

Fig. E1-A

Survival curve showing the percentage of patients free of periprosthetic fracture after total shoulder arthroplasty (TSA), by sex. The x axis represents the number of years since the total shoulder arthroplasty, and the y axis shows the percentage of patients without periprosthetic fracture.

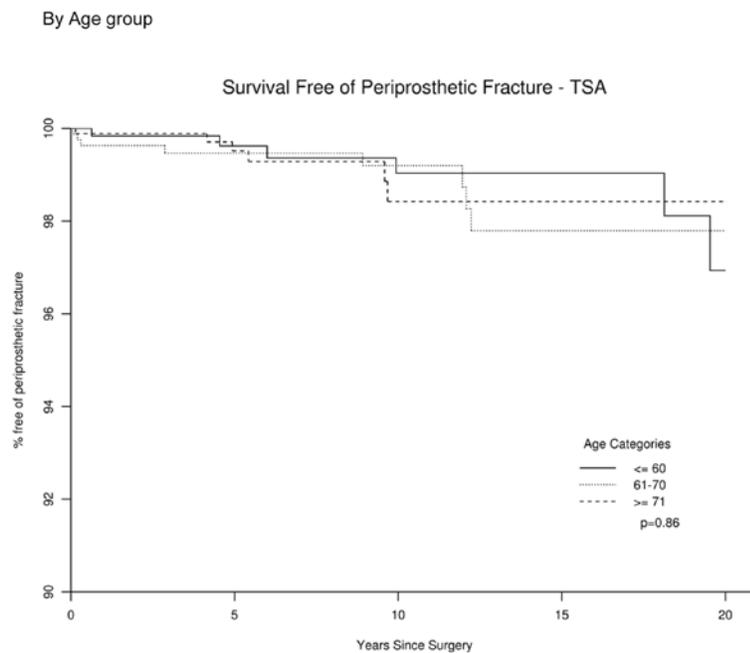


Fig. E1-B

Survival curve showing the percentage of patients free of periprosthetic fracture after total shoulder arthroplasty (TSA), by age group. The x axis represents the number of years since the total shoulder arthroplasty, and the y axis shows the percentage of patients without periprosthetic fracture.

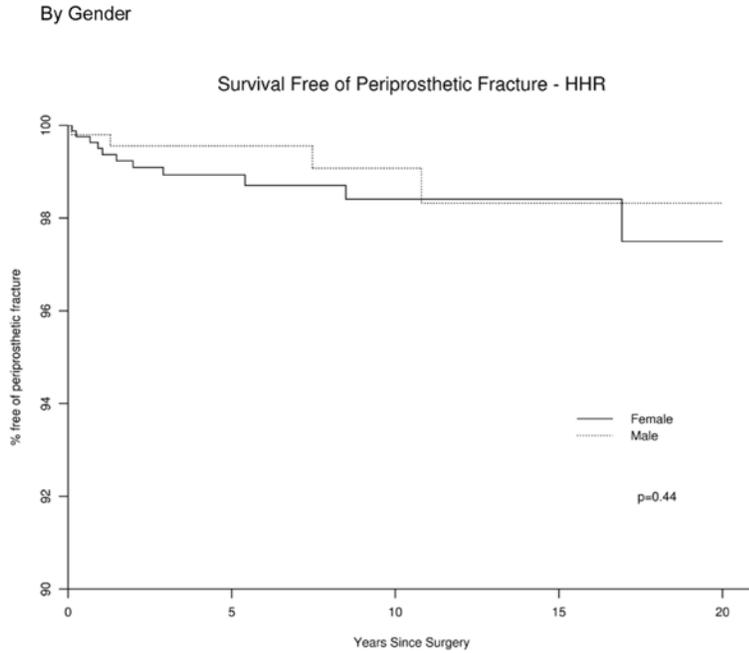


Fig. E2-A

Survival curve showing the percentage of patients free of periprosthetic fracture after humeral head replacement (HHR), by sex. The x axis represents the number of years since the humeral head replacement, and the y axis shows the percentage of patients without periprosthetic fracture.

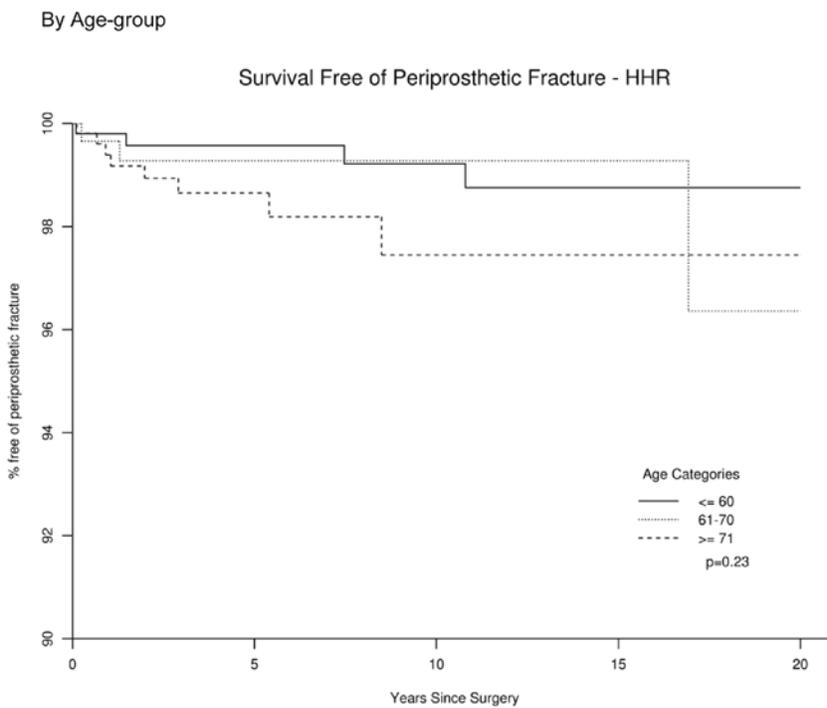


Fig. E2-B

Survival curve showing the percentage of patients free of periprosthetic fracture after humeral head replacement (HHR), by age group. The x axis represents the number of years since the humeral head replacement, and the y axis shows the percentage of patients without periprosthetic fracture.

TABLE E-1 Clinical and Demographic Characteristics of Study Population

	Total Shoulder Arthroplasty	Humeral Head Replacement
No. of patients (shoulders)	2207 (2588)	1349 (1431)
Mean follow-up duration and stand dev. (range) (yr)	7 ± 6 (1 day to 31 yr)	8 ± 7 (1 day to 32 yr)
Age at surgery (yr)		
Mean and stand dev. (range)	65 ± 12 (19-91)	63 ± 16 (18-97)
Median	67	66
Male/female (%)	47/53	37/63
Deyo-Charlson index		
Mean and stand dev. (range)	0.8 ± 1 (0-13)	1.4 ± 2 (0-13)
Median	0	0
Implant fixation (%)		
Cemented*	96	60
Uncemented	4	40
Diagnosis (%)		
Rheumatoid arthritis	17	16
Trauma-related†	15	35
Acute trauma	13	16
Posttraumatic arthritis	2	19
Tumor	1	10
Osteoarthritis	63	24
Rotator cuff disease	2	10
Other‡	2	5
BMI§ (kg/m ²)		
Mean and stand dev. (range)	30 ± 6 (16-60)	28 ± 6 (15-66)
Median	29	27
ASA class# (%)		
1 or 2	61	49
3 or 4	39	51

*Humeral and/or glenoid components were cemented. †Acute trauma includes acute fractures and fracture-dislocations; posttraumatic arthritis includes chronic conditions that were the sequelae of trauma (malunion, nonunion, ankylosis, or previous fractures or dislocations); none of these were classified as osteoarthritis. ‡Includes osteonecrosis, ankylosing spondylitis, psoriatic arthritis, gout, Charcot arthropathy, dislocation, and a history of septic arthritis. §The BMI was available from 9/1/87 to the time of the study. #The ASA class was available from 11/1/88 to the time of the study.

TABLE E-2 Univariate Risk Factors for Postoperative Periprosthetic Fractures After Humeral Head Replacement

	No. of Shoulders	No. of Events	Kaplan-Meier Estimate (95% Confidence Interval)		
			5 Yr	10 Yr	20 Yr
Sex					
Male	533	4	99.6 (98.9, 100)	99.1 (98.0, 100)	98.3 (96.5, 100)
Female	898	11	98.9 (98.2, 99.7)	98.4 (97.4, 99.5)	97.5 (95.5, 99.6)
Age at surgery					
≤60 yr	539	4	99.6 (99.0, 100)	99.2 (98.3, 100)	98.8 (97.5, 100)
61-70 yr	328	3	99.3 (98.3, 100)	99.3 (98.3, 100)	96.4 (90.8, 100)
≥71 yr	564	8	98.7 (97.6, 99.7)	97.4 (95.5, 99.5)	97.4 (95.5, 99.5)
BMI*					
<24.9 kg/m ²	335	1	99.6 (98.9, 100)	99.6 (98.9, 100)	99.6 (98.9, 100)
25-29.9 kg/m ²	349	6	98.2 (96.7, 99.8)	97.3 (94.9, 99.7)	97.3 (94.9, 99.7)
30-39.9 kg/m ²	291	1	99.5 (98.6, 100)	99.5 (98.6, 100)	99.5 (98.6, 100)
≥40 kg/m ²	51	1	97.9 (94.0, 100)	97.9 (94.0, 100)	97.9 (94.0, 100)
ASA class†					
1 or 2	489	3	99.1 (98.2, 100)	99.1 (98.2, 100)	99.1 (98.2, 100)
3 or 4	501	3	99.7 (99.2, 100)	98.1 (95.9, 100)	‡
Deyo-Charlson index					
0	739	8	99.1 (98.3, 99.8)	98.8 (97.8, 99.7)	97.9 (96.1, 99.8)
>0	692	7	99.3 (98.6, 100)	98.4 (97.1, 99.8)	97.7 (95.8, 99.7)
Implant fixation					
No cement	574	3	99.8 (99.4, 100)	99.3 (98.2, 100)	96.8 (92.0, 100)
Cement	857	12	98.7 (97.9, 99.6)	98.2 (97.1, 99.3)	97.8 (96.5, 99.2)
Underlying diagnosis					
Rheumatoid/inflammatory arthritis	233	2	99.6 (98.7, 100)	99.6 (98.7, 100)	98.5 (96.3, 100)
Trauma-related	493	6	98.6 (97.4, 99.7)	98.6 (97.4, 99.7)	98.6 (97.4, 99.7)
Acute trauma	265	2	99.2 (98.0, 100)	99.2 (98.0, 100)	99.2 (98.0, 100)
Posttraumatic arthritis	228	4	97.9 (95.8, 100)	97.9 (95.8, 100)	97.9 (95.8, 100)
Osteoarthritis	348	1	100	100	96.6 (90.1, 100)
Other§	357	6	98.9 (97.7, 100)	96.4 (93.4, 95.5)	96.4 (93.4, 99.5)

*The BMI was available from 9/1/87 to the time of the study. †The ASA class was available from 11/1/88 to the time of the study. ‡No patients with an ASA class of 3 or 4 were under observation at twenty years. §Includes osteonecrosis, ankylosing spondylitis, psoriatic arthritis, gout, Charcot arthropathy, dislocation, old injury, and a history of septic arthritis.

TABLE E-3 Univariate Risk Factors for Postoperative Periprosthetic Fractures After Total Shoulder Arthroplasty

	No. of Shoulders	No. of Events	Kaplan-Meier Estimate (95% Confidence Interval)		
			5 Yr	10 Yr	20 Yr
Sex					
Male	1352	12	99.5 (99.1, 99.9)	98.6 (97.7, 99.5)	97.9 (96.7, 99.2)
Female	1236	8	99.5 (99.1, 100)	99.3 (98.7, 100)	96.1 (92.2, 100)
Age at surgery					
≤60 yr	716	6	99.6 (99.1, 100)	99.0 (98.1, 100)	96.9 (93.9, 100)
61-70 yr	885	8	99.5 (98.9, 100)	99.2 (98.5, 99.9)	97.8 (96.1, 99.5)
≥71 yr	987	6	99.5 (99.0, 100)	98.4 (97.0, 99.8)	98.4 (97.0, 99.8)
BMI*					
<24.9 kg/m ²	475	7	98.9 (97.9, 100)	97.5 (95.3, 99.8)	96.1 (92.7, 99.7)
25-29.9 kg/m ²	744	1	99.8 (99.6, 100)	99.8 (99.6, 100)	99.8 (99.6, 100)
30-35.9 kg/m ²	521	2	99.8 (99.4, 100)	99.1 (97.7, 100)	99.1 (97.7, 100)
35-39.9 kg/m ²	235	3	99.1 (97.3, 100)	96.7 (91.9, 100)	92.1 (82.7, 100)
≥40 kg/m ²	126	2	98.3 (95.0, 100)	95.5 (89.5, 100)	‡
ASA class†					
1 or 2	1236	8	99.5 (99.0, 100)	98.6 (97.5, 99.7)	98.0 (96.4, 99.6)
3 or 4	780	6	99.6 (99.1, 100)	98.6 (97.2, 100)	97.2 (94.2, 100)
Deyo-Charlson index					
0	1536	10	99.5 (99.1, 100)	99.4 (98.8, 99.9)	96.2 (92.6, 99.9)
>0	1052	10	99.5 (99.0, 100)	98.3 (97.1, 99.5)	97.9 (96.5, 99.3)
Implant fixation					
No cement	103	1	99.0 (97.1, 100)	99.0 (97.1, 100)	99.0 (97.1, 100)
Cement	2485	19	99.6 (99.2, 99.9)	98.9 (98.3, 99.5)	97.0 (94.9, 99.1)
Underlying diagnosis					
Rheumatoid/inflammatory arthritis	452	4	99.8 (99.3, 100)	98.6 (97.1, 100)	98.6 (97.1, 100)
Trauma-related	374	3	99.6 (98.8, 100)	99.6 (98.8, 100)	97.3 (94.0, 100)
Acute trauma	40	0	100	100	100
Posttraumatic arthritis	334	3	99.5 (98.7, 100)	99.5 (98.7, 100)	96.9 (93.3, 100)
Osteoarthritis	1640	13	99.4 (98.9, 99.9)	98.8 (98.1, 99.6)	95.5 (91.3, 99.9)
Other§	122	0	100	100	100

*The BMI was available from 9/1/1987 to the time of the study. †The ASA class was available from 11/1/88 to the time of the study. ‡No patients with a BMI of ≥40 kg/m² were under observation at twenty years. §Includes osteonecrosis, ankylosing spondylitis, psoriatic arthritis, gout, Charcot arthropathy, dislocation, old injury, and a history of septic arthritis.