

Freedom PKR Active/Freedom PKR Active Unicompartmental Knee Investigation

Note: This analysis compares the Freedom PKR Active/Freedom PKR Active femoral/tibial combination with all other unicompartmental 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-2024>.

Note: Procedures using prostheses with no recorded use in 2023 are excluded from the comparator.

TABLE 1

Revision Rate of Primary Unicompartmental Knee Replacement

The revision rate of the Freedom PKR Active/Freedom PKR Active unicompartmental knee combination is compared to all other unicompartmental knee prostheses.

Table 1: Revision Rates of Primary Unicompartmental Knee Replacement

| Component | N Revised | N Total | Obs. Years | Revisions/100 Obs. Yrs (95% CI) |
|---------------------------------------|-------------|--------------|---------------|------------------------------------|
| Freedom PKR Active/Freedom PKR Active | 509 | 1505 | 16570 | 3.07 (2.81, 3.35) |
| Other Unicompartmental Knee | 5027 | 51046 | 373593 | 1.35 (1.31, 1.38) |
| TOTAL | 5536 | 52551 | 390163 | 1.42 (1.38, 1.46) |

Note: Prostheses no longer used in 2023 are excluded from the comparator.

TABLE 2

Yearly Cumulative Percent Revision of Primary Unicompartmental Knee Replacement

The yearly cumulative percent revision of the Freedom PKR Active/Freedom PKR Active unicompartmental knee combination is compared to all other unicompartmental knee prostheses.

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

| CPR | 1 Yr | 2 Yrs | 3 Yrs | 4 Yrs | 5 Yrs | 6 Yrs | 7 Yrs | 8 Yrs |
|---------------------------------------|----------------|----------------|----------------|------------------|-------------------|-------------------|-------------------|-------------------|
| Freedom PKR Active/Freedom PKR Active | 1.9 (1.3, 2.7) | 5.1 (4.1, 6.4) | 8.0 (6.7, 9.5) | 10.4 (9.0, 12.1) | 13.8 (12.1, 15.6) | 16.3 (14.5, 18.3) | 18.8 (16.9, 20.9) | 20.6 (18.6, 22.8) |
| Other Unicompartmental Knee | 1.9 (1.8, 2.0) | 3.4 (3.3, 3.6) | 4.4 (4.2, 4.6) | 5.3 (5.1, 5.5) | 6.1 (5.9, 6.3) | 7.0 (6.7, 7.2) | 8.0 (7.7, 8.3) | 9.0 (8.7, 9.3) |

| CPR | 9 Yrs | 10 Yrs | 11 Yrs | 12 Yrs | 13 Yrs | 14 Yrs | 15 Yrs | 16 Yrs |
|---------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Freedom PKR Active/Freedom PKR Active | 24.1 (21.9, 26.4) | 27.3 (25.0, 29.7) | 29.6 (27.3, 32.1) | 31.7 (29.3, 34.3) | 33.4 (30.9, 36.0) | 35.0 (32.4, 37.7) | 37.9 (35.1, 40.7) | 39.7 (36.8, 42.6) |
| Other Unicompartmental Knee | 10.2 (9.9, 10.5) | 11.3 (11.0, 11.7) | 12.6 (12.2, 13.0) | 13.9 (13.5, 14.4) | 15.4 (14.9, 15.9) | 16.9 (16.4, 17.5) | 18.4 (17.8, 19.0) | 19.9 (19.3, 20.6) |

| CPR | 17 Yrs | 18 Yrs | 19 Yrs | 20 Yrs | 21 Yrs | 22 Yrs | 23 Yrs |
|---------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Freedom PKR Active/Freedom PKR Active | 40.3 (37.4, 43.3) | 41.9 (38.7, 45.2) | | | | | |
| Other Unicompartmental Knee | 21.6 (20.9, 22.4) | 23.4 (22.6, 24.2) | 25.1 (24.2, 26.0) | 27.0 (26.0, 28.1) | 29.0 (27.8, 30.3) | 30.6 (29.1, 32.2) | 31.3 (29.5, 33.1) |

Note: Prostheses no longer used in 2023 are excluded from the comparator.

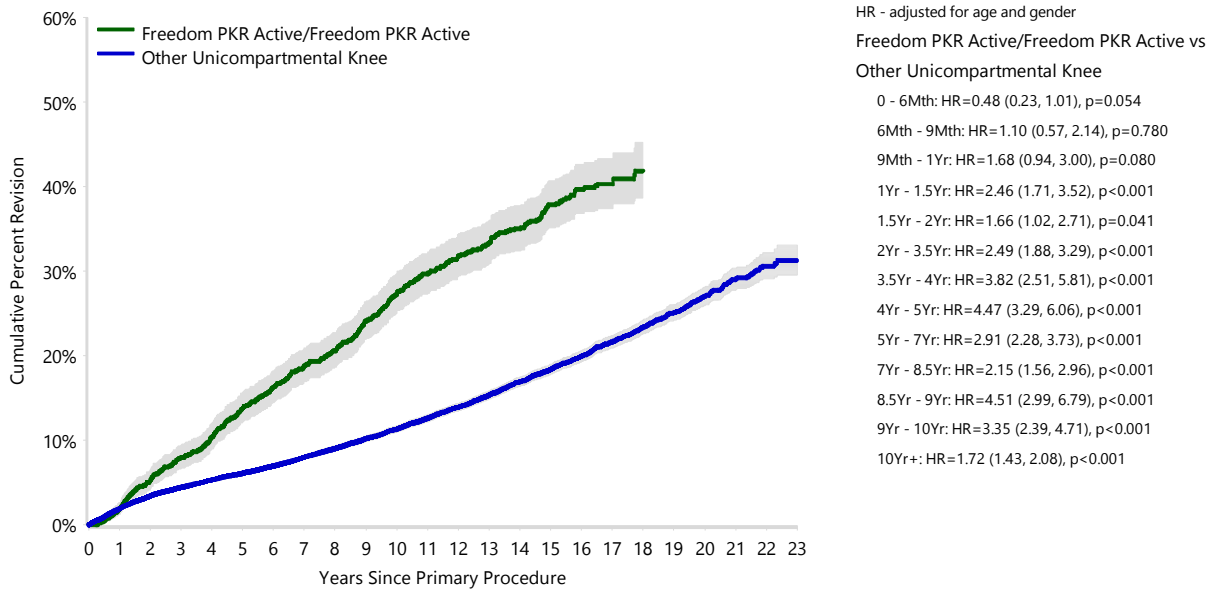
FIGURE 1

Yearly Cumulative Percent Revision of Primary Unicompartmental Knee Replacement

The yearly cumulative percent revision of the Freedom PKR Active/Freedom PKR Active unicompartmental knee combination is compared to all other unicompartmental 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 Unicompartmental 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 |
|---------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|
| Freedom PKR Active/Freedom PKR Active | 1505 | 1473 | 1414 | 1361 | 1315 | 1249 | 1198 | 1142 | 1082 | 989 | 889 | 794 |
| Other Unicompartmental Knee | 51046 | 46421 | 42133 | 38023 | 34005 | 29907 | 25908 | 22127 | 19010 | 16489 | 14286 | 12363 |

| 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 | 23 Yrs |
|---------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Freedom PKR Active/Freedom PKR Active | 708 | 629 | 533 | 424 | 325 | 208 | 92 | 3 | 0 | 0 | 0 | 0 |
| Other Unicompartmental Knee | 10629 | 8938 | 7315 | 5932 | 4651 | 3560 | 2650 | 1940 | 1337 | 807 | 346 | 78 |

Note: Prostheses no longer used in 2023 are excluded from the comparator.

TABLE 3**Primary Diagnosis for Revised Primary Unicompartamental 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 unicompartamental knee prostheses.

Table 3: Primary Diagnosis for Revised Primary Unicompartamental Knee Replacement

| Primary Diagnosis | Freedom PKR Active/Freedom PKR Active | | Other Unicompartamental Knee | |
|------------------------------|---------------------------------------|--------------|------------------------------|--------------|
| | Number | Percent | Number | Percent |
| Osteoarthritis | 502 | 98.6 | 4978 | 99.0 |
| Osteonecrosis | 7 | 1.4 | 30 | 0.6 |
| Rheumatoid Arthritis | | | 11 | 0.2 |
| Other Inflammatory Arthritis | | | 5 | 0.1 |
| Fracture | | | 2 | 0.0 |
| Tumour | | | 1 | 0.0 |
| TOTAL | 509 | 100.0 | 5027 | 100.0 |

Note: Prostheses no longer used in 2023 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 Unicompartmental Knee Replacement - Reason for Revision (Follow-up Limited to 19.4 Years)

| Revision Diagnosis | Freedom PKR Active/Freedom PKR Active | | | Other Unicompartmental Knee | | |
|--------------------------------|---------------------------------------|---------------------|--------------|-----------------------------|---------------------|--------------|
| | Number | % Primaries Revised | % Revisions | Number | % Primaries Revised | % Revisions |
| Progression Of Disease | 199 | 13.2 | 39.1 | 1842 | 3.6 | 37.2 |
| Loosening | 197 | 13.1 | 38.7 | 1555 | 3.0 | 31.4 |
| Pain | 34 | 2.3 | 6.7 | 358 | 0.7 | 7.2 |
| Infection | 8 | 0.5 | 1.6 | 272 | 0.5 | 5.5 |
| Bearing Dislocation | | | | 188 | 0.4 | 3.8 |
| Fracture | 7 | 0.5 | 1.4 | 151 | 0.3 | 3.0 |
| Instability | 3 | 0.2 | 0.6 | 99 | 0.2 | 2.0 |
| Lysis | 39 | 2.6 | 7.7 | 89 | 0.2 | 1.8 |
| Wear Tibial Insert | 9 | 0.6 | 1.8 | 72 | 0.1 | 1.5 |
| Malalignment | 2 | 0.1 | 0.4 | 63 | 0.1 | 1.3 |
| Implant Breakage Tibial Insert | | | | 46 | 0.1 | 0.9 |
| Patellofemoral Pain | 1 | 0.1 | 0.2 | 31 | 0.1 | 0.6 |
| Incorrect Sizing | 1 | 0.1 | 0.2 | 28 | 0.1 | 0.6 |
| Prosthesis Dislocation | | | | 28 | 0.1 | 0.6 |
| Implant Breakage Tibial | 4 | 0.3 | 0.8 | 26 | 0.1 | 0.5 |
| Metal Related Pathology | | | | 13 | 0.0 | 0.3 |
| Osteonecrosis | | | | 13 | 0.0 | 0.3 |
| Wear Tibial | 2 | 0.1 | 0.4 | 12 | 0.0 | 0.2 |
| Synovitis | | | | 11 | 0.0 | 0.2 |
| Arthrofibrosis | 1 | 0.1 | 0.2 | 9 | 0.0 | 0.2 |
| Wear Femoral | | | | 5 | 0.0 | 0.1 |
| Implant Breakage Femoral | | | | 4 | 0.0 | 0.1 |
| Patella Erosion | | | | 3 | 0.0 | 0.1 |
| Tumour | | | | 1 | 0.0 | 0.0 |
| Other | 2 | 0.1 | 0.4 | 38 | 0.1 | 0.8 |
| N Revision | 509 | 33.8 | 100.0 | 4957 | 9.7 | 100.0 |
| N Primary | 1505 | | | 51046 | | |

Note: This table is restricted to revisions within 19.4 years for all groups to allow a time-matched comparison of revisions.

Note: Prostheses no longer used in 2023 are excluded from the comparator.

FIGURE 2

Cumulative Incidence Revision Diagnosis of Primary Unicompartmental 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 Freedom PKR Active/Freedom PKR Active unicompartmental knee combination. A comparative graph is provided of the cumulative incidence for the same reasons for revisions for all other unicompartmental knee prostheses.

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

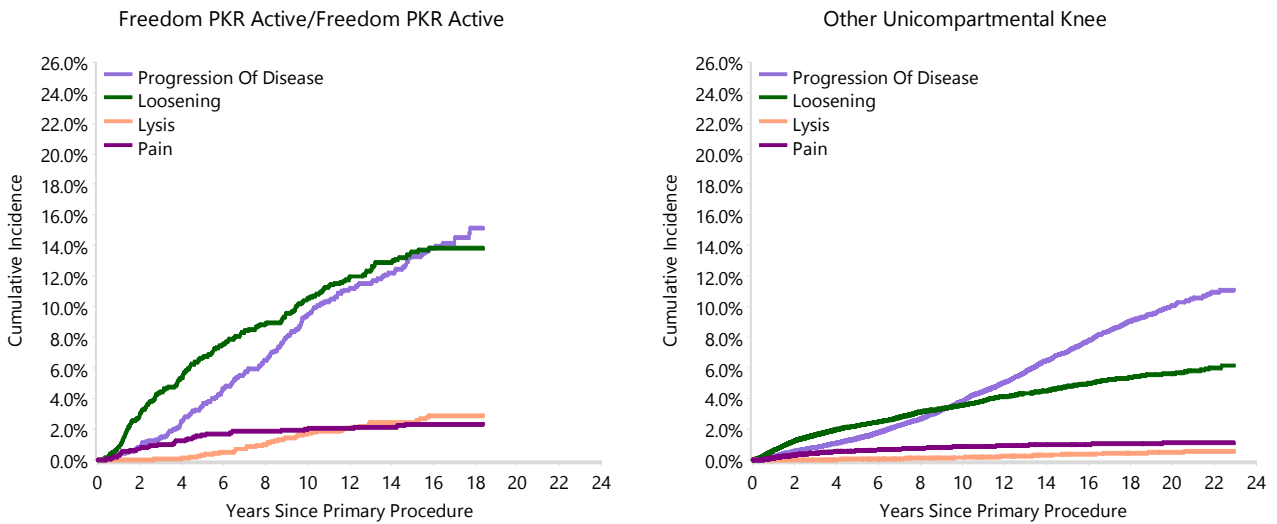


TABLE 5

Type of Revision Performed for Primary Unicompartmental Knee Replacement

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

Table 5: Primary Unicompartmental Knee Replacement - Type of Revision (Follow-up Limited to 19.4 Years)

| Type of Revision | Freedom PKR Active/Freedom PKR Active | | Other Unicompartmental Knee | |
|-------------------------------|---------------------------------------|--------------|-----------------------------|--------------|
| | Number | Percent | Number | Percent |
| TKR (Tibial/Femoral) | 486 | 95.5 | 4155 | 83.8 |
| Uni Tibial Component | 16 | 3.1 | 94 | 1.9 |
| Uni Femoral Component | 1 | 0.2 | 52 | 1.0 |
| Cement Spacer | 2 | 0.4 | 39 | 0.8 |
| UKR (Uni Tibial/Uni Femoral) | 3 | 0.6 | 36 | 0.7 |
| Patella/Trochlear Resurfacing | 1 | 0.2 | 20 | 0.4 |
| Removal of Prostheses | | | 5 | 0.1 |
| Femoral Component | | | 4 | 0.1 |
| Reinsertion of Components | | | 4 | 0.1 |
| Tibial Component | | | 1 | 0.0 |
| N Major | 509 | 100.0 | 4410 | 89.0 |
| Uni Insert Only | | | 546 | 11.0 |
| Patella Only | | | 1 | 0.0 |
| N Minor | | | 547 | 11.0 |
| TOTAL | 509 | 100.0 | 4957 | 100.0 |

Note: This table is restricted to revisions within 19.4 years for all groups to allow a time-matched comparison of revisions.

Note: Prostheses no longer used in 2023 are excluded from the comparator.

TABLE 6**Revision Rates of Freedom PKR Active/Freedom PKR Active Primary Unicompartmental 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 Freedom PKR Active/Freedom PKR Active Primary Unicompartmental Knee Replacement by Fixation

| Fixation | N Revised | N Total |
|--------------|------------|-------------|
| Cemented | 509 | 1505 |
| TOTAL | 509 | 1505 |

TABLE 7**Revision Rates of Primary Unicompartmental Knee Replacement by State**

This enables a state by state variation to be identified for the Freedom PKR Active/Freedom PKR Active unicompartmental knee combination and provides the comparative data for each of the states for all other unicompartmental 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 7: Revised Number of Primary Unicompartmental Knee Replacement by State

| Component | State | N Revised | N Total |
|---------------------------------------|--------|-------------|--------------|
| Freedom PKR Active/Freedom PKR Active | NSW | 424 | 1197 |
| | VIC | 67 | 275 |
| | QLD | 1 | 3 |
| | WA | 2 | 2 |
| | SA | 12 | 24 |
| | ACT/NT | 3 | 4 |
| Other Unicompartmental Knee | NSW | 1414 | 12295 |
| | VIC | 1018 | 11777 |
| | QLD | 922 | 10501 |
| | WA | 652 | 8073 |
| | SA | 708 | 5394 |
| | TAS | 174 | 1971 |
| | ACT/NT | 139 | 1035 |
| TOTAL | | 5536 | 52551 |

Note: Prostheses no longer used in 2023 are excluded from the comparator.

TABLE 8**Number of Revisions of Freedom PKR Active/Freedom PKR Active Primary Unicompartmental Knee Replacement by Year of Implant**

This analysis details the number of prostheses reported each year to the Registry for the Freedom PKR Active/Freedom PKR Active unicompartmental 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 2023 has a maximum of one year to be revised, whereas a primary procedure performed in 2021 has a maximum of three years to be revised.

Table 8: Number of Revisions of Freedom PKR Active/Freedom PKR Active Primary Unicompartmental Knee Replacement by Year of Implant

| Year of Implant | Number Revised | Total Number |
|-----------------|----------------|--------------|
| 2004 | 8 | 19 |
| 2005 | 68 | 223 |
| 2006 | 94 | 281 |
| 2007 | 100 | 264 |
| 2008 | 51 | 162 |
| 2009 | 65 | 149 |
| 2010 | 36 | 102 |
| 2011 | 27 | 75 |
| 2012 | 23 | 68 |
| 2013 | 12 | 63 |
| 2014 | 13 | 51 |
| 2015 | 6 | 31 |
| 2016 | 3 | 12 |
| 2017 | 3 | 5 |
| TOTAL | 509 | 1505 |

TABLE 9

Revision Rates of Freedom PKR Active/Freedom PKR Active Primary Unicompartmental 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 Freedom PKR Active/Freedom PKR Active 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 | Mobility | Material | Fixation |
|--------------------|-------------------------|--|--------|----------|-------------------------------|----------|
| Femoral | | | | | | |
| Freedom PKR/Active | 10UNF100RL-10UNF520RM | UNI FEMORAL COMPONENT | YES | | | POLISHED |
| Freedom PKR/Active | 10UNF120RLN-10UNF520RMN | FREEDOM TREKKING FEMORAL COMPONENT TINBN | YES | | | |
| Tibial | | | | | | |
| Freedom PKR/Active | 10UNT165RL-10UNT465RM | UNICOMPARTMENTAL TIBIAL | YES | FIXED | NON CROSS-LINKED POLYETHYLENE | |
| Freedom PKR/Active | 10UNTA65RL-10UNTF95RM | UNICOMPARTMENTAL TIBIAL | YES | FIXED | NON CROSS-LINKED POLYETHYLENE | |
| Freedom PKR/Active | 10UNTA65RLE-10UNTF95RME | UNICOMPARTMENTAL TIBIAL | YES | FIXED | XL POLYETHYLENE + ANTIOXIDANT | |

Table 9: Revised Number of Freedom PKR Active/Freedom PKR Active Primary Unicompartmental Knee Replacement by Catalogue Number Range

| Femoral Range | Tibial Range | N Revised | N Total |
|-------------------------|-------------------------|------------|-------------|
| 10UNF100RL-10UNF520RM | 10UNT165RL-10UNT465RM | 8 | 19 |
| | 10UNTA65RL-10UNTF95RM | 471 | 1368 |
| | 10UNTA65RLE-10UNTF95RME | 21 | 93 |
| 10UNF120RLN-10UNF520RMN | 10UNTA65RL-10UNTF95RM | 1 | 1 |
| | 10UNTA65RLE-10UNTF95RME | 8 | 24 |
| TOTAL | | 509 | 1505 |