

Hintermann Series H3/Hintermann Series H3 Total Ankle Investigation

Note: This analysis compares the Hintermann Series H3/Hintermann Series H3 talar/tibial tray combination with all other total ankle 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-2025>.

Note: Procedures using prostheses with no recorded use in 2024 are excluded from the comparator.

TABLE 1

Revision Rate of Primary Total Ankle Replacement

The revision rate of the Hintermann Series H3/Hintermann Series H3 total ankle combination is compared to all other total ankle prostheses.

Table 1: Revision Rates of Primary Total Ankle Replacement

Component	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
Hintermann Series H3/Hintermann Series H3	108	573	4725	2.29 (1.87, 2.76)
Other Total Ankle	316	4806	24440	1.29 (1.15, 1.44)
TOTAL	424	5379	29165	1.45 (1.32, 1.60)

Note: Prostheses no longer used in 2024 are excluded from the comparator.

TABLE 2

Yearly Cumulative Percent Revision of Primary Total Ankle Replacement

The yearly cumulative percent revision of the Hintermann Series H3/Hintermann Series H3 total ankle combination is compared to all other total ankle prostheses.

Table 2: Yearly Cumulative Percent Revision (95% CI) of Primary Total Ankle Replacement

CPR	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs
Hintermann Series H3/Hintermann Series H3	4.1 (2.7, 6.0)	5.9 (4.2, 8.2)	8.4 (6.4, 11.1)	10.1 (7.8, 12.9)	11.4 (8.9, 14.4)	13.0 (10.4, 16.2)
Other Total Ankle	1.6 (1.3, 2.0)	3.3 (2.8, 3.9)	4.5 (3.9, 5.3)	5.6 (4.8, 6.4)	6.9 (6.0, 7.8)	7.6 (6.6, 8.6)

CPR	7 Yrs	8 Yrs	9 Yrs	10 Yrs	11 Yrs	12 Yrs
Hintermann Series H3/Hintermann Series H3	15.7 (12.7, 19.2)	18.1 (14.8, 21.9)	20.1 (16.6, 24.1)	21.0 (17.5, 25.2)	22.5 (18.8, 26.8)	23.3 (19.5, 27.7)
Other Total Ankle	8.2 (7.2, 9.3)	9.3 (8.2, 10.6)	10.7 (9.5, 12.2)	11.9 (10.5, 13.4)	12.6 (11.2, 14.3)	13.5 (11.9, 15.3)

CPR	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs
Hintermann Series H3/Hintermann Series H3	24.9 (20.8, 29.7)	25.7 (21.4, 30.8)	25.7 (21.4, 30.8)		
Other Total Ankle	14.3 (12.6, 16.2)	15.2 (13.3, 17.3)	15.2 (13.3, 17.3)	15.8 (13.6, 18.4)	

Note: Prostheses no longer used in 2024 are excluded from the comparator.

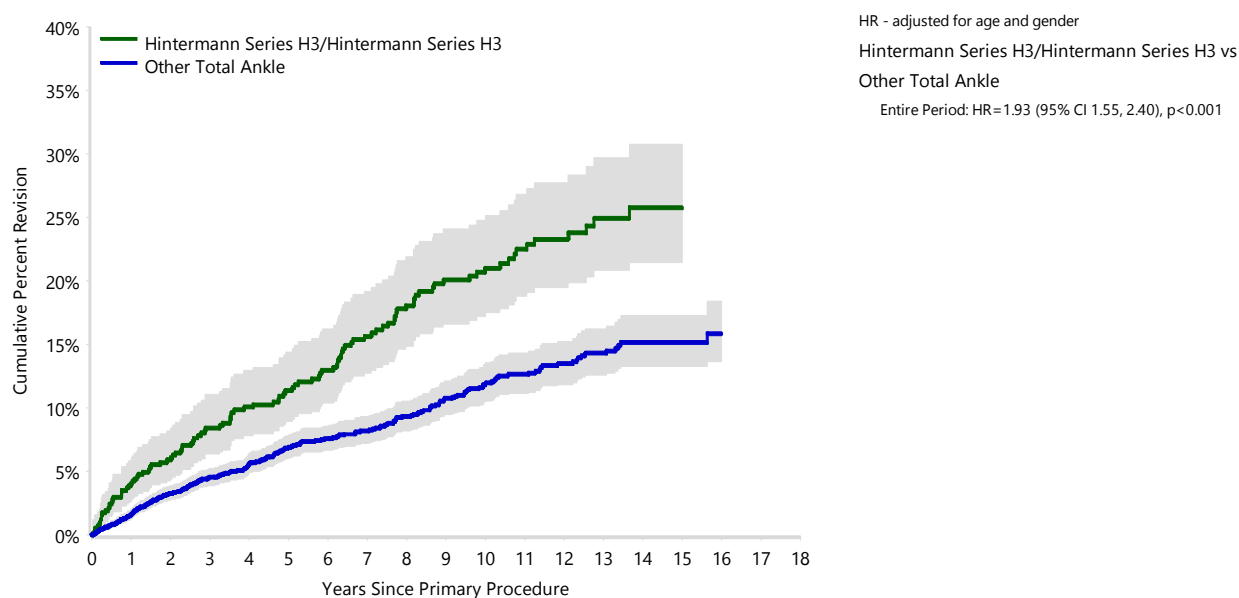
FIGURE 1

Yearly Cumulative Percent Revision of Primary Total Ankle Replacement

The yearly cumulative percent revision of the Hintermann Series H3/Hintermann Series H3 total ankle combination is compared to all other total ankle 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 Ankle Replacement



Number at Risk	0 Yr	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs	7 Yrs	8 Yrs
Hintermann Series H3/Hintermann Series H3	573	532	498	463	425	394	371	331	293
Other Total Ankle	4806	4002	3284	2739	2238	1843	1553	1326	1129

Number at Risk	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs
Hintermann Series H3/Hintermann Series H3	272	238	199	163	116	81	42	22	4
Other Total Ankle	947	814	688	560	438	284	174	93	23

Note: Prostheses no longer used in 2024 are excluded from the comparator.

TABLE 3**Primary Diagnosis for Revised Primary Total Ankle 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 ankle prostheses.

Table 3: Primary Diagnosis for Revised Primary Total Ankle Replacement

Primary Diagnosis	Hintermann Series H3/Hintermann Series H3		Other Total Ankle	
	Number	Percent	Number	Percent
Osteoarthritis	105	97.2	295	93.4
Rheumatoid Arthritis	3	2.8	12	3.8
Instability			3	0.9
Osteonecrosis			2	0.6
Other Inflammatory Arthritis			2	0.6
Fracture/Dislocation			1	0.3
Other			1	0.3
TOTAL	108	100.0	316	100.0

Note: Prostheses no longer used in 2024 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 Ankle Replacement - Reason for Revision

Revision Diagnosis	Hintermann Series H3/Hintermann Series H3			Other Total Ankle		
	Number	% Primaries Revised	% Revisions	Number	% Primaries Revised	% Revisions
Loosening	27	4.7	25.0	113	2.4	35.8
Infection	11	1.9	10.2	50	1.0	15.8
Lysis	9	1.6	8.3	31	0.6	9.8
Instability	11	1.9	10.2	23	0.5	7.3
Implant Breakage Ankle Insert	18	3.1	16.7	20	0.4	6.3
Impingement	5	0.9	4.6	16	0.3	5.1
Fracture	4	0.7	3.7	13	0.3	4.1
Pain	9	1.6	8.3	13	0.3	4.1
Arthrofibrosis	1	0.2	0.9	6	0.1	1.9
Prosthesis Dissociation	6	1.0	5.6	5	0.1	1.6
Heterotopic Bone				5	0.1	1.6
Malalignment	3	0.5	2.8	4	0.1	1.3
Wear Ankle Insert	2	0.3	1.9	4	0.1	1.3
Implant Breakage Tibial				2	0.0	0.6
Incorrect Sizing				2	0.0	0.6
Synovitis	1	0.2	0.9	2	0.0	0.6
Metal Related Pathology	1	0.2	0.9			
Osteonecrosis				1	0.0	0.3
Progression Of Disease				1	0.0	0.3
Tumour				1	0.0	0.3
Other				4	0.1	1.3
N Revision	108	18.8	100.0	316	6.6	100.0
N Primary	573			4806		

Note: Prostheses no longer used in 2024 are excluded from the comparator.

FIGURE 2

Cumulative Incidence Revision Diagnosis of Primary Total Ankle 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 Hintermann Series H3/Hintermann Series H3 total ankle combination. A comparative graph is provided of the cumulative incidence for the same reasons for revisions for all other total ankle prostheses.

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

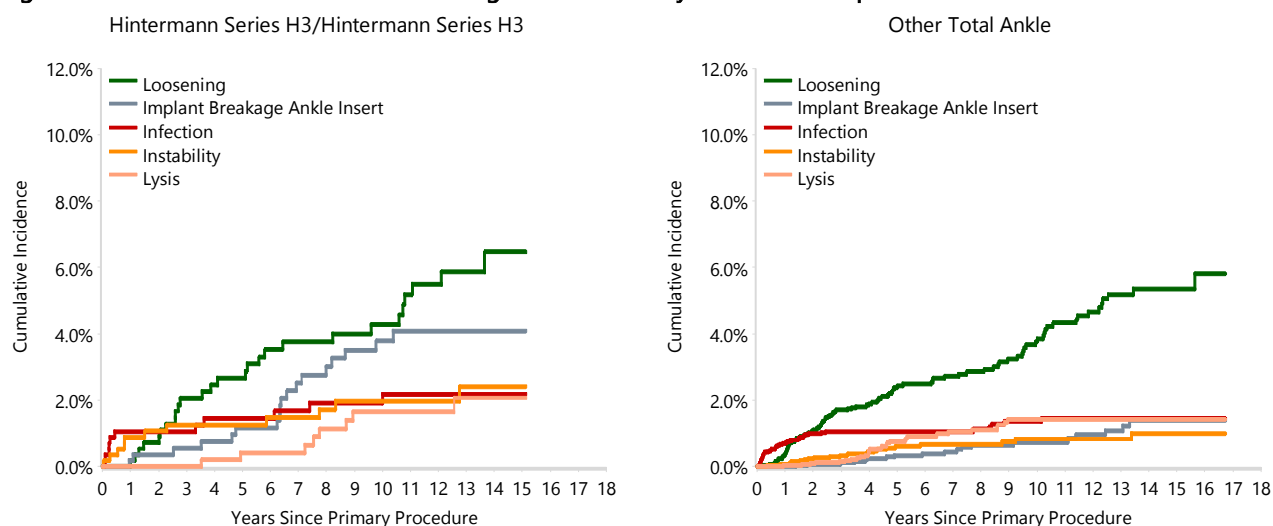


TABLE 5

Type of Revision Performed for Primary Total Ankle Replacement

This analysis identifies the components used in the revision of the Hindermann Series H3/Hindermann Series H3 total ankle combination and compares it to the components used in the revision of all other total ankle 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 ankle prostheses i.e. is there a difference in the type of revision undertaken for the Hindermann Series H3/Hindermann Series H3 total ankle combination compared to all other total ankle prostheses.

Table 5: Primary Total Ankle Replacement - Type of Revision

Type of Revision	Hindermann Series H3/Hindermann Series H3		Other Total Ankle	
	Number	Percent	Number	Percent
Tibial/Talar	19	17.6	63	19.9
Tibial Only	3	2.8	36	11.4
Talar Only	6	5.6	24	7.6
Cement Spacer	4	3.7	16	5.1
Removal of Prostheses	2	1.9	5	1.6
N Major	34	31.5	144	45.6
Insert Only	57	52.8	133	42.1
Arthrodesis	14	13.0	35	11.1
Minor Components	3	2.8	4	1.3
N Minor	74	68.5	172	54.4
TOTAL	108	100.0	316	100.0

Note: Prostheses no longer used in 2024 are excluded from the comparator.

TABLE 6**Revision Rates of Hintermann Series H3/Hintermann Series H3 Primary Total Ankle 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 Hintermann Series H3/Hintermann Series H3 Primary Total Ankle Replacement by Fixation

Fixation	N Revised	N Total
Cementless	108	573
TOTAL	108	573

TABLE 7**Number of Revisions of Hintermann Series H3/Hintermann Series H3 Primary Total Ankle Replacement by Year of Implant**

This analysis details the number of prostheses reported each year to the Registry for the Hintermann Series H3/Hintermann Series H3 total ankle 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 2024 has a maximum of one year to be revised, whereas a primary procedure performed in 2022 has a maximum of three years to be revised.

Table 7: Number of Revisions of Hintermann Series H3/Hintermann Series H3 Primary Total Ankle Replacement by Year of Implant

Year of Implant	Number Revised	Total Number
2007	1	6
2008	7	34
2009	11	45
2010	14	63
2011	13	56
2012	15	67
2013	8	48
2014	9	40
2015	11	34
2016	5	12
2017	2	25
2018	6	30
2019	1	13
2020	1	20
2021	2	24
2022	1	21
2023	0	20
2024	1	15
TOTAL	108	573