, 0.71)</b>

**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 + Antioxidant	137	8001	22822	0.60 (0.50, 0.71)
<b>TOTAL</b>	<b>137</b>	<b>8001</b>	<b>22822</b>	<b>0.60 (0.50, 0.71)</b>

**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	77	3977	13611	0.57 (0.45, 0.71)
Rotating	60	4024	9210	0.65 (0.50, 0.84)
<b>TOTAL</b>	<b>137</b>	<b>8001</b>	<b>22822</b>	<b>0.60 (0.50, 0.71)</b>

**Table 18: 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	122	7635	21389	0.57 (0.47, 0.68)
No Patella	15	366	1433	1.05 (0.59, 1.73)
<b>TOTAL</b>	<b>137</b>	<b>8001</b>	<b>22822</b>	<b>0.60 (0.50, 0.71)</b>

**Table 19: 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	41	3118	7399	0.55 (0.40, 0.75)
Non-Navigated	96	4883	15423	0.62 (0.50, 0.76)
<b>TOTAL</b>	<b>137</b>	<b>8001</b>	<b>22822</b>	<b>0.60 (0.50, 0.71)</b>

**Table 20: 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	84	219	0.91 (0.11, 3.30)
IDI Not Used	135	7917	22603	0.60 (0.50, 0.71)
<b>TOTAL</b>	<b>137</b>	<b>8001</b>	<b>22822</b>	<b>0.60 (0.50, 0.71)</b>

**Table 21: 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	2	1	0.00 (0.00, 300.1)
Non-Robotic	137	7999	22820	0.60 (0.50, 0.71)
<b>TOTAL</b>	<b>137</b>	<b>8001</b>	<b>22822</b>	<b>0.60 (0.50, 0.71)</b>

**Table 22: Number of Revisions of Attune PS Primary Total Knee Replacement by Year of Implant (All Diagnoses)**

Year of Implant	Number Revised	Total Number
2013	1	154
2014	8	564
2015	29	931
2016	20	1048
2017	34	1353
2018	27	1365
2019	17	1776
2020	1	810
<b>TOTAL</b>	<b>137</b>	<b>8001</b>

**Table 23: 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	137	8001	22822	0.60 (0.50, 0.71)
<b>TOTAL</b>	<b>137</b>	<b>8001</b>	<b>22822</b>	<b>0.60 (0.50, 0.71)</b>



**Table 24: 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)
150410102	0	8	18	0.00 (0.00, 20.44)
150410103	1	111	377	0.27 (0.01, 1.48)
150410104	8	340	1113	0.72 (0.31, 1.42)
150410105	5	540	1602	0.31 (0.10, 0.73)
150410106	9	629	1873	0.48 (0.22, 0.91)
150410107	14	664	1859	0.75 (0.41, 1.26)
150410108	7	404	1030	0.68 (0.27, 1.40)
150410109	1	126	321	0.31 (0.01, 1.74)
150410110	1	19	50	2.01 (0.05, 11.20)
150410123	0	16	50	0.00 (0.00, 7.41)
150410124	3	160	452	0.66 (0.14, 1.94)
150410125	4	342	1020	0.39 (0.11, 1.00)
150410126	7	374	971	0.72 (0.29, 1.48)
150410201	0	2	7	0.00 (0.00, 55.81)
150410202	0	6	15	0.00 (0.00, 25.21)
150410203	2	123	385	0.52 (0.06, 1.88)
150410204	3	380	1178	0.25 (0.05, 0.74)
150410205	11	640	1905	0.58 (0.29, 1.03)
150410206	15	688	2053	0.73 (0.41, 1.20)
150410207	18	776	2079	0.87 (0.51, 1.37)
150410208	7	474	1213	0.58 (0.23, 1.19)
150410209	5	135	327	1.53 (0.50, 3.57)
150410210	1	26	61	1.63 (0.04, 9.07)
150410223	0	23	67	0.00 (0.00, 5.51)
150410224	2	149	475	0.42 (0.05, 1.52)
150410225	7	437	1255	0.56 (0.22, 1.15)
150410226	6	409	1066	0.56 (0.21, 1.22)
<b>TOTAL</b>	<b>137</b>	<b>8001</b>	<b>22822</b>	<b>0.60 (0.50, 0.71)</b>