



Australian
Orthopaedic
Association
National
Joint
Replacement
Registry

Automated Industry Report 3041

Depuy Synthes Australia

Attune CR Total Knee

Report Generated: 15 September 2020

Data Period: 1 September 1999 - 14 September 2020

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 CR 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 CR Femoral Components included in this analysis

Model	Catalogue Range	Range Description	No. of Primary Procedures
Attune CR	150400101 - 150400210	CR Femoral Component	13003
Attune CR	150400123 - 150400226	CR Narrow Femoral Component	3807

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

Model	Catalogue Range	Range Description
Attune CR	150401103 - 150401226	CR Femoral Component Porocoat

Table 1: Revision Rates of Attune CR 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)
150400101 - 150400210	256	13003	37428	0.68 (0.60, 0.77)
150400123 - 150400226	75	3807	10873	0.69 (0.54, 0.86)
TOTAL	331	16810	48301	0.69 (0.61, 0.76)

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

	N
Implant Usage	
Date First Used	12 February 2013
Date Last Used	31 August 2020
N Procedures	16810
N Patients	14238
N Hospitals Implanting	167
N Surgeons Implanting*	224
Outcome	
N Revised	331
N Deceased**	346

*475 Attune CR procedures have unknown surgeon

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

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

Model	N	Minimum	Maximum	Median	Mean	Std Dev
Attune CR	16810	0.01	7.59	2.77	2.87	1.68
TOTAL	16810	0.01	7.59	2.77	2.87	1.68

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

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	7669	45.6%	30	95	68	67.8	8.8
Female	9141	54.4%	18	96	69	68.3	9.1
TOTAL	16810	100.0%	18	96	68	68.1	9.0

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

Age	Attune CR		Other Total Knee	
	N	Col%	N	Col%
<55	1154	6.9	49050	6.8
55-64	4533	27.0	191520	26.4
65-74	6963	41.4	286743	39.5
≥75	4160	24.7	198810	27.4
TOTAL	16810	100.0	726123	100.0

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

Gender	Attune CR		Other Total Knee	
	N	Col%	N	Col%
Male	7669	45.6	316940	43.6
Female	9141	54.4	409183	56.4
TOTAL	16810	100.0	726123	100.0

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

ASA Grade	Attune CR		Other Total Knee	
	N	Col%	N	Col%
1	919	5.5	21106	5.9
2	9256	55.2	196798	54.9
3	6403	38.2	136499	38.1
4	181	1.1	3947	1.1
5	.	.	11	0.0
TOTAL	16759	100.0	358361	100.0

Note: The AOANJRR commenced collection of ASA data in 2013. 51 Attune CR 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 CR		Other Total Knee	
	N	Col%	N	Col%
Underweight (<18.50)	36	0.3	539	0.2
Normal (18.50-24.99)	1347	9.6	28047	10.5
Pre Obese (25.00-29.99)	4332	30.8	83316	31.2
Obese Class 1 (30.00-34.99)	4438	31.5	81901	30.7
Obese Class 2 (35.00-39.99)	2554	18.1	45142	16.9
Obese Class 3 (\geq 40.00)	1370	9.7	28050	10.5
TOTAL	14077	100.0	266995	100.0

Note: The AOANJRR commenced collection of BMI data in 2015. 2733 Attune CR procedures with no BMI recorded are excluded from this table

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

Primary Diagnosis	Attune CR		Other Total Knee	
	N	Col%	N	Col%
Osteoarthritis	16606	98.8	709324	97.7
Rheumatoid Arthritis	107	0.6	9121	1.3
Other Inflammatory Arthritis	47	0.3	3689	0.5
Osteonecrosis	43	0.3	2266	0.3
Tumour	.	.	905	0.1
Fracture	3	0.0	583	0.1
Chondrocalcinosis	.	.	18	0.0
Osteochondritis Dissecans	.	.	2	0.0
Other	4	0.0	215	0.0
TOTAL	16810	100.0	726123	100.0

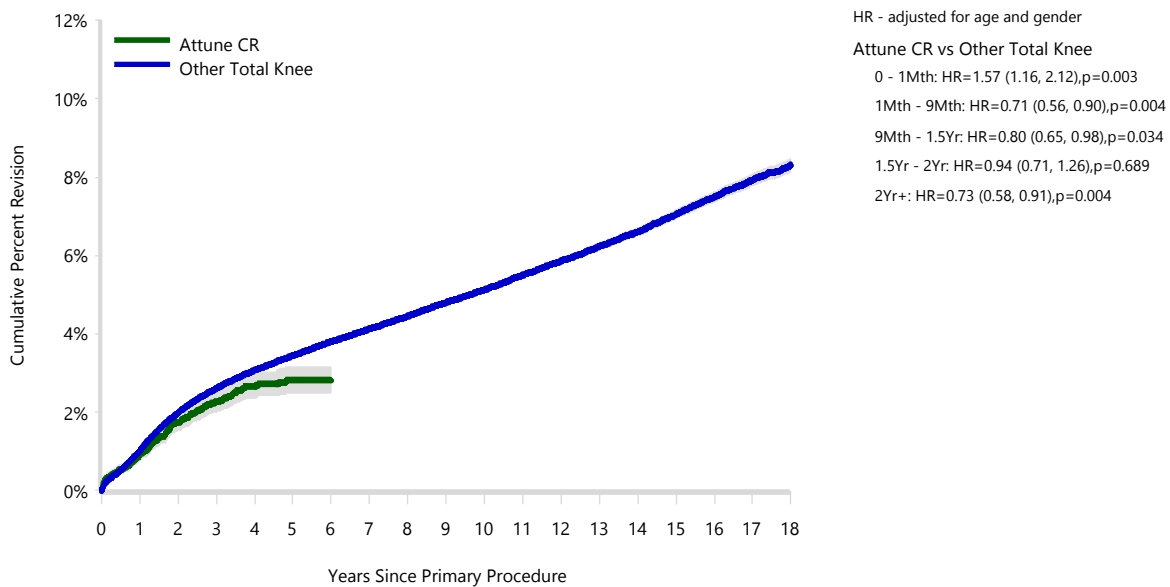
Table 10: Revision Rates of Primary Total Knee Replacement by Model (All Diagnoses)

Model	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Attune CR	331	16810	48301	0.69 (0.61, 0.76)
Other Total Knee	29347	726123	5038677	0.58 (0.58, 0.59)
TOTAL	29678	742933	5086978	0.58 (0.58, 0.59)

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 CR	0.9 (0.8, 1.1)	1.7 (1.5, 2.0)	2.3 (2.0, 2.5)	2.7 (2.4, 3.0)	2.8 (2.5, 3.2)	2.8 (2.5, 3.2)
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 CR						
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 CR						
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 CR	16810	14177	10847	7638	4615	2340	364	30	0	
Other Total Knee	726123	672768	607877	545504	485265	427764	373188	321313	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 CR	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 7.6 Years)

Revision Diagnosis	Number	Attune CR		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	120	0.7	36.3	6408	0.9	26.0
Loosening	56	0.3	16.9	5791	0.8	23.5
Patellofemoral Pain	22	0.1	6.6	2353	0.3	9.5
Instability	28	0.2	8.5	2173	0.3	8.8
Pain	32	0.2	9.7	2078	0.3	8.4
Patella Erosion	22	0.1	6.6	1316	0.2	5.3
Arthrofibrosis	23	0.1	6.9	979	0.1	4.0
Fracture	5	0.0	1.5	718	0.1	2.9
Malalignment	3	0.0	0.9	585	0.1	2.4
Metal Related Pathology	2	0.0	0.6	311	0.0	1.3
Incorrect Sizing	4	0.0	1.2	292	0.0	1.2
Lysis	1	0.0	0.3	276	0.0	1.1
Wear Tibial Insert				205	0.0	0.8
Patella Maltracking	3	0.0	0.9	191	0.0	0.8
Bearing Dislocation	1	0.0	0.3	170	0.0	0.7
Implant Breakage Patella				115	0.0	0.5
Implant Breakage Tibial Insert	1	0.0	0.3	102	0.0	0.4
Synovitis	1	0.0	0.3	81	0.0	0.3
Prosthesis Dislocation				69	0.0	0.3
Osteonecrosis				57	0.0	0.2
Implant Breakage Tibial				39	0.0	0.2
Implant Breakage Femoral				34	0.0	0.1
Tumour				25	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	7	0.0	2.1	266	0.0	1.1
N Revision	331	2.0	100.0	24679	3.4	100.0
N Primary	16810			726123		

Note: This table is restricted to revisions within 7.6 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 CR	Infection	120	0.5 (0.4, 0.6)	0.7 (0.6, 0.8)	0.8 (0.7, 0.9)	0.9 (0.7, 1.1)		
	Loosening	56	0.1 (0.0, 0.1)	0.2 (0.2, 0.3)	0.4 (0.3, 0.5)	0.6 (0.4, 0.7)		
	Pain	32	0.0 (0.0, 0.1)	0.2 (0.1, 0.2)	0.2 (0.2, 0.3)	0.3 (0.2, 0.4)		
	Instability	28	0.1 (0.0, 0.1)	0.1 (0.1, 0.2)	0.2 (0.1, 0.3)	0.3 (0.2, 0.4)		
	Arthrofibrosis	23	0.0 (0.0, 0.1)	0.1 (0.1, 0.2)	0.2 (0.1, 0.3)	0.2 (0.1, 0.3)		
	Other	72	0.2 (0.1, 0.3)	0.4 (0.3, 0.5)	0.5 (0.4, 0.6)	0.6 (0.5, 0.8)		
	Deceased	346	0.4 (0.3, 0.5)	1.0 (0.9, 1.2)	2.1 (1.8, 2.4)	4.1 (3.7, 4.6)		
	All Revision	331	0.9 (0.8, 1.1)	1.7 (1.5, 2.0)	2.2 (2.0, 2.5)	2.8 (2.5, 3.1)		
Other Total Knee	Infection	7033	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	7200	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)
	Pain	2355	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)
	Instability	2509	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	1018	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)
	Other	9232	0.3 (0.2, 0.3)	0.5 (0.5, 0.6)	0.7 (0.7, 0.7)	1.0 (1.0, 1.0)	1.5 (1.5, 1.6)	2.1 (2.0, 2.2)
	Deceased	11818	0.7 (0.7, 0.8)	1.7 (1.7, 1.8)	3.0 (3.0, 3.0)	6.4 (6.4, 6.5)	19.8 (19.7, 20.0)	37.4 (37.1, 37.6)
	All Revision	29347	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)

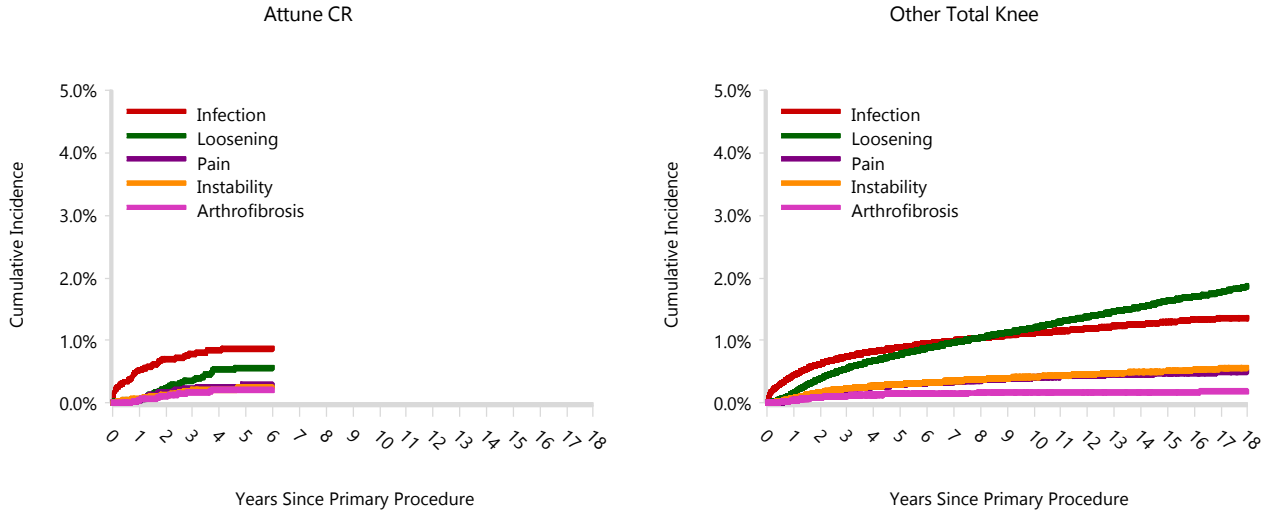


TABLE 14

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 7.6 Years)

Type of Revision	Number	Attune CR		Other Total Knee		
		% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Insert Only	120	0.7	36.3	6274	0.9	25.4
TKR (Tibial/Femoral)	67	0.4	20.2	5884	0.8	23.8
Patella Only	65	0.4	19.6	4963	0.7	20.1
Tibial Component	21	0.1	6.3	2238	0.3	9.1
Insert/Patella	23	0.1	6.9	2187	0.3	8.9
Femoral Component	13	0.1	3.9	1476	0.2	6.0
Cement Spacer	17	0.1	5.1	1403	0.2	5.7
Removal of Prostheses	3	0.0	0.9	157	0.0	0.6
Minor Components	2	0.0	0.6	60	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
N Revision	331	2.0	100.0	24679	3.4	100.0
N Primary	16810			726123		

Note: This table is restricted to revisions within 7.6 years for all groups to allow a time-matched comparison of revisions.

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

Fixation	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Cemented	331	16808	48296	0.69 (0.61, 0.76)
Hybrid (Tibial Cemented)	0	2	5	0.00 (0.00, 71.14)
TOTAL	331	16810	48301	0.69 (0.61, 0.76)

Table 16: Revision Rates of Attune CR 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, 181.8)
XLPE + Antioxidant	331	16807	48295	0.69 (0.61, 0.76)
Unknown	0	2	3	0.00 (0.00, 108.0)
TOTAL	331	16810	48301	0.69 (0.61, 0.76)

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

Bearing Mobility	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Fixed	208	10305	31161	0.67 (0.58, 0.76)
Rotating	123	6503	17136	0.72 (0.60, 0.86)
Unknown	0	2	3	0.00 (0.00, 108.0)
TOTAL	331	16810	48301	0.69 (0.61, 0.76)

Table 18: Revision Rates of Attune CR 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	181	11789	31891	0.57 (0.49, 0.66)
No Patella	150	5021	16410	0.91 (0.77, 1.07)
TOTAL	331	16810	48301	0.69 (0.61, 0.76)

Table 19: Revision Rates of Attune CR 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	88	4886	11677	0.75 (0.60, 0.93)
Non-Navigated	243	11924	36624	0.66 (0.58, 0.75)
TOTAL	331	16810	48301	0.69 (0.61, 0.76)

Table 20: Revision Rates of Attune CR 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	12	674	1533	0.78 (0.40, 1.37)
IDI Not Used	319	16136	46768	0.68 (0.61, 0.76)
TOTAL	331	16810	48301	0.69 (0.61, 0.76)

Table 21: Revision Rates of Attune CR 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	2	0.00 (0.00, 202.9)
Non-Robotic	331	16808	48299	0.69 (0.61, 0.76)
TOTAL	331	16810	48301	0.69 (0.61, 0.76)

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

Year of Implant	Number Revised	Total Number
2013	2	83
2014	36	919
2015	45	2218
2016	62	2489
2017	75	3175
2018	73	3158
2019	33	3276
2020	5	1492
TOTAL	331	16810

Table 23: Revision Rates of Attune CR Primary Total Knee Replacement by Tibial Component (All Diagnoses)

Tibial	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Attune	331	16807	48289	0.69 (0.61, 0.76)
Custom Made (Depuy)	0	2	9	0.00 (0.00, 39.50)
Other Tibial Components*	0	1	2	0.00 (0.00, 181.8)
TOTAL	331	16810	48301	0.69 (0.61, 0.76)

*denotes tibial components distributed by other companies

Table 24: Revision Rates of Attune CR 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)
150400101	0	1	5	0.00 (0.00, 74.15)
150400102	0	9	33	0.00 (0.00, 11.35)
150400103	3	110	348	0.86 (0.18, 2.52)
150400104	14	549	1668	0.84 (0.46, 1.41)
150400105	17	1013	3083	0.55 (0.32, 0.88)
150400106	30	1159	3224	0.93 (0.63, 1.33)
150400107	28	1647	4662	0.60 (0.40, 0.87)
150400108	30	1123	3121	0.96 (0.65, 1.37)
150400109	6	366	1017	0.59 (0.22, 1.28)
150400110	2	103	304	0.66 (0.08, 2.38)
150400123	0	26	86	0.00 (0.00, 4.31)
150400124	5	200	553	0.90 (0.29, 2.11)
150400125	15	667	1846	0.81 (0.45, 1.34)
150400126	17	894	2621	0.65 (0.38, 1.04)
150400201	0	1	4	0.00 (0.00, 84.53)
150400202	0	5	17	0.00 (0.00, 21.95)
150400203	3	138	373	0.80 (0.17, 2.35)
150400204	17	572	1745	0.97 (0.57, 1.56)
150400205	23	1144	3313	0.69 (0.44, 1.04)
150400206	23	1313	3817	0.60 (0.38, 0.90)
150400207	30	1831	5170	0.58 (0.39, 0.83)
150400208	18	1317	3856	0.47 (0.28, 0.74)
150400209	6	478	1356	0.44 (0.16, 0.96)
150400210	6	124	313	1.92 (0.70, 4.17)
150400223	2	27	75	2.66 (0.32, 9.61)
150400224	3	203	606	0.50 (0.10, 1.45)
150400225	13	764	2142	0.61 (0.32, 1.04)
150400226	20	1026	2944	0.68 (0.41, 1.05)
TOTAL	331	16810	48301	0.69 (0.61, 0.76)