TABLE E-1 Preoperative Data

Case	Anthropometric Data					No. of Procedures Following Arthrodesis	Final Fusion	Time Since Fusion *(yr)*	Preoperative Findings				Indication for Total Ankle Replacement				Visual Analog Score for Pain *(points)*	AOFAS Hindfoot Score *(points)*
									Fibular Resection	Adjacent Joints			Malunion*					
	Sex	Age *(yr)*	Height *(cm)*	Weight *(kg)*	Body Mass Index *(kg/m^2)*					Subtalar	Talonavicular	Tarsometatarsal	Equinus	Varus	Valgus	Nonunion		
1	F	54	167	65	23.3	9	Pantalar†	18	No	Fused	Fused	Osteoarthritis	+	–	+	–	10	18
2	F	72	166	66	24	6	Tibiocalcaneal	1.7	Yes	Nonunion	No	No	++	+	–	Subtalar	7	12
3	M	75	174	95	27.2	4	Ankle	25	Yes	Osteoarthritis	Osteoarthritis	No	+	–	+	–	8	38
4	F	46	150	64	28.4	8	Ankle	18	Yes	Osteoarthritis	No	No	++	+	–	–	8	18
5	M	71	177	87	27.8	3	Ankle	1.5	No	Osteoarthritis	No	No	+	+	–	Ankle	6	25
6	M	43	179	86	26.8	8	Pantalar†	12	No	Fused	Fused	Fused	+	–	+	–	9	20
7	M	34	203	115	27.9	4	Tibiocalcaneal	2.2	No	Nonunion	No	Osteoarthritis	++	+	–	Subtalar	9	18
8	M	84	173	81	27.1	3	Ankle	1.8	No	Osteoarthritis	Osteoarthritis	No	++	–	++	–	7	54
9	F	31	169	62	21.7	4	Ankle	2.2	No	Osteoarthritis	Osteoarthritis	No	+	–	+	–	10	15
10	F	56	167	66	23.7	6	Pantalar†	11	Yes	Fused	Fused	No	+	–	+	–	8	22
11‡	F	74	158	60	24	0	Ankle	57	No	Osteoarthritis	Osteoarthritis	No	–	–	++	–	7	22
12	M	55	168	100	35.4	2	Ankle	1.4	No	No	No	No	+	+	–	Ankle	7	49
13	F	76	171	69	23.6	2	Ankle	19	No	Osteoarthritis	Osteoarthritis	No	–	+	–	–	6	60
14	F	63	173	94	31.4	3	Ankle	25	No	Osteoarthritis	Osteoarthritis	No	+	–	++	–	8	52
15	M	69	180	88	27.2	4	Pantalar†	15	Yes	Fused	Fused	No	+	+	–	–	8	51
16	F	47	171	58	19.8	5	Ankle	9	No	Osteoarthritis	Osteoarthritis	No	+	–	+	–	8	40

17	F	56	172	72	24.3	3	Ankle	5	No	Osteoarthritis	Osteoarthritis	No	–	+	–	–	8	46
18	F	82	169	61	21.4	2	Ankle	0.8	No	Osteoarthritis	Osteoarthritis	No	+	–	+	–	9	41
19§	M	40	174	80	26.4	1	Ankle	10	No	Osteoarthritis	No	No	–	–	+	–	9	38
20	M	50	172	76	25.7	3	Ankle	5.2	No	No	No	No	+	–	+	Ankle	4	22
21	M	50	176	84	27.1	3	Ankle	2	No	No	No	No	–	+	–	Ankle	8	37
22	M	55	165	73	26.8	2	Ankle	1.4	Yes	Osteoarthritis	No	No	–	–	+++	–	8	23
23	M	80	167	74	26.5	1	Ankle	15.2	No	Osteoarthritis	No	No	–	–	+	–	8	55
24	M	44	174	73	24.1	4	Ankle	16.8	Yes	Osteoarthritis	No	No	+++	+	–	–	3	57
25	F	55	158	49	19.6	1	Ankle	15.8	No	No	No	No	–	–	+	–	6	43
26	M	52	169	78	27.3	3	Ankle	12.3	No	Fused	No	No	–	–	+	Ankle	8	29
27†	M	39	174	72	23.8	2	Ankle	1	No	Osteoarthritis	No	No	–	–	–	–	10	36
28	F	61	161	73	28.2	2	Ankle	8.9	No	Osteoarthritis	Osteoarthritis	No	+	+	–	–	8	12
29	F	74	159	65	25.7	1	Ankle	19.7	No	No	Osteoarthritis	No	+	+	–	–	7	24
30	M	46	174	81	26.8	1	Ankle	19.7	Yes	No	No	No	+	–	+	–	3	45
Mean		57.8	170.3	75.6	25.8	3.3		11.8									7.5	34.1
Standard deviation		14.9	9.1	14.0	3.2	2.2		11.5									1.8	14.9
Median		55.0	171	73	26.5	3		10.5									8	36.5
Range		31 to 84	150 to 203	49 to 115	19.6 to 35.4	0 to 9		0.8 to 57									3 to 10	12 to 60

*+ = 8º to 10º of malalignment, ++ = 11º to 15º of malalignment, +++ = >15º of malalignment. †Pantalar arthrodesis = tibiotalar, talocalcaneal, talonavicular, and calcaneocuboid arthrodesis. ‡Tuberculosis. §Hemophilia.

TABLE E-2 Clinical Results and Patient Satisfaction at Latest Follow-up

Case	Duration of Follow-up *(mo)*	Visual Analog Score for Pain *(points)*	AOFAS Hindfoot Score *(points)*				Patient Satisfaction	Shoe Modifications	Maximum Walking Distance
			Pain	Function	Alignment	Total			
1	90	2	30	24	10	64	Very satisfied	No	>3 km
2	87	1	30	36	10	76	Very satisfied	Yes	Unlimited
3	84	3	30	11	10	51	Partially satisfied	Yes	0.5 to 2 km
4	84	7	10	12	10	42	Not satisfied	Yes	0.5 to 2 km
5	76	2	30	41	10	81	Very satisfied	No	>3 km
6	75*	3.5	10	36	10	56	Partially satisfied	No	2 to 3 km
7	70	2.5	20	12	10	52	Satisfied	Yes	2 to 3 km
8	68	1	30	30	10	70	Very satisfied	No	Unlimited
9	24†	8	10	12	5	27	Not satisfied	Yes	<0.5 km
10	60	2	30	16	10	56	Very satisfied	No	>3 km
11	58	2	30	28	10	68	Very satisfied	Yes	>3 km
12	56	0	40	41	10	81	Very satisfied	No	Unlimited
13	54	1	40	39	10	89	Very satisfied	No	Unlimited
14	50	3	30	18	5	53	Satisfied	Yes	>3 km
15	49	2	30	30	10	70	Satisfied	No	>3 km
16	48	1	40	34	8	82	Very satisfied	No	Unlimited
17	48	2.5	40	36	10	86	Satisfied	No	>3 km
18	48	1.5	50	32	10	92	Very satisfied	No	Unlimited
19	48	1	30	28	10	68	Very satisfied	No	Unlimited
20	48	1	30	42	10	82	Very satisfied	No	Unlimited
21	46	1	30	28	10	68	Satisfied	Yes	2 to 3 km
22	45	0	40	23	8	71	Satisfied	No	Unlimited
23	43	0	40	32	10	82	Very satisfied	Yes	0.5 to 2 km
24	42	0	30	32	10	72	Satisfied	No	Unlimited
25	42	1.5	30	37	10	77	Satisfied	No	Unlimited
26	42	1	30	29	10	69	Very satisfied	No	Unlimited
27	40	2.5	20	31	10	61	Partially satisfied	Yes	>3 km
28	39	5	30	31	10	71	Partially satisfied	No	>3 km

29	36	0	40	44	10	94	Very satisfied	No	Unlimited
30	36	1.5	30	32	10	72	Satisfied	No	Unlimited
Mean‡	55.6	1.8	31.0	29.8	9.7	70.6			
Standard deviation‡	16.5	1.5	8.6	9.1	1.0	13.0			
Median‡	48	1.5	30	31	10	71			
Range‡	36 to 90	0 to 7	10 to 50	11 to 44	5 to 10	42 to 94			

*Latest follow-up control at four years (see text). †Latest follow-up control after two years; was then revised to arthrodesis and results were thus excluded from study (see text). ‡With exclusion of Case 9 (see text).

TABLE E-3 Range of Motion at Latest Follow-up

Case	Clinical Range of Motion						Radiographic Range of Motion					
	Affected Foot *(deg)*			Contralateral Foot *(deg)*			Affected Foot *(deg)*			Contralateral Foot *(deg)*		
	Dorsiflexion	Plantar Flexion	Total	Dorsiflexion	Plantar Flexion	Total	Dorsiflexion	Plantar Flexion	Total	Dorsiflexion	Plantar Flexion	Total
1*	5	25	30	10	25	35	6	22	28	8	26	34
2	5	25	30	15	30	45	6	20	26	12	34	46
3	0	10	10	10	25	35	0	8	8	8	30	38
4	0	10	10	5	25	30	0	12	12	6	28	34
5	5	35	40	10	40	50	4	34	38	10	38	48
6†	5	15	20	15	35	50	6	14	20	18	34	52
7	5	10	15	20	40	60	6	12	18	18	44	62
8	5	15	20	15	25	40	6	18	24	18	28	46
9‡	0	10	10	20	55	75	0	8	8	24	48	72
10*	10	25	35	5	25	30	8	26	34	6	22	28
11	0	10	10	5	25	30	0	8	8	4	28	32
12	10	25	35	15	50	65	12	22	34	14	48	62
13	5	25	30	15	35	50	4	22	26	12	36	48
14	10	20	30	10	45	55	8	24	32	10	44	54
15	5	20	25	10	40	50	6	14	20	8	40	48
16	5	20	25	10	35	45	6	20	26	12	40	52
17	5	25	30	10	35	45	8	26	34	14	40	54
18	5	30	35	10	40	50	8	32	40	10	42	52
19*	5	15	20	5	15	20	6	16	22	6	14	20
20	5	20	25	5	15	20	7	24	31	6	17	23
21	5	20	25	15	35	50	4	22	26	14	38	52
22	0	15	15	15	40	55	4	21	25	13	39	52
23	5	25	30	5	25	30	8	22	30	6	22	28
24	10	15	25	15	50	65	12	19	31	15	41	56
25	10	20	30	10	45	55	9	19	28	13	46	59
26	5	20	25	10	35	45	9	23	32	13	32	45
27*	5	15	20	5	15	20	6	14	20	6	16	22
28	0	15	15	10	45	55	3	16	19	14	44	58
29§	15	15	30	25	25	50	14	18	32	28	24	52

30	5	10	15	15	35	50	4	11	15	15	33	48
Mean#	5.3	19.0	24.3	11.2	32.9	44.1	6.2	19.3	25.5	11.6	33.4	45.0
Standard deviation#	3.5	6.6	8.2	4.9	10.0	12.8	3.3	6.3	8.2	5.1	9.5	11.9
Median #	5.0	20.0	25.0	10.0	35.0	50.0	6.0	20.0	26.0	12.0	34.0	48.0
Range#	0 to 15	10 to 35	10 to 40	5 to 25	15 to 50	20 to 65	0 to 14	8 to 34	8 to 40	4 to 28	14 to 48	20 to 62

*Bilateral procedures (Cases 1 [right ankle] and 10 [left ankle], Cases 19 [right ankle] and 27 [left ankle]) were thus excluded from calculation of range of motion of unaffected foot. †Latest follow-up control at four years (see text). ‡Latest follow-up control after two years; was then revised to arthrodesis and results were thus excluded from study (see text). §See Figs. 3-A, 3-B, and 3-C. #With exclusion of Case 9 (see text).

TABLE E-4 Radiographic Result at Latest Follow-up

Case	Center of Rotation *(mm)*		Migration		Tibial Loosening	Tilting		Periarticular Ossifications	Remarks*
	Dorsiflexion	Plantar Flexion	Talus	Tibia		Talus	Tibia		
1	4	5	None	None	Potential (asymptomatic)	None	None	Yes	ORIF healed
2	2	4	None	None	None	None	None	None	Subtalar arthrodesis healed
3	–5	–3	Yes	None	Yes	None	None	None	ORIF healed
4	–5	–4	None	None	None	None	None	Yes	Triple arthrodesis healed
5	–8	–7	Yes	None	None	Yes	None	None	
6†	–6	–3	None	None	None	None	None	None	
7	3	–2	None	None	None	None	None	None	Subtalar, tarsometatarsal II/III arthrodeses healed
8	5	2	None	None	None	None	None	None	Triple arthrodesis, calcaneal osteotomy healed
9‡	1	1	Yes	None	None	Yes	None	Yes	Subtalar arthrodesis healed
10	–4	–4	Yes	None	None	Yes	None	Yes	
11	0	4	None	None	None	None	None	Yes	Triple arthrodesis healed
12	–5	–3	None	None	None	None	None	None	
13	–2	–5	None	None	None	None	None	None	Triple arthrodesis healed
14	–4	–1	None	None	None	None	None	None	ORIF healed
15	–1	–2	None	None	None	None	None	None	Tarsometatarsal II/III arthrodesis healed
16	5	4	None	None	None	None	None	None	Subtalar arthrodesis, ORIF healed
17	–4	–2	None	None	None	None	None	None	
18	–3	–1	None	None	None	None	None	None	
19	–4	–2	None	None	None	None	None	None	ORIF healed
20	–3	–3	None	None	None	None	None	None	
21	1	4	None	None	None	None	None	None	
22	3	–2	None	None	None	None	None	None	Subtalar arthrodesis healed, medial ankle stable
23	1	1	None	None	None	None	None	Yes	Subtalar arthrodesis healed
24	4	2	None	None	None	None	None	None	
25	–3	–4	None	None	None	None	None	None	Subtalar arthrodesis healed
26	–5	–3	None	None	None	None	None	Yes	
27	1	–2	None	None	None	None	None	None	Medial malleolus healed
28	2	2	None	None	None	None	None	Yes	Triple arthrodesis healed
29	–3	–1	None	None	None	None	None	None	Triple arthrodesis healed
30	0	3	None	None	None	None	None	None	Subtalar arthrodesis healed, lateral ankle stable, tibiofibular

									arthrodesis healed

*ORIF = open reduction and internal fixation. †Latest follow-up control at four years (see text). ‡Latest follow-up control after two years; was then revised to arthrodesis and results were thus excluded from study (see text).

TABLE E-5 Surgery, Complications, and Revisions

Case	Side	Prosthetic Components			Additional Procedures*							Complications		Revision Procedures
					Arthrodesis									
		Talar Size	Tibial Size	Insert *(mm)*	Subtalar	Talonavicular	Tarsometatarsal	Calcaneal Osteotomy	Ligament Reconstruction	Heel-Cord Lengthening	Other Procedures	Intraoperative	Late	
1	Right	2	2	5	Fused	Fused	Yes	No	No	No	No	None	None	None
2	Left	2	4	7	Yes	No	No	No	Medial	No	No	None	None	None
3	Right	5	5	5	No	No	No	No	No	No	No	Fracture medial and lateral malleolus	Lymphedema	None
4	Right	1	2	7	Yes	Yes	No	Yes	No	No	No	None	Painful arthrofibrosis	Change talar component
5	Left	5	5	7	No	No	No	No	No	No	No	None	None	None
6	Left	5	5	7	Fused	Fused	No	No	No	No	No	None	Painful arthrofibrosis	None
7	Left	5	5	7	Yes	No	Yes	No	No	No	No	None	Painful arthrofibrosis	None
8	Right	4	4	5	Yes	Yes	No	No	No	No	No	None	Valgus malalignment	Medial sliding osteotomy
9	Left	1	2	5	Yes	No	No	No	No	No	No	None	Pain	Tibiocalcaneal fusion
10	Left	3	2	5	Fused	Fused	No	No	No	No	No	Dissection flexor hallucis longus tendon	None	None
11	Left	3	3	5	Yes	Yes	No	No	No	Yes	No	None	None	None
12	Right	4	4	5	No	No	No	No	No	Yes	No	None	None	None
13	Right	3	3	7	Yes	Yes	No	No	No	No	No	None	None	None
14	Left	3	3	5	No	No	No	No	No	No	Yes†	Fracture medial malleolus	Valgus malalignment	Supramalleolar osteotomy

15	Left	5	5	5	Fused	Fused	No	No	No	No	No	None	Tarsometatarsal II/III osteoarthritis	Tarsometatarsal II/III fusion
16	Left	3	3	5	Yes	No	No	No	No	No	No	Fracture lateral malleolus, minor wound necrosis	Valgus malalignment	Medial sliding osteotomy
17	Left	2	3	5	No	No	No	No	No	No	No	None	None	None
18	Right	3	2	5	No	No	No	No	No	No	No	None	None	None
19	Right	4	4	5	No	No	No	No	No	No	No	Fracture medial malleolus	None	None
20	Left	5	5	5	No	No	No	No	No	No	No	None	None	None
21	Right	3	3	5	No	No	No	No	No	No	No	None	None	None
22	Right	4	4	5	Yes	Yes	No	No	Medial	No	No	None	Medial instability	Medial ligament reconstruction
23	Left	3	3	5	Yes	No	No	No	No	No	No		Lateral and medial impingement	Débridement, medial sliding osteotomy
24	Left	3	3	5	No	No	No	No	No	Yes	Yes‡	None	Painful arthrofibrosis, lateral impingement	Lateral ligament reconstruction, lengthening osteotomy of fibula, tibiofibular fusion
25	Right	4	4	5	Yes	No	No	No	No	No	No	None	None	None
26	Right	5	5	5	Fused	No	No	No	No	Yes	No	None	None	None
27	Left	4	4	5	No	No	No	No	No	Yes	Yes§	Fracture medial malleolus	None	None
28	Left	3	3	5	Yes	Yes	No	No	No	Yes	No	Delayed wound-healing	None	None
29	Left	3	3	7	Yes	Yes	No	No	No	No	No	None	None	None

30	Left	5	5	5	Yes	No	No	No	Lateral	No	Yes#	None	None	None

*Done at the time of taking down the fusion. †Prosthesis of ipsilateral knee. ‡Corticotomy and callus distraction were performed at the proximal part of ipsilateral tibia to lengthen the tibia and the site was fixed with an external fixator. §Reconstruction of medial malleolus. #Correcting osteotomy of fibula, tibiofibular fusion, revision peroneal tendons.