

TABLE E-1 Patient Demographics*

Study	Prosthesis	No. of Ankles	No. of Patients	Mean Age (Range) (yr)	Cause of Ankle Arthritis				Mean Follow-Up (Range) (yr)	Author Was Designer
					Trauma	Idiopathic	Autoimmune	Other		
Knecht et al. ¹⁷	Fixed bearing	132	126	61 (27-89)	6 (46%)	38 (29%)	31 (24%)	2 (1.5%)	9 (7-16)	Yes
Pyeovich et al. ²³	Fixed bearing	85	82	63 (27-81)	44 (52%)	19 (22%)	19 (22%)	2 (2%)	4.8 (2.8-12.3)	Yes
Kopp et al. ²²	Fixed bearing	40	38	63 (32-85)	24 (60%)	8 (20%)	8 (20%)	0	2.8 (2.2-5.3)	No
Spirt et al. ¹⁵	Fixed bearing	306	303	54 (19-85)	198 (65%)	77 (25%)	13 (4%)	18 (6%)	2.8 (0.3-6.25)	No
Nunley et al. ¹³	Mobile bearing	85	82	63.3 (34-85)	43 (50.6%)	30 (35.3%)	11 (13.9%)	1 (1.2%)	5.1 (2-9)	No
Schutte and Louwerens ⁷⁰	Mobile bearing	48	47	57 (37-81)	12 (25)	5 (10%)	29 (59%)	3 (6%)	2.3 (1-5.6)	No
Valderrabano et al. ¹⁴	Mobile bearing	68	65	56 (25-81)	48 (71%)	9 (13%)	11 (16%)	0	3.7 (2.4-6.2)	No
Saltzman et al. ³	Mobile bearing-initial cohort	158	158	63 (NR)	76 (48%)	62 (39%)	20 (13%)	0	2	No
	Mobile bearing-continued access	435	435	63 (NR)	269 (62%)	95 (22%)	31 (7%)	40 (9%)	2	No
Kofoed ⁵	Mobile bearing	25	25	58 (29-81)	NR	22 (88%)	3 (12%)	0	9.5 (NR)	Yes
Wood and Deakin ⁴⁰	Mobile bearing	200	200	59 (18-83)	25	56	119	0	3.8 (24-101)	No
Anderson et al. ²⁸	Mobile bearing	51	45	57 (29-76)	10 (20%)	13 (26%)	28 (55%)	0	4.3 (3-8)	No
Wood et al. ⁶	Mobile bearing	200	184	60 (18-83)	25 (12%)	56 (28%)	119 (60%)	0	7.3 (5-13)	No
Wood et al. ⁷	Mobile bearing-1st implant design	100	100	65 (23-83)	13 (13%)	56 (56%)	31 (31%)	0	4.5 (3-7)	No
	Mobile bearing-2nd implant design	100	100	64 (29-84)	15 (15%)	54 (54%)	31 (31%)	0	4.5 (3-6.3)	No
Buechel et al. ¹⁰	Mobile bearing	50	49	49 (26-71)	33 (66%)	8 (16%)	7 (14%)	2 (4%)		Yes
Buechel et al. ¹¹	Mobile bearing-shallow sulcus design	75	74	49 (25-78)	55 (73%)	8 (11%)	9 (12%)	3(4%)	12 (2-20)	Yes
	Mobile bearing-deep sulcus design	40	38	55 (21-89)	21 (53%)	8 (20%)	9 (22.5%)	3 (7.5%)	NRS	Yes
Doets et al. ¹⁶	Mobile bearing-1st implant design	93	76	58 (27-81)	0	0	88 (95%)	5 (5%)	NRS	No
	Mobile bearing-2nd implant design	74	NRS						NRS	No
Ali et al. ²¹	Mobile bearing	35	34	69 (58-84)	24 (68%)	10 (29%)	0	0	5 (0.3-12.5)	No
San Giovanni et al. ¹²	Mobile bearing	31	23	61 (28-79)	0	0	31 (100%)	0	8.3 (5-12.2)	No
Naal et al. ²⁹	Mobile bearing-1st implant design	47	101	59 (24-85)	47 (46%)	35 (35%)	19 (19%)	0	4.5 (2-7)	No
	Mobile bearing-2nd implant design	54	NRS	NRS	NRS	NRS	NRS	NRS	3 (2-4)	Yes
Valderrabano et al. ²⁰	Mobile bearing	152	147	60 (28-86)	115 (76%)	21 (14%)	16 (10%)	0	2.8 (2-4)	Yes
Hintermann and Barg ^{9†}	Mobile bearing	470	448	60 (NR)	359 (76%)	49 (10%)	62 (13%)	0	3.3 (1-8)	Yes
Bonnin et al. ⁴	Mobile bearing	98	96	56 (26-81)	43 (44%)	22 (22%)	29 (30%)	4 (4%)	2.9 (2-5.7)	Yes
Bonnin et al. ¹⁸	Mobile bearing	98	96	56 (26-81)	43 (44%)	22 (22%)	29 (30%)	4 (4%)	8.9 (6.8-11.1)	Yes

Takakura et al. ⁸	Fixed bearing	68	60	71.3 (50-87) for OA and 59.7 (41-76) for RA	NRS	39 (56%)	31 (44%)	0	5.2 (2-11.2)	Yes
Besse et al. ¹⁹	Mobile bearing	50	47	56 (21-79)	25 (50%)	21 (42%)	2 (4%)	2 (4%)	3.3 (NR)	No
Mann et al. ²⁶	Mobile bearing	84	80	61 (33-86)	47 (56%)	21 (25%)	15 (18%)	1 (1%)	9.1 (2.6-11)	No
Rippstein et al. ³⁶	Mobile bearing	240	233	62 (24-86)	123 (51%)	74 (31%)	36 (15%)	7 (3%)	2.7 (1-3)	Yes
Wood et al. ²⁵	Mobile bearing	100	96	66 (41-95)	73 (73%)	0	27 (27%)	0	3.6 (0.4-5.25)	Yes
Karantana et al. ²⁴	Mobile bearing	48	41	62 (33-81)	12 (25%)	22 (46%)	14 (29%)	0	NR (5-9.2)	No
Giannini et al. ²⁷	Mobile bearing	51	51	61.5 (35-82)	38 (75%)	8 (16%)	4 (8%)	0	2.6 (2-4)	Yes

*NR = not reported, NRS = not reported separately, OA = osteoarthritis, and RA = rheumatoid arthritis. †Presented in abstract form but not yet published.

TABLE E-2 Functional Outcomes*

Study	Prosthesis	Scoring System	Preoperative			Postoperative			P Value
			Total	Pain Subscore	Function Subscore	Total	Pain Subscore	Function Subscore	
Knecht et al. ¹⁷	Fixed bearing	AOS	NR	NR	NR	2.5 ± 2.3	2.02 ± 2.24	3.36 ± 2.9	NR
Pyeovich et al. ²³	Fixed bearing	AOFAS	NR	NR	NR	85 (40-100)	NR	NR	NR
Kopp et al. ²²	Fixed bearing	AOFAS	34 (12-70)	NR	NR	83 (65-100)	NR	NR	<0.001
		SF-36	NR	NR	NR	PCS: 49.5 (28.2-63.7)	NR	NR	NR
						MCS: 56.1 (23.1-66.9)	NR	NR	NR
Spirit et al. ¹⁵	Fixed bearing	NR	NR	NR	NR	NR	NR	NR	NR
Nunley et al. ¹³	Mobile bearing	SF-36	45.6 ± 16			78.3 ± 19.0			<0.001
		AOFAS	38.8 ± 12.6	4.7 ± 8.5	23.1 ± 6.2	85.9 ± 11.5	34.7 ± 5.5	42.5 ± 6.1	<0.001
		NJOH	NR	9.8 ± 3.9	17.9 ± 5.6	NR	36.9 ± 3.0	35.2 ± 4.1	0.59, 0.62
Schutte and Louwerens ⁷⁰	Mobile bearing	Kofoed	NR	NR	NR	68 ± 19	35	20; 13	NA
		FFI	59 ± 17	54	62	35 ± 19	29	40	<0.001
Valderrabano et al. ¹⁴	Mobile bearing	AOFAS	24.7 (3-44)	NR	NR	84.3 (44-100)	34.3 (0-40)	40.1 (17-50)	NR
Saltzman et al. ³	Mobile bearing-initial cohort	NJOH	40.8 ± 7.4	10.6 ± 3.9	18.6 ± 5.7	40.5 ± 15.1†	21.5 ± 9.6†	13.4 ± 7.3†	<0.001
		VAS	71.1 (NR)	NA	NA	19.5 (NR)	NA	NA	NR
	Mobile bearing-continued access	NJOH	37.6 ± 8.5	9.4 ± 3.3	15.6 ± 5.9	46.7 ± 13.0†	24.2 ± 7.5†	17.9 ± 7.2†	<0.001
		VAS	76.5 (NR)	NA	NA	15.8 (NR)	NA	NA	NR
Kofoed ⁵	Mobile bearing	Kofoed	30 ± 12	NRS	NRS	92 ± 7	NRS	NRS	NR
Anderson et al. ²⁸	Mobile bearing	Kofoed	39 (14-61)	NRS	NRS	70 (14-96)	NRS	NRS	NR
		AOFAS	NR	NR	NR	74 (21-100)	NRS	NRS	NA
		Mazur	NR	NR	NR	74 (28-91)			
Wood and Deakin ⁴⁰	Mobile bearing	AOFAS	NR	0	28	NR	35	35	NR
	Mobile bearing	AOFAS	NR	NR	NR	70 (20-94)	NRS	NRS	NA
Wood et al. ⁶	Mobile bearing	AOFAS	NR	NR	NR	NR	35 (0-40)	40 (20-54)	NA
Wood et al. ⁷	Mobile bearing-1st implant design	AOFAS	NR	0	31 (10-44)	NR	34 (20-40)	45 (21-58)	NR
	Mobile bearing-2nd	AOFAS	NR	0	33 (12-51)	NR	37 (30-40)	46 (29-58)	NR

	implant design								
		G/E				88% G/E			
Buechel et al. ¹⁰	Mobile bearing	NJOH	NR	9.8 (0-20)	NR	NR	32.6 (10-40)	NR	NR
Buechel et al. ¹¹	Mobile bearing	NJOH	NR	NR	NR	NR	NR	NR	NR
	Mobile bearing	NJOH	NR	NR	NR	NR	NR	NR	NR
Doets et al. ¹⁶	Mobile bearing	NJOH	36.1 (33.6-38.7)	NRS	NRS	81.5 (78.4-83.9)	NRS	NRS	<0.05
		AOFAS	26.5 (24.1-28.8)	NRS	NRS	77.7 (74.7-80.6)	NRS	NRS	<0.05
		Kofoed	26.9 (24.1-29.7)	NRS	NRS	74.0 (70.9-77.2)	NRS	NRS	<0.05
Ali et al. ²¹	Mobile bearing	AOFAS	34.6 (20-56)	NRS	NRS	76 (54-100)	30 (20-40)	40 (29-50)	<0.001
San Giovanni et al. ¹²	Mobile bearing	AOFAS	NR	NR	NR	81 (40-92)	NR	NR	NR
Naal et al. ²⁹	Mobile bearing	AOFAS	45.5 ± 16.6	NR	NR	84.3 ± 13.3	NR	NR	<0.001
	Mobile bearing	NRS	NRS	NRS	NRS	NRS	NRS	NRS	NRS
Valderrabano et al. ²⁰	Mobile bearing	AOFAS	36 (10-74)	NRS	NRS	84 (28-100)	NRS	NRS	<0.001
		VAS	6.9 (3-10)	NA	NA	2.4 (1-5)	NA	NA	<0.001
Hintermann and Barg ^{9§}	Mobile bearing	AOFAS	42 (NR)	NRS	NRS	72 (NR)	NRS	NRS	NR
		VAS	6.8 ± 1.9			2.8 ± 2.4			NR
Bonnin et al. ⁴	Mobile bearing	AOFAS	32 ± 10	NRS	NRS	82 ± 11	NRS	NRS	<0.005
Bonnin et al. ¹⁸	Mobile bearing	AOFAS	26.7 ± 8.9	NRS	NRS	79.3 ± 11.9	NRS	NRS	0.0001
Takakura et al. ⁸	Fixed bearing	Takakura†	OA: 48.7 ± 10.5; RA: 44.3 ± 9.7	OA: 14.2 ± 6.3; RA: 13.8 ± 4.7	OA: 34.4 ± 6.8; RA: 30.5 ± 7.7	OA: 86.1 ± 11.3; RA: 74.2 ± 12.4	OA: 36.8 ± 6.7; RA: 35.5 ± 8.5	OA: 49.4 ± 6.9; RA: 38.7 ± 8.2	<0.001
Besse et al. ¹⁹	Mobile bearing	AOFAS	36.9 (15-65)	2.4 (0-20)	27 (14-40)	85.4 (47-100)	29.6 (0-40)	45.9 (28-50)	<0.001
		Tegner	1.9 (0-5)			3.3 (2-5)			<0.001
Mann et al. ²⁶	Mobile bearing	AOFAS	42.7 (16-76)	7.1	26.7	81.9 (40-100)	32.9	41.3	NR
Rippstein et al. ³⁶	Mobile bearing	AOFAS	48.2 ± 17.5 (6-85)	NRS	NRS	84.3 ± 12.1 (44-100)	NRS	NRS	<0.001
		VAS	7.7 ± 1.4			1.7 ± 2.0 (0-7))			<0.001
Wood et al. ²⁵	Mobile bearing	AOFAS	NR	2.9 (0-20)	32.0 (12-52)	NR	30.6 (0-40)	48.4 (15-60)	NR
		VAS	8.5 (5-10)			2.1 (0-9)			
Karantana et al. ²⁴	Mobile bearing	AOFAS	NR	NR	NR	78 ± 18 (30-100)	NRS	NRS	NA
Giannini et al. ²⁷	Mobile bearing	AOFAS	38.5 (0-70)	11.6	20.8	79.0 (76-82)	30	37.8	0.003

*The values are given as the mean and the standard deviation or as the mean with the range in parentheses. AOS = Ankle Osteoarthritis Scale, AOFAS = American Orthopaedic Foot and Ankle Society, NJOH = New Jersey Orthopaedic Hospital, FFI = Foot Function Index, VAS = visual analog scale, SF-36 = Short Form-36, PCS = physical component score, MCS = mental component score, OA = osteoarthritis, RA = rheumatoid arthritis, NA = not applicable, NR = not reported, and NRS = not reported separately. †Points of improvement not final score. ‡A 100-point scale, with 0 as worst score and 100 as best score. §Presented in abstract form but not yet published.

NEW TABLE E-3 Range of Motion and Patient Satisfaction

Study	Prosthesis	Scoring System	Range of Motion*		Patient Satisfaction†
			Preop.	Postop.	
Knecht et al. ¹⁷	Fixed bearing	AOS	NR	18° (2°-40°)‡	92%
Pyeovich et al. ²³	Fixed bearing	AOFAS	NR	36° (10°-64°)	93%
Kopp et al. ²²	Fixed bearing	AOFAS	NR	NR	97%
		SF-36			
Spirt et al. ¹⁵	Fixed bearing	NR	NR	NR	NR
Nunley et al. ¹³	Mobile bearing	SF-36	NR	NR	NR
		AOFAS			
		NJOH	DF: 2.9° ± 5.9°; PF: 22.2° ± 11.0°	DF: 6.3° ± 7.9°; PF: 26.9° ± 7.8°	NR
Schutte and Louwerens ⁷⁰	Mobile bearing	Kofoed	NR	DF: 7° ± 4°; PF: 20° ± 8°	41%
Valderrabano et al. ¹⁷	Mobile bearing	AOFAS	NR	28.1° (4°-42°)	97%
Saltzman et al. ³	Mobile bearing-initial cohort	NJOH	NR	ROM subscore: 8.7 ± 3.6	85.4
		VAS	NR	ROM subscore: 8.8 ± 3.6	NR
	Mobile bearing-continued access	NJOH			85.4
Kofoed ⁵	Mobile bearing	Kofoed	NRS	NRS	NR
Anderson et al. ²⁸	Mobile bearing	Kofoed	NRS	28° (10°-55°)	85%
Wood and Deakin ⁴⁰	Mobile bearing	AOFAS	23° (5°-60°)	27° (10°-60°)	NR
	Mobile bearing	AOFAS			NR
Wood et al. ⁶	Mobile bearing	AOFAS	NR	NR	NR
Wood et al. ⁷	Mobile bearing-1st implant design	AOFAS	NR	DF improved >10 in 14/75 (19%)	NR
	Mobile bearing-2nd implant design	AOFAS	NR	DF improved >10 in 6/75 (8%)	NR
Buechel et al. ¹⁰	Mobile bearing	NJOH	NR	28° (12°-46°)	
Buechel et al. ¹¹	Mobile bearing	NJOH		25° (10°-47°)	70%
	Mobile bearing	NJOH		29° (10°-50°)	88%
Doets et al. ²⁵	Mobile bearing	NJOH	DF: 3.9° (2.9°-5.0°); PF: 22.4° (20.2°-24.6°)	DF 7.1° (5.8°-8.4°); PF 24.8° (22.5°-27.2°)	NR
Ali et al. ²¹	Mobile bearing	AOFAS	NR	41.2 clinical; 44.1 radiographic	97%
San Giovanni et al. ¹²	Mobile bearing	AOFAS	17° (5°-40°)	23° (8°-40°)	89%
Naal et al. ²⁹	Mobile bearing	AOFAS	NR	NR	NR

	Mobile bearing	NRS			
Valderrabano et al. ²⁰	Mobile bearing	AOFAS	21° (0°-45°)	35° (10°-55°)	83%
Hintermann et al. ⁹ §	Mobile bearing	AOFAS			95%
Bonnin et al. ⁴	Mobile bearing	AOFAS	15.2° ± 10°	28.3° ± 7°	92%
Bonnin et al. ¹⁸	Mobile bearing	AOFAS	NR	DF 9 ± 5; PF 18° ± 8°	NR
Takakura et al. ⁸	Fixed bearing	Takakura§	27.7° ± 8.9°	OA: 33.3° ± 10.2°	OA: 91.2% and RA: 76.9%
			RA: 21.5° ± 7.3°	RA: 22.1° ± 5.3°	NR
Besse et al. ¹⁹	Mobile bearing	AOFAS	23.5° (3°-45°)	22.1° (9°-45°)	80%
	Mobile bearing	Tegner			
Mann et al. ²⁶	Mobile bearing	AOFAS			92%
Rippstein et al. ³⁶	Mobile bearing	AOFAS	19.8° ± 9.8°	21.9° ± 8.7°	96%
Wood et al. ²⁵	AOFAS	NRS	NRS	22° (2°-43°)#; 13 improved; 10 decreased; 1 no change	NR
Karantana et al. ²⁴	Mobile bearing	AOFAS		23° ± 12° (0°-55°)	NR
Giannini et al. ²⁷	Mobile bearing	AOFAS	DF: 0°; PF: 12°	DF: 6°; PF: 18°	NR

*The values are given in degrees (unless otherwise indicated) as the mean and standard deviation or as the mean with the range in parentheses. DF = dorsiflexion, PF = plantar flexion, OA = osteoarthritis, RA = rheumatoid arthritis, ROM = range of motion, AOS = Ankle Osteoarthritis Scale, AOFAS = American Orthopaedic Foot and Ankle Society, NJOH = New Jersey Orthopaedic Hospital, SF-36 = Short Form-36, VAS = visual analog scale, NR = not reported, and NRS = not reported separately. †Reported as good, excellent, satisfied, or satisfied with minimal reservation; the percentage is based on the number of patients who responded (may differ from number of implants.) ‡Based on radiographs of thirty-three patients. §A 100-point scale, with 0 as worst score and 100 as best score. #Based on radiographs of twenty-four ankles only.

TABLE E-4 Implant Survival*

Study	Prosthesis	Survivorship	Postoperative Alignment†	Revision	Arthrodesis	Amputation
Knecht et al. ¹⁷	Fixed bearing	89% at 9 yr	NRS	7	7	1‡
Pyevich et al. ²³	Fixed bearing	NR	NRS	4	1	0
Kopp et al. ²²	Fixed bearing	98% at 3.7 yr	NR	1	0	0
Spirit et al. ¹⁵	Fixed bearing	80% at 5 yr	NR	31	1	8§
Nunley et al. ¹³	Mobile bearing	88.5% at 9 yr	NR	5	0	0
Schutte and Louwerens ⁷⁰	Mobile bearing	91.8% at 2.3 yr	25/49 (48%) satisfactory; 14 tibial (1 varus, 4 valgus, 9 posterior slope); 12 talar (1 valgus, 11 anterior slope)	1	3	0
Valderrabano and Hintermann ¹⁴	Mobile bearing	87% at 3.7 yr	Coronal: TA 1° valgus (5.6° varus-6.6° valgus); sagittal: tibial slope 88° (73.3°-11.4°), talar 17° (7.4°-32.6°) (talar component relative to native talar sagittal axis)	9 (13%)	0	0
Saltzman et al. ³	Mobile bearing-initial cohort	92% at 2 yr	NR	NRS	NRS	NRS
	Mobile bearing-continued access	96% at 2 yr	NRS	NRS	NRS	1
Kofoed ⁵	Mobile bearing	95.4% at 12 yr	NR	1	0	0
Anderson et al. ²⁸	Mobile bearing	70% at 5 yr	NR	7	5	0
Wood and Deakin ⁴⁰	Mobile bearing	92.7% at 5 yr	Coronal: TA 85° (75°-100°); sagittal: tibial slope: 88° (70°-100°), talar sagittal position: 22° (6°-40°)	3		
Wood et al. ⁶	Mobile bearing	80.3% at 10 yr	Coronal: TA 85° (75°-100°); sagittal: tibial slope: 86/144 (60%) between 83° and 90° (mean, 88%)	4#	NR	NR
Wood et al. ⁷	Mobile bearing-1st implant design	95% at 6 yr	Coronal: NRS; sagittal: 40/46 (87%) improved from preop. anterior talar translation	0	4	0
	Mobile bearing-2nd implant design	79% at 6 yr	NRS	2	10	0
Buechel et al. ¹⁰	Mobile bearing	93.5% at 10 yr	NRS	2	0	0
Buechel et al. ¹¹	Mobile bearing-shallow sulcus design	74% at 20 yr	NR	9	NRS	0
	Mobile bearing-deep sulcus design	92% at 12 yr	NR	1	NRS	0
Doets et al. ¹⁶	Mobile bearing-1st implant design	84% at 8 yr	NR	2	13	0
	Mobile bearing-2nd implant design	NRS	NRS	NRS	NRS	NRS
Ali et al. ²¹	Mobile bearing	97% at 5 yr	NR	0	1	0
San Giovanni et al. ¹²	Mobile bearing	93% at 8.3 yr	Acceptable position: 23/28 (82%)	0	2	0
Valderrabano et	Mobile bearing	91% at 2.8 yr	NR	13	0	0

al. ²⁰						
Hintermann and Barg ^{9**}	Mobile bearing	95.4% at 5 yr	UTD	9	2	0
Bonnin et al. ⁴	Mobile bearing	98% favorable scenario at 5.6 yr	NR	0	2	0
		95% unfavorable scenario at 5.6 yr				
Bonnin et al. ¹⁸	Mobile bearing	84.4% at 11 yr	Coronal: TA $90.5^\circ \pm 1.8^\circ$ (88° - 95°), TAL $90.9^\circ \pm 2.5^\circ$ (87° - 98°); sagittal: tibial slope $9.9^\circ \pm 4.3^\circ$ (2° - 19°); NRS	1	6	0
Takakura et al. ⁸	Fixed bearing	96% at 5.2 yr	NR	NR	3	0
Besse et al. ¹⁹	Mobile bearing	96% at 3.3 yr	Coronal: tibial: 88% at $90^\circ \pm 3^\circ$ sagittal: tibial slope $3.2^\circ \pm 4.96\%$ of tibial implants between 0° - 8° . Acceptable: coronal: 98% tibial and 96% talar	3	2	0
Mann et al. ²⁶	Mobile bearing	90% at 10 yr	Coronal: tibial 2° varus (9° varus to 4° valgus), talar 3° varus (15° varus to 19° valgus); sagittal: tibial 4° DF (1° - 11°), talar 4 mm anterior (12 mm anterior to 5 mm posterior)	4	5	0
Rippstein et al. ³⁶	Mobile bearing	97.7% at 4 yr	Coronal: TA $2.1^\circ \pm 2.9^\circ$ (-5.5° to 10.2°); sagittal: tibial slope: $6.0^\circ \pm 3.8^\circ$ (range, -5.8° to 17.1°); acceptable: coronal: 424/456 (93%) sagittal: 444/456 (97.4%)	4	1	0
Wood et al. ²⁵	Mobile bearing	93.6% at 4 yr	NR	1	2	0
Karantana et al. ²⁴	Mobile bearing	84% at 8 yr	9/13 (69%) with acceptable correction for preop. coronal plane malalignment of $>10^\circ$	4††	2	0
Giannini et al. ²⁷	Mobile bearing	97% at 3 yr	NRS	1	1	0

*NR = not reported, and NRS = not reported separately, and UTD = unable to determine. †The values are given as coronal and sagittal alignment in parentheses: percentage within investigators' target range for acceptable. DF = dorsiflexion, TA = tibial angle (coronal plane angle of tibial component relative to longitudinal axis of tibia), TAL = talar angle (coronal angle of talar component relative to longitudinal axis of tibia), tibial slope = sagittal plane angle of tibial component relative to longitudinal axis of tibia, and talar sagittal position = angle between talar component and native talar sagittal longitudinal axis. ‡Unrelated to ankle replacement. §Seven of eight were considered for amputation prior to total ankle arthroplasty. #One went on to arthrodesis. **Presented in abstract form but not yet published. ††Excluding polyethylene exchanges.

Ali et al. ²¹	Mobile bearing	2 MM	2	0			Frequent , but NRS	NRS	1/35 (3%)	NR	NRS
San Giovanni et al. ¹²	Mobile bearing	10 (32%) MM	14, 12 MM, 1 LM, 1 distal tibia	0	0	1	7 (radiogra phic)	7/28 (25%)	NR	5	7
Valderrabano et al. ²⁰	Mobile bearing	NR	NR		NR	NR	1	47/152 (31%)	NR	4	13
Hintermann and Barg ^{9§}	Mobile bearing	NR	NR	NR	NR			NRS	1/470 (0.2%)	NR	UTD
Bonnin et al. ⁴	Mobile bearing	NR	NR	NR	NR	1	NR	21/93 (23%)	2	2	4
					NR	1	1				
Bonnin et al. ¹⁸	Mobile bearing	0%	0%	5#	NR	NR	2		3	17	24
Takakura et al. ⁸	Fixed bearing	NRS	4	NR	NR	1	2	NR	NR	2	5
Besse et al. ¹⁹	Mobile bearing	NR	1	NR	NR	1	2	37/47 (78%)	NR	2	5
Mann et al. ²⁶	Mobile bearing	4: 3 MM and 1 LM	7: 6 MM and 1 LM	1	NR	3	NR	26/80 (33%) mod or severe pain	NR	7	16
Rippstein et al. ³⁶	Mobile bearing	9: 4 MM and 5 LM	14: 14 MM and 5 LM	NR	NR	2	NR	NRS	NR	13	18 (7.9%)
Wood et al. ²⁵	Mobile bearing	2 (2%) MM	7: 6 (6%) MM and 1 (1%) LM	0%	NR	1 (1%)	9	NR	NR	2	5
Karantana et al. ²⁴	Mobile bearing	5: 1 MM and 4 LM	8	2	NR	1 (1%)	2	NRS	NR	11	17
Giannini et al. ²⁷	Mobile bearing	1 MM	1	0%	0%	NR	1	NR	NR	1	3

*NR = not reported, NRS = not reported separately, LM = lateral malleolar fracture, and MM = medial malleolar fracture, and UTD = unable to determine. †Unexplained pain = total ankle arthroplasty without problems clinically and radiographically but ankle painful, and CRPS = complex regional pain syndrome. ‡Without removal of prosthesis (relieve impingement, realignment, cyst bone-grafting, or polyethylene exchange). §Presented in abstract form but not yet published. #All five failures with 3-mm polyethylene thickness no longer used.

TABLE E-6 Radiographic Loosening*

Study	Prosthesis	No. of Ankles†	Bone Cysts or Radiolucencies (no. of ankles)	Radiolucencies or Cysts Prompting Reoperation	Subsidence and/or Migration (no. of ankles)	Subsidence and/or Migration Prompting Reoperation	Impending Failure
Knecht et al. ¹⁷	Fixed bearing	117	89 (76%)	5	16 (14%)	9	NR
Pyeovich et al. ²³	Fixed bearing	98	17/61 (28%) ballooning in patients with syndesmosis fusion; 25/98 (26%) circumferential lucency	NR	12	2	NR
Kopp et al. ²²	Fixed bearing	40	34 (85%)	NR	18 (45%)	1	NR
Spirit et al. ¹⁵	Fixed bearing	306	NR	NR	NRS	NRS; 31 component revisions	NR
Nunley et al. ¹³	Mobile bearing	82	NR	NR	NR	NR	NR
Schutte and Louwerens ⁷⁰	Mobile bearing	48	1 cyst; 22 radiolucencies	1	28 (58%)	NR	NR
Valderrabano et al. ¹⁴	Mobile bearing	68	13 (19%)	16 (23.5%)	10 (15%)	3	NR
Saltzman et al. ³	Mobile bearing-initial cohort	NRS	NRS	NR	NRS	NRS	NR
	Mobile bearing-continued access	NRS	NRS	NR	NRS		NR
Kofoed ⁵	Mobile bearing	25	0%	0%	NRS	1 (4%)	NR
Anderson et al. ²⁸	Mobile bearing	39	NR	NR	15	7	8
Wood et al. ⁶	Mobile bearing	200	1	24 (12%)	NRS	14 (7%)	NR
Wood et al. ⁷	Mobile bearing-1st implant design	100	NRS	NR	1	1	NR
	Mobile bearing-2nd implant design	100	1	1	5	5	NR
Buechel et al. ¹⁰	Mobile bearing		6	NR	2	1	
Buechel et al. ¹¹	Mobile bearing-shallow sulcus design	26	7 (27%)	4 (15.4%)	6 (23.1%)	5 (19.2%)	NR
	Mobile bearing-deep sulcus design	42	8 (19%)	1 (2.4%)	4 (9.5%)	1 (2.4%)	NR
Doets et al. ¹⁶	Mobile bearing-1st implant design	57‡	45 tibial comps. (78.9%) and 7 talar comps.	NRS	3 tibial and 4 talar	6 (10.5%)	4/93 (4.3%) (entire cohort)

	Mobile bearing-2nd implant design	NRS	NRS		NRS		NR
Ali et al. ²¹	Mobile bearing	0	1 (3%)	0	NR	NR	NR
San Giovanni et al. ¹²	Mobile bearing	28	1 (4%)	0	5 (18%)	0	5 (18%)
Naal et al. ²⁹	Mobile bearing-1st implant design	47	35%	NR	NR	NR	NR
	Mobile bearing-2nd implant design	54	NRS	NRS	NRS	NRS	NR
Valderrabano et al. ²⁰	Mobile bearing	152	NR	NR	12	9	NR
Hintermann and Barg ^{9§}	Mobile bearing	470	NR	NR	NRS	9	NR
Bonnin et al. ⁴	Mobile bearing	93	NRS	0	3 (3%)	1 (1%)	2 (2%)
Bonnin et al. ¹⁸	Mobile bearing	93	NRS; radiolucencies§	9 (9.5%)	1 (1%)	1 (1%)	2 (2%)
Takakura et al. ⁸	Fixed bearing	68	NR	NR	OA: 6: RA: 17	2	NR
Besse et al. ¹⁹	Mobile bearing	50	Tibial 62%; talar 43%	2	2#	2#	NR
Mann et al. ²⁶	Mobile bearing	84	26 (31%)	6 (7.1%)	5	5	8 (9.5%)
Rippstein et al. ³⁶	Mobile bearing	240	20 cysts (8.8%); radiolucencies**	4 (1.7%)	8 (3.5%)	0	0
Wood et al. ²⁵	Mobile bearing	100	14 (14%)	1 (1%)	1 (1%)	1 (1%)	0
Karantana et al. ²⁴	Mobile bearing	48	2 (4.2%)	2 (4.2%)	2 (4.2%)	2 (4.2%)	0
Giannini et al. ²⁷	Mobile bearing	51	NR	NR	Nr	NR	

*NR = not reported. NRS = not reported separately. †Assessed radiographically, may differ from total number in study. ‡Fifty-seven of ninety-three (entire cohort) with adequate follow-up. §Presented in abstract form but not yet published. #Bilateral in one patient. **Radiographic data reported separately for each component, unable to determine how many patients.

TABLE E-7 Registry Data

Study	Country	Access Dates	No. of Ankles	No. of Centers*	No. of Surgeons *	Prostheses Used	Survivorship
Fevang et al. ³¹	Norway	1994-2005	216	14	NR	Mobile bearing	89% at 5 yr 76% at 10 yr
Skyttä et al. ⁵²	Finland	1982-2006	515†	17	NR	Mobile bearing	83% at 5 yr‡ 95% at 5 yr§ 78% at 7 yr
Henricson et al. ³²	Sweden	1993-2006	531	NR	3#	Mobile bearing	78% at 5 yr
Hosman et al. ⁵³	New Zealand	2000-2005	202	18	18	Mobile and fixed bearing	86% at 5 yr

*NR = not reported. †Three centers with >100 total ankle arthroplasties, four centers with between ten and fifty total ankle arthroplasties, and ten centers with less than ten total ankle arthroplasties. ‡Any repeat surgery was used as the end point. §Aseptic loosening was used as the end point. #Three surgeons performed the majority of cases.