



Fig. E-1
The rehabilitation protocol following arthroscopic rotator cuff repair. Except for the duration of immobilization, the postoperative care programs were identical for all study participants. The eight-week group went through the same stages, only four weeks later. ROM = range of motion.

TABLE E-1 Comparisons of Ranges of Motion, Clinical Scores, and Retear Rates Between Four and Eight-Week Groups: Analysis of Patients with and without Preoperative Stiffness

	Preoperative Stiffness (N = 23)			No Preoperative Stiffness (N = 65)		
	4-Wk Group (N = 11)	8-Wk Group (N = 12)	P Value	4-Wk Group (N = 29)	8-Wk Group (N = 36)	P Value
Preoperative						
Range of motion*						
Flex.-ext. (deg)	137.7 (31.8)	148.8 (24.0)	0.065	154.5 (12.4)	155.6 (13.2)	0.739
Int. rotat. †	10.1 (4.6)	10.1 (4.1)	0.941	8.3 (2.9)	8.4 (2.6)	0.844
Ext. rotat. (deg)	39.0 (18.3)	42.3 (19.6)	0.456	45.2 (16.0)	46.0 (14.4)	0.833
Patients with any limitation in range of motion (no. [%])	11 (100%)	12 (100%)	1.0	24 (83%)	24 (67%)	0.142
6 months						
Range of motion*						
Flex.-ext. (deg)	106.0 (30.3)	129.0 (17.9)	0.053	137.2 (21.2)	129.7 (23.1)	0.209
Int. rotat. †	11.7 (3.6)	10.9 (3.0)	0.597	9.8 (3.9)	11.6 (3.6)	0.077
Ext. rotat. (deg)	10 (15.6)	17.5 (16.5)	0.311	22.4 (15.9)	20.0 (15.4)	0.564
Stiffness ‡ (no. [%])	9 (82%)	6 (50%)	0.193	11 (38%)	18 (50%)	0.331
24 months						
Range of motion*						
Flex.-ext. (deg)	128.2 (23.6)	137.5 (26.0)	0.380	152.8 (15.1)	143.3 (24.4)	0.074
Int. rotat. †	10.6 (3.2)	8.8 (2.3)	0.155	8.6 (2.3)	9.4 (2.8)	0.241
Ext. rotat. (deg)	20.9 (19.7)	25.8 (19.3)	0.552	36.9 (16.3)	31.7 (21.6)	0.284
Stiffness ‡ (no. [%])	6 (55%)	6 (50%)	0.827	1 (3.4%)	12 (33%)	0.003

*The values are given as the mean, with the standard deviation in parentheses. †Internal rotation was measured according to the place on the back that could be reached by the thumb, which was then converted to contiguous numbers (1 to 12 = T1 to T12 vertebrae, 13 to 17 = L1 to L5 vertebrae, 18 = sacrum, and 19 = greater tuberosity of the femur). ‡Patients who showed any one of the following three criteria were defined as having stiffness: forward elevation of <120°, internal rotation lower than L3, and external rotation with the arm at the side of <20°.

TABLE E-2 Comparisons of Demographic Data and Intraoperative Procedures Between Four and Eight-Week Groups: Analysis of Entire Series

	Entire Series (N = 88)	4-Wk Group (N = 40)	8-Wk Group (N = 48)	P Value
Sex*				1.0
Male	44 (50%)	20 (50%)	24 (50%)	
Female	44 (50%)	20 (50%)	24 (50%)	
Age†	59.9 (8)	60.1 (9)	59.5 (6)	0.622
Involved shoulder*				0.084
Right	63 (72%)	25 (63%)	38 (79%)	
Left	25 (28%)	15 (38%)	10 (21%)	
Dominant arm involvement*				0.084
Yes	65 (74%)	26 (65%)	39 (81%)	
No	23 (26%)	14 (35%)	9 (19%)	
Smoking: yes*	19 (22%)	6 (15%)	13 (27%)	0.170
Diabetes: yes*	16 (18%)	8 (20%)	7 (15%)	0.501
Symptom duration† (mo)	34.9 (44)	37.4 (45.5)	32.7 (44)	0.910
Actual duration of immobilization† (wk)	5.8 (1.9)	4.1 (1.0)	7.3 (1.1)	<0.001
Acromioplasty*				0.517
Yes	77 (88%)	36 (90%)	41 (85%)	
No	11 (13%)	4 (10%)	7 (15%)	
Distal clavicle resection*				0.174
Yes	9 (10%)	2 (5%)	7 (15%)	
No	79 (90%)	38 (95%)	41 (85%)	
Biceps procedure*				0.995
Autotenotomy state	6 (7%)	3 (8%)	3 (6%)	
Left in situ	27 (31%)	12 (30%)	15 (31%)	
Tenodesis	15 (17%)	7 (18%)	8 (17%)	
Tenotomy	40 (45%)	18 (45%)	22 (46%)	
Subscapularis procedure*				0.209
Debridement	24 (27%)	9 (23%)	15 (31%)	
No treatment	43 (49%)	18 (45%)	25 (52%)	
Repair	21 (24%)	13 (33%)	8 (17%)	
Successful brisement procedure*				0.790
Yes	23 (26%)	11 (28%)	12 (25%)	
No	65 (74%)	29 (73%)	36 (75%)	
Capsular release*				0.139
Yes	71 (81%)	35 (88%)	36 (75%)	
No	17 (19%)	5 (13%)	12 (25%)	

*The values are given as the numbers of patients in each group, with the percentage in parentheses. †The values are given as the mean, with the standard deviation in parentheses.

TABLE E-3 Comparisons of Demographic Data Between Four and Eight-Week Groups: Analysis of Patients with and without Diabetes

	Diabetes (N = 15)			P Value	No Diabetes (N = 73)		P Value
	Entire Series (N = 15)	4-Wk Group (N = 8)	8-Wk Group (N = 7)		4-Wk Group (N = 32)	8-Wk Group (N = 41)	
Sex*				1.0			0.990
Male	10 (67%)	5 (63%)	5 (71%)		14 (44%)	18 (44%)	
Female	5 (33%)	3 (38%)	2 (29%)		18 (56%)	23 (56%)	
Age† (yr)	61.7 (7.0)	61.5 (9.4)	61.9 (3.5)	0.926	60.3 (8.8)	59.4 (6.4)	0.629
Involved shoulder*				1.0			0.084
Right	11 (73%)	6 (75%)	5 (71%)		19 (59%)	32 (78%)	
Left	4 (27%)	2 (25%)	2 (29%)		13 (41%)	9 (22%)	
Dominant arm involvement*				1.0			0.087
Yes	11 (73%)	6 (75%)	5 (71%)		20 (63%)	33 (80%)	
No	4 (27%)	2 (25%)	2 (29%)		12 (38%)	8 (20%)	
Smoking: Yes*	6 (40%)	2 (25%)	4 (57%)	0.315	4 (13%)	8 (20%)	0.422
Symptom duration† (mo)	31.2 (42.0)	35.0 (52.6)	26.9 (28.9)	0.722	38.2 (44.4)	33.8 (46.0)	0.682
Actual duration of immobilization† (wk)	5.5 (2.0)	3.9 (0.4)	7.4 (1.1)	<0.001	4.1 (1.1)	7.2 (1.1)	<0.001

*The values are given as the numbers of patients in each group, with the percentage in parentheses. †The values are given as the mean, with the standard deviation in parentheses.

TABLE E-4 Comparisons of Ranges of Motion, Clinical Scores, and Retear Rates Between Four and Eight-Week Groups: Analysis of Patients with and without Diabetes

	Diabetes (N = 15)			No Diabetes (N = 73)		
	4-Wk Group (N = 8)	8-Wk Group (N = 7)	P Value	4-Wk Group (N = 32)	8-Wk Group (N = 41)	P Value
Preoperative						
Range of motion*						
Flex.-ext. (deg)	111.3 (58.4)	151.4 (10.7)	0.095	146.3 (22.0)	146.8 (30.3)	0.928
Int. rotat. †	10.9 (4.3)	12.0 (6.1)	0.682	9.2 (4.0)	9.3 (3.2)	0.855
Ext. rotat. (deg)	37.5 (19.8)	45.7 (16.2)	0.4	40.5 (17.9)	41.7 (19.1)	0.778
Preoperative stiffness ‡ (no. [%])	4 (50%)	3 (43%)	1.0	7 (22%)	9 (22%)	0.994
Clinical scores*						
Pain VAS	7.3 (1.5)	5.6 (2.0)	0.085	5.3 (1.9)	5.6 (2.2)	0.498
Constant	43.5 (19.3)	45.3 (24.0)	0.876	53.9 (17.3)	56.2 (17.8)	0.582
ASES	36.5 (14.4)	41.4 (16.9)	0.552	47.3 (19.9)	46.4 (18.3)	0.843
24 months						
Range of motion*						
Flex.-ext. (deg)	137.5 (21.2)	137.1 (30.4)	0.979	148.1 (20.4)	142.7 (23.9)	0.307
Int. rotat. †	11.0 (3.5)	7.9 (3.1)	0.09	8.7 (2.3)	9.5 (2.6)	0.171
Ext. rotat. (deg)	28.8 (24.2)	34.3 (24.4)	0.667	33.4 (17.2)	29.5 (20.6)	0.388
Clinical scores*						
Pain VAS	1.9 (1.5)	0.3 (0.5)	0.017	1.2 (1.9)	0.9 (1.0)	0.43
Constant	80.3 (14.3)	92.6 (5.1)	0.049	88.0 (13.6)	87.7 (10.0)	0.9
ASES	73.6 (27.9)	97.0 (4.5)	0.050	89.7 (17.1)	91.0 (10.2)	0.699
Postoperative stiffness ‡ (no. [%])	2 (25%)	3 (43%)	0.608	5 (16%)	15 (37%)	0.046
Postoperative Sugaya classification § (no.)						
I	3 (38%)	2 (29%)	0.831	12 (38%)	19 (46%)	0.707
II	2 (25%)	2 (29%)		11 (34%)	14 (34%)	
III	1 (13%)	2 (29%)		6 (19%)	5 (12%)	
IV	1 (13%)	1 (14%)		1 (3%)	0 (0%)	
V	1 (13%)	0 (0%)		2 (6%)	3 (7%)	
Full-thickness retear # (no.)	2 (25%)	1 (14%)	1.0	3 (9%)	3 (7%)	1.0

*The values are given as the mean, with the standard deviation in parentheses. †Internal rotation was measured according to the place on the back that could be reached by the thumb, which was then converted to contiguous numbers (1 to 12 = T1 to T12 vertebrae, 13 to 17 = L1 to L5 vertebrae, 18 = sacrum, and 19 = greater tuberosity of the femur). ‡Patients who showed any one of the following three criteria were defined as having stiffness: forward elevation of <120°, internal rotation lower than L3, and external rotation with the arm at the side of <20°. §According to the Sugaya classification, I = sufficient thickness with homogeneously low signal intensity, II = sufficient thickness with partial high signal intensity, III = insufficient thickness without discontinuity, IV = a minor discontinuity, and V = a major discontinuity. #A type-IV or V retear according to the Sugaya classification was considered a full-thickness retear.