

Australian Orthopaedic Association National Joint Replacement Registry

2026 SUPPLEMENTARY REPORT

Demographics and Outcome of Ankle Arthroplasty



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<https://doi.org/10.25310/FKAT1768>

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Demographics and Outcome of Ankle Arthroplasty

2026 Supplementary Report

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The AOANJRR is funded by the Australian Government Department of Health, Disability and Ageing

Cite this report

Stavrou P, Gill DR, Smith PN, McAuliffe MJ, Stoney JD, Wall CJ, Corfield S, Esaian R, Moylan S, McCaul M, Mushangwe S, Davies LW, Holder C, Edwards S, Xu Q, Oakey H, Lewis PL. Demographics and Outcome of Ankle Arthroplasty: Supplementary Report in *Hip, Knee & Shoulder Arthroplasty: 2026 Annual Report*, Australian Orthopaedic Association National Joint Replacement Registry, AOA, Adelaide; 2026. <https://doi.org/10.25310/FKAT1768>

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Contents

AUSTRALIA ORTHOPAEDIC ASSOCIATION NATIONAL JOINT REPLACEMENT REGISTRY	1
DEMOGRAPHICS AND OUTCOME OF ANKLE ARTHROPLASTY	1
2026 SUPPLEMENTARY REPORT	1
CONTENTS.....	1
INTRODUCTION	2
ANKLE REPLACEMENT	3
Categories of Ankle Replacement	3
Demographics of Ankle Replacement	3
Demographics.....	5
ASA AND BMI	6
Bilateral Procedures	6
Prosthesis Use	6
Outcome for All Diagnoses.....	8
Primary Diagnosis.....	8
Reason for Revision	8
Type Of Revision.....	8
Change in outcome over time.....	8
Re-operation	8
Prosthesis Types	8
Outcome for Osteoarthritis	13
DEMOGRAPHICS.....	13
Age and Gender	13
ASA and BMI	13
Prosthesis characteristics.....	17
Insert Mobility	17
Fixation	17
Image Derived Instrumentation (IDI).....	17
Polyethylene Type	17
Demographics of All 1st Revisions.....	23
Demographics of 1 st Revisions of Known Primary Procedures.....	24
Outcome of 1 st Revision of Known Primary Ankle Replacement.....	26

Introduction

This Ankle Arthroplasty Supplementary Report is based on the analysis of 7,103 ankle procedures with a procedure date from 2006 up to and including 31 December 2025.

This Report is one of 14 supplementary reports to complete the AOANJRR Annual Report for 2026.

Information on the background, purpose, aims, benefits and governance of the Registry can be found in the Introductory chapter of the 2026 Hip, Knee and Shoulder Arthroplasty Annual Report.

The Registry data quality processes, including data collection, validation and outcomes assessment, are provided in detail in the Data Quality section of the introductory chapter of the 2026 Hip, Knee and Shoulder Arthroplasty Annual Report:

<https://registry.aoa.org.au/annual-reports-2026>.

Ankle Replacement

CATEGORIES OF ANKLE REPLACEMENT

Ankle replacements are grouped into two broad categories: primary total and revision ankle replacement.

A primary total ankle replacement is the initial procedure involving replacing both the tibial and talar articular surfaces of the ankle joint with tibial and talar prostheses and an intervening insert, which may or may not be attached to the tibial component.

Revision procedures are subsequent operations of previous ankle replacements where one or more of the prosthetic components are replaced, removed, or another component is added. Revisions include subsequent operations of primary total or previous revision procedures.

Ankle revisions are subcategorised into three classes: major total, major partial and minor revisions. Major total involves replacing both the tibial and talar components. Major partial involves revising either the tibial or talar component, and a minor revision procedure retains the original tibial and talar components and most often involves a revision of the insert only.

There is a third category of ankle replacement procedure data that the AOANJRR collects. This is information on re-operation after ankle replacement, but without revision of any of the components. Surgeons have reported a small number of these procedures, and the future aim of the AOANJRR is to increase reporting of these operations.

DEMOGRAPHICS OF ANKLE REPLACEMENT

This report is an analysis of 7,103 ankle replacement procedures (6,205 primaries (87.4%) and 898 revisions (12.6%). This excludes 2 primary partial resurfacing ankle replacements from 2008.

Ankle replacement is more frequently undertaken in males (62.4%). The overall mean age is 67.6 years, and the most common age group for both male and female patients is 65-74 years (Table A1 to Table A3 and Figure A1).

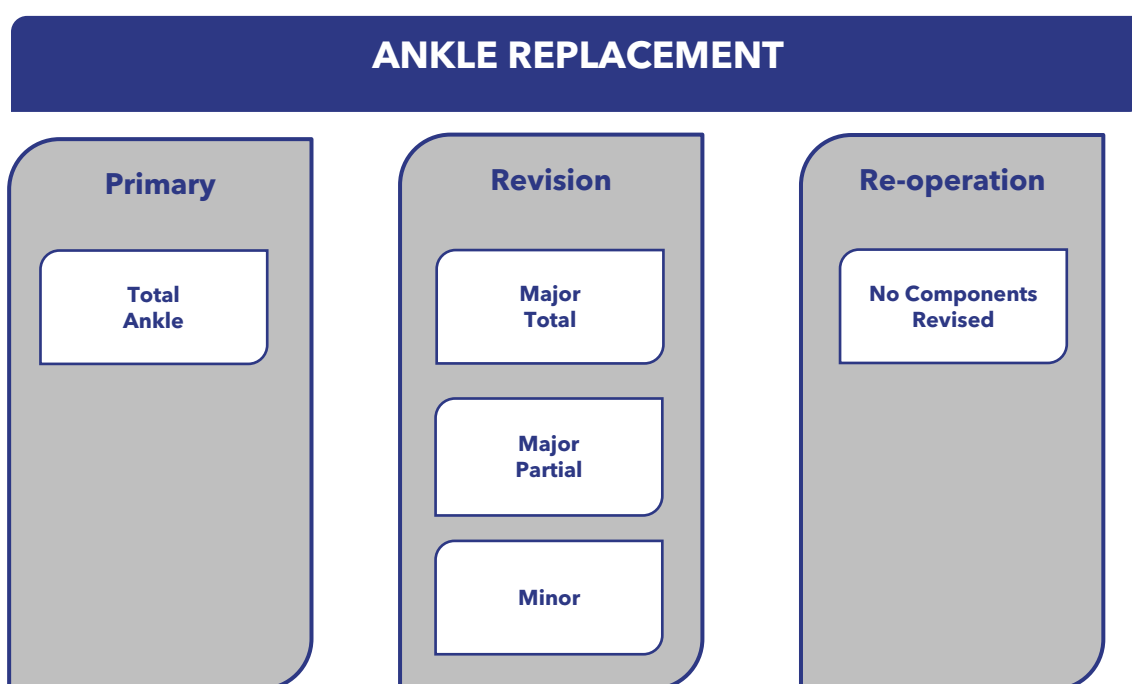


Table A1 Number of Ankle Replacements by Gender

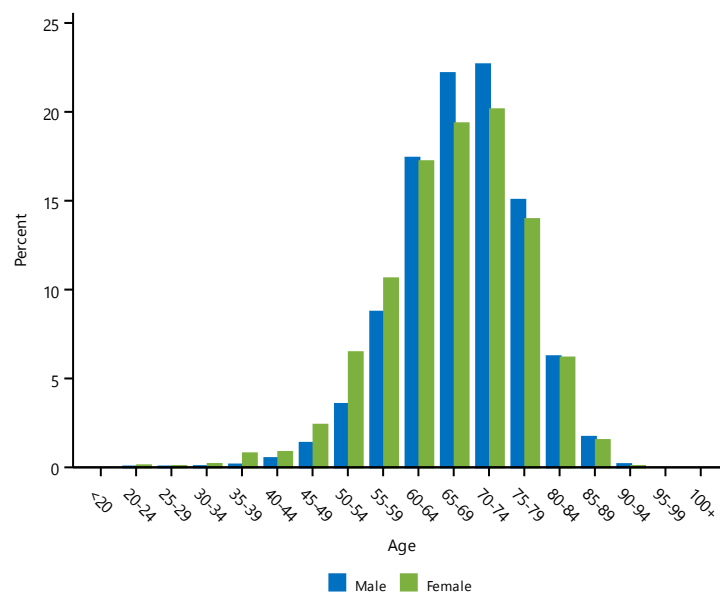
Ankle Replacement	Male		Female		TOTAL	
	N	Row%	N	Row%	N	Row%
Primary Total	3872	62.4	2333	37.6	6205	100.0
Revision	560	62.4	338	37.6	898	100.0
TOTAL	4432	62.4	2671	37.6	7103	100.0

Table A2 Number of Ankle Replacements by Age

Ankle Replacement	<55		55-64		65-74		75-84		≥85		TOTAL	
	N	Row%	N	Row%	N	Row%	N	Row%	N	Row%	N	Row%
Primary Total	467	7.5	1717	27.7	2633	42.4	1280	20.6	108	1.7	6205	100.0
Revision	80	8.9	187	20.8	410	45.7	202	22.5	19	2.1	898	100.0
TOTAL	547	7.7	1904	26.8	3043	42.8	1482	20.9	127	1.8	7103	100.0

Table A3 Age and Gender of Primary and Revision Ankle Replacement

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Male	4432	62.4%	23	94	69	68.2	8.6
Female	2671	37.6%	20	90	67	66.7	9.7
TOTAL	7103	100.0%	20	94	68	67.6	9.1

Figure A1 Ankle Replacement by Age and Gender

DEMOGRAPHICS

There have been 6,205 primary total ankle replacements reported to the Registry. This is an additional 826 procedures since the last report.

For further information on the **closure of the database**, please see the **Glossary** of the **Hip, Knee & Shoulder Arthroplasty Annual Report**.

The use of total ankle replacement was lowest in 2014 and is currently at its highest recorded usage of 790 procedures in 2025. There has been a 409.7% increase in the use of ankle replacement since 2014. In 2025, there was a 3.8% increase in the number of total ankle replacements compared to 2024 (Figure A2). The principal primary diagnosis is osteoarthritis (94.5%) (Table A4).

Figure A2 Numbers of Ankle Replacement

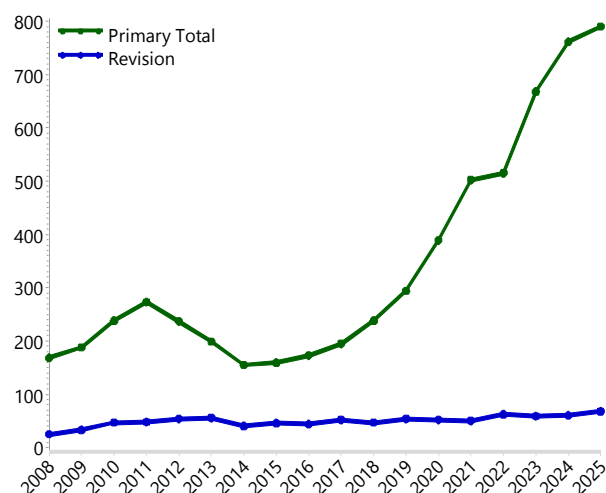


Table A4 Primary Total Ankle Replacement by Primary Diagnosis

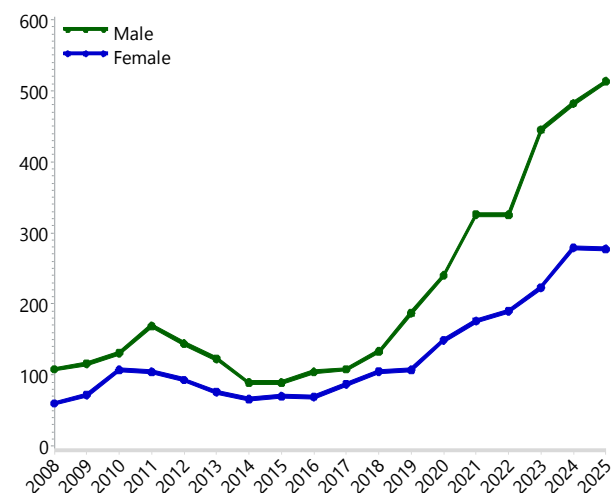
Primary Diagnosis	Number	Percent
Osteoarthritis	5862	94.5
Rheumatoid Arthritis	207	3.3
Other Inflammatory Arthritis	43	0.7
Instability	41	0.7
Fracture/Dislocation	18	0.3
Osteonecrosis	14	0.2
Tumour	2	0.0
Other	18	0.3
TOTAL	6205	100.0

Table A5 Age and Gender of Primary Total Ankle Replacement

Gender	Number	Percent	Minimum	Maximum	Median	Mean	Std Dev
Female	2333	37.6	20	90	67	66.7	9.6
Male	3872	62.4	23	94	68	68.0	8.6
TOTAL	6205	100.0	20	94	68	67.5	9.0

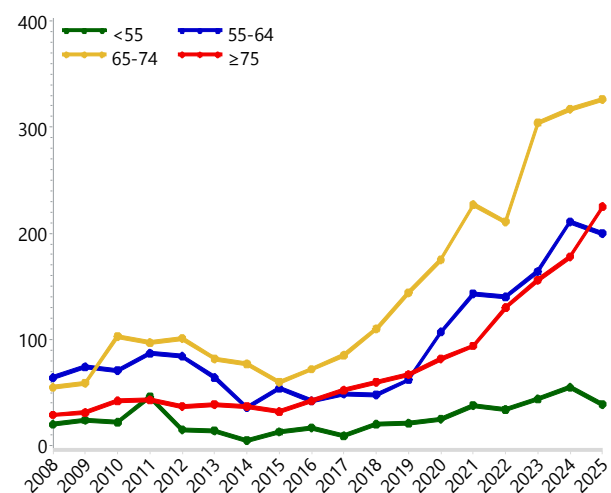
Overall, 62.4% of primary ankle procedures are performed on males. The use of primary ankle replacement in males has increased in recent years (Table A5 and Figure A3).

Figure A3 Number of Primary Total Ankle Replacement by Gender



The median age is 68 years with males and females having a similar median age (67). The most common age group is 65-74 years. Of the four age groups, procedure volume increased in 65-74 and older than 75 from 2024 to 2025, while it declined in younger than 55 and 55-64. (Figure A4).

Figure A4 Number of Primary Total Ankle Replacement by Age



ASA AND BMI

ASA scores are an indication of comorbidity and have been collected since 2012. The Registry has ASA data on 4,918 primary total ankle replacement procedures. Total ankle replacement is most commonly performed in patients with an ASA score 2 (Table A6).

BMI data have been collected since 2015. There are BMI data on 4,491 primary total ankle replacement procedures. Total ankle replacement is more common in patients who are pre-obese or obese class 1 (Table A7).

BILATERAL PROCEDURES

The Registry has recorded 430 bilateral ankle replacements, 14.7% of which were performed within 6 months of the initial procedure (Table A8).

PROSTHESIS USE

Information on the changing use of tibial and talar prostheses in recent years compared to 2008 is provided in Table A9 and Table A10.

Table A6 ASA Score for Primary Total Ankle Replacement

ASA Score	Number	Percent
ASA 1	409	8.3
ASA 2	2709	55.1
ASA 3	1751	35.6
ASA 4	49	1.0
TOTAL	4918	100.0

Table A7 BMI Category for Primary Total Ankle Replacement

BMI Category	Number	Percent
Underweight (<18.50)	12	0.3
Normal (18.50-24.99)	691	15.4
Pre Obese (25.00-29.99)	1794	39.9
Obese Class 1 (30.00-34.99)	1352	30.1
Obese Class 2 (35.00-39.99)	443	9.9
Obese Class 3 (≥40.00)	199	4.4
TOTAL	4491	100.0

Note: BMI has not been presented for patients aged ≤19 years

Table A8 Time between Procedures for Bilateral Primary Ankle Replacement

Bilateral Procedures	Same Day		1 day-6 months		≥6 months		TOTAL	
	N	Total%	N	Total%	N	Total%	N	Total%
Both - Total Ankle	5	1.2	58	13.5	367	85.3	430	100.0
TOTAL	5	1.2	58	13.5	367	85.3	430	100.0

Table A9 Most Used Tibial Prostheses in Primary Total Ankle Replacement

2008		2021		2022		2023		2024		2025	
N	Model	N	Model	N	Model	N	Model	N	Model	N	Model
98	Mobility	268	Infinity	313	Infinity	415	Infinity	481	Infinity	481	Infinity
34	Hintermann Series H3	91	Trabecular Metal	75	Trabecular Metal	84	Inbone	127	Inbone	168	Inbone
18	Buechel-Pappas	47	Salto Talaris	63	Inbone	81	Trabecular Metal	81	Trabecular Metal	88	Trabecular Metal
11	Salto	42	Inbone	27	Salto Talaris	67	Vantage	57	Vantage	51	Vantage
6	BOX	24	Hintermann Series H3	21	Hintermann Series H3	20	Hintermann Series H3	15	Hintermann Series H3	1	Hintermann Series H3
1	Ankle Joint (Eska)	23	Vantage	16	Vantage	1	Salto Talaris			1	Invision
		4	Zenith								
		2	Invision								
		1	Salto								
10 Most Used											
168 (6)	100.0%	502 (9)	100.0%	515 (6)	100.0%	668 (6)	100.0%	761 (5)	100.0%	790 (6)	100.0%

Table A10 Most Used Talar Prostheses in Primary Total Ankle Replacement

2008		2021		2022		2023		2024		2025	
N	Model	N	Model	N	Model	N	Model	N	Model	N	Model
98	Mobility	201	Infinity	259	Infinity	356	Infinity	403	Infinity	431	Infinity
34	Hintermann Series H3	109	Inbone	113	Inbone	140	Inbone	203	Inbone	218	Inbone
18	Buechel-Pappas	91	Trabecular Metal	75	Trabecular Metal	81	Trabecular Metal	81	Trabecular Metal	88	Trabecular Metal
11	Salto	47	Salto Talaris	27	Salto Talaris	67	Vantage	57	Vantage	51	Vantage
6	BOX	24	Hintermann Series H3	21	Hintermann Series H3	20	Hintermann Series H3	15	Hintermann Series H3	1	Hintermann Series H3
1	Ankle Joint (Eska)	23	Vantage	16	Vantage	2	Invision	2	Invision	1	Invision
		4	Zenith	4	Invision	1	Custom Made (Osseoint)				
		2	Invision			1	Salto Talaris				
		1	Salto								
10 Most Used											
168 (6)	100.0%	502 (9)	100.0%	515 (7)	100.0%	668 (8)	100.0%	761 (6)	100.0%	790 (6)	100.0%

OUTCOME FOR ALL DIAGNOSES

PRIMARY DIAGNOSIS

The cumulative percent revision for osteoarthritis at 10 years is 13.0%. There has only been a small number of procedures for rheumatoid arthritis, and when adjusted for age and gender, there is no difference in the revision rate when compared to osteoarthritis (Table A11 and Figure A5).

REASON FOR REVISION

Loosening is the most common reason for revision of primary total ankle replacement. This accounts for 33.6% of all revisions, followed by infection, lysis, implant breakage and instability (Table A12). The cumulative incidence of the five most common reasons for revision is presented in Figure A6.

TYPE OF REVISION

The most common type of revision is an insert only revision (44.1%) (Table A13).

CHANGE IN OUTCOME OVER TIME

There has been an improvement in primary total ankle replacement outcomes over time.

Comparing procedures undertaken prior to 2015 to those undertaken since 2015, the 7 year cumulative percent revision has declined from 12.9% to 6.6% (Table A14 and Figure A7).

RE-OPERATION

There have been 49 procedures where a re-operation without component revision was performed on a primary total ankle replacement. These procedures are not included in the revision analysis.

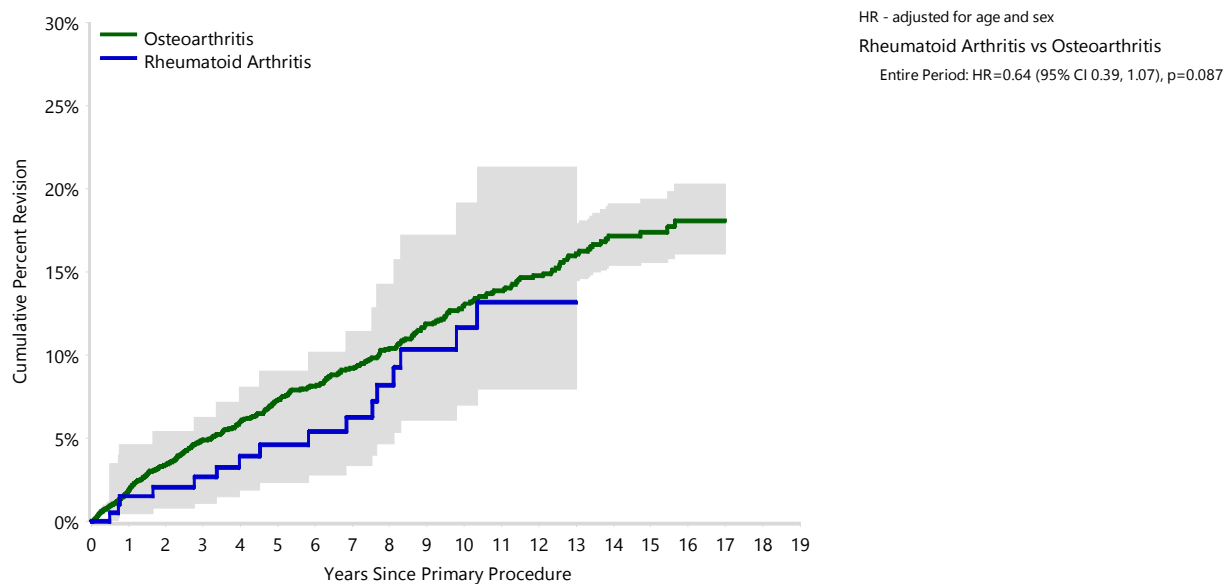
PROSTHESIS TYPES

The outcomes of different prosthesis types are listed in Table A15.

Table A11 Cumulative Percent Revision of Primary Total Ankle Replacement by Primary Diagnosis

Primary Diagnosis	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	15 Yrs
Osteoarthritis	451	5862	1.9 (1.5, 2.3)	4.9 (4.3, 5.6)	7.3 (6.5, 8.2)	9.2 (8.3, 10.3)	13.0 (11.7, 14.4)	17.4 (15.6, 19.4)
Rheumatoid Arthritis	16	207	1.5 (0.5, 4.6)	2.7 (1.1, 6.3)	4.6 (2.3, 9.0)	6.3 (3.4, 11.4)	11.7 (7.0, 19.1)	
Other Inflammatory Arthritis	2	43	0.0 (0.0, 0.0)	6.6 (1.7, 23.8)	6.6 (1.7, 23.8)	6.6 (1.7, 23.8)	6.6 (1.7, 23.8)	
Instability	3	41	2.4 (0.3, 16.1)	2.4 (0.3, 16.1)	2.4 (0.3, 16.1)	16.4 (3.2, 62.9)		
Fracture/Dislocation	1	18	5.9 (0.9, 35.0)	5.9 (0.9, 35.0)	5.9 (0.9, 35.0)	5.9 (0.9, 35.0)		
Other	1	18	0.0 (0.0, 0.0)	7.1 (1.0, 40.9)	7.1 (1.0, 40.9)	7.1 (1.0, 40.9)		
Osteonecrosis	2	14	8.3 (1.2, 46.1)	8.3 (1.2, 46.1)	8.3 (1.2, 46.1)	8.3 (1.2, 46.1)	8.3 (1.2, 46.1)	
Other (1)	0	2	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)		
TOTAL	476	6205						

Note: Only primary diagnoses with over 10 procedures have been listed

Figure A5 Cumulative Percent Revision of Primary Total Ankle Replacement by Primary Diagnosis

Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	15 Yrs
Osteoarthritis	5862	4981	3460	2410	1717	1081	316
Rheumatoid Arthritis	207	188	163	131	104	63	22

Note: Only primary diagnoses with over 50 procedures have been listed

Table A12 Reason for Revision of Primary Total Ankle Replacement

Revision Diagnosis	Number	Percent
Loosening	160	33.6
Infection	68	14.3
Lysis	48	10.1
Implant Breakage Ankle Insert	42	8.8
Instability	37	7.8
Impingement	25	5.3
Pain	24	5.0
Fracture	17	3.6
Prosthesis Dissociation	11	2.3
Arthrofibrosis	8	1.7
Malalignment	8	1.7
Heterotopic Bone	6	1.3
Wear Ankle Insert	6	1.3
Synovitis	3	0.6
Incorrect Sizing	2	0.4
Implant Breakage Tibial	2	0.4
Metal Related Pathology	1	0.2
Tumour	1	0.2
Osteonecrosis	1	0.2
Progression Of Disease	1	0.2
Other	5	1.1
TOTAL	476	100.0

Table A13 Type of Revision of Primary Total Ankle Replacement

Type of Revision	Number	Percent
Insert Only	210	44.1
Tibial/Talar	104	21.8
Arthrodesis	49	10.3
Tibial Only	40	8.4
Talar Only	33	6.9
Cement Spacer	23	4.8
Removal of Prostheses	9	1.9
Minor Components	8	1.7
TOTAL	476	100.0

Figure A6 Cumulative Incidence Revision Diagnosis of Primary Total Ankle Replacement

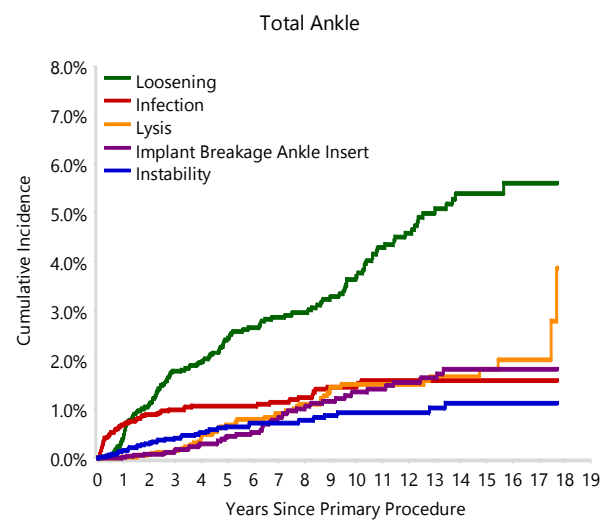
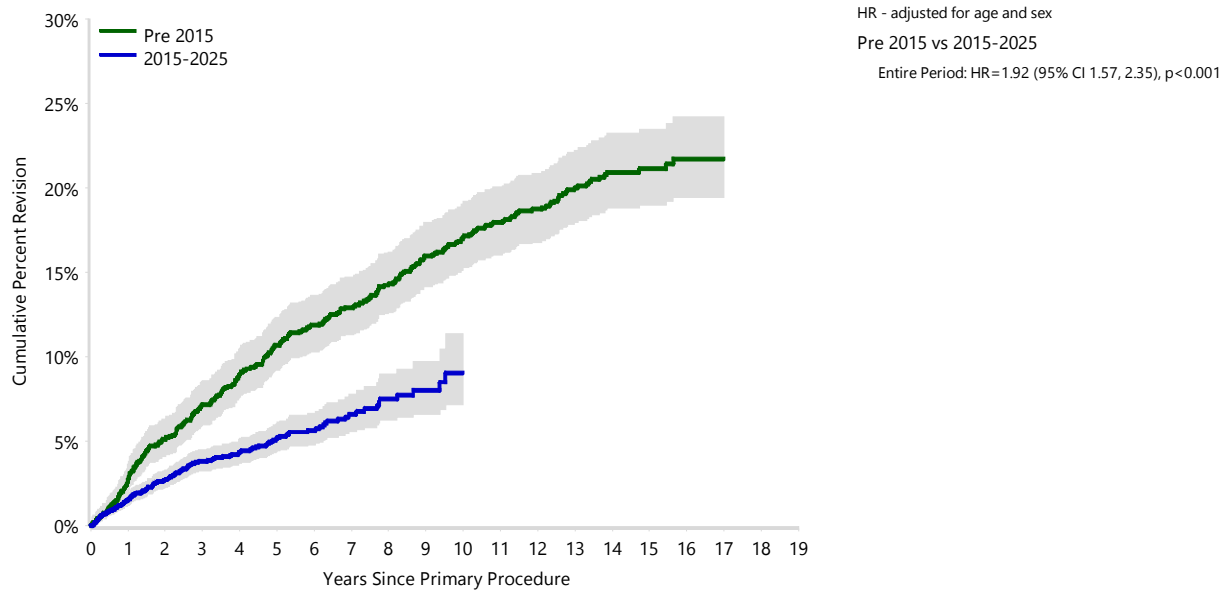


Table A14 Cumulative Percent Revision of Primary Total Ankle Replacement by Period

Period	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	15 Yrs
2015-2025	185	4684	1.5 (1.2, 2.0)	3.8 (3.2, 4.5)	5.2 (4.4, 6.1)	6.6 (5.6, 7.8)	9.0 (7.2, 11.4)	
Pre 2015	291	1521	2.8 (2.1, 3.7)	7.2 (6.0, 8.6)	10.7 (9.2, 12.4)	12.9 (11.3, 14.7)	17.1 (15.2, 19.1)	21.1 (19.0, 23.5)
TOTAL	476	6205						

Figure A7 Cumulative Percent Revision of Primary Total Ankle Replacement by Period

Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	15 Yrs
Pre 2015	1521	1467	1376	1289	1208	1051	346
2015-2025	4684	3809	2319	1297	647	113	0

Table A15 Cumulative Percent Revision of Primary Total Ankle Replacement by Prosthesis Combination

Tibia	Talar	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	15 Yrs
BOX	BOX*	17	114	1.8 (0.4, 6.8)	5.4 (2.4, 11.6)	10.1 (5.7, 17.5)	10.1 (5.7, 17.5)	14.7 (9.1, 23.3)	
Buechel-Pappas	Buechel-Pappas*	12	63	1.6 (0.2, 10.7)	8.0 (3.4, 18.1)	9.6 (4.4, 20.1)	11.2 (5.5, 22.2)	16.6 (9.3, 28.8)	16.6 (9.3, 28.8)
Hintermann Series H3	Hintermann Series H3	115	574	4.0 (2.7, 6.0)	8.8 (6.7, 11.4)	11.6 (9.2, 14.6)	15.7 (12.8, 19.2)	20.8 (17.3, 24.8)	26.5 (22.3, 31.4)
Inbone	Inbone	8	564	1.0 (0.4, 2.5)	1.9 (1.0, 3.9)	1.9 (1.0, 3.9)			
	Invision	1	15	6.7 (1.0, 38.7)	6.7 (1.0, 38.7)	6.7 (1.0, 38.7)			
Infinity	Inbone	22	433	1.7 (0.8, 3.6)	4.4 (2.6, 7.3)	7.9 (5.0, 12.4)			
	Infinity	52	1948	1.4 (0.9, 2.0)	3.2 (2.4, 4.3)	4.3 (3.1, 6.0)	5.7 (3.7, 8.8)		
Mobility	Mobility*	95	568	2.3 (1.3, 3.9)	7.1 (5.2, 9.5)	10.2 (7.9, 13.0)	11.1 (8.8, 14.0)	14.7 (11.9, 17.9)	17.8 (14.8, 21.5)
S.T.A.R	S.T.A.R*	14	49	4.1 (1.0, 15.5)	12.6 (5.8, 25.8)	14.7 (7.3, 28.4)	21.3 (12.0, 35.9)	29.1 (17.9, 45.0)	
Salto	Salto*	72	421	2.2 (1.1, 4.1)	5.5 (3.7, 8.2)	9.0 (6.6, 12.2)	11.8 (9.0, 15.3)	16.2 (12.9, 20.3)	
Salto Talaris	Salto Talaris*	27	507	1.2 (0.5, 2.6)	3.8 (2.4, 5.9)	4.5 (3.0, 6.7)	5.5 (3.8, 8.1)	6.1 (4.1, 8.9)	
Trabecular Metal	Trabecular Metal	12	592	1.4 (0.7, 2.8)	2.2 (1.2, 4.0)	2.6 (1.4, 4.8)	2.6 (1.4, 4.8)		
Vantage	Vantage	13	246	2.3 (0.9, 5.4)	6.5 (3.4, 12.3)				
Zenith	Zenith*	14	87	3.4 (1.1, 10.3)	6.9 (3.2, 14.8)	14.3 (8.4, 23.8)	14.3 (8.4, 23.8)	15.8 (9.5, 25.7)	
Other (9)		2	24	0.0 (0.0, 0.0)	15.4 (4.1, 48.8)	15.4 (4.1, 48.8)	15.4 (4.1, 48.8)	15.4 (4.1, 48.8)	15.4 (4.1, 48.8)
TOTAL		476	6205						

Note: Only prostheses with over 15 procedures have been listed

*denotes prosthesis combinations that have not had any reported use in primary total ankle procedures in 2025

¹ The Hinterman Series H3 combination has been identified as having a higher than anticipated rate of revision (HTARR) in the 2024 Annual Report:

See the Hinterman Series H3 combination in the HTARR Chapter

Corresponding prosthesis investigation of this combination is available [here](#)

HTARR methodology is available [here](#)

OUTCOME FOR OSTEOARTHRITIS

DEMOGRAPHICS

Age and Gender

Age is a risk factor for revision. Patients aged ≥ 75 years have a lower rate of revision compared to patients aged 65-74 years from 3 months, patients 55-64 years from 3-9 months and from 2.5 years, and when compared to patients aged < 55 years for the entire period (Table A16 and Figure A8).

There is no difference in the rate of revision between males and females (Table A17 and Figure A9).

ASA and BMI

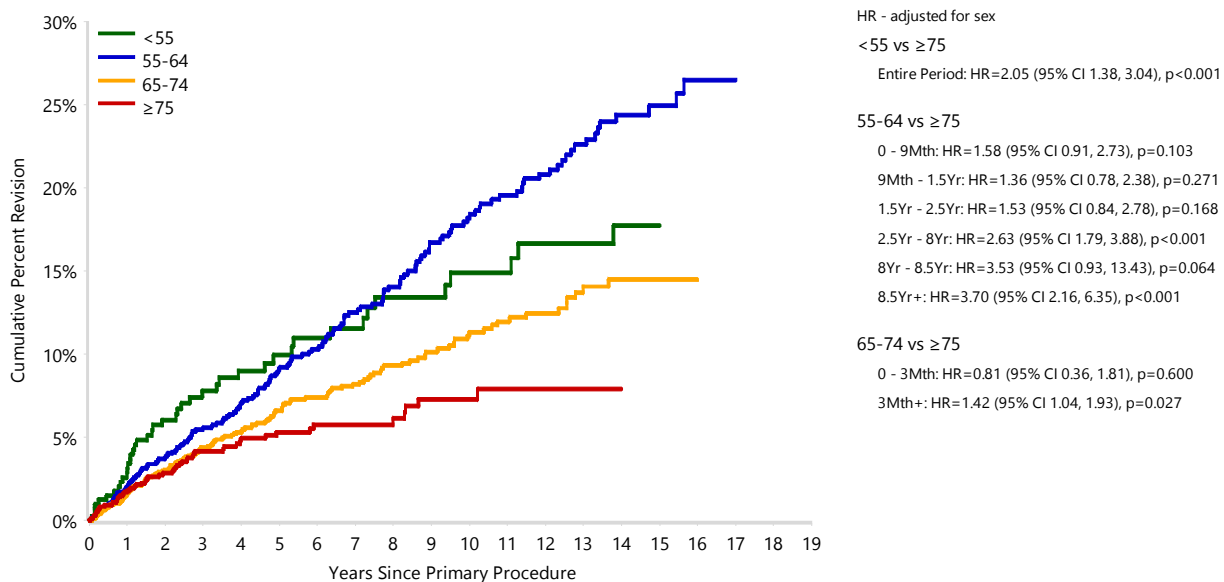
ASA is not a risk factor for revision (Table A18 and Figure A10).

As the number of procedures in each BMI category is relatively small, an analysis of combined BMI $< 30 \text{ kg/m}^2$ (underweight, normal and pre-obese) compared to BMI of $\geq 30 \text{ kg/m}^2$ (obese classes 1-3) was undertaken. BMI does not affect revision rates, with obese patients at higher risk (Table A19 and Figure A11).

Table A16 Cumulative Percent Revision of Primary Total Ankle Replacement by Age (Primary Diagnosis OA)

Age	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	15 Yrs
<55	44	402	3.1 (1.8, 5.5)	7.8 (5.4, 11.2)	9.9 (7.1, 13.9)	11.5 (8.3, 15.9)	14.9 (10.9, 20.3)	17.7 (13.0, 24.0)
55-64	184	1600	2.0 (1.4, 2.8)	5.6 (4.4, 6.9)	9.1 (7.5, 10.9)	12.5 (10.5, 14.8)	18.2 (15.6, 21.2)	24.9 (21.4, 28.9)
65-74	165	2509	1.6 (1.2, 2.2)	4.4 (3.6, 5.4)	6.6 (5.5, 7.9)	8.2 (6.9, 9.7)	11.3 (9.5, 13.4)	14.5 (12.0, 17.4)
≥ 75	58	1351	1.8 (1.2, 2.7)	4.2 (3.1, 5.6)	5.3 (4.0, 7.0)	5.8 (4.4, 7.6)	7.3 (5.4, 9.8)	
TOTAL	451	5862						

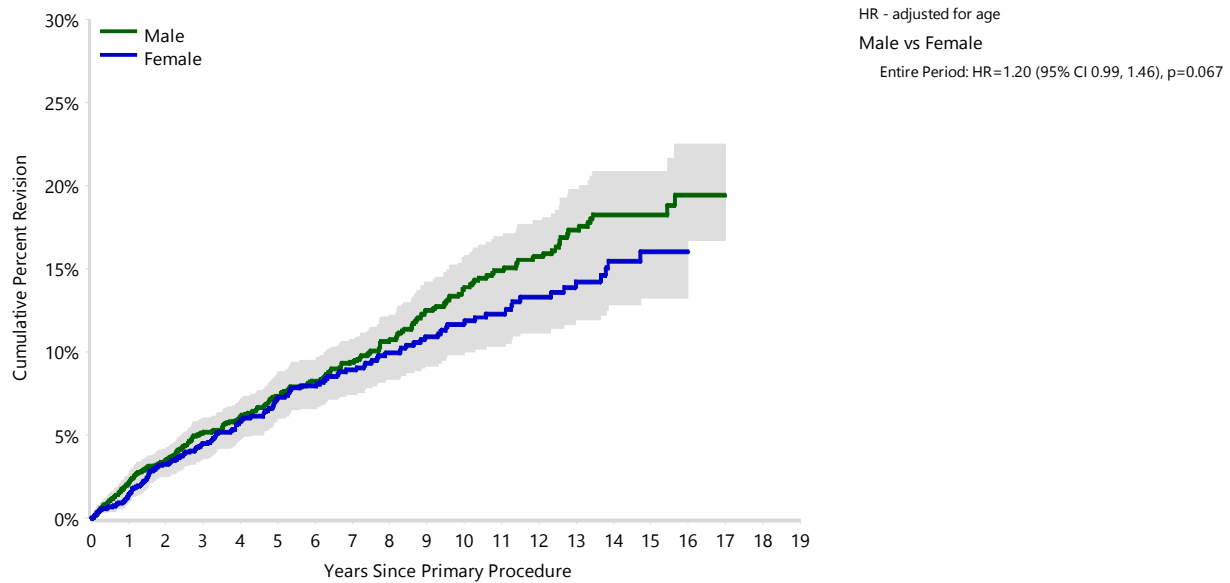
Figure A8 Cumulative Percent Revision of Primary Total Ankle Replacement by Age (Primary Diagnosis OA)



Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	15 Yrs
<55	402	354	246	183	145	108	45
55-64	1600	1384	994	706	529	381	122
65-74	2509	2153	1484	1036	716	432	127
≥ 75	1351	1090	736	485	327	160	22

Table A17 Cumulative Percent Revision of Primary Total Ankle Replacement by Gender (Primary Diagnosis OA)

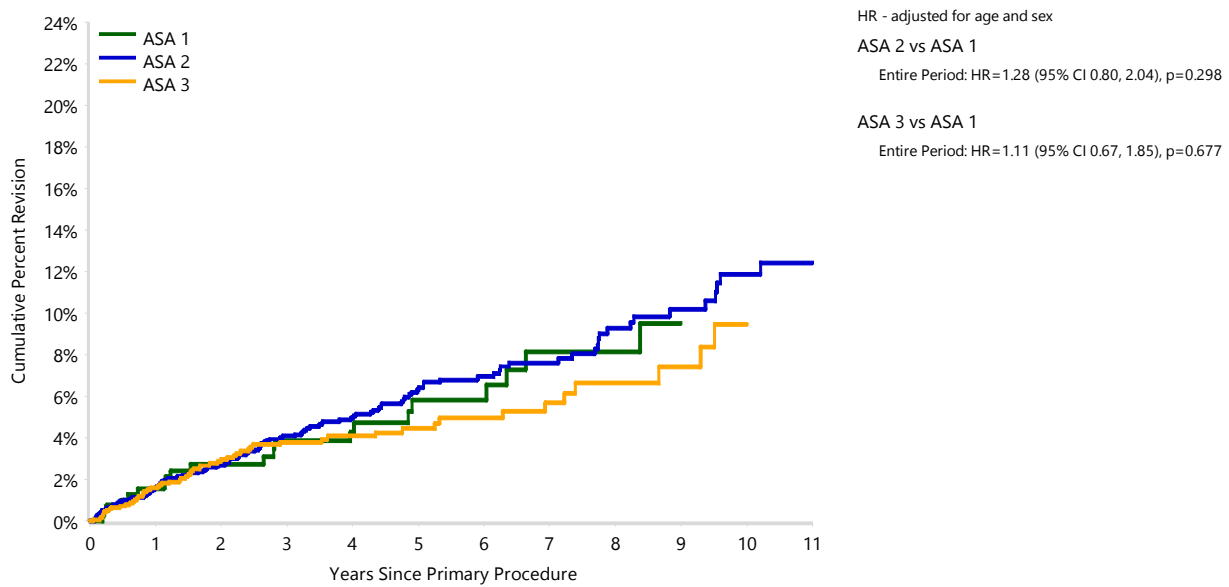
Gender	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	15 Yrs
Male	296	3736	2.1 (1.7, 2.7)	5.2 (4.4, 6.0)	7.3 (6.4, 8.4)	9.4 (8.2, 10.7)	13.9 (12.2, 15.8)	18.3 (16.0, 20.9)
Female	155	2126	1.4 (1.0, 2.0)	4.5 (3.6, 5.6)	7.2 (6.0, 8.7)	8.9 (7.5, 10.6)	11.7 (9.8, 13.8)	16.0 (13.2, 19.3)
TOTAL	451	5862						

Figure A9 Cumulative Percent Revision of Primary Total Ankle Replacement by Gender (Primary Diagnosis OA)

Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	15 Yrs
Male	3736	3154	2164	1484	1032	642	184
Female	2126	1827	1296	926	685	439	132

Table A18 Cumulative Percent Revision of Primary Total Ankle Replacement by ASA Score (Primary Diagnosis OA)

ASA Score	N Revised	N Total	1 Yr	2 Yrs	3 Yrs	5 Yrs	7 Yrs	10 Yrs
ASA 1	21	399	1.6 (0.7, 3.5)	2.7 (1.5, 5.1)	3.9 (2.2, 6.6)	5.8 (3.6, 9.4)	8.1 (5.1, 12.9)	
ASA 2	132	2608	1.6 (1.2, 2.2)	2.7 (2.1, 3.5)	4.1 (3.3, 5.1)	6.3 (5.2, 7.7)	7.6 (6.3, 9.2)	11.9 (9.5, 14.9)
ASA 3	61	1615	1.6 (1.1, 2.4)	3.0 (2.2, 4.0)	3.8 (2.8, 5.0)	4.5 (3.4, 5.9)	5.7 (4.2, 7.8)	9.5 (6.3, 14.1)
ASA 4	2	46	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	13.9 (3.5, 46.7)	13.9 (3.5, 46.7)	
TOTAL	216	4668						

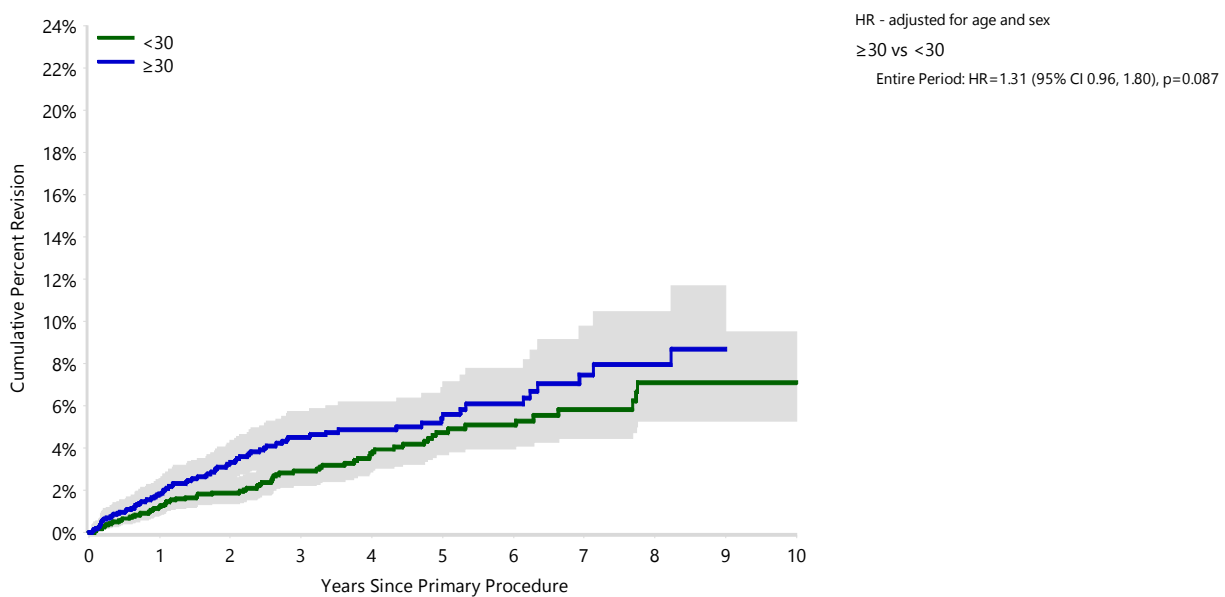
Figure A10 Cumulative Percent Revision of Primary Total Ankle Replacement by ASA Score (Primary Diagnosis OA)

Number at Risk	0 Yr	1 Yr	2 Yrs	3 Yrs	5 Yrs	7 Yrs	10 Yrs
ASA 1	399	345	296	254	169	97	38
ASA 2	2608	2161	1726	1337	799	463	172
ASA 3	1615	1293	1012	782	435	225	67

Table A19 Cumulative Percent Revision of Primary Total Ankle Replacement by BMI Category (Primary Diagnosis OA)

BMI Category	N Revised	N Total	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	7 Yrs
Underweight (<18.50)	0	8	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	
Normal (18.50-24.99)	25	637	1.4 (0.7, 2.9)	2.5 (1.5, 4.3)	3.9 (2.4, 6.2)	4.6 (2.9, 7.1)	5.9 (3.9, 9.0)	7.7 (4.9, 12.1)
Pre Obese (25.00-29.99)	51	1710	1.1 (0.7, 1.8)	1.7 (1.1, 2.5)	2.6 (1.8, 3.6)	3.4 (2.5, 4.7)	4.4 (3.2, 5.9)	5.1 (3.7, 7.0)
Obese Class 1 (30.00-34.99)	56	1296	1.8 (1.2, 2.8)	3.1 (2.2, 4.3)	4.4 (3.3, 5.9)	4.6 (3.4, 6.1)	5.1 (3.8, 6.9)	7.2 (5.2, 9.9)
Obese Class 2 (35.00-39.99)	19	433	1.6 (0.7, 3.5)	3.8 (2.1, 6.6)	5.0 (3.0, 8.2)	6.2 (3.8, 10.0)	6.2 (3.8, 10.0)	8.8 (5.1, 14.9)
Obese Class 3 (≥40.00)	7	180	2.4 (0.9, 6.4)	3.9 (1.8, 8.6)	3.9 (1.8, 8.6)	3.9 (1.8, 8.6)		
TOTAL	158	4264						

Note: BMI has not been presented for patients aged ≤19 years

Figure A11 Cumulative Percent Revision of Primary Total Ankle Replacement by BMI Category (Primary Diagnosis OA)

Number at Risk	0 Yr	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	7 Yrs
<30	2355	1898	1514	1145	881	628	293
≥30	1909	1547	1175	891	675	466	210

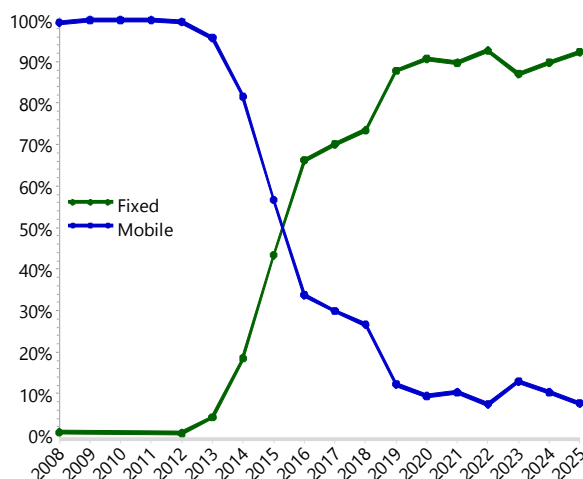
Note: BMI has not been presented for patients aged ≤19 years

PROSTHESIS CHARACTERISTICS

Insert Mobility

Inserts used in primary ankle replacement may be either fixed or mobile. There has been a major change in the type of insert chosen during the last decade. Fixed inserts are now more common for primary total ankle replacements (Figure A12).

Figure A12 Primary Total Ankle Replacement by Mobility (Primary Diagnosis OA)



Fixed inserts are used in the majority of primary total ankle replacements (65.2%). Total ankle replacements with fixed inserts have a lower rate of revision compared to mobile inserts (Table A20 and Figure A13).

Fixation

It is not possible to assess the comparative revision rate of cement and cementless fixation, as almost all procedures (98%) use cementless fixation for both the tibial and talar components (Table A21).

Approximately 40% of cementless prostheses have an HA coating. Prostheses with an HA coating have a higher rate of revision compared to prostheses without HA (Table A22 and Table A14). However, there is no difference in revision rate for either fixed or mobile bearing prostheses when those with and without HA coating are compared (Table A23 and Figure A15).

Image Derived Instrumentation (IDI)

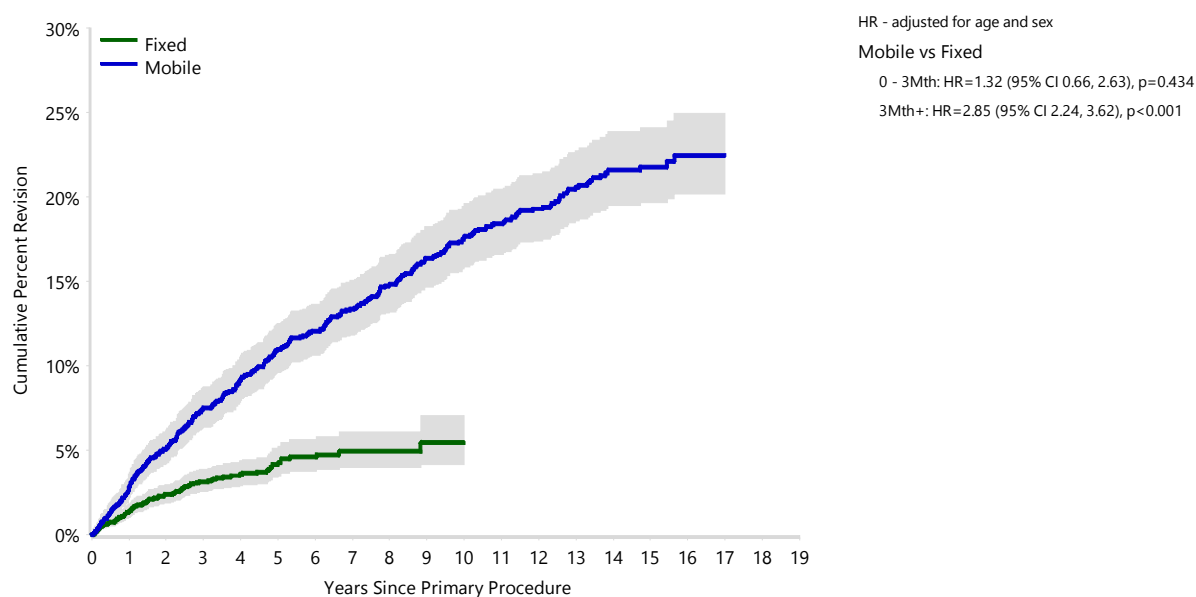
IDI has been used in 2,468 primary total ankle replacement procedures since 2015 (Figure A16). There is no difference in the rate of revision when primary total ankle replacement procedures using IDI are compared to procedures without IDI use (Table A24 and Figure A17). However, the results should be interpreted with caution as IDI is used with a limited number of primary total ankle prostheses.

POLYETHYLENE TYPE

After 2022, there has been a precipitous reduction in the use of non-highly cross-linked polyethylene (non-XLPE) as a tibial insert surface compared to highly crosslinked polyethylene (XLPE) (Figure A18). In total, there are 2,356 primary total ankle replacements with non-XLPE and 2,236 with XLPE. There is an increased risk of revision of primary total ankle replacements utilising non-XLPE compared to implants with XLPE (Table A25 and Figure A19).

Table A20 Cumulative Percent Revision of Primary Total Ankle Replacement by Mobility (Primary Diagnosis OA)

Mobility	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	15 Yrs
Fixed	114	3715	1.4 (1.0, 1.8)	3.2 (2.6, 3.9)	4.2 (3.4, 5.1)	4.9 (4.0, 6.1)	5.4 (4.2, 7.1)	
Mobile	336	1981	2.8 (2.2, 3.7)	7.5 (6.4, 8.8)	11.0 (9.6, 12.5)	13.4 (11.8, 15.0)	17.6 (15.8, 19.5)	21.8 (19.7, 24.1)
TOTAL	450	5696						

Figure A13 Cumulative Percent Revision of Primary Total Ankle Replacement by Mobility (Primary Diagnosis OA)

Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	15 Yrs
Fixed	3715	3070	1852	974	431	78	2
Mobile	1981	1868	1608	1436	1286	1003	314

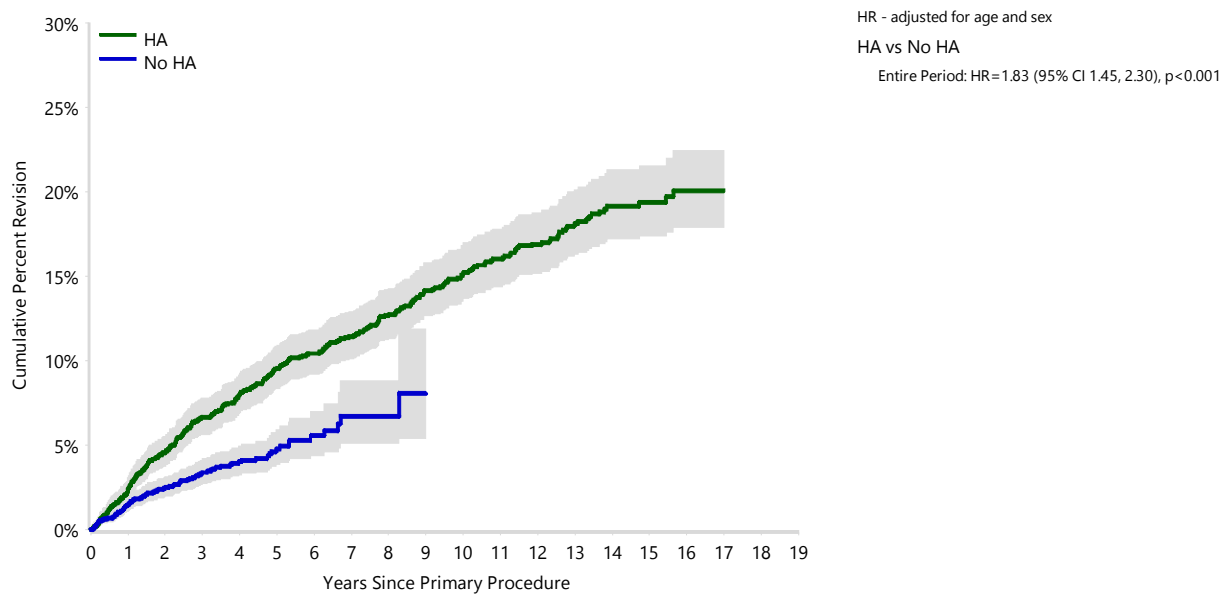
Table A21 Cumulative Percent Revision of Primary Total Ankle Replacement by Fixation (Primary Diagnosis OA)

Fixation	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	15 Yrs
Cemented	2	45	4.5 (1.1, 16.8)	4.5 (1.1, 16.8)	4.5 (1.1, 16.8)	4.5 (1.1, 16.8)	4.5 (1.1, 16.8)	
Cementless	444	5746	1.9 (1.5, 2.3)	4.9 (4.3, 5.6)	7.3 (6.5, 8.2)	9.2 (8.3, 10.3)	13.1 (11.8, 14.5)	17.5 (15.6, 19.5)
Hybrid (Tibial Cemented)	1	35	3.2 (0.5, 20.8)	3.2 (0.5, 20.8)	3.2 (0.5, 20.8)			
Hybrid (Talus Cemented)	4	36	0.0 (0.0, 0.0)	6.6 (1.7, 23.9)	10.8 (3.6, 30.3)	19.7 (7.0, 48.8)		
TOTAL	451	5862						

Table A22 Cumulative Percent Revision of Cementless Primary Total Ankle Replacement by Surface Coating (Primary Diagnosis OA)

Coating	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	15 Yrs
HA	331	2273	2.4 (1.8, 3.1)	6.6 (5.7, 7.8)	9.5 (8.3, 10.9)	11.4 (10.1, 12.9)	15.2 (13.6, 16.9)	19.4 (17.4, 21.6)
No HA	113	3440	1.5 (1.1, 2.0)	3.4 (2.7, 4.2)	4.8 (3.9, 5.9)	6.7 (5.1, 8.8)		
TOTAL	444	5713						

Figure A14 Cumulative Percent Revision of Cementless Primary Total Ankle Replacement by Surface Coating (Primary Diagnosis OA)

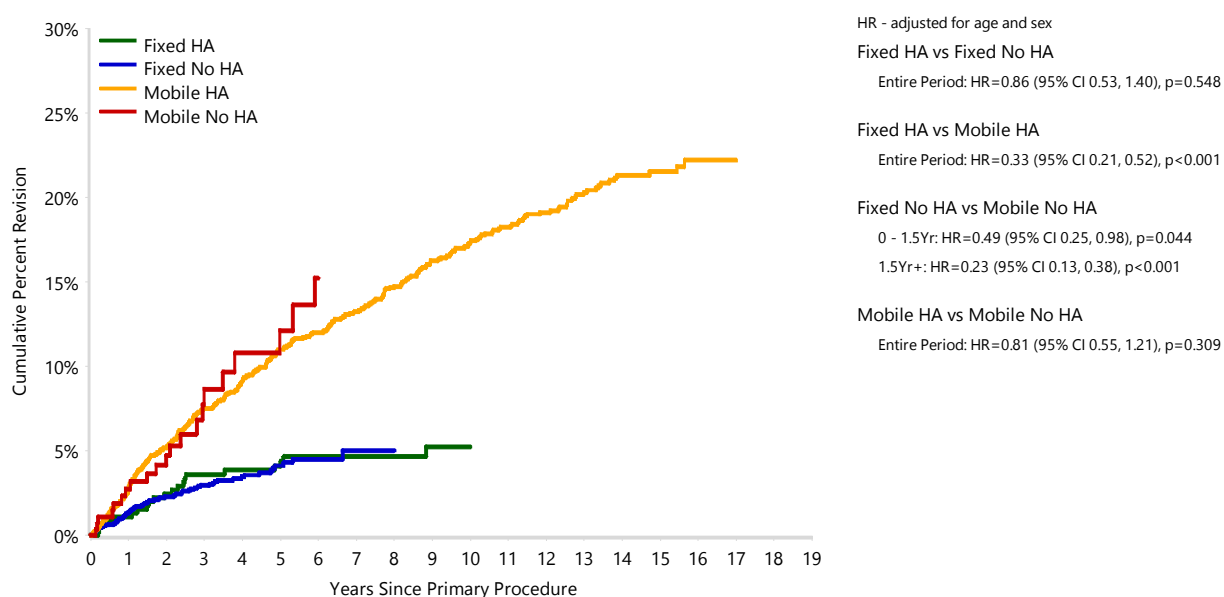


Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	15 Yrs
HA	2273	2114	1919	1721	1525	1048	313
No HA	3440	2773	1471	642	171	22	0

Table A23 Cumulative Percent Revision of Cementless Primary Total Ankle Replacement by Mobility and Surface Coating (Primary Diagnosis OA)

Mobility	Coating	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	15 Yrs
Fixed	HA	21	450	1.1 (0.5, 2.7)	3.6 (2.2, 5.8)	4.1 (2.6, 6.5)	4.6 (3.0, 7.1)	5.2 (3.4, 8.1)	
	No HA	86	3160	1.4 (1.0, 1.8)	3.0 (2.3, 3.7)	4.1 (3.2, 5.2)	5.0 (3.7, 6.7)		
Mobile	HA	309	1691	2.8 (2.2, 3.8)	7.5 (6.3, 8.9)	11.0 (9.6, 12.6)	13.2 (11.7, 15.0)	17.4 (15.5, 19.4)	21.5 (19.4, 23.9)
	No HA	27	280	2.7 (1.3, 5.7)	8.7 (5.2, 14.2)	12.1 (7.5, 19.2)			
TOTAL		443	5581						

Figure A15 Cumulative Percent Revision of Cementless Primary Total Ankle Replacement by Mobility and Surface Coating (Primary Diagnosis OA)



Number at Risk		0 Yr	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	15 Yrs
Fixed	HA	450	440	419	359	280	74	1
	No HA	3160	2548	1372	577	138	0	0
Mobile	HA	1691	1633	1500	1362	1245	974	312
	No HA	280	225	99	65	33	22	0

Figure A16 Primary Total Ankle Replacement by IDI Usage (Primary Diagnosis OA)

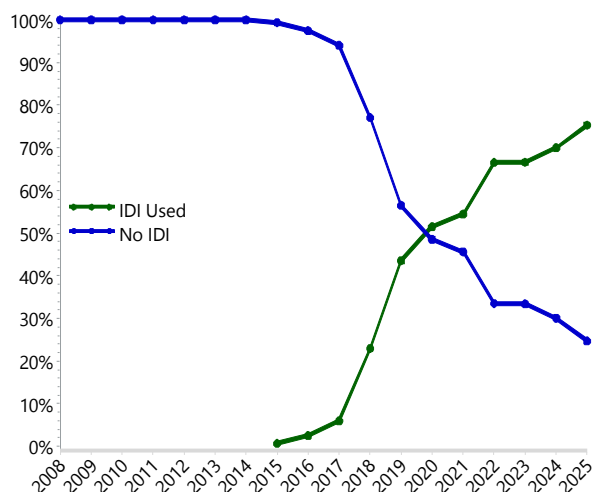
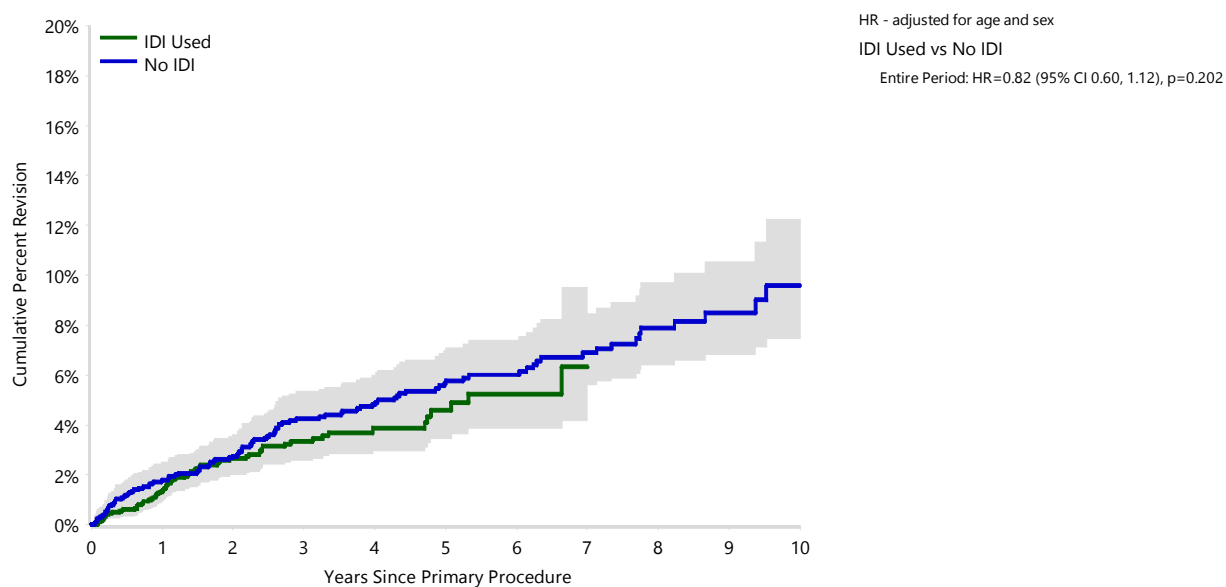


Table A24 Cumulative Percent Revision of Primary Total Ankle Replacement Since 2015 by IDI Usage (Primary Diagnosis OA)

IDI Usage	N Revised	N Total	1 Yr	2 Yrs	3 Yrs	4 Yrs	6 Yrs	7 Yrs
IDI Used	69	2468	1.3 (0.9, 1.9)	2.7 (2.0, 3.5)	3.3 (2.6, 4.3)	3.9 (3.0, 5.0)	5.2 (3.9, 7.1)	6.3 (4.2, 9.5)
No IDI	106	1982	1.8 (1.3, 2.5)	2.7 (2.1, 3.6)	4.2 (3.4, 5.3)	4.8 (3.9, 6.0)	6.0 (4.9, 7.4)	6.9 (5.6, 8.4)
TOTAL	175	4450						

Figure A17 Cumulative Percent Revision of Primary Total Ankle Replacement Since 2015 by IDI Usage (Primary Diagnosis OA)



Number at Risk	0 Yr	1 Yr	2 Yrs	3 Yrs	4 Yrs	6 Yrs	7 Yrs
IDI Used	2468	1865	1332	907	587	162	57
No IDI	1982	1754	1518	1279	1105	701	544

Figure A18 Primary Total Ankle Replacement by Polyethylene Type (Primary Diagnosis OA)

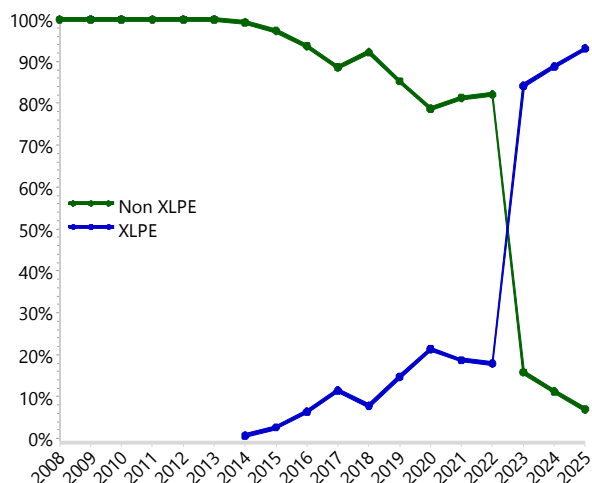
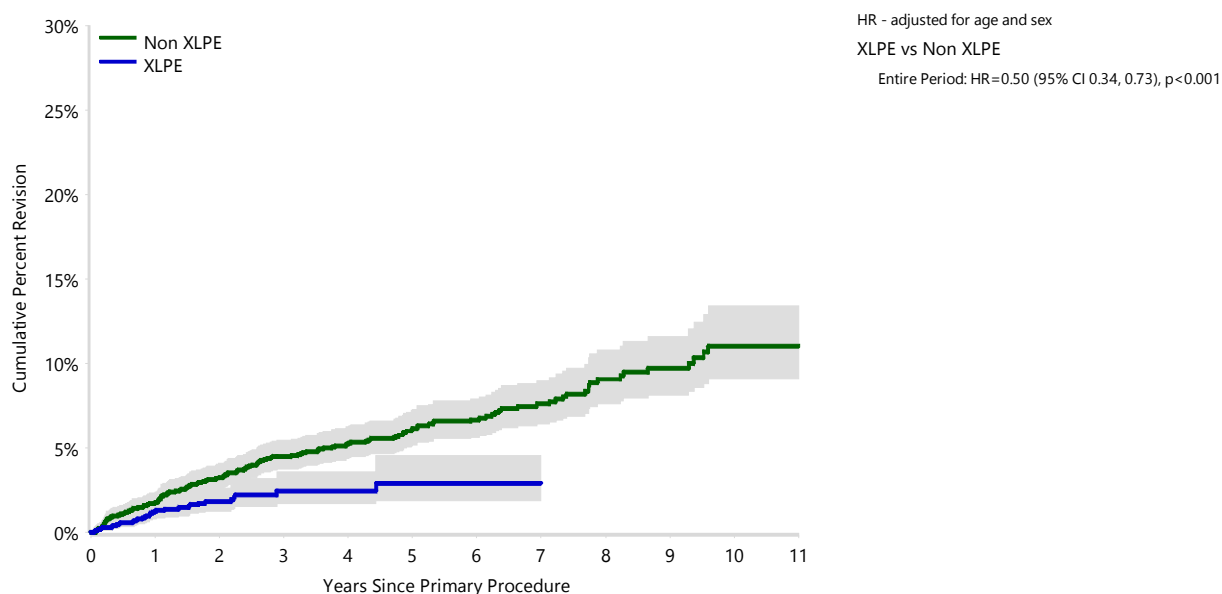


Table A25 Cumulative Percent Revision of Primary Total Ankle Replacement Since 2014 by Polyethylene Type (Primary Diagnosis OA)

Polyethylene Type	N Revised	N Total	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	8 Yrs
Non XLPE	158	2356	1.8 (1.3, 2.4)	3.3 (2.6, 4.1)	4.5 (3.7, 5.5)	5.2 (4.4, 6.3)	6.1 (5.1, 7.2)	9.1 (7.6, 10.8)
XLPE	35	2236	1.3 (0.8, 1.9)	1.8 (1.3, 2.6)	2.5 (1.7, 3.6)	2.5 (1.7, 3.6)	2.9 (1.9, 4.5)	
TOTAL	193	4592						

Figure A19 Cumulative Percent Revision of Primary Total Ankle Replacement Since 2014 by Polyethylene Type (Primary Diagnosis OA)



Number at Risk	0 Yr	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	8 Yrs
Non XLPE	2356	2250	2123	1985	1576	1190	485
XLPE	2236	1510	867	339	252	162	35

DEMOGRAPHICS OF ALL 1ST REVISIONS

This report analyses 897 revisions of ankle replacements with a procedure date up to and including 31 December 2025. This is an additional 78 procedures compared to the previous report.

TYPE OF REVISION

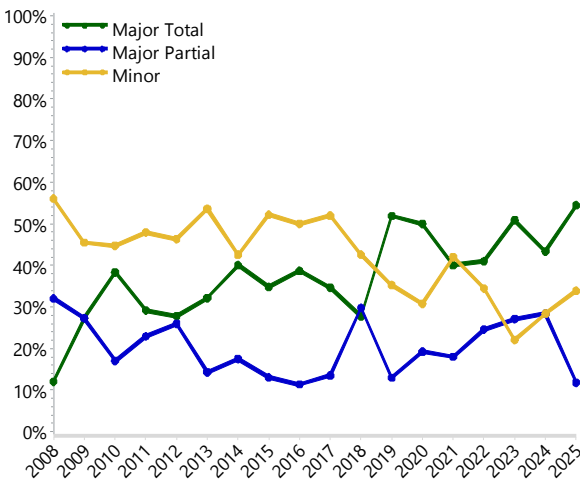
The majority of all revisions recorded by the Registry are major revisions (58.9%) (Table A26).

The proportion of revisions that are major total, major partial and minor revisions has changed since 2008. In 2008, 32.0% of ankle revisions performed were major partial revisions, and this has decreased to 20.0%. The proportion of minor revisions has also decreased over this time. The proportion of major total revisions has increased, from 12.0% of revisions performed in 2008 to 54.4% of revisions performed in 2025 (Figure A20).

REASON FOR REVISION

Overall, the most common reasons for revision are loosening (35.3%), infection (13.6%), implant breakage of the ankle insert (10.0%), and lysis (9.0%) (Table A27).

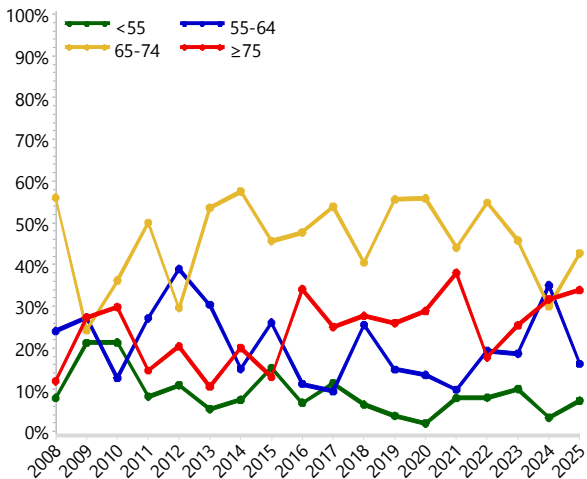
Figure A20 Revision Ankle Replacement by Class



AGE AND GENDER

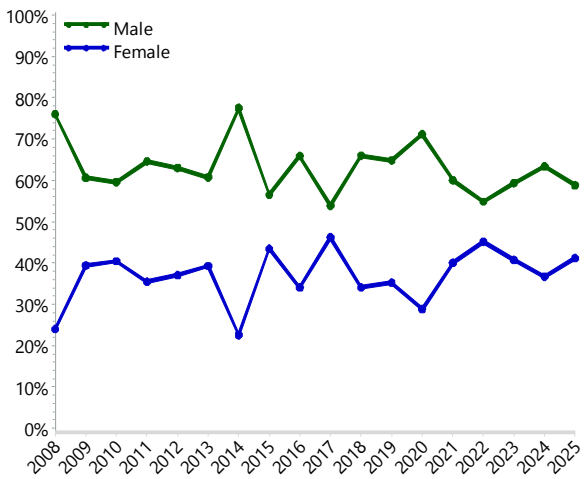
Compared to 2008, 2025 has seen an increase in the proportion of revision procedures in patients aged ≥ 75 years and a decrease in the proportion of procedures in patients aged 65-74 years (Figure A21).

Figure A21 Revision Ankle Replacement by Age



Revision ankle replacement is more common in males (62.4%). There has been a decrease in the proportion of males undergoing revisions since 2008 (Figure A22).

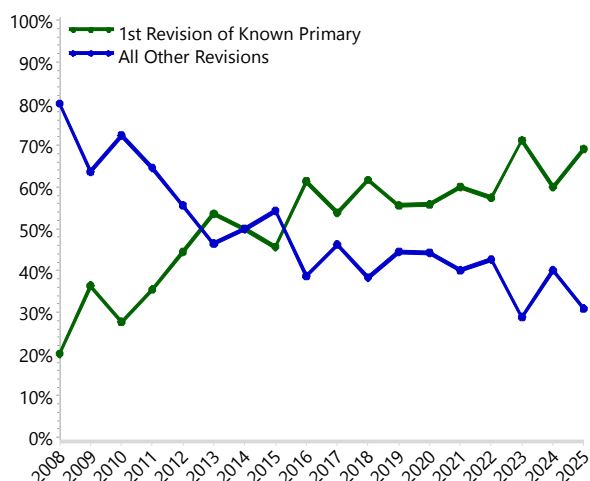
Figure A22 Revision Ankle Replacement by Gender



DEMOGRAPHICS OF 1ST REVISIONS OF KNOWN PRIMARY PROCEDURES

There have been 475 1st revision procedures where the primary procedure has been recorded by the Registry. This includes revisions of all known primary total ankle replacements (Figure A23).

Figure A23 Ankle Replacement by Revision



TYPE OF REVISION

The '1st revisions of known primary procedures' group and the 'all revisions' group differ in the types of revisions recorded.

The 1st revisions of known primary procedures group has a slightly smaller proportion of major revisions (54.1%) compared to the all revisions group (58.9%). There are less arthrodesis, tibial/talar, cement spacer and removal of prostheses, but more tibial only, talar only, insert only and minor components revisions (Table A26).

There are a higher proportion of minor revisions in the 1st revisions of known primary procedures group (45.9%) compared to the all revisions group (41.1%) (Table A27).

REASON FOR REVISION

There are differences in the reasons for revision between the 1st revisions of known primary procedures group and the all revisions group. Loosening is the most common reason for revision in both groups, but the proportion is lower in the 1st revisions of known primary procedures group (33.7% compared to 35.3%). There is a smaller proportion of implant breakage ankle insert in the 1st revisions group (8.8%) compared to the all revisions group (10.0%). Other diagnoses such as infection, lysis, instability and pain are slightly higher in the 1st revisions of known primary procedures group (Table A27).

**Table A26 Revision Ankle Replacement
by Type of Revision**

Type of Revision	1st Revision of Known Primary		All Revisions	
	Number	Percent	Number	Percent
Tibial/Talar	104	21.9	213	23.7
Arthrodesis	49	10.3	136	15.2
N Major Total	153	32.2	349	38.9
Tibial Only	40	8.4	50	5.6
Talar Only	33	6.9	61	6.8
Cement Spacer	23	4.8	44	4.9
Removal of Prostheses	8	1.7	24	2.7
N Major Partial	104	21.9	179	20.0
Insert Only	210	44.2	355	39.6
Minor Components	8	1.7	14	1.6
N Minor	218	45.9	369	41.1
TOTAL	475	100.0	897	100.0

**Table A27 Revision Ankle Replacement
by Reason for Revision**

Reason for Revision	1st Revision of Known Primary		All Revisions	
	Number	Percent	Number	Percent
Loosening	160	33.7	317	35.3
Infection	68	14.3	122	13.6
Lysis	48	10.1	81	9.0
Implant Breakage Ankle Insert	42	8.8	90	10.0
Instability	37	7.8	64	7.1
Impingement	24	5.1	50	5.6
Pain	24	5.1	43	4.8
Fracture	17	3.6	24	2.7
Prosthesis Dissociation	11	2.3	20	2.2
Arthrofibrosis	8	1.7	14	1.6
Malalignment	8	1.7	12	1.3
Heterotopic Bone	6	1.3	8	0.9
Wear Ankle Insert	6	1.3	11	1.2
Synovitis	3	0.6	3	0.3
Implant Breakage Tibial	2	0.4	2	0.2
Incorrect Sizing	2	0.4	2	0.2
Metal Related Pathology	1	0.2	1	0.1
Osteonecrosis	1	0.2	3	0.3
Progression Of Disease	1	0.2	2	0.2
Tumour	1	0.2	2	0.2
Avascular Talus			1	0.1
Cysts			1	0.1
Fusion/Arthrodesis			1	0.1
Malposition			1	0.1
Non-Union Of Arthrodesis			1	0.1
Prosthesis Dislocation			1	0.1
Valgus Deformity			1	0.1
Other	5	1.1	19	2.1
TOTAL	475	100.0	897	100.0

OUTCOME OF 1ST REVISION OF KNOWN PRIMARY ANKLE REPLACEMENT

This analysis reports the outcome of the 1st revision of a known primary total ankle replacement.

There is no difference in the rate of 2nd revision when the classes of 1st revision are compared (Table A28 and Figure A24).

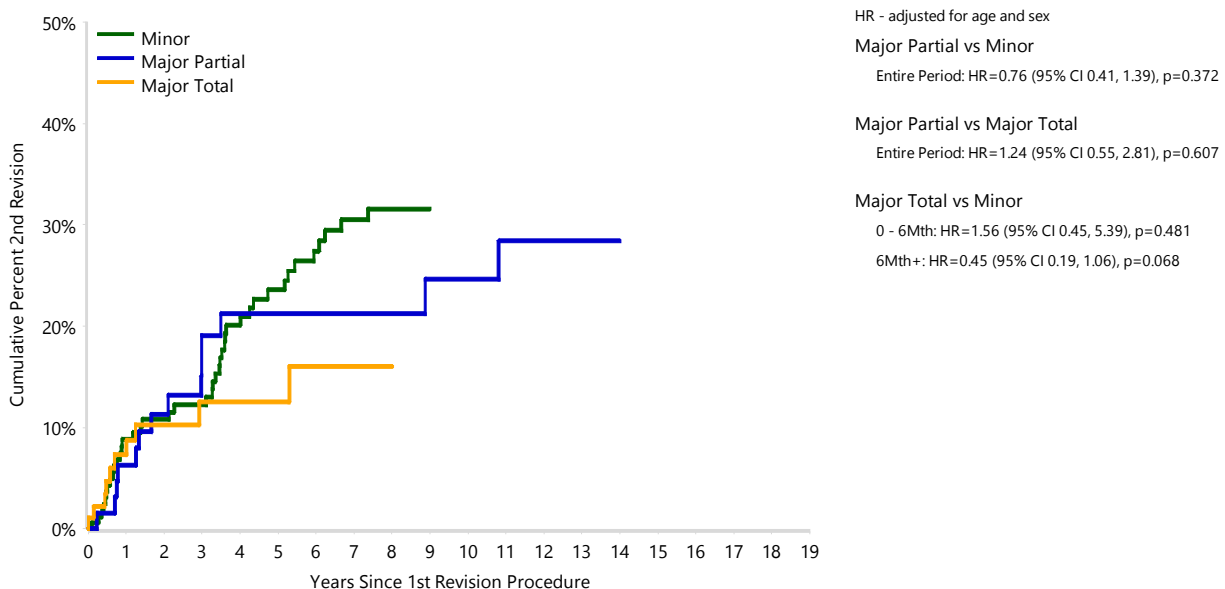
There are 326 1st revisions of primary total ankle replacements undertaken for osteoarthritis, excluding all procedures with a 1st revision for infection or where no tibial or talar components have been inserted.

Table A28 Cumulative Percent 2nd Revision of Known Primary Total Ankle Replacement by Class of 1st Revision (Primary Diagnosis OA, Excluding 1st Revision for Infection)

Class of 1st Revision	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	15 Yrs
Minor	43	170	8.8 (5.3, 14.4)	12.2 (8.0, 18.5)	23.5 (17.3, 31.6)	30.5 (23.2, 39.5)		
Major Partial	14	65	6.3 (2.4, 15.9)	19.1 (11.0, 31.9)	21.2 (12.5, 34.5)	21.2 (12.5, 34.5)	24.6 (14.7, 39.5)	
Major Total	10	91	7.3 (3.4, 15.7)	12.5 (6.6, 23.1)	12.5 (6.6, 23.1)	16.0 (8.4, 29.4)		
TOTAL	67	326						

Note: Excluding revisions where no minor or major tibial/talar components have been inserted

Figure A24 Cumulative Percent 2nd Revision of Known Primary Total Ankle Replacement by Class of 1st Revision (Primary Diagnosis OA, Excluding 1st Revision for Infection)



Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs	15 Yrs
Minor	170	138	114	82	64	34	4
Major Partial	65	56	41	34	31	20	4
Major Total	91	65	38	25	15	7	1



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The AOANJRR is funded by the Australian Government Department of Health, Disability and Ageing