ML Taper Kinectiv Total Conventional Hip Investigation

Note: This analysis compares the ML Taper Kinectiv femoral stem prosthesis with all other total conventional hip prostheses.

This prosthesis has been identified as having a significantly higher rate of revision. For a detailed explanation of the process used by the Registry that results in identification of prostheses that have a higher than anticipated rate of revision please refer to the Prostheses with Higher than Anticipated Rates of Revision chapter of the most recent AOANJRR Annual Report, https://aoanjrr.sahmri.com/annual-reports-2023.

Note: Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator. Procedures using prostheses with no recorded use in 2022 are excluded from the comparator.

TABLE 1

Revision Rate of Primary Total Conventional Hip Replacement

The revision rate of the ML Taper Kinectiv total conventional hip prosthesis is compared to all other total conventional hip prostheses.

Table 1: Revision Rates of Primary Total Conventional Hip Replacement

Component	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
ML Taper Kinectiv	205	3532	31690	0.65 (0.56, 0.74)
Other Total Conventional Hip	17452	494145	3081462	0.57 (0.56, 0.57)
TOTAL	**17657**	**497677**	**3113152**	**0.57 (0.56, 0.58)**

Note: Prostheses no longer used in 2022 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

TABLE 2

Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement

The yearly cumulative percent revision of the ML Taper Kinectiv total conventional hip prosthesis is compared to all other total conventional hip prostheses.

Table 2: Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement

CPR	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs	7 Yrs	8 Yrs
ML Taper Kinectiv	2.4 (2.0, 3.0)	3.2 (2.7, 3.9)	3.5 (3.0, 4.2)	4.0 (3.4, 4.7)	4.3 (3.7, 5.0)	4.6 (3.9, 5.3)	5.0 (4.4, 5.8)	5.4 (4.7, 6.2)
Other Total Conventional Hip	1.7 (1.7, 1.8)	2.2 (2.1, 2.2)	2.5 (2.5, 2.6)	2.8 (2.7, 2.8)	3.1 (3.0, 3.1)	3.4 (3.3, 3.4)	3.6 (3.6, 3.7)	3.9 (3.9, 4.0)

CPR	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs
ML Taper Kinectiv	5.7 (5.0, 6.6)	6.1 (5.3, 7.0)	6.4 (5.5, 7.3)	6.7 (5.8, 7.7)	7.1 (6.1, 8.3)		
Other Total Conventional Hip	4.3 (4.2, 4.3)	4.6 (4.5, 4.7)	4.9 (4.8, 5.0)	5.3 (5.2, 5.4)	5.7 (5.6, 5.8)	6.1 (6.0, 6.2)	6.5 (6.4, 6.6)

CPR	16 Yrs	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs	22 Yrs
ML Taper Kinectiv							
Other Total Conventional Hip	6.9 (6.8, 7.1)	7.3 (7.1, 7.4)	7.6 (7.4, 7.8)	8.2 (8.0, 8.5)	8.5 (8.2, 8.8)	8.9 (8.5, 9.3)	9.3 (8.8, 9.8)

Note: Prostheses no longer used in 2022 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

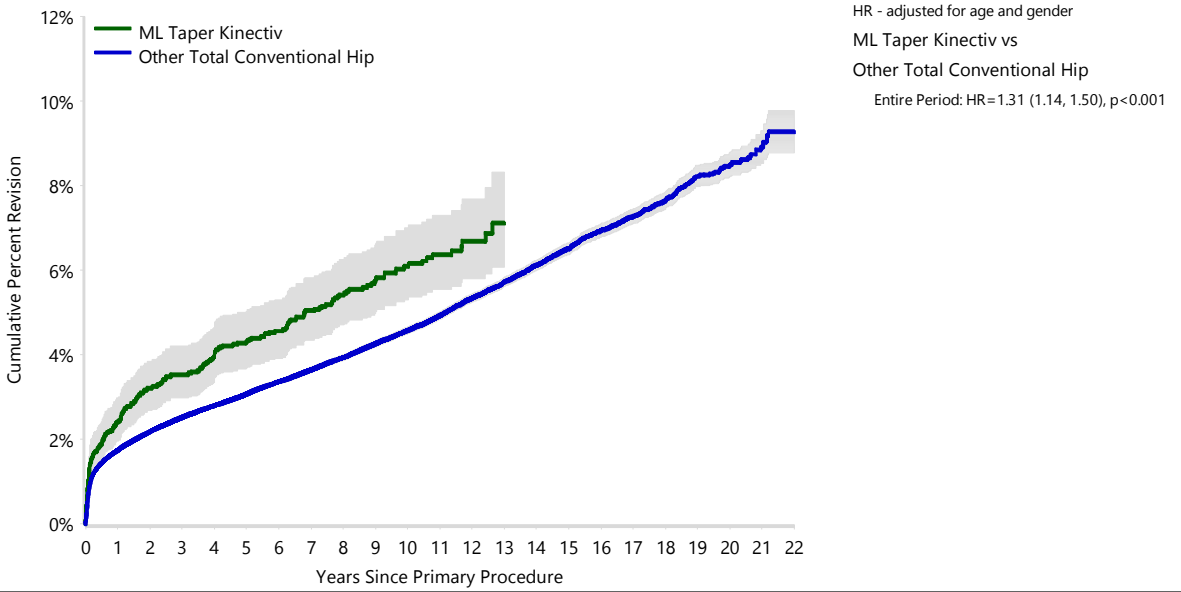
FIGURE 1

Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement

The yearly cumulative percent revision of the ML Taper Kinectiv total conventional hip prosthesis is compared to all other total conventional hip prostheses. In addition, hazard ratios are reported.

Hazard ratios are reported for specific time periods during which the hazard ratio is constant. This is done to enable more specific and valid comparisons of the risk of revision over time. The pattern of variation in risk has important implications with respect to the underlying reasons for any difference.

Figure 1: Cumulative Percent Revision of Primary Total Conventional Hip Replacement



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	11 Yrs
ML Taper Kinectiv	3532	3415	3352	3301	3240	3106	2891	2635	2325	1968	1596	1152
Other Total Conventional Hip	494145	437500	388717	344220	299660	258064	219311	183514	151369	124924	102632	83483

Number at Risk	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs	22 Yrs
ML Taper Kinectiv	702	245	21	0	0	0	0	0	0	0	0
Other Total Conventional Hip	66659	51987	39538	29740	22330	16535	11402	7013	3737	1435	252

Note: Prostheses no longer used in 2022 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

TABLE 3

Primary Diagnosis for Revised Primary Total Conventional Hip Replacement

This table identifies the diagnosis of the primary procedure which was subsequently revised. This information is provided as there is a variation on outcome depending on the primary diagnosis. It is therefore important when considering the reasons for a higher than anticipated rate of revision that there is identification of the primary diagnosis. This information should be compared to the primary diagnosis for the revisions of all other total conventional hip prostheses.

Table 3: Primary Diagnosis for Revised Primary Total Conventional Hip Replacement

	ML Taper Kinectiv		Other Total Conventional Hip	
Primary Diagnosis	Number	Percent	Number	Percent
Osteoarthritis	183	89.3	14432	82.7
Fractured Neck Of Femur	7	3.4	1291	7.4
Osteonecrosis	5	2.4	797	4.6
Developmental Dysplasia	6	2.9	279	1.6
Rheumatoid Arthritis	1	0.5	186	1.1
Failed Internal Fixation			147	0.8
Tumour	1	0.5	145	0.8
Other Inflammatory Arthritis	1	0.5	99	0.6
Fracture/Dislocation	1	0.5	46	0.3
Arthrodesis Takedown			16	0.1
Other			14	0.1
TOTAL	**205**	**100.0**	**17452**	**100.0**

Note: Prostheses no longer used in 2022 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

TABLE 4

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 4: Primary Total Conventional Hip Replacement - Reason for Revision (Follow-up Limited to 14.7 Years)

	ML Taper Kinectiv			Other Total Conventional Hip		
Revision Diagnosis	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	25	0.7	12.2	3968	0.8	23.2
Prosthesis Dislocation/Instability	67	1.9	32.7	3967	0.8	23.2
Fracture	48	1.4	23.4	3722	0.8	21.8
Loosening	20	0.6	9.8	3417	0.7	20.0
Pain	6	0.2	2.9	305	0.1	1.8
Leg Length Discrepancy	5	0.1	2.4	270	0.1	1.6
Malposition	6	0.2	2.9	243	0.0	1.4
Lysis	3	0.1	1.5	173	0.0	1.0
Implant Breakage Stem	2	0.1	1.0	159	0.0	0.9
Implant Breakage Acetabular Insert	2	0.1	1.0	118	0.0	0.7
Incorrect Sizing	1	0.0	0.5	102	0.0	0.6
Wear Acetabular Insert				86	0.0	0.5
Implant Breakage Acetabular	1	0.0	0.5	68	0.0	0.4
Metal Related Pathology	17	0.5	8.3	68	0.0	0.4
Wear Head				44	0.0	0.3
Tumour	1	0.0	0.5	40	0.0	0.2
Implant Breakage Head				30	0.0	0.2
Heterotopic Bone				26	0.0	0.2
Wear Acetabulum				9	0.0	0.1
Progression Of Disease				2	0.0	0.0
Osteonecrosis				1	0.0	0.0
Synovitis				1	0.0	0.0
Other	1	0.0	0.5	257	0.1	1.5
N Revision	**205**	**5.8**	**100.0**	**17076**	**3.5**	**100.0**
N Primary	**3532**			**494145**		

Note: This table is restricted to revisions within 14.7 years for all groups to allow a time-matched comparison of revisions.
Note: Prostheses no longer used in 2022 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

FIGURE 2

Cumulative Incidence Revision Diagnosis of Primary Total Conventional Hip Replacement

This figure details the cumulative incidence of the most common reasons for revision. The five most common reasons for revision are included as long as each of these reasons account for more than 10 procedures or at least 5% of all revisions for the ML Taper Kinectiv total conventional hip prosthesis. A comparative graph is provided of the cumulative incidence for the same reasons for revisions for all other total conventional hip prostheses.

Figure 2: Cumulative Incidence Revision Diagnosis for Primary Total Conventional Hip Replacement

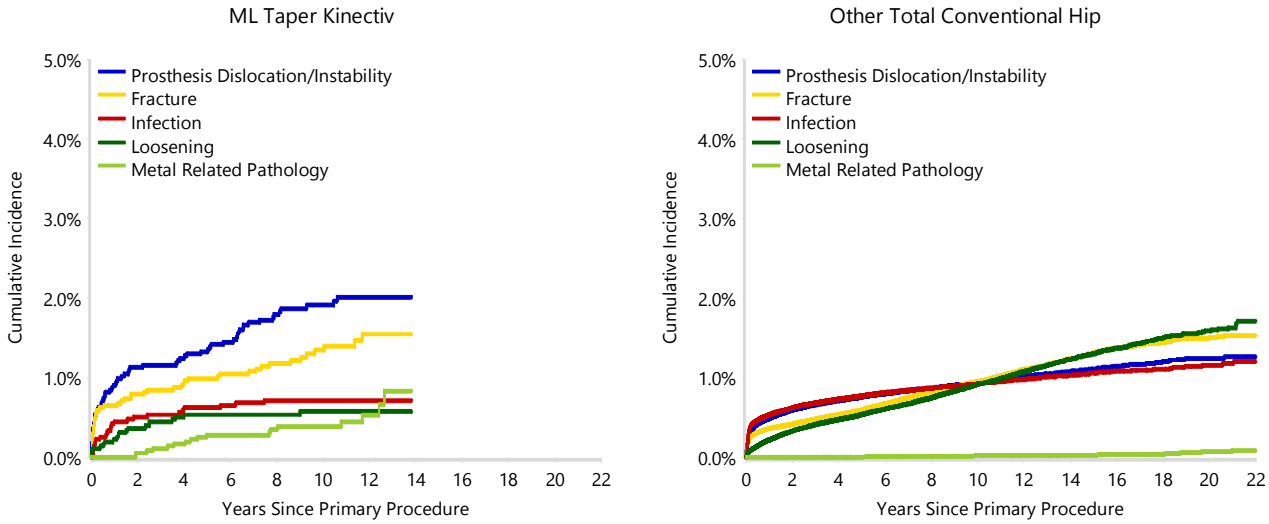


TABLE 5

Type of Revision Performed for Primary Total Conventional Hip Replacement

This analysis identifies the components used in the revision of the ML Taper Kinectiv total conventional hip prosthesis and compares it to the components used in the revision of all other total conventional hip prostheses.

The reason this analysis is undertaken is to identify whether there is one or more components which are being replaced that differ from the components replaced for revisions of all other total conventional hip prostheses i.e. is there a difference in the type of revision undertaken for the ML Taper Kinectiv total conventional hip prosthesis compared to all other total conventional hip prostheses.

Table 5: Primary Total Conventional Hip Replacement - Type of Revision (Follow-up Limited to 14.7 Years)

	ML Taper Kinectiv		Other Total Conventional Hip	
Type of Revision	Number	Percent	Number	Percent
Femoral Component	68	33.2	5591	32.7
Acetabular Component	33	16.1	3212	18.8
THR (Femoral/Acetabular)	12	5.9	1952	11.4
Cement Spacer	10	4.9	613	3.6
Removal of Prostheses			94	0.6
Reinsertion of Components			27	0.2
Total Femoral			8	0.0
Bipolar Head and Femoral			5	0.0
Saddle			1	0.0
N Major	**123**	**60.0**	**11503**	**67.4**
Head/Insert	12	5.9	4256	24.9
Head Only	5	2.4	841	4.9
Minor Components	2	1.0	293	1.7
Insert Only	2	1.0	179	1.0
Head/Neck/Insert	41	20.0		
Head/Neck	16	7.8	1	0.0
Neck Only	4	2.0		
Bipolar Only			2	0.0
Cement Only			1	0.0
N Minor	**82**	**40.0**	**5573**	**32.6**
TOTAL	**205**	**100.0**	**17076**	**100.0**

Note: This table is restricted to revisions within 14.7 years for all groups to allow a time-matched comparison of revisions.
Note: Prostheses no longer used in 2022 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

TABLE 6

Revision Rates of ML Taper Kinectiv Primary Total Conventional Hip Replacement by Fixation

This analysis is provided as some prostheses have more than one fixation option. Additionally there are prostheses where an alternative to the recommended approach to fixation was used e.g. a cementless prosthesis that has been cemented or vice-versa.

Table 6: Revised Number of ML Taper Kinectiv Primary Total Conventional Hip Replacement by Fixation

Fixation	N Revised	N Total
Cementless	201	3510
Hybrid (Femur Cemented)	0	2
Reverse Hybrid (Femur Cementless)	4	20
TOTAL	**205**	**3532**

TABLE 7

Revision Rates of ML Taper Kinectiv Primary Total Conventional Hip Replacement by Bearing Surface

This analysis is provided as some prostheses are combined with a variety of bearing surfaces. All bearing surfaces used with this prosthesis are listed.

Table 7: Revised Number of ML Taper Kinectiv Primary Total Conventional Hip Replacement by Bearing Surface

Bearing Surface	N Revised	N Total
Ceramic/Ceramic	17	429
Ceramic/Non XLPE	1	1
Ceramic/XLPE	48	1104
Ceramic/XLPE + Antioxidant	3	36
Metal/Metal	40	295
Metal/Non XLPE	0	6
Metal/XLPE	93	1618
Metal/XLPE + Antioxidant	3	43
TOTAL	**205**	**3532**

TABLE 8

Revision Rates of ML Taper Kinectiv Primary Total Conventional Hip Replacement by Approach

This analysis is provided as some prostheses are used with a variety of surgical approaches. All surgical approaches used with this prosthesis are listed.

Table 8: Revised Number of ML Taper Kinectiv Primary Total Conventional Hip Replacement by Approach

Approach	N Revised	N Total
Anterior	0	37
Lateral	7	109
Posterior	22	471
TOTAL	**29**	**617**

Note: Excludes 2915 procedures with no approach recorded

TABLE 9

Revision Rates of Primary Total Conventional Hip Replacement by State

This enables a state by state variation to be identified for the ML Taper Kinectiv total conventional hip prosthesis and provides the comparative data for each of the states for all other total conventional hip prostheses.

The purpose of this analysis is to determine if the higher than anticipated rate of revision has widespread distribution between states. If there is widespread distribution then the reason for the higher than anticipated rate of revision is unlikely to be surgeon specific. If the prosthesis has been used in only a small number of states it is not possible to distinguish if the higher than anticipated rate of revision is related to the prosthesis, surgeon, technique or patient.

Table 9: Revised Number of Primary Total Conventional Hip Replacement by State

Component	State	N Revised	N Total
ML Taper Kinectiv	NSW	98	1308
	VIC	52	828
	QLD	32	1136
	WA	19	230
	SA	2	17
	TAS	0	6
	ACT/NT	2	7
Other Total Conventional Hip	NSW	4728	144768
	VIC	4348	128324
	QLD	3451	86927
	WA	2389	58888
	SA	1621	45638
	TAS	405	16382
	ACT/NT	510	13218
TOTAL		**17657**	**497677**

Note: Prostheses no longer used in 2022 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

TABLE 10

Number of Revisions of ML Taper Kinectiv Primary Total Conventional Hip Replacement by Year of Implant

This analysis details the number of prostheses reported each year to the Registry for the ML Taper Kinectiv total conventional hip prosthesis. It also provides the subsequent number of revisions of the primaries reported in that year.

Primary procedures performed in later years have had less follow up time therefore the number revised is expected to be less than the number revised in earlier years. For example, a primary procedure performed in 2022 has a maximum of one year to be revised, whereas a primary procedure performed in 2020 has a maximum of three years to be revised.

Table 10: Number of Revisions of ML Taper Kinectiv Primary Total Conventional Hip Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2008	7	36
2009	22	341
2010	50	647
2011	44	576
2012	18	515
2013	18	384
2014	17	345
2015	7	256
2016	8	199
2017	11	159
2018	3	74
TOTAL	**205**	**3532**

TABLE 11

Revision Rates of ML Taper Kinectiv Primary Total Conventional Hip Replacement by Catalogue Number Range

Many prostheses have a number of catalogue ranges. The catalogue range is specific to particular design features; more than one catalogue range usually indicates a minor difference in design in a particular ML Taper Kinectiv prosthesis.

This analysis has been undertaken to determine if the revision rate varies according to the catalogue number range.

Model	Catalogue Range	Catalogue Description	Cement	Material	Stem Type	Coating
Femoral Stem						
M/L Taper Kinectiv	00771300500-00771302200	PRESS FIT MODULAR FEMORAL STEM W/KINECTIV TECHNOLOGY	NO	METAL	REQUIRES FEMNECK	
M/L Taper Kinectiv	65771300500-65771302200	HA/TCP PRESS-FIT MODULAR FEMORAL STEM W/KINECTIV TECHNOLOGY	NO	METAL	REQUIRES FEMNECK	HA COATED

Table 11: Revised Number of ML Taper Kinectiv Primary Total Conventional Hip Replacement by Catalogue Number Range

Femoral Stem Range	N Revised	N Total
00771300500-00771302200	3	30
65771300500-65771302200	202	3502
TOTAL	**205**	**3532**

TABLE 12

Revision Rates of ML Taper Kinectiv Primary Total Conventional Hip Replacement by Component

A prosthesis may be combined with multiple components. This analysis has been undertaken to determine if the revision rate varies according to the component with which it is combined.

Table 12: Revised Number of ML Taper Kinectiv Primary Total Conventional Hip Replacement by Acetabular Component

Acetabular Component	N Revised	N Total
Adept	0	1
Allofit	11	243
Avantage	3	10
Continuum	106	2246
DeltaMotion	0	11
Durom	6	17
Exceed	3	110
Exeter Contemporary	0	1
FMP	0	1
Fitmore	45	447
G7	0	5
Low Profile Cup	1	3
Mallory-Head	2	116
Mpact	0	1
PINNACLE	0	4
Regenerex	1	1
Trabecular Metal (Shell)	15	148
Trilogy	11	162
ZCA	1	5
TOTAL	**205**	**3532**