Trekking/Trekking Total Knee Investigation

Note: This analysis compares the Trekking/Trekking femoral/tibial combination with all other total knee prostheses.

This combination 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 prostheses with no recorded use in 2022 are excluded from the comparator.

TABLE 1

Revision Rate of Primary Total Knee Replacement

The revision rate of the Trekking/Trekking total knee combination is compared to all other total knee prostheses.

Table 1: Revision Rates of Primary Total Knee Replacement

Component	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Trekking/Trekking	71	1281	8209	0.86 (0.68, 1.09)
Other Total Knee	26765	756668	5061571	0.53 (0.52, 0.54)
TOTAL	**26836**	**757949**	**5069780**	**0.53 (0.52, 0.54)**

Note: Prostheses no longer used in 2022 are excluded from the comparator.

TABLE 2

Yearly Cumulative Percent Revision of Primary Total Knee Replacement

The yearly cumulative percent revision of the Trekking/Trekking total knee combination is compared to all other total knee prostheses.

Table 2: Yearly Cumulative Percent Revision of Primary Total Knee Replacement

CPR	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs	7 Yrs	8 Yrs
Trekking/Trekking	2.3 (1.6, 3.3)	3.2 (2.3, 4.3)	3.9 (3.0, 5.1)	4.6 (3.6, 6.0)	4.9 (3.8, 6.2)	5.7 (4.5, 7.3)	6.2 (4.9, 7.9)	6.2 (4.9, 7.9)
Other Total Knee	1.0 (1.0, 1.0)	1.8 (1.8, 1.9)	2.4 (2.4, 2.4)	2.8 (2.8, 2.9)	3.1 (3.1, 3.2)	3.5 (3.4, 3.5)	3.8 (3.7, 3.8)	4.0 (4.0, 4.1)

CPR	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs
Trekking/Trekking	6.5 (5.1, 8.3)	6.5 (5.1, 8.3)	7.3 (5.4, 9.8)				
Other Total Knee	4.3 (4.3, 4.4)	4.6 (4.6, 4.7)	4.9 (4.9, 5.0)	5.2 (5.2, 5.3)	5.5 (5.5, 5.6)	5.9 (5.8, 5.9)	6.2 (6.1, 6.3)

CPR	16 Yrs	17 Yrs	18 Yrs	19 Yrs	20 Yrs	21 Yrs	22 Yrs
Trekking/Trekking							
Other Total Knee	6.6 (6.5, 6.8)	7.0 (6.9, 7.2)	7.3 (7.2, 7.5)	7.6 (7.4, 7.8)	7.8 (7.6, 8.0)	8.0 (7.7, 8.2)	8.2 (7.9, 8.6)

Note: Prostheses no longer used in 2022 are excluded from the comparator.

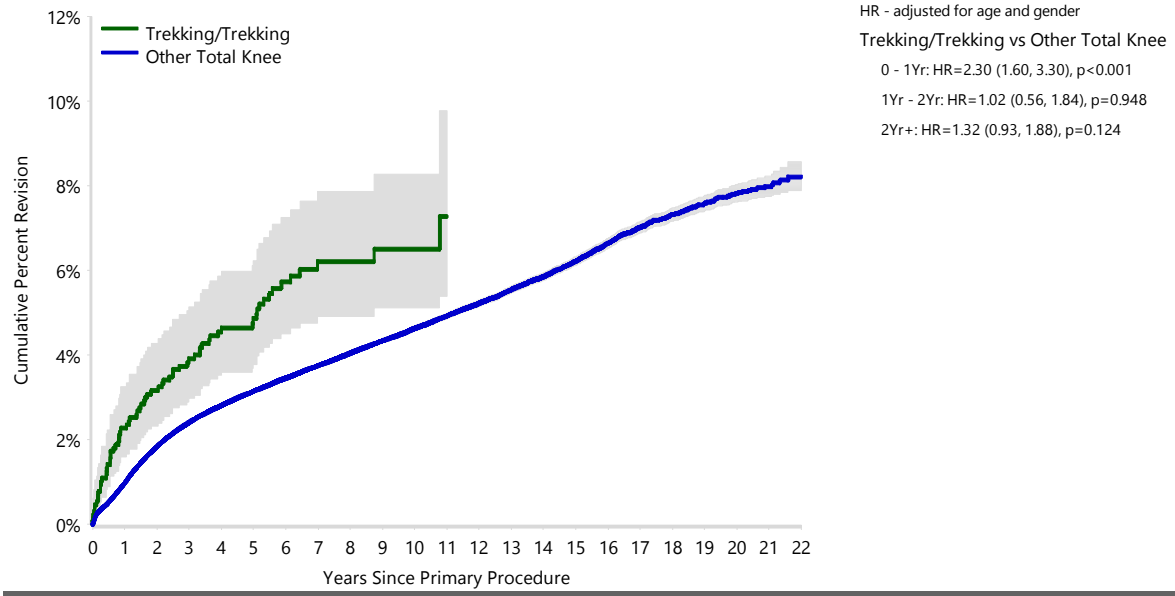
FIGURE 1

Yearly Cumulative Percent Revision of Primary Total Knee Replacement

The yearly cumulative percent revision of the Trekking/Trekking total knee combination is compared to all other total knee 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 Knee 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
Trekking/Trekking	1281	1228	1187	1114	1003	864	647	516	403	300	205	106
Other Total Knee	756668	688654	618429	555719	491798	430266	372090	317610	266826	221260	180204	143337

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
Trekking/Trekking	26	0	0	0	0	0	0	0	0	0	0
Other Total Knee	111896	85787	65049	47997	34991	24735	16433	9944	5486	2318	538

Note: Prostheses no longer used in 2022 are excluded from the comparator.

TABLE 3

Primary Diagnosis for Revised Primary Total Knee 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 knee prostheses.

Table 3: Primary Diagnosis for Revised Primary Total Knee Replacement

	Trekking/Trekking		Other Total Knee	
Primary Diagnosis	Number	Percent	Number	Percent
Osteoarthritis	68	95.8	25936	96.9
Rheumatoid Arthritis			342	1.3
Tumour			162	0.6
Other Inflammatory Arthritis	3	4.2	157	0.6
Osteonecrosis			101	0.4
Fracture			48	0.2
Other			18	0.1
Chondrocalcinosis			1	0.0
TOTAL	**71**	**100.0**	**26765**	**100.0**

Note: Prostheses no longer used in 2022 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 Knee Replacement - Reason for Revision (Follow-up Limited to 12.5 Years)

	Trekking/Trekking			Other Total Knee		
Revision Diagnosis	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Infection	17	1.3	23.9	7187	0.9	28.0
Loosening	24	1.9	33.8	5668	0.7	22.1
Instability	7	0.5	9.9	2526	0.3	9.8
Pain	1	0.1	1.4	1982	0.3	7.7
Patellofemoral Pain	4	0.3	5.6	1881	0.2	7.3
Patella Erosion	3	0.2	4.2	1672	0.2	6.5
Arthrofibrosis	4	0.3	5.6	1022	0.1	4.0
Fracture	4	0.3	5.6	932	0.1	3.6
Malalignment				593	0.1	2.3
Wear Tibial Insert	1	0.1	1.4	293	0.0	1.1
Lysis	1	0.1	1.4	280	0.0	1.1
Incorrect Sizing	2	0.2	2.8	259	0.0	1.0
Patella Maltracking				185	0.0	0.7
Bearing Dislocation				149	0.0	0.6
Implant Breakage Tibial Insert	1	0.1	1.4	145	0.0	0.6
Implant Breakage Patella				137	0.0	0.5
Metal Related Pathology				100	0.0	0.4
Prosthesis Dislocation				81	0.0	0.3
Synovitis				72	0.0	0.3
Osteonecrosis	1	0.1	1.4	54	0.0	0.2
Implant Breakage Tibial				39	0.0	0.2
Implant Breakage Femoral				33	0.0	0.1
Tumour				32	0.0	0.1
Wear Patella				31	0.0	0.1
Heterotopic Bone				12	0.0	0.0
Wear Tibial				8	0.0	0.0
Progression Of Disease				5	0.0	0.0
Patella Dislocation				2	0.0	0.0
Incorrect Side				1	0.0	0.0
Wear Femoral				1	0.0	0.0
Other	1	0.1	1.4	313	0.0	1.2
N Revision	**71**	**5.5**	**100.0**	**25695**	**3.4**	**100.0**
N Primary	**1281**			**756668**		

Note: This table is restricted to revisions within 12.5 years for all groups to allow a time-matched comparison of revisions.
Note: Prostheses no longer used in 2022 are excluded from the comparator.

FIGURE 2

Cumulative Incidence Revision Diagnosis of Primary Total Knee 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 Trekking/Trekking total knee combination. A comparative graph is provided of the cumulative incidence for the same reasons for revisions for all other total knee prostheses.

Figure 2: Cumulative Incidence Revision Diagnosis for Primary Total Knee Replacement

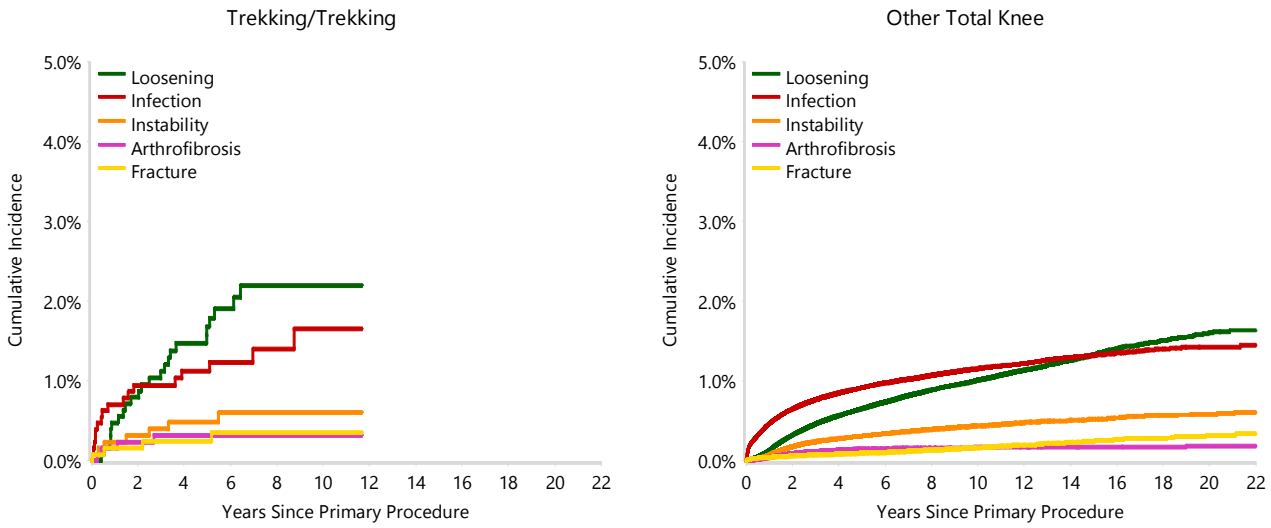


TABLE 5

Type of Revision Performed for Primary Total Knee Replacement

This analysis identifies the components used in the revision of the Trekking/Trekking total knee combination and compares it to the components used in the revision of all other total knee 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 knee prostheses i.e. is there a difference in the type of revision undertaken for the Trekking/Trekking total knee combination compared to all other total knee prostheses.

Table 5: Primary Total Knee Replacement - Type of Revision (Follow-up Limited to 12.5 Years)

	Trekking/Trekking		Other Total Knee	
Type of Revision	Number	Percent	Number	Percent
TKR (Tibial/Femoral)	32	45.1	6145	23.9
Tibial Component	3	4.2	2101	8.2
Cement Spacer	4	5.6	1323	5.1
Femoral Component	7	9.9	1306	5.1
Removal of Prostheses	1	1.4	148	0.6
Total Femoral			23	0.1
Reinsertion of Components			13	0.1
N Major	**47**	**66.2**	**11059**	**43.0**
Insert Only	12	16.9	7394	28.8
Patella Only	8	11.3	4618	18.0
Insert/Patella	4	5.6	2544	9.9
Minor Components			63	0.2
Cement Only			17	0.1
N Minor	**24**	**33.8**	**14636**	**57.0**
TOTAL	**71**	**100.0**	**25695**	**100.0**

Note: This table is restricted to revisions within 12.5 years for all groups to allow a time-matched comparison of revisions.
Note: Prostheses no longer used in 2022 are excluded from the comparator.

TABLE 6

Revision Rates of Trekking/Trekking Primary Total Knee 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 Trekking/Trekking Primary Total Knee Replacement by Fixation

Fixation	N Revised	N Total
Cemented	28	406
Cementless	21	311
Hybrid (Tibial Cemented)	21	559
Hybrid (Tibial Cementless)	1	5
TOTAL	**71**	**1281**

TABLE 7

Revision Rates of Trekking/Trekking Primary Total Knee 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 combination are listed.

Table 7: Revised Number of Trekking/Trekking Primary Total Knee Replacement by Bearing Surface

Bearing Surface	N Revised	N Total
Non XLPE	67	1209
XLPE + Antioxidant	4	72
TOTAL	**71**	**1281**

TABLE 8

Revision Rates of Trekking/Trekking Primary Total Knee Replacement by Bearing Mobility

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

Table 8: Revised Number of Trekking/Trekking Primary Total Knee Replacement by Bearing Mobility

Bearing Mobility	N Revised	N Total
Fixed	17	513
Rotating	54	768
TOTAL	**71**	**1281**

TABLE 9

Revision Rates of Trekking/Trekking Primary Total Knee Replacement by Stability

This analysis is provided as some prostheses are combined with a variety of stabilities. All stabilities used with this combination are listed.

Table 9: Revised Number of Trekking/Trekking Primary Total Knee Replacement by Stability

Stability	N Revised	N Total
Minimally Stabilised	36	838
Posterior Stabilised	35	443
TOTAL	**71**	**1281**

TABLE 10

Revision Rates of Primary Total Knee Replacement by State

This enables a state by state variation to be identified for the Trekking/Trekking total knee combination and provides the comparative data for each of the states for all other total knee 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 10: Revised Number of Primary Total Knee Replacement by State

Component	State	N Revised	N Total
Trekking/Trekking	NSW	16	105
	VIC	28	407
	QLD	12	434
	WA	4	58
	TAS	2	19
	ACT/NT	9	258
Other Total Knee	NSW	7943	262328
	VIC	5797	152640
	QLD	5754	156574
	WA	3241	81081
	SA	2967	66419
	TAS	435	18114
	ACT/NT	628	19512
TOTAL		**26836**	**757949**

Note: Prostheses no longer used in 2022 are excluded from the comparator.

TABLE 11

Number of Revisions of Trekking/Trekking Primary Total Knee Replacement by Year of Implant

This analysis details the number of prostheses reported each year to the Registry for the Trekking/Trekking total knee combination. 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 11: Number of Revisions of Trekking/Trekking Primary Total Knee Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2010	5	35
2011	7	102
2012	12	133
2013	7	107
2014	3	108
2015	3	106
2016	9	129
2017	9	216
2018	6	143
2019	6	99
2020	4	65
2021	0	20
2022	0	18
TOTAL	**71**	**1281**

TABLE 12

Revision Rates of Trekking/Trekking Primary Total Knee 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 Trekking/Trekking 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	Coating
Femoral				
Trekking	GSP0001-GSP0105	FEMORAL COMPONENT CR	YES	
Trekking	GSP0001P-GSP0105P	CR PRESSFIT FEMORAL	NO	HA COATED
Trekking	GSP0002N-GSP0002N	FEMORAL COMPONENT CR	YES	
Trekking	GSP0004PN-GSP0104PN	CR PRESSFIT FEMORAL	NO	HA COATED
Trekking	GSP1001-GSP1105	FEMORAL COMPONENT PS	YES	
Trekking	GSP1001P-GSP1105P	PS PRESSFIT FEMORAL	NO	HA COATED
Trekking	GSP1004N-GSP1103N	FEMORAL COMPONENT PS	YES	
Tibial				
Trekking	GSP7011-GSP7015	COCRMO MBHOLLOW TIBIAL TRAY	YES	
Trekking	GSP7011P-GSP7015P	COCRMO PRESSFIT TIBIAL	NO	
Trekking	GSP7011PN-GSP7014PN	TIBIAL TRAY MB HOLLOW COCRMO PRESSFIT	NO	
Trekking	GSP7013N-GSP7014N	COCRMO MBHOLLOW TIBIAL TRAY	YES	
Trekking	GSP7041-GSP7045	FB TIBIAL TRAY COCRMO	YES	
Trekking	GSP7041P-GSP7045P	COCRMO PRESSFIT FB TIBIAL	NO	
Trekking	GSP7042N-GSP7043N	FB TIBIAL TRAY COCRMO	YES	

Table 12: Revised Number of Trekking/Trekking Primary Total Knee Replacement by Catalogue Number Range

Femoral Range	Tibial Range	N Revised	N Total
GSP0001-GSP0105	GSP7011-GSP7015	5	50
	GSP7013N-GSP7014N	0	1
	GSP7041-GSP7045	3	59
GSP0001P-GSP0105P	GSP7011-GSP7015	5	105
	GSP7011P-GSP7015P	10	213
	GSP7011PN-GSP7014PN	1	8
	GSP7041-GSP7045	12	393
	GSP7042N-GSP7043N	0	1
GSP0002N-GSP0002N	GSP7042N-GSP7043N	0	1
GSP0004PN-GSP0104PN	GSP7011-GSP7015	0	1
	GSP7011P-GSP7015P	0	4
	GSP7041-GSP7045	0	2
GSP1001-GSP1105	GSP7011-GSP7015	18	249
	GSP7011P-GSP7015P	1	6
	GSP7013N-GSP7014N	0	3
	GSP7041-GSP7045	2	35
	GSP7041P-GSP7045P	0	1
GSP1001P-GSP1105P	GSP7011-GSP7015	4	31
	GSP7011P-GSP7015P	10	95
	GSP7011PN-GSP7014PN	0	1
	GSP7041-GSP7045	0	17
	GSP7041P-GSP7045P	0	1
GSP1004N-GSP1103N	GSP7011-GSP7015	0	3
	GSP7041-GSP7045	0	1
TOTAL		**71**	**1281**