TABLE E-1 Outline of the Passive and Active Motion Protocols

Passive range of motion protocol
24 hours to 3 weeks postoperatively
Custom dorsal blocking splint fabricated
Passive flexion-extension exercises performed each waking hour within the splint
Active extension of proximal and distal interphalangeal joints is performed with the metacarpophalangeal joints held in flexion by the splint
Compressive wraps applied to control edema
3 to 6 weeks postoperatively
Change dorsal blocking splint to wrist neutral position
Begin place-and-hold exercises
6 to 9 weeks postoperatively
Wean from splint as patient reliability permits and begin gentle active motion
Begin passive extension of isolated joints in protective positions
Light functional activities are allowed
Begin combined joint finger extension exercises with wrist flexed
9 to 12 weeks postoperatively
Begin blocking exercises for proximal and distal interphalangeal joints
Begin static-progressive splinting to correct joint contractures, if present
Begin gentle extension splinting (combined wrist and finger) to increase soft-tissue length, if needed
Begin progressive resistive exercises
12 to 14 weeks postoperatively
Light to moderate resistive activities
16 weeks
No precautions
Early active range of motion protocol
24 to 72 hours postoperatively
Custom dorsal blocking splint fabricated
Passive flexion-extension exercises performed within splint
Active extension of proximal and distal interphalangeal joints is performed, under the direction of the therapists, with metacarpophalangeal joints held in flexion by splint
Compressive wraps applied to control edema
72 hours to 4 weeks postoperatively
Tenodesis splint (hinged wrist) fabricated
Instruction in active place-and-hold exercises in tenodesis splint. With the tenodesis splint on, the wrist is passively brought into 30° extension (the two extension blocking tabs come together), while fingers are pushed into full composite flexion. The patient then gently contracts the finger flexors and attempts to hold the flexed position for five seconds. After five seconds the patient relaxes the muscle contraction and allows the wrist to drop into flexion and the fingers to extend to the limits of the dorsal finger block of the splint
Patient returns to the dorsal blocking splint between hourly exercise sessions
Exercises continued until fourth week postoperatively
2 to 4 weeks postoperatively
Place-and-hold exercises previously performed in tenodesis splint now performed without the

guidance of the splint. Fingers are passively brought into flexion with wrist brought into extension
4 weeks postoperatively
Active muscle contraction is used to hold the above position, then muscles are relaxed and hand falls into wrist flexion and finger extension, in a tenodesis pattern
Tenodesis splint discontinued. Patient continues to use dorsal blocking splint after each exercise session
Active movement from full fist, to "hook fist," to "straight fist," to full finger extension used to facilitate maximum tendon gliding
5 weeks postoperatively
Active wrist and finger flexion followed by wrist and finger extension is allowed
6 weeks postoperatively
Dorsal blocking splint is discontinued
Active finger flexion exercises with joint blocking at both the proximal and distal interphalangeal joints are added to facilitate tendon gliding only in patients within limited range of motion (those not flexing to at least 3 cm of the distal palmar flexion crease). NOTE: Blocking exercises to the little finger are not recommended
Buddy taping may be used to facilitate full flexion
7 weeks postoperatively
Passive extension exercises and extension splints may be used when indicated
9 weeks postoperatively
Light strengthening exercises are initiated
10 to 14 weeks postoperatively
A progressive resistive strengthening program is used to return the patient to preoperative strength. Return to full, unrestricted activity is allowed at 14 weeks

TABLE E-2 Results After Digits Treated with Active Compared with Passive Motion Protocol, Stratified by Single Compared with Multiple Digit Injury

	Active Protocol Single Digit* (N = 41)	Active Protocol Multiple Digits* (N = 13)	Passive Protocol Single Digit* (N = 40)	Passive Protocol Multiple Digits* (N = 12)
Range of motion				
6 wk	124° ± 18°	116° ± 14°	84° ± 15°	78° ± 9°
12 wk	140° ± 20°	131° ± 7°	118° ± 21°	101° ± 12°
26 wk	**150° ± 23°**	**140° ± 12°**	128° ± 19°	120° ± 10°
52 wk	**159° ± 25°**	**149° ± 11°**	**132° ± 22°**	**124° ± 11°**
Flexion contracture				
6 wk	25° ± 12°	30° ± 7°	40° ± 19°	48° ± 6°
12 wk	20° ± 11°	25° ± 5°	32° ± 15°	42° ± 10°
26 wk	16° ± 10°	19° ± 6°	28° ± 12°	33° ± 5°
52 wk	**13° ± 9°**	**20° ± 7°**	**26° ± 14°**	**32° ± 7°**
DASH score†				
52 wk	2.0 ± 3.9	2.3 ± 3.9	3.0 ± 4.3	3.7 ± 5.1
Jebsen-Taylor *(seconds to complete)*				
52 wk	38 ± 15.7	41 ± 19.1	40 ± 17.4	44 ± 22.3
Purdue pegboard *(no. of pegs completed)*				
52 wk	19 ± 9	20 ± 11	18 ± 11	16 ± 10
Range	14-26	13-27	11-27	10-24
Satisfaction score				
52 wk	**9.6 ± 4.2**	**8.0 ± 5.0**	**8.4 ± 4.2**	**6.9 ± 4.7**

*The values are given as the mean (and the standard deviation) for the combined range of motion for the proximal interphalangeal and distal interphalangeal joints, and are based on the number of digits. Not all patients had measurement at each time point. Boldface type indicates a significant difference ($p < 0.05$).
†DASH = Disabilities of the Arm, Shoulder and Hand outcome questionnaire.

Table E-3 The Effect of Nerve Injuries on Digit Motion

	Active Protocol without Nerve Injury* (N = 34)	Active Protocol with Nerve Injury* (N = 20)	Passive Protocol without Nerve Injury* (N = 33)	Passive Protocol with Nerve Injury* (N = 19)
Range of motion				
6 wk	122° ± 15°	117° ± 12°	85° ± 15°	77° ± 9°
12 wk	140° ± 20°	134° ± 10°	120° ± 14°	110° ± 12°
26 wk	151° ± 23°	139° ± 13°	128° ± 18°	115° ± 11°
52 wk	**161° ± 24°**	**144° ± 10°**	**134° ± 23°**	**120° ± 9°**
Flexion contracture				
6 wk	23° ± 14°	32° ± 8°	38° ± 11°	49° ± 6°
12 wk	20° ± 14°	28° ± 10°	30° ± 7°	41° ± 9°
26 wk	16° ± 12°	20° ± 6°	25° ± 7°	34° ± 7°
52 wk	**12° ± 8°**	**22° ± 7°**	**24° ± 6°**	**32° ± 8°**
DASH score†				
52 wk	1.9 ± 3.5	2.4 ± 3.8	3.0 ± 4.4	3.5 ± 5.0
Jebsen-Taylor *(seconds to complete)*				
52 wk	38 ± 16.6	43 ± 17.3	40 ± 18	46 ± 19
Purdue pegboard *(no. of pegs completed)*				
52 wk	21 ± 7.0	16 ± 9.3	19 ± 6.8	14 ± 10.2
Range	15-28	10-23	12-26	8-23
Satisfaction score				
52 wk	**9.5 ± 4.6**	**8.6 ± 6.2**	**8.5 ± 4.4**	**7.6 ± 5.0**

*The values are given as the mean (and the standard deviation) and are based on the number of digits. Boldface type indicates a significant difference ($p < 0.05$). †DASH = Disabilities of the Arm, Shoulder and Hand outcome questionnaire.

TABLE E-4 The Effect of Smoking on Digit Motion

	Active Protocol Nonsmoking* (N = 38)	Active Protocol Smoking* (N = 16)	Passive Protocol Nonsmoking* (N = 37)	Passive Protocol Smoking* (N = 15)
Range of motion				
6 wk	125° ± 17°	118° ± 6°	86° ± 15°	79° ± 4°
12 wk	**140° ± 19°**	**130° ± 8°**	118° ± 14°	110° ± 8°
26 wk	151° ± 22°	139° ± 10°	**127° ± 18°**	**118° ± 7°**
52 wk	**159° ± 25°**	**142° ± 8°**	**133° ± 21°**	**123° ± 9°**
Flexion contracture				
6 wk	23° ± 13°	31° ± 6°	39° ± 20°	48° ± 6°
12 wk	20° ± 12°	27° ± 8°	33° ± 15°	39° ± 7°
26 wk	15° ± 10°	23° ± 8°	26° ± 13°	34° ± 7°
52 wk	**12° ± 10°**	**21° ± 7°**	**24° ± 14°**	**32° ± 5°**
DASH score†				
52 wk	1.9 ± 3.7	2.7 ± 4.0	3.0 ± 4.6	3.8 ± 4.2
Jebsen-Taylor *(seconds to complete)*				
52 wk	39 ± 16.2	40 ± 18.5	42 ± 20.4	42 ± 17.8
Purdue pegboard *(no. of pegs completed)*				
52 wk	19 ± 10	19 ± 10	18 ± 9	16 ± 11
Range	12-26	13-27	10-24	9-23
Satisfaction score				
52 wk	9.7 ± 5.2	8.5 ± 7.7	8.6 ± 5.7	7.0 ± 5.2

*The values are given as the mean (and the standard deviation) and are based on the number of digits. Boldface type indicates a significant difference ($p < 0.05$). †DASH = Disabilities of the Arm, Shoulder and Hand outcome questionnaire.

TABLE E-5 The Effect of Hand Therapist Certification on Digit Motion

	Active Protocol with Certified Hand Therapist* (N = 24)	Active Protocol without Certified Hand Therapist* (N = 23)	Passive Protocol with Certified Hand Therapist* (N = 24)	Passive Protocol without Certified Hand Therapist* (N = 22)
Range of motion				
6 wk	**125° ± 11°**	115° ± 17°	84° ± 11°	75° ± 11°
12 wk	140° ± 13°	132° ± 14°	121° ± 9°	110° ± 13°
26 wk	150° ± 16°	146° ± 19°	**128° ± 10°**	**118° ± 16°**
52 wk	**161° ± 11°**	**150° ± 18°**	**134° ± 9°**	**122° ± 22°**
Flexion contracture				
6 wk	22° ± 8°	31° ± 13°	41° ± 8°	50° ± 18°
12 wk	19° ± 11°	29° ± 12°	**29° ± 10°**	**40° ± 12°**
26 wk	13° ± 7°	24° ± 10°	26° ± 10°	36° ± 14°
52 wk	**12° ± 6°**	**22° ± 10°**	**25° ± 7°**	**34° ± 13°**
DASH score†				
52 wk	2.0 ± 3.6	2.7 ± 3.7	3.0 ± 4.1	3.8 ± 4.4
Jebsen-Taylor *(seconds to complete)*				
52 wk	39 ± 17	39 ± 18	41 ± 18	42 ± 19
Purdue pegboard *(no. of pegs completed)*				
52 wk	19 ± 7.3	19 ± 7.5	18 ± 7.4	17 ± 7.7
Range	12-26	13-26	10-24	9-23
Satisfaction score				
52 wk	**9.6 ± 5.0**	**8.6 ± 4.6**	**8.2 ± 5.9**	**7.1 ± 4.5**

*The values are given as the mean (and the standard deviation) and are based on the number of patients. Boldface type indicates a significant difference ($p < 0.05$). †DASH = Disabilities of the Arm, Shoulder and Hand outcome questionnaire.

TABLE E-6 Results Reported in the Literature According to Strickland's Criteria Compared with Results in the Current Study*

Strickland Classification	Silfverskiöld and May[8]	May et al.[20]			Strickland[18]		Current Study	
	Active Range of Motion Protocol	Passive Range of Motion Protocol	Four-Finger Kleinert Protocol	Kleinert Protocol (Injured Digits Only)	Immobilization Protocol	Passive Range of Motion Protocol	Active Range of Motion Protocol	Passive Range of Motion Protocol
Excellent (≥150°)	39 (70.9)	18 (35.3)	30 (55.6)	19 (35.2)	0 (0)	9 (36)	39 (72.2)	19 (36.5)
Good (125°-149°)	14 (25.5)	14 (27.5)	15 (27.8)	20 (37)	3 (12)	5 (20)	12 (22.2)	13 (25)
Fair (90°-124°)	0 (0)	12 (23.5)	7 (13)	9 (16.7)	7 (28)	4 (16)	1 (1.9)	11 (21.2)
Poor (<90°)	0 (0)	6 (11.8)	0 (0)	4 (7.4)	11 (44)	6 (24)	0 (0)	7 (13.5)
Rupture	2 (3.6)	1 (2)	2 (3.7)	2 (3.7)	4 (16)	1 (4)	2 (3.7)	2 (3.8)
Total	55	51	54	54	25	25	54	52

*The values are given as the number of digits, with the percentage in parentheses.