TABLE E-1 Preoperative and Most Recent Postoperative Clinical Scores for Patients Included in the Analysis*

Shoulder No.	Age at Sx	Preop.Diagnosis	Side	Pre-op Instability	Preop Glenoid Erosion	Use of Proximal Humeral Allograft	Use of Glenoid Allograft	Period from surgery to X-ray f/u	Follow-up (mo)	Preop Total ASES	Postop Total ASES	Preop ASES Pain	Postop ASES Pain	FF Preop	FF Postop	AB Preop	AB Postop	ER Preop.	ER Postop	SST preop	SST Postop.	Postop Satis	Complications
1	65	Primary RCD	L	1	0	N	N	27	27	40	100	10	50	152.2	180.0	113.8	180.0	48.1	68.5	7	10	exc	Traumatic dislocation
2	65	Primary RCD	R	1	0	N	N	24	24	15	100	15	50	146.0	180.0	77.5	180.0	78.1	73.7	4	10	exc	Acromial base fracture
3	73	Failed RCR	R	1	1	N	N	23	24	45	90	17.5	40	139.8	153.2	86.7	138.9	3.1	24.4	3	12	exc	
4	79	Failed RCR	R	2	2	N	N	24	25	27.5	70	10	45	136.6	147.9	134.3	174.8	31.6	27.3	3	7	exc	
5	61	Primary RCD	R	2	1	N	N	24	37	32.5	81.8	10	41	135.9	141.0	130.5	131.4	37.8	29.9	3	7	exc	
6	70	Failed RCR	L	1	0	N	N	24	25	7.5	100	2.5	50	126.4	144.5	158.0	126.8	12.5	23.4	1	11	good	
7	67	Primary RCD	L	1	0	N	N	23	24	35	83.3	25	40	126.2	144.9	159.0	126.1	32.5	26.1	3	8	good	
8	69	Failed RCR	R	2	1	N	N	31	31	40	85	22.5	45	125.0	180.0	100.0	180.0	-20.0	0.0	0	8	exc	
9	79	Failed RCR	R	2	1	N	N	24	25	27.5	52.5	10	27.5	123.4	123.2	109.3	124.9	25.7	0.0	0	1	exc	
10	74	Primary RCD	R	3	1	N	N	33	34	17.5	81.6	0	40	120.0	90.0	165.0	180.0	30.0	18.0	1	8	exc	
11	53	Failed Hemi for Fracture	R	2	1	Y	N	31	32	47.5	83.4	25	40	115.7	138.5	50.8	149.2	10.1	32.0	7	11	exc	
12	65	Failed RCR	R	2	2	N	N	12	31	57.5	78.33	25	35	105.0	150.0	120.0	150.0	35.0	60.0	3	7	sat	
13	75	Failed RCR	R	1	0	N	N	25	25	50	100	22.5	50	104.8	150.7	92.4	145.0	23.8	34.4	2	12	exc	
14	80	Failed RCR	L	2	1	N	N	12	34	7.5	93.3	0	45	102.2	104.6	91.2	94.9	0.0	12.7	2	11	exc	
15	72	Failed Hemi for RCD	R	1	1	N	Y	25	25	17.5	96.6	10	50	99.6	167.1	68.5	141.7	31.0	36.8	1	9	exc	Dislocation
16	77	Primary RCD	L	2	1	N	N	17	25	32.5	90	25	50	93.5	86.7	82.5	85.8	3.2	3.8	1	8	good	
17	72	Primary RCD	R	2	0	N	N	5	32	30	95	10	50	90.0	180.0	70.0	180.0	0.0	0.0	4	8	exc	
18	75	Primary	R	1	0	N	N	23	24	52.5	93.3	15	50	87.5	154.3	100.0	123.9	8.1	31.5	1	9	exc	

		RCD																				
19	65	Primary RCD	L	2	1	N	N	13	36	30	90	10	40	87.4	139.0	83.4	103.8	4.2	29.0	4	11	exc	
20	67	Failed RCR	R	2	1	N	N	25	25	20	100	7.5	50	86.9	170.3	84.2	115.9	-19.0	49.0	1	10	good	
21	79	Primary RCD	L	2	2	N	N	24	25	40	80	15	40	85.6	130.4	70.4	120.8	45.0	46.0	4	7	exc	
22	73	Primary RCD	L	2	0	N	N	12	32	25	75	25	50	85.6	124.0	65.4	180.0	0.0	12.2	2	10	good	
23	66	Failed RCR	R	3	1	N	N	25	26	32.5	80	15	40	84.7	155.7	60.6	147.0	-17.5	0.0	3	10	exc	
24	79	Primary RCD	R	1	1	N	N	24	25	22.5	70	15	50	84.2	130.0	81.2	145.0	13.1	5.1	1	10	good	
25	56	Primary RCD	L	1	2	N	N	24	24	37.5	65	25	47.5	83.6	48.1	45.5	39.1	-16.9	-6.4	2	2	exc	
26	80	Primary RCD	L	2	2	N	Y	25	26	45	86.6	22.5	45	81.5	173.9	81.6	172.7	-13.9	15.0	6	8	exc	
27	80	Primary RCD	L	1	1	N	N	22	24	20	100	10	50	81.5	126.1	60.6	112.7	13.0	41.6	1	8	exc	
28	83	Primary RCD	R	2	1	N	Y	24	24	32.5	98.3	20	50	76.3	136.3	70.9	159.2	54.7	31.1	0	7	exc	
29	78	Primary RCD	R	2	2	N	Y	24	25	25	87.5	5	37.5	75.6	105.4	55.6	75.5	33.1	69.1	2	6	exc	
30	68	Failed RCR	R	1	0	N	N	25	25	62.5	73.3	37.5	30	75.0	90.0	65.0	90.0	25.0	44.0	1	4	good	
31	52	Failed Hemi for Fracture	L	3	1	Y	N	35	36	10	78.3	5	30	74.0	126.9	41.1	103.5	26.1	18.8	0	6	exc	
32	76	Failed RCR	L	2	1	N	N	24	25	52.5	82.5	27.5	45	70.9	131.1	80.1	102.2	9.4	44.5	0	5	sat	
33	56	Failed Hemi for RCD	R	2	1	N	N	27	28	45	90	25	45	70.9	133.9	72.5	141.7	44.0	46.0	4	12	good	
34	67	Proximal Humeral Nonunion	R	3	1	N	N	13	38	50	80	20	40	70.3	146.5	70.3	153.4	13.2	23.0	3	10	exc	
35	56	Primary RCD	R	1	0	N	N	22	24	27.5	93.3	12.5	50	70.1	150.7	61.1	128.3	14.1	85.2	2	3	exc	
36	76	Failed TSA	R	3	1	N	N	n/a	26	35	80	20	50	70.0	150.0	65.0	120.0	15.0	10.0	2	9	exc	
37	77	Failed Hemi for Fracture	R	1	0	Y	N	27	27	27.5	80	10	50	69.6	59.7	41.4	80.2	10.1	54.0	2	8	good	
38	69	Primary RCD	R	1	0	N	N	34	35	17.5	88.4	15	45	68.9	139.1	48.5	98.8	12.7	45.6	2	12	exc	

39	78	Failed RCR	R	2	1	N	N	26	26	30	91.6	0	45	66.9	131.5	74.1	85.8	19.6	36.2	2	9	exc	
40	74	Failed RCR	R	3	1	N	Y	24	24	40	85	22.5	50	66.1	156.1	72.0	96.0	33.6	50.9	0	4	exc	
41	73	Failed RCR	R	3	0	N	N	25	26	30	65	15	35	65.8	99.6	71.6	95.0	44.0	54.4	1	5	exc	
42	83	Primary RCD	L	2	1	N	N	23	24	57.5	73.3	22.5	40	65.4	84.7	79.3	75.5	49.0	48.6	1	2	good	
43	57	Primary RCD	L	2	0	N	N	12	24	37.5	70	20	30	63.0	98.8	57.7	71.3	9.2	34.5	2	9	exc	
44	77	Primary RCD	R	2	1	N	N	24	25	30	91.6	25	50	62.1	133.9	76.3	120.1	8.0	60.8	2	9	good	
45	81	Failed RCR	L	2	1	N	N	29	27	12.5	100	0	50	61.6	134.6	52.0	127.9	-14.9	59.6	7	10	good	
46	61	Failed RCR	L	2	0	N	N	24	24	22.5	87.5	12.5	50	61.1	157.3	42.0	126.1	23.5	3.5	0	10	good	
47	85	Primary RCD	R	1	0	N	N	19	26	12.5	93.3	10	50	60.9	136.3	88.2	139.0	-17.5	51.1	1	7	exc	
48	59	Failed RCR	L	1	IR	N	N	35	24	37.5	70	15	40	59.4	116.3	57.3	86.0	38.3	51.6	5	7	exc	
49	87	Primary RCD	L	3	1	N	N	12	26	32.5	100	25	50	59.1	144.5	40.0	155.6	26.4	45.4	5	12	exc	
50	82	Failed RCR	R	1	1	N	N	23	24	42.5	80	22.5	35	58.6	97.2	49.8	94.9	11.2	17.8	1	8	good	
51	79	Proximal Humeral Nonunion	L	0	0	N	N	24	24	20	19.1	20	7.5	57.9	62.3	36.0	57.8	-4.8	25.4	1	1	unsat	Instability
52	57	Primary RCD	R	2	2	N	Y	13	25	40	96.6	22.5	15	55.8	147.5	65.0	123.3	50.3	49.2	1	10	exc	
53	71	Failed TSA	R	2	IMP	N	N	26	27	42.5	65	25	50	55.6	98.1	50.7	90.2	33.3	0.0	0	0	good	1. BP loosening 2. hum loosening
54	69	Failed TSA	R	3	IMP	N	N	26	27	27.5	80	22.5	35	55.6	78.0	48.3	82.1	28.3	31.7	4	6	sat	
55	69	Primary RCD	L	3	0	N	N	34	37	37.5	100	15	50	54.5	131.2	44.4	131.1	26.9	30.1	3	12	exc	
56	67	Failed Hemi for Fracture	R	3	2	N	N	20	24	12.5	65	10	40	54.5	95.5	34.6	81.3	-23.5	0.0	2	5	good	
57	75	Failed RCR	R	1	IR	N	N	24	25	25	70	12.5	50	54.0	140.1	66.6	127.5	-14.1	43.7	0	8	exc	
58	64	Failed Hemi for Fracture	L	1	1	Y	N	24	24	40	85	22.5	50	51.7	127.0	42.1	114.5	0.0	33.5	5	7	exc	
59	78	Primary	R	1	1	N	N	12	30	20	60	12.5	30	50.3	134.0	56.5	75.6	29.6	26.3	0	4	good	

		RCD																				
60	87	Primary RCD	R	3	0	N	N	33	38	52.5	97.5	25	50	49.0	149.0	54.9	151.1	52.1	53.6	1	9	exc	
61	79	Failed RCR	L	2	0	N	N	29	29	37.5	25.5	20	10	48.9	86.6	56.5	67.7	8.9	20.0	1	0	good	
62	64	Primary RCD	L	1	0	N	N	25	25	20	77.5	10	42.5	47.7	92.6	53.4	71.1	42.2	73.7	4	4	exc	
63	74	Failed Hemi for Fracture	R	2	1	Y	N	29	30	15	63.3	15	30	47.5	83.3	60.5	86.5	11.1	7.5	0	5	sat	
64	76	Primary RCD	R	3	1	N	N	26	26	30	90	12.5	45	46.5	151.6	36.5	107.4	34.5	42.1	1	9	good	
65	76	Primary RCD	R	2	0	N	N	31	32	35	81.6	15	50	43.6	82.3	57.1	64.9	8.0	27.7	2	7	good	
66	64	Primary RCD	R	1	0	N	N	27	26	25	100	5	50	41.8	142.8	49.7	150.4	5.0	60.5	2	8	exc	
67	86	Failed RCR	R	2	1	N	N	n/a	29	10	70	10	50	40.0	90.0	40.0	90.0	-30.0	0.0	1	2	sat	
68	81	Failed RCR	R	2	1	N	N	24	24	25	85	15	45	37.3	130.1	60.3	118.5	16.6	34.6	0	7	exc	
69	58	Failed Hemi for Fracture	R	2	1	Y	N	29	30	25	35	10	30	35.7	86.5	50.5	63.7	0.0	-26.3	1	2	sat	
70	74	Failed Hemi for Fracture	R	1	2	Y	N	24	25	22.5	77.5	0	32.5	35.0	100.0	45.0	70.0	0.0	30.0	2	3	good	
71	63	Primary RCD	L	1	1	N	N	12	24	0	50	0	25	35.0	150.0	60.0	150.0	-40.0	-10.0	2	8	exc	
72	88	Failed RCR	L	3	0	N	N	24	24	32.5	91.6	12.5	50	34.3	158.2	39.8	90.5	51.5	35.3	2	8	sat	
73	78	Primary RCD	R	3	1	N	N	36	37	25	83.3	10	50	34.0	111.5	40.2	94.0	-4.6	24.0	2	8	Good	
74	82	Failed RCR	L	1	1	N	N	25	26	35	58.3	22.5	45	32.3	39.3	24.7	50.8	-14.1	4.1	2	4	good	
75	55	Failed Hemi for Fracture	R	2	IR	Y	N	29	30	5	20	5	15	30.2	35.5	17.8	45.6	-6.9	10.0	1	1	exc	
76	71	Failed Hemi for Fracture	R	3	1	Y	N	26	27	40	85	25	50	28.6	48.6	46.1	54.7	-20.7	10.2	0	3	exc	
77	56	Failed RCR	R	1	1	N	N	23	24	47.5	100	25	50	26.4	158.3	40.4	141.3	39.5	45.5	1	12	exc	1. Infection 2. Hematoma
78	65	Failed RCR	R	2	1	N	N	24	25	27.5	87.5	10	45	24.9	137.5	24.8	151.1	-13.1	22.7	1	8	exc	
79	68	Failed	L	3	0	N	N	24	24	35	90	5	50	23.6	129.7	56.5	154.1	-24.1	41.3	2	7	exc	

		RCR																				
80	76	Primary RCD	R	1	0	N	N	26	26	35	82.5	15	50	23.3	100.0	22.4	97.3	19.1	24.0	2	2	unsat	
81	59	Failed Hemi for RCD	R	3	2	N	N	26	27	15	61.7	5	40	23.2	61.0	30.9	47.5	0.0	21.6	0	3	sat	
82	67	Failed RCR	L	1	0	N	N	n/a	27	35	83.3	10	50	22.8	120.0	21.6	120.0	-20.5	0.0	0	6	exc	
83	52	Proximal Humeral Nonunion	L	0	0	N	N	15	32	20	43.3	10	15	22.8	82.3	19.4	68.2	-4.2	19.7	0	2	good	
84	72	Failed Hemi for Fracture	L	2	1	Y	N	24	25	45	73.3	25	32.5	19.6	126.4	35.8	82.3	10.6	8.1	2	7	exc	
85	78	Primary RCD	R	3	0	N	N	24	24	0	75	0	50	14.6	93.6	30.6	87.4	50.7	41.1	0	10	good	
86	75	Failed TSA	R	2	IMP	N	N	24	24	30	48.3	27.5	30	11.8	56.9	55.8	71.5	48.4	3.8	1	4	sat	
87	74	Failed RCR	L	3	1	N	N	22	37	0	84.1	0	42.5	10.3	119.0	21.4	111.9	-17.1	9.6	0	10	exc	
88	75	Failed Hemi for Fracture	L	3	IR	Y	N	26	27	10	50	10	20	10.1	22.9	22.4	48.0	3.2	-13.9	1	3	sat	
89	80	Failed RCR	L	3	1	N	N	25	37	27.5	60	25	35	10.0	60.0	40.0	60.0	20.0	20.0	0	1	sat	
90	67	Failed TSA	L	1	IMP	N	N	11	31	0	95	5	25	10.0	135.0	10.0	140.0	15.0	30.0	0	10	exc	
91	69	Failed Hemi for Fracture	R	n/a	n/a	Y	N	24	24	37.5	60	25	40	4.3	4.5	34.5	15.6	8.1	27.5	2	4	unsat	Instability
92	70	Failed RCR	L	1	1	N	N	24	24	57.5	50	25	25	40.0	60.0	40.0	51.8	0.0	38.9	2	2	unsat	
93	72	Failed RCR	L	3	1	N	N	28	29	55	35	20	15	20.0	116.8	30.0	76.4	50.0	27.7	2	1	unsat	
94	63	Failed Hemi for Fracture	R	3	1	N	N	28	29	17.5	65	10	50	90.0	98.3	45.0	85.0	-20.0	31.5	1	2	exc	
95	66	Failed Hemi for Fracture	L	1	1	Y	N	24	24	7.5	20	7.5	12.5	5.0	54.1	5.0	38.0	-10.0	-20.6	0	1	unsat	
96	60	Primary RCD	R	1	0	N	N	14	37	50	100	25	50	95.0	170.0	60.0	180.0	10.0	10.0	2	12	good	

*RCD = rotator cuff deficiency, RCR = rotator cuff repair, ASES = American Shoulder and Elbow Surgeons, FF = forward flexion, AB = abduction, ER = external rotation, SST = Simple Shoulder Test, hemi = hemiarthroplasty, BP = baseplate, IR = Insufficient Radiographs, IMP = Implant, and TSA = total shoulder arthroplasty.

TABLE E-2 Preoperative and Most Recent Postoperative Clinical Scores for Patients That Were Lost to Follow-up or Died Before 2 Years of Follow-up*

Shoulder Number	Age Sx	Preop Diagnosis	Use of Proximal Humeral Allograft	Use of Glenoid Allograft	Months Follow-up	Preop. Total ASES	Postop.Total ASES	Preop. ASES Pain	Postop. ASES Pain	Preop. ASES Function	Postop. ASES Function	FF Preop.	FF Postop.	AB Preop.	AB Postop.	ER Preop/	ER Postop.	SST preop.	SST Postop.	Postop Sat	Deceased/ LTFU	Complications
97	60	Failed RCR	N	N	8	12.5	100	0	50	12.5	50	110	145	90	165	35	40	3	6	exc	LTFU	
98	71	Primary RCD	N	N	4	25	67.5	5	35	20	32.5	80	60	50	55	30	30	1	4		Deceased	
99	62	Primary RCD	N	N	4	0	27.5	0	15	0	12.5	80	130	80	105	0	25	0	2	good	LTFU	
100	73	Failed RCR	N	N	5	35	40	30	35	5	5	75	120	105	110	15	90	3	2	exc	LTFU	
101	79	Failed RCR	N	N	12	47.5	65	30	40	17.5	25	65	150	65	150	0	5	2	4	sat	LTFU	
102	76	Failed Hemi for Fracture	Y	N	6	32.5	75	12.5	45	20	30	65	85	40	90	15	20	0	3	exc	LTFU	
103	76	Failed RCR	N	N	14	27.5	52.5	5		22.5		50		50		–10		1	2	exc	Deceased	
104	81	Failed RCR	N	N	0	0		0		0		50		45		15		1			LTFU	Fall 4wks post-op resulting in hematoma and dislocation
105	71	Failed RCR	N	Y	12	50	82.5	25	45	25	37.5	45	115	55	107	20	57	3	7	exc	Deceased	
106	77	Failed RCR	N	N	14	52.5	52.5	25	27.5	27.5	25	35	85	35	60	25	35	2	4	unsat	LTFU	
107	81	Failed Hemi for Fracture	Y	N	6	27.5	52.5	22.5	42.5	5	17.5	25	15	40	30	–5	0	1	5	sat	Deceased	Acromial Fracture, untreated
108	80	Failed RCR	N	N	12	32.50	67.50	10.00	42.50	22.50	25.00	25	60	20	55	–5	10	2	2	unsat	Deceased	
109	68	Failed RCR	N	N	13	37.5	75	15	50	22.5	25	15	110	15	55	–5	0	2	3	exc	Deceased	
110	78	Primary	N	N	11	10.0	42.5	10.0	25.0	0.00	17.5	15	90	-5	90	20	10	0	2	good	Deceased	Dislocation,

		RCD				0	0	0	0		0										closed reduction
111	54	Failed RCR	N	N	12	2.5	80	0	45	2.5	35	10	140	10	95	10	45	1	5	exc	LTFU	
112	78	Failed Hemi for fracture	N	N	0	32.5		15		17.5		0		35		–5		2			Deceased	
113	81	Primary RCD	N	N	13	50	97.5	25	50	25	47.5	45	125	40	120	60	50	3	12	exc	LTFU	
114	73	Primary RCD	N	N	10	20	72.5	10	30	7.5	42.5	30	100	30	90	15	20	0	5	exc	Deceased	

*RCD = rotator cuff deficiency, RCR = rotator cuff repair, ASES = American Shoulder and Elbow Surgeons, FF = forward flexion, AB = abduction, ER = external rotation, SST = Simple Shoulder Test, hemi = hemiarthroplasty, and LTFU = Lost to follow-up.



Fig. E-1A

Photograph demonstrating how patients were videotaped while performing abduction with both arms simultaneously while standing.

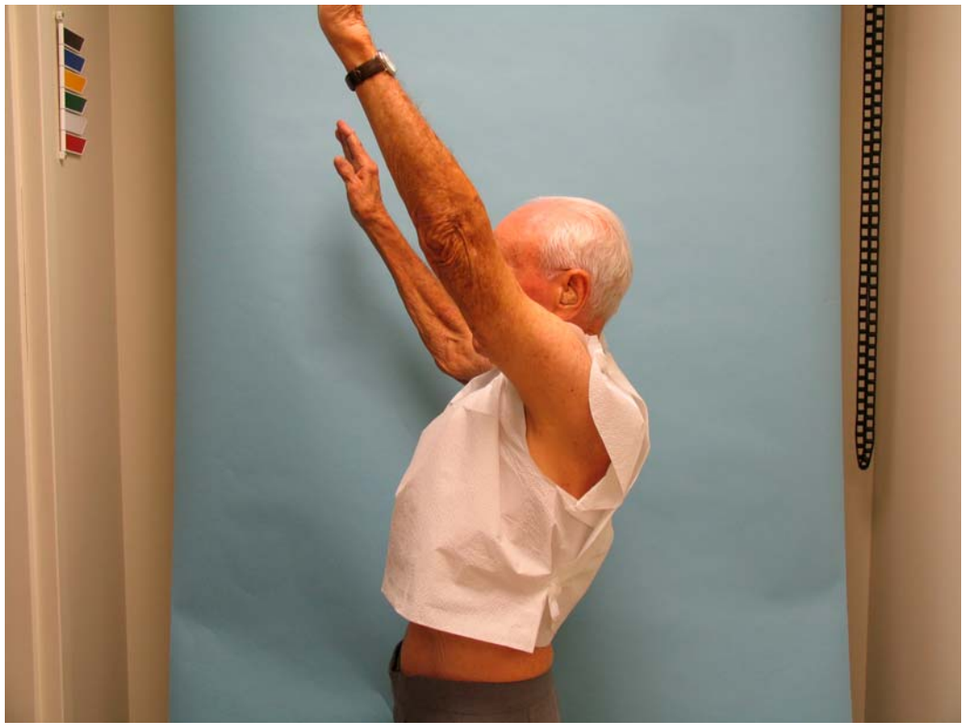


Fig. E-1B

Photograph demonstrating how patients were videotaped while performing forward flexion with both arms simultaneously while standing.



Fig. E-1C

Photograph demonstrating how patients were videotaped while performing external rotation with the elbows at the side and in 90° of flexion while seated.