Supplemental Table 1. Evidence for Effectiveness of Occupational Therapy Interventions for Adults With Musculoskeletal Conditions of the Forearm, Wrist, and Hand

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control Groups	Outcome Measures	Results
		Bone, Joint, and General Hand Disorders		
Ayhan, Unal, & Yakut (2014) https:/doi.org/10.1177/0269215513492443	Level I RCT *N* = 27. Intervention group, *n* = 14. Control group, *n* = 13. *Inclusion criteria:* Adults (ages 25–45 yr) with general conditions including subacute wrist (*n* = 13) or elbow (*n* = 14) fracture or soft tissue injury.	*Intervention* Traditional rehabilitation plus core stabilization exercises based on a clinical Pilates protocol that involved respiratory control, postural training, biofeedback, and exercise. *Control* Traditional rehabilitation.	• VAS Pain • ROM • DASH • Manual muscle testing	Outcomes improved in both groups, but no significant differences were found in posttreatment status between the groups for pain, ROM, DASH score, or strength.
Becker, Bot, Curley, Jupiter, & Ring (2013) https:/doi.org/10.1016/j.joca.2013.02.006	Level I RCT *N* = 119. Prefabricated group, *n* = 61. Customized group, *n* = 58. *Inclusion criteria:* Adults with trapeziometacarpal arthrosis.	*Intervention* Splint wear as needed during activity. *Prefabricated group:* Prefabricated neoprene Comfort Cool thumb CMC restriction splint. *Customized group:* Customized 3.2-mm thermoplastic hand-based thumb spica including the MCP and IP joints.	• DASH • Pain • Pinch strength • Grip strength • Patient satisfaction • Splint comfort	No significant differences were found between groups at 5- to 15-wk follow-up on any outcome measure. Participants in the prefabricated group found the neoprene splint more comfortable.
Bruder, Taylor, Dodd, & Shields (2011) https:/doi.org/10.1016/S1836-9553(11)70017-0	Level I SR *N* = 7 RCTs specific to distal radius fracture. *Inclusion criteria:* RCTs and quasi-RCTs including participants with distal radius fractures using exercise as an intervention.	*Intervention* Interventions included some sort of exercise as a comparator: exercise and advice vs. no intervention, home exercise vs. supervised and home exercise, and PT with supervised and home exercise vs. home exercise.	• Modified Solgaard and Werley functional score • Grip strength • ROM • PRWE • Quick DASH • Edema • Pain • ADL assessment • SF–36	1 study found no difference between groups for wrist extension or grip strength for participants receiving exercise compared with no intervention, but the exercise group had less pain. No evidence supports supervised exercise in addition to home exercise as superior to home exercise alone. Mixed evidence was found for PT supervised exercises; 1 trial found positive results for PT, a 2nd trial found negative effects for PT, and an SR concluded that there was no effect for PT.

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Supplemental Table 1. Evidence for Effectiveness of Occupational Therapy Interventions for Adults With Musculoskeletal Conditions of the Forearm, Wrist, and Hand (*cont.*)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control Groups	Outcome Measures	Results
Glasgow, Fleming, Tooth, & Peters (2012) https:/doi.org/10.5014/ajot.2012.002816	Level I RCT *N* = 22. 6- to 12-hr group, *n* = 11. 12- to 16-hr group, *n* = 11. *Inclusion criteria:* History of traumatic injury leading to decreased PIP extension (i.e., joint contracture).	*Intervention* Dynamic Capener splint (set to 200–250 g of force) with therapy once every 1–2 wk for standard treatment that included ROM and edema management. *6- to 12-hr group*: Daily TERT of 6–12 hr. *12- to 16-hr group*: Daily TERT of 12–16 hr.	• AROM, PROM, and total ROM for PIP extension	No significant differences were observed between the groups in ROM measures at 8 wk. The 12- to 16-hr group averaged only 11.5 hr of daily TERT, similar to the average of 9.5 hr in the other group.
Glasgow, Tooth, Fleming, & Peters (2011) https:/doi.org/10.1016/j.jht.2011.03.001	Level III Cohort study *N* = 46 (56 joints) in one cohort. *Inclusion criteria:* MCP or PIP contracture secondary to history of hand trauma.	*Intervention* Dynamic splinting specific to affected joint for 8 wk with weekly or biweekly therapy visits including AROM, edema management, and strengthening.	• AROM • PROM • End feel • Time since injury • Joint stiffness	AROM and PROM improved by 20.0˚ and 21.8˚, respectively, after intervention. Joint stiffness and time since injury accounted for 51% of the variance in improvement in AROM. Joint stiffness and type of deficit also significantly predicted PROM but accounted for only 9% of the variance observed.
Handoll, Madhok, & Howe (2006) https://doi.org/10.1002/14651858.CD003324	Level I SR (Cochrane) *N* = 15 RCTs. *N* = 746 participants. *Inclusion criteria:* RCTs or quasi-RCTs concerning adults with distal radius fractures receiving rehabilitation interventions.	*Intervention* OT, PT, other hand therapy, continuous passive motion, pulsed electromagnetic field, ice, passive mobilization, pneumatic compression, US, whirlpool, therapeutic exercise, and HEP.	• DASH • VAS Pain • ROM • Grip strength • Pinch strength • Purdue Pegboard Test	Weak evidence suggests that early OT during immobilization leads to better grip strength, pinch strength, and ROM at 4 wk postimmobilization compared with no treatment, but no evidence was found for differences between groups at 3 mo. No difference was found between OT and a no-OT control at short- or long-term time frames when rehabilitation started postimmobilization. No evidence supports the use of US or whirlpool as treatments. Mixed evidence exists for benefits of postfracture care instructions provided by PTs vs. physicians, with no difference in outcomes at 12-wk follow-up.

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Supplemental Table 1. Evidence for Effectiveness of Occupational Therapy Interventions for Adults With Musculoskeletal Conditions of the Forearm, Wrist, and Hand (*cont.*)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control Groups	Outcome Measures	Results
Harth, Germann, & Jester (2008) https:/doi.org/10.1177/1753193408091602	Level II Nonrandomized comparative trial *N* = 150. Intervention group, *n* = 75. Control group, *n* = 75. *Inclusion criteria:* Adults (predominantly male) at an inpatient hand clinic with a variety of hand-related diagnoses.	*Intervention* Adapted standard care in patient-oriented hand rehabilitation that used a biopsychosocial model of health in which patients ranked DASH items by importance, patients were screened for anxiety and depression, weekly patient visits were conducted by provider teams, OT treatments targeted work-related activities, and rehabilitation managers joined the team instead of contacting the patient after care. *Control* Standard multidisciplinary inpatient care provided by doctors, PTs, OTs, sport therapists, clinical psychologists, social workers, and vocational rehabilitation managers. All patients received care for 5–6 wk.	• Days until return to work • ROM • Grip strength • Pinch strength • VAS Pain • SF–36 • German DASH • Health-related locus of control • German Client Satisfaction Questionnaire	The patient-oriented hand rehabilitation program resulted in more improvement in DASH scores and decreased pain at 6-mo follow-up than standard multidisciplinary inpatient care. Participants in the patient-centered care condition were significantly more satisfied with their function, ROM, and hand strength outcomes indicated by subjective report. No differences between groups were noted for ROM, grip or pinch strength, or other outcome measures.
Heiser, O'Brien, & Schwartz (2013) https:/doi.org/10.1016/j.jht.2013.07.004	Level I SR *N* = 6 studies specific to the wrist and hand. *Inclusion criteria:* Cohort studies, comparative trials, and RCTs evaluating mobilization techniques for limited ROM due to wrist or hand disorders.	*Intervention* Mobilization with movement, Maitland mobilizations, dorsal palmar glides, and anterior–posterior joint mobilization for the thumb.	• ROM • Pain • Strength	Moderate evidence supports joint mobilization techniques at the wrist for distal radius fracture for short-term improvements in ROM and pain. Limited, low-quality evidence was found for short-term improvement in ROM and pain for hand disorders with mobilization techniques.
Hermann et al. (2014) https:/doi.org/10.3109/11038128.2013.851735	Level I RCT *N* = 59. Intervention group, *n* = 30. Control group, *n* = 29. *Inclusion criteria:* Adults diagnosed with CMC OA.	*Intervention* Education on hand exercises to be completed 2×/day plus a prefabricated, hand-based soft thumb spica splint made of Fabrifoam and worn as needed. *Control* Hand exercise education only.	• Pain • Grip strength • Pinch strength	No significant differences were found for pain, grip strength, or pinch strength pre- to postintervention for either group, nor was there a significant mean change between groups. Patients in the intervention group had lower pain during grip and pinch and decreased grip strength while wearing the splint.

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Supplemental Table 1. Evidence for Effectiveness of Occupational Therapy Interventions for Adults With Musculoskeletal Conditions of the Forearm, Wrist, and Hand (*cont.*)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control Groups	Outcome Measures	Results
Jongs, Harvey, Gwinn, & Lucas (2012) https:/doi.org/10.1016/S1836-9553(12)70108-X	Level I RCT $N = 40$. Intervention group, $n = 19$. Control group, $n = 21$. *Inclusion criteria:* Adults at a hand therapy clinic being seen for joint contracture due to distal radius fracture ≥10 wk postinjury, no longer immobilized (i.e., loss of passive wrist extension).	*Intervention* Hand therapy treatment, which included symptom management and exercises for ROM and strengthening for 8 wk, plus a dynamic wrist extension splint using an elastic band set to the maximum tolerated level of extension, with a wear schedule of ≥6 hr/day. *Control* Hand therapy treatment only.	• PRWE • Passive wrist extension • Active wrist extension, flexion, radial and ulnar deviation • COPM	No clinically relevant differences for any outcome measure were found between groups at the end of treatment (i.e., at 8 wk) or at the 12-wk follow-up.
Knygsand-Roenhoej & Maribo (2011) https:/doi.org/10.1016/j.jht.2010.10.009	Level I RCT $N = 30$. Group 1, $n = 15$. Group 2, $n = 15$. *Inclusion criteria:* Adults with distal radius fracture 10 wk postinjury with ≥60 ml difference in volume between upper extremities.	*Intervention* Two types of edema management performed 3×/wk for 4 wk, then 2×/wk for 2 wk, and continued longer as indicated. *Group 1:* Traditional edema management that included elevation, intermittent compression with a pump, and functional training, as well as a home program with an Isotoner glove. *Group 2:* Modified manual edema management that included deep breathing, proximal to distal exercises, terminus stimulation, axillary stimulation, edema management to the trunk, and stimulation of pump points in the upper extremity, as well as a one-handed HEP.	• Volumetry • ROM • VAS Pain • COPM • ADL assessment	Both groups showed significant pre- to postintervention differences in edema, pain, and AROM. No significant between-groups differences were found for any of the measures at 6 or 9 wk. A significantly higher no. of participants in Group 1 required edema management for >6 wk, but an equal no. of participants in both groups required treatment at 9 wk.
Krischak et al. (2009) https:/doi.org/10.1016/j.apmr.2008.09.575	Level I RCT $N = 48$. Intervention group, $n = 24$. Control group, $n = 24$. *Inclusion criteria:* Adults with volar locking plate internal fixation to treat distal radius fracture.	*Intervention* 12 30-min sessions of directed physical therapy interventions over a 6-wk period, primarily consisting of instruction in exercises that could also be completed at home. *Control* Detailed written plan for a 6-wk progressive HEP with direct instruction provided during a surgical follow-up visit.	• PRWE • Grip strength • ROM	At 6 wk, PRWE, grip strength, and ROM were all significantly more improved in the control group, who received postsurgical home program instruction, than in the therapy intervention group.

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Supplemental Table 1. Evidence for Effectiveness of Occupational Therapy Interventions for Adults With Musculoskeletal Conditions of the Forearm, Wrist, and Hand (*cont.*)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control Groups	Outcome Measures	Results
Kuo et al. (2013) https:/doi.org/10.1177/0269215513487391	Level I RCT *N* = 22. Intervention group, *n* = 11. Control group, *n* = 11. *Inclusion criteria:* Adults age ≥50 yr with distal radius fracture being treated with external fixation.	*Intervention* Early mobilization of fingers beginning in Wk 1, with edema management, massage, PROM, AROM, stretching, ADLs, and strengthening for 6 wk. *Control* 1 session with education in edema management and AROM of uninvolved joints. Both groups received the same rehabilitation protocol in Wk 7–12, which involved joint mobilization, scar management, and work hardening.	• Grip strength • Pinch strength • Purdue Pegboard Test • Manual Ability Measure–36 • Hand kinematics (work space of thumb and finger motions, dynamic goniometry of thumb or finger)	No significant differences were noted between groups in strength or dexterity at 12 wk. The intervention group had larger maximal work space movements of the thumb and finger than the control group at 12 wk.
Magnus et al. (2013) https:/doi.org/10.1016/j.apmr.2013.03.005	Level I RCT *N* = 51. Intervention group, *n* = 27. Control group, *n* = 24. *Inclusion criteria:* Women age >50 yr with distal radius fracture.	*Intervention* Treatment as usual plus contralateral training for the unaffected upper extremity, which included strengthening exercises for the fingers, hand, and forearm completed 3×/wk, monitored and progressed via biweekly telephone calls. *Control* Treatment as usual for distal radius fracture including casting, home exercise for the affected side for AROM while casted, and AROM and PROM after cast removal, leading to gentle strengthening, all provided as an HEP by the surgeon.	• PRWE • Grip strength • ROM	No significant differences were found between groups for the PRWE at any follow-up. At 12 wk, the intervention group showed significantly higher grip strength and better ROM in the affected hand than the control group, but no differences were found between groups in these outcomes at either 9 or 26 wk.
Moe, Kjeken, Uhlig, & Hagen (2009) https:/doi.org/10.2522/ptj.20080398	Level I SR *N* = 4 SRs. *Inclusion criteria:* Systematic reviews evaluating conservative, non-pharmacological treatments of hand OA.	*Intervention* LLLT, yoga, compression garments, splinting, exercise, and education.	• Pain • Function	Mixed evidence exists for the effect of splinting on pain, and no evidence supports 1 splinting design over another. Limited evidence supports education and exercise for hand OA.

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Supplemental Table 1. Evidence for Effectiveness of Occupational Therapy Interventions for Adults With Musculoskeletal Conditions of the Forearm, Wrist, and Hand (*cont.*)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control Groups	Outcome Measures	Results
O'Brien, Jones, Mullis, Mulherin, & Dziedzic (2006) https:/doi.org/10.1093/rheumatology/kei215	Level I RCT *N* = 67. Group 1, *n* = 21. Group 2, *n* = 24. Control group, *n* = 22. *Inclusion criteria*: Adults with RA.	*Intervention* 1 30-min therapy session that provided information on joint protection and energy conservation. *Group 1:* Joint protection education and an HEP that included stretching, tendon gliding, and progressive strengthening exercises for 6 mo. *Group 2:* Joint protection education and an HEP with 8 general wrist and finger stretches for 6 mo. *Control* Joint protection education only.	• AIMS II • Jebsen–Taylor Test of Hand Function • Grip strength • ROM	Group 1 had significantly better scores on the Upper Limb Function subscale of the AIMS II than the other groups at 6-mo follow-up. Both intervention groups had better grip strength than the control group at 6-mo follow-up. No other significant differences between groups were noted in functional outcomes or ROM.
Poolman et al. (2005) https:/doi.org/10.1002/14651858.CD003210.pub3	Level I SR (Cochrane) *N* = 5 RCTs. *N* = 252 participants. *Inclusion criteria:* RCTs and quasi-RCTs evaluating conservative treatments of adult and child participants with closed 5th metacarpal neck fractures.	*Intervention* Various types of immobilization techniques, including ulnar gutter splinting vs. bulky dressing, ulnar gutter cast with 90° of flexion of the MCP joints and extended IP joints vs. buddy strapping, metacarpal bracing vs. buddy strapping, splinting the MCP joints in 60° of flexion and leaving the IP joints free vs. an elastic bandage, and ulnar gutter cast with later mobilization vs. a compression bandage with earlier mobilization.	• Patient satisfaction • Cosmetic appearance • Pain • Fracture angulation • ROM in the MCP • Grip strength • Skin integrity	All immobilization techniques showed positive short-term outcomes, but no studies evaluated long-term hand function. No evidence supports 1 intervention as better than another.
Rostami, Arefi, & Tabatabaei (2013) https:/doi.org/10.3109/09638288.2012.751132	Level I RCT *N* = 30. Intervention group, *n* = 15. Control group, *n* = 15. *Inclusion criteria:* Adults with impaired active ROM or contracture in ≥1 digit of the hand resulting from orthopedic injury.	*Intervention* Mirror therapy session for 30 min, which included ROM exercises, resistive exercises, and functional activities, followed by 30 min of intensive rehabilitation, plus 2 15-min sessions of daily mirror-based home exercises. *Control* Conventional therapy sessions lasting 60 min, plus 2 15-min sessions of daily hand AROM home exercises. Both groups received interventions 5 days/wk for 3 wk.	• TAM • DASH	Both groups showed significant pre-to-post increases in TAM. The mirror therapy group presented with significantly larger increases in TAM and improvement in DASH scores than the control group.

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Supplemental Table 1. Evidence for Effectiveness of Occupational Therapy Interventions for Adults With Musculoskeletal Conditions of the Forearm, Wrist, and Hand (*cont.*)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control Groups	Outcome Measures	Results
Silva, Lombardi, Breitschwerdt, Poli Araújo, & Natour (2008) https:/doi.org/10.1177/0269215508088989	Level I RCT *N* = 40. Intervention group, *n* = 20. Control group, *n* = 20. *Inclusion criteria:* Adults with RA and boutonniere deformity of the thumb.	*Intervention* Custom-cast thermoplastic thumb orthosis that allowed for functional use of the thumb while maintaining immobilization, worn during ADL performance. *Control* No intervention, but a thumb orthosis worn during evaluations.	• O'Connor Dexterity Test (with and without orthosis) • Grip strength (with and without orthosis) • Pinch strength (with and without orthosis) • VAS Pain • Health Assessment Questionnaire • Hand function	VAS pain scores were significantly decreased at 45 and 90 days in the intervention group, with no significant changes in pain in the control group. No significant between-groups differences were observed in the other outcome measures. 85% of the participants in the orthosis group reported *better* or *much better* on a Likert scale for satisfaction with the effectiveness of thumb orthosis use at Day 45, and 75% reported *better* or *much better* at Day 90.
Souer, Buijze, & Ring (2011) https:/doi.org/10.2106/JBJS.J.01452	Level I RCT *N* = 94. Intervention group, *n* = 48. Control group, *n* = 46. *Inclusion criteria:* Patients with unstable distal radii after open reduction and volar locking plate fixation for distal radial fracture.	*Intervention* Instruction by the surgeon on wrist splint use and an HEP to be completed 3–4×/day for ≥30 min, including early finger flexion, isolated forearm supination and pronation, and self ROM, with the addition of wrist flexion exercises after recovery of finger and forearm motions. *Control* OT performed by a therapist unaware of the study who determined individualized rehabilitation content, frequency, and duration for each patient.	• DASH • Arc of wrist flexion and extension (degrees and percentage of ROM compared with unaffected side) • Grip strength • Gartland and Werley scores • Mayo wrist scores	At 3 mo, the home exercise group presented with significantly better results in pinch strength, grip strength, and Gartland and Werley score than the OT group. At 6 mo, the home exercise group showed significantly better results in arc of wrist flexion and extension of the injured side, wrist extension compared with the uninjured wrist, ulnar deviation, supination, grip strength, and modified Mayo wrist score than the OT group. More postsurgical complications occurred in the OT group than in the home exercise group.
Szczegielniak, Łuniewski, Bogacz, & Sliwiński (2012) https:/doi.org/10.5604/15093492.976896	Level II 2 nonrandomized groups *N* = 20. Intervention group, *n* = 10. Control group, *n* = 10. *Inclusion criteria:* Patients with RA (*M* age = 62.2 yr).	*Intervention* Comprehensive PT, which included strength building for hand muscles and ROM exercises for the hand and wrist in 2 30-min sessions/day for 2 wk, plus kinesiotaping for palmar flexors, dorsal flexors, ulnar collateral ligament of the wrist, and ulnar deviation correction. *Control* Comprehensive PT only.	• Grip strength • Hand function test (screwing and unscrewing a bottle top)	Both groups showed significant increases in grip strength and hand function. The intervention group showed a significantly larger increase in grip strength and hand function than the control group.

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Supplemental Table 1. Evidence for Effectiveness of Occupational Therapy Interventions for Adults With Musculoskeletal Conditions of the Forearm, Wrist, and Hand (*cont.*)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control Groups	Outcome Measures	Results
Thiele, Nimmo, Rowell, Quinn, & Jones (2009) https:/doi.org/10.1186/1471-2474-10-129	Level I RCT with crossover *N* = 30. Group 1, *n* = 16. Group 2, *n* = 14. *Inclusion criteria:* Adults with chronic wrist pain that impaired function but no diagnosis of CTS.	*Intervention* Use of either a circumferential elasticized fabric wrist brace with a palmar metal bar or a custom-made leather splint during periods of pain and discomfort over a 2-wk period. *Crossover:* After a 1-wk washout period, all patients received the splint not initially provided.	• Australian/Canadian Osteoarthritis Hand Index • COPM • Grip strength • Splint preference	Significant reductions in pain, improved hand function and stiffness, and increased grip strength were observed at 2-wk follow-up for both splints. Between-groups significance was observed only for patient-perceived occupational performance and satisfaction favoring the custom-made leather splint.
Valdes (2009) https:/doi.org/10.1016/j.jht.2009.06.003	Level II 2 nonrandomized groups (retrospective) *N* = 23 cases. Intervention group, *n* = 14. Control group, *n* = 9. *Inclusion criteria:* Records of patients with internal fixation of a distal radius fracture.	*Intervention* Early ROM provided by a hand therapist after surgical fixation. *Control* 6 wk of wrist immobilization before ROM intervention.	• Upper Limb Functional Index • ROM • Grip strength • No. of therapy visits	The intervention group attended significantly fewer therapy visits and attained functional ROM of the wrist and forearm significantly faster than the control group. No other significant differences were noted between groups at discharge from therapy.
van der Giesen et al. (2009) https:/doi.org/10.1002/art.24866	Level I RCT with crossover *N* = 50. Group 1, *n* = 26. Group 2, *n* = 24. *Inclusion criteria:* Patients with RA and ≥1 swan neck deformity.	*Intervention* Use of either a SIRIS swan neck splint or an Oval-8 finger splint full time for 4 wk, with removal only for skin care. *Crossover:* After a 2-wk washout period, all patients received the splint not initially provided. After the crossover period, patients were given the opportunity to wear their preferred splint for another 12 wk.	• SODA • Dutch AIMS II • MHQ • Passive ROM • Grip strength • Pinch strength • Perception of change in hand function • Satisfaction with splints • Splint preference	Both splints led to significant improvements in SODA scores after 4 wk. Patients using the SIRIS swan neck splint showed significant decreases in PIP hyperextension over 4 wk. At the conclusion of the crossover, both splints were preferred by nearly equal numbers of patients. No other differences between outcomes for the 2 splints were observed for any of the outcome measures at 12 wk.

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Supplemental Table 1. Evidence for Effectiveness of Occupational Therapy Interventions for Adults With Musculoskeletal Conditions of the Forearm, Wrist, and Hand (*cont.*)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control Groups	Outcome Measures	Results
Villafañe, Silva, Bishop, & Fernandez-Carnero (2012) https:/doi.org/10.1016/j.apmr.2011.08.045	Level I RCT *N* = 60. Intervention group, *n* = 30. Control group, *n* = 30. *Inclusion criteria:* Adults ages 70–90 yr with dominant right-hand CMC OA.	*Intervention* Sliding radial nerve mobilization treatment. With the patient in supine, the PT depressed the patient's shoulder girdle, extended the elbow, and internally rotated the arm, while the patient flexed and ulnarly deviated the wrist with the hand in a fist. Then the therapist cycled through 2 positions at a rate of 2 s/cycle, including (1) simultaneous shoulder depression, elbow flexion, and wrist extension and (2) simultaneous shoulder elevation, elbow extension, wrist flexion, and ulnar deviation. Each treatment included 3 sets, lasting 4 min each, with a 1-min resting period between sets. 6 treatment sessions were provided over 4 wk. *Control* Inactive or nontherapeutic doses of US to the affected area as a placebo treatment.	• PPT • Pinch strength	Measurements of the PPT at the trapeziometacarpal joint, scaphoid bone, and hamate bone were significantly improved in the treatment group at the posttreatment measurement. A significant improvement in tip-to-tip pinch with Digits I and II were shown in the treatment group posttreatment, but these differences were not found at 4-wk and 2-mo follow-up. No group differences in any outcomes were observed at 4-wk and 2-mo follow-up.
		Peripheral Nerve Disorders		
Baker et al. (2012) https:/doi.org/10.1016/j.apmr.2011.08.013	Level I RCT *N* = 124. Group 1, *n* = 31. Group 2, *n* = 34. Group 3, *n* = 31. Group 4, *n* = 28. *Inclusion criteria:* Adults with mild or moderate CTS and no history of carpal tunnel release.	*Intervention* Daily nocturnal splint wear and stretches 6×/day for 4 wk. *Group 1:* General splinting (i.e., prefabricated cock-up splint) with general stretching. *Group 2:* General splinting with lumbrical stretching. *Group 3:* Lumbrical splinting (i.e., custom-made splint) with lumbrical stretching. *Group 4:* Lumbrical splinting with general stretching.	• BCTQ SS • BCTQ FS • DASH	At 4 wk, all groups demonstrated improved outcomes, with no differences between groups. At 12 wk, Group 1 and Group 2 showed greater improvements in BCTQ and DASH scores. At 24 wk, Group 2 was more likely to present with clinically important changes on the BCTQ than groups receiving other combinations of interventions.
Bakhtiary, Fatemi, Emami, & Malek (2013) https:/doi.org/10.1097/ AJP.0b013e318255c090	Level I RCT *N* = 52 wrists (34 participants). Group 1, *n* = 26 wrists.	*Intervention* 10 sessions over 2 wk. *Group 1:* 0.4% Dex-P via iontophoresis for 20 min.	• VAS Pain • Pinch and grip strength • Nerve conduction	Group 2 showed greater improvement in nerve conduction values, finger pinch strength, hand grip strength, and pain relief than Group 1.

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Supplemental Table 1. Evidence for Effectiveness of Occupational Therapy Interventions for Adults With Musculoskeletal Conditions of the Forearm, Wrist, and Hand (*cont.*)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control Groups	Outcome Measures	Results
	Group 2, $n = 26$ wrists. *Inclusion criteria:* Patients diagnosed with mild to moderate CTS referred to a PT clinic.	*Group 2:* 0.4% Dex-P via phonophoresis for 5 min.		All improvements were sustained at 4-wk follow-up.
Chang, Wu, Jiang, Yeh, & Tsai (2008) https:/doi.org/10.1089/pho.2007.2234	Level I RCT $N = 40$ wrists (36 participants). LLLT group, $n = 20$ wrists. Control group, $n = 20$ wrists. *Inclusion criteria:* Patients diagnosed with mild to moderate CTS and no history of carpal tunnel release.	*Intervention* LLLT 1×/day, 5 days/wk, for 2 wk. *Control* Sham laser therapy (without laser output).	• VAS Pain • Grip strength • BCTQ SS • BCTQ FS • Nerve conduction	The LLLT group had a significant decrease in pain after the intervention and at 2-wk follow-up. The LLLT group showed improved grip and BCTQ SS and BCTQ FS scores at 2-wk follow-up. No difference in nerve conduction speed was observed between groups.
Dakowicz, Kuryliszyn-Moskal, Kosztyła-Hojna, Moskal, & Latosiewicz (2011) https:/doi.org/10.2478/v10039-011-0041-z	Level I RCT $N = 38$. Group 1, $n = 18$. Group 2, $n = 20$. *Inclusion criteria:* Adults diagnosed with idiopathic CTS.	*Intervention* 2 series of 10 sessions each of 1 modality intervention. *Group 1:* LLLT. *Group 2:* PMF therapy.	• VAS Pain (daytime and nighttime) • Paresthesia symptoms • Phalen's, Tinel's, and armband tests • Nerve conduction	The LLLT group showed significant reduction in day- and nighttime pain at each assessment, and the PMF group showed improvement only after the 2nd series. The PMF group experienced a significant decrease in day- and nighttime paresthesia, and the LLLT group showed a significant improvement in Phalen's symptoms. Both groups showed significant improvements in VAS score. No significant change or improvement was noted for nerve conduction in either group.
Goransson & Cederlund (2011) https:/doi.org/10.1258/ht.2010.010023	Level III Cohort $N = 39$ participants in a single cohort. *Inclusion criteria:* Adults with pain or discomfort near scars after injury or surgery.	*Intervention* Self-massage over area of hypersensitivity 3×/day with a textured surface until numbness occurred (2–5 min), with graded texturing as the program progressed.	• VAS Pain (with use, at touch, at rest) • Area of sensitive skin • COPM	All outcome measures showed significant improvements after 6 wk.

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Supplemental Table 1. Evidence for Effectiveness of Occupational Therapy Interventions for Adults With Musculoskeletal Conditions of the Forearm, Wrist, and Hand (*cont.*)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control Groups	Outcome Measures	Results
Gurcay, Unlu, Gurcay, Tuncay, & Cakci (2012) https:/doi.org/10.1007/s00296-010-1706-9	Level I RCT *N* = 52. Group 1, *n* = 18. Group 2, *n* = 16. Control group, *n* = 18. *Inclusion criteria:* Women with mild or moderate CTS and no history of carpal tunnel release.	*Intervention* 3 10-min sessions/wk for 3 wk. *Group 1:* Phonophoresis with betamethasone plus nocturnal splinting. *Group 2:* Iontophoresis with betamethasone plus nocturnal splinting. *Control* Nocturnal splinting only.	• BCTQ SS • Grip strength • Nine-Hole Peg Test	All groups showed significant improvements in BCTQ SS score at 3 mo. No improvements or group differences were seen in grip strength or Nine-Hole Peg Test scores.
Hains, Descarreaux, Lamy, & Hains (2010)	Level I RCT *N* = 55. Intervention group, *n* = 37. Control group, *n* = 18. *Inclusion criteria:* Patients at a chiropractic clinic with self-reported CTS-like symptoms daily for ≥3 mo.	*Intervention* Myofascial release of trigger points on the pronator teres, axilla of the shoulder, and biceps over 15 sessions. *Control* Myofascial release of trigger points on the posterior region of the clavicle, deltoid, and infraspinatus over 15 sessions (i.e., placebo). *Crossover:* Control participants were offered intervention after completing the control protocol.	• BCTQ SS • BCTQ FS • Perceived symptom improvement	The intervention group showed significant decreases in BCTQ SS and BCTQ FS scores that were maintained at 1- and 6-mo follow-up. The control group experienced similar changes only after the crossover. The intervention group reported greater perceived improvement than the control group.
Hall et al. (2013) https:/doi.org/10.5014/ajot.2013.006031	Level I RCT *N* = 54. Intervention group, *n* = 30. Control group, *n* = 24. *Inclusion criteria:* Adults with CTS symptoms who had not received conservative or surgical treatment before enrollment.	*Intervention* Fitted wrist splint and education over 4 treatment sessions and 20-min follow-up phone call over 8 wk. *Control* Wait list, no intervention.	• BCTQ SS • BCTQ FS • VAS Pain • Grip strength • Purdue Pegboard Test • SWM • Phalen's test • Satisfaction questionnaire	The intervention group showed more significant improvement in BCTQ SS and BCTQ FS scores than the control group. The intervention group experienced significant improvement in VAS pain and grip strength, and the control group showed no improvements. Neither group showed significant improvements on Phalen's test, the Purdue Pegboard, or SWM score, but the control group had more positive Phalen's test, decreased Purdue Pegboard scores, and

(*Continued*)

Supplemental Table 1. Evidence for Effectiveness of Occupational Therapy Interventions for Adults With Musculoskeletal Conditions of the Forearm, Wrist, and Hand (*cont.*)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control Groups	Outcome Measures	Results
				poorer SWM scores than the intervention group. The intervention group reported better understanding of CTS and higher confidence regarding self-management than the control group.
Huisstede et al. (2010) https:/doi.org/10.1016/j.apmr.2010.03.022	Level I SR *N* = 2 SRs and 20 RCTs of nonsurgical treatments of CTS. *Inclusion criteria:* Experimental studies or SRs investigating treatments for idiopathic CTS.	*Intervention* Splinting, manual therapy, US, LLLT, ergonomic keyboards, iontophoresis, phonophoresis, and heat wrap.	• Global assessment of improvements in function, decreases in pain, and nerve recovery	Moderate evidence supports US for short- and mid-term outcomes. Moderate evidence supports splinting for short-term outcomes, and night-only splinting was as effective as continual splinting. Use of ergonomic keyboards was supported by moderate evidence for short-term outcomes. No other interventions were found to be supported by evidence.
Maddali Bongi et al. (2013) https:/doi.org/10.1007/s00296-012-2507-0	Level III Cohort *N* = 22 (41 wrists) in a single cohort. *Inclusion criteria:* Adults with idiopathic CTS and no history of carpal tunnel release.	*Intervention* Manual therapy intervention including 3 wk of manual manipulation in 10–15-min sessions 2×/wk. Participants were asked to refrain from using splints or any medications.	• BCTQ SS • BCTQ FS • Nerve conduction • Phalen's test	Participants showed significant improvements in BCTQ SS and BCTQ FS scores posttreatment that were maintained at 24-mo follow-up. The no. of participants with pain, paresthesia, and night awakening decreased after intervention. No significant changes were found in nerve conduction.
Madenci, Altindag, Koca, Yilmaz, & Gur (2012) https:/doi.org/10.1007/s00296-011-2149-7	Level I RCT *N* = 80. Intervention group, *n* = 40. Control group, *n* = 40. *Inclusion criteria:* Adults with idiopathic CTS and no history of conservative treatment.	*Intervention* Madenci hand massage technique (effleurage, friction, petrissage, and shaking) lasting 3 min on a daily basis plus splinting and tendon and nerve glide education over a 6-wk period. *Control* Nocturnal wrist splint and tendon and nerve glide education.	• BCTQ SS • BCTQ FS • VAS Pain • Nerve conduction • Grip strength • Patient's and physician's global assessment	BCTQ SS and BCTQ FS scores, grip strength, and global assessment scores were all significantly improved in both groups, but the intervention group improved more than the control group. The intervention group had significant improvements in nerve conduction values; there were significant posttest differences between groups.

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Supplemental Table 1. Evidence for Effectiveness of Occupational Therapy Interventions for Adults With Musculoskeletal Conditions of the Forearm, Wrist, and Hand (*cont.*)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control Groups	Outcome Measures	Results
Medina McKeon & Yancosek (2008)	Level I SR *N* = 6 trials. *Inclusion criteria:* Comparative trials evaluating the efficacy of neural gliding for treatment of CTS.	*Intervention* Nerve gliding as an intervention vs. other treatments, including splinting and treatment as usual.	• BCTQ SS • BCTQ FS • VAS Pain • 2-point discrimination • Grip strength • Pinch strength • Phalen's test • Tinel's test	Few studies showed significant positive outcomes for use of neural gliding as the best nonsurgical treatment of CTS. Neural gliding may be a beneficial addition to other intervention for short-term relief of CTS symptoms.
Miller, Chester, & Jerosch-Herold (2012) https:/doi.org/10.1016/j.jht.2012.04.001	Level I SR *N* = 7 trials. *Inclusion criteria:* Controlled trials with ≥10 participants evaluating sensory reeducation techniques after complete median or ulnar nerve injuries.	*Intervention* Classical sensory reeducation in the late phase, early sensory reeducation, and comparisons of each with no treatment and analgesics.	• 2-point discrimination • Locognosia test • Moberg Pickup Test • SWM • Model Instrument for Outcome • Shape/Texture Identification Test	Both classical and early-phase sensory reeducation may have short-term effects of tactile gnosis, but support is inconsistent for long-term outcomes, and no evidence supports other sensory measures. Very few published studies were found, and they were of limited quality and too heterogeneous in design to provide convincing evidence for or against sensory reeducation.
O'Connor, Page, Marshall, & Massy-Westropp (2012) https:/doi.org/10.1002/14651858.CD009600	Level I SR (Cochrane) *N* = 2 RCTs. *Inclusion criteria:* RCTs investigating the use of ergonomic equipment in the treatment of CTS.	*Intervention* Ergonomic keyboards vs. placebo.	• VAS Pain • Self-reported functional status • Phalen's test • Nerve conduction • Symptoms of CTS	Limited evidence was found to support the use of ergonomic keyboards as an efficacious treatment for CTS. When compared with placebo, ergonomic keyboards may reduce pain, but not enough evidence is available to support their use in reducing other CTS symptoms.
Page, Massy-Westropp, O'Connor, & Pitt (2012) https:/doi.org/10.1002/14651858.CD010003	Level I SR (Cochrane) *N* = 19 RCTs. *N* = 1,190 participants. *Inclusion criteria:* RCTs involving splinting as a comparator intervention for participants with CTS.	*Intervention* Splinting vs. no treatment, comparison of different splint designs, comparison of splinting wear schedules, and splinting vs. other conservative treatments.	• BCTQ • VAS Pain • Phalen's test	Some evidence supports nighttime splinting for the short-term reduction of symptoms compared with no treatment. Not enough evidence is available to identify the best splint type or wear schedule or to evaluate the long-term outcomes of splinting for CTS.
Page, O'Connor, Pitt, & Massy-Westropp (2012) https:/doi.org/10.1002/14651858.CD009899	Level I SR (Cochrane) *N* = 16 RCTs.	*Intervention* Exercise or mobilization vs. no treatment, comparison of mobilization interventions, mobilization delivered as part of a larger intervention vs. other conservative methods,	• CTS symptoms • Functional status • Nerve conduction • Phalen's test • Referral for surgery	Limited, low-quality evidence suggests that exercise and mobilization interventions, compared with no treatment, had significant short-term effects on symptoms and function in participants with CTS.

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Supplemental Table 1. Evidence for Effectiveness of Occupational Therapy Interventions for Adults With Musculoskeletal Conditions of the Forearm, Wrist, and Hand (*cont.*)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control Groups	Outcome Measures	Results
	N = 741 participants. *Inclusion criteria:* RCTs investigating mobilization or exercise as a comparator intervention for participants with CTS.	and mobilization interventions alone compared with other conservative treatment.	• Adverse events	No evidence supports 1 type of mobilization, and the evidence is inconclusive as to the comparative effects of mobilization vs. other conservative treatments.
Page, O'Connor, Pitt, & Massy-Westropp (2013) https:/doi.org/10.1002/14651858.CD009601.pub2	Level I SR (Cochrane) *N* = 11 RCTs. *N* = 414 participants. *Inclusion criteria:* RCTs using US as a comparator intervention for participants with CTS.	*Intervention* Therapeutic US vs. placebo, comparison of different frequencies of therapeutic US, comparison of different intensities of therapeutic US, therapeutic US compared with other conservative treatments, and therapeutic US in conjunction with other therapies vs. other conservative treatments.	• Pain • Paresthesia • Grip strength • Adverse events at short- and long-term intervals	Limited, low-quality evidence was found to support use of US to improve pain or paresthesia in the short term for participants with CTS when compared with a placebo group. Evidence is insufficient to support any specific US protocol, and no evidence supports the use of US as better than other conservative treatments or better for long-term outcomes.
Peters, Page, Coppieters, Ross, & Johnston (2013) https:/doi.org/10.1002/14651858.CD004158.pub2	Level I SR (Cochrane) *N* = 20 randomized or quasi-randomized trials. *N* = 1,445 participants. *Inclusion criteria:* RCTs or quasi-RCTs investigating rehabilitation of participants after carpal tunnel release surgery.	*Intervention* Rehabilitation vs. placebo comparison, rehabilitation vs. no-treatment control, rehabilitation vs. standard care, and multiple rehabilitation interventions. Rehabilitation included splinting, dressings, exercise, modalities, LLLT, and scar desensitization.	• CTS symptoms • Functional status • Grip strength • Pinch strength • Iatrogenic symptoms of surgery (e.g., pain, swelling, adverse events)	Limited, low-quality evidence was found to support rehabilitation interventions after carpal tunnel release surgery. Methodological concerns limit interpretation of studies that report positive results, and more research is recommended to assess the safety of these interventions.
Piazzini et al. (2007) https:/doi.org/10.1177/0269215507077294	Level I SR *N* = 33 RCTs. *Inclusion criteria:* RCTs investigating conservative treatments for CTS for patients with no history of carpal tunnel release.	*Intervention* US, LLLT, exercise, splinting.	• BCTQ • VAS Pain • Nerve conduction • Global Impression of Change Questionnaire	Low-level evidence supports US, but results are mixed for use of LLLT for participants with CTS. No evidence supports exercise, with the exception of limited evidence of the possible effects of yoga. Moderate evidence supports the positive impact of full-time splinting on CTS symptoms.
Sawan, Sayed Mahmoud, & Hussien (2013) https:/doi.org/10.3233/PPR-130024	Level I RCT *N* = 45.	*Intervention* Therapy 3×/wk for 6 wk. *Group 1:* Continuous US for 5 min over the carpal tunnel plus tendon and nerve gliding exercises.	• VAS Pain • Nerve conduction • Pinch strength	All participants showed significantly decreased pain, improved pinch strength, and improvement in nerve conduction after intervention, regardless of intervention group assignment.

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Supplemental Table 1. Evidence for Effectiveness of Occupational Therapy Interventions for Adults With Musculoskeletal Conditions of the Forearm, Wrist, and Hand (*cont.*)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control Groups	Outcome Measures	Results
	Group 1, $n = 15$. Group 2, $n = 15$. Group 3, $n = 15$. *Inclusion criteria:* Women ages 25–45 yr who recently received surgical release of the carpal tunnel and were experiencing residual pain or other functional limitations.	*Group 2:* LLLT for 15 min over the carpal tunnel plus tendon and nerve gliding exercises. *Group 3:* Tendon and nerve gliding exercises only.		Although all groups improved, comparison of the magnitude of change and the final outcomes across each of the groups suggests that those receiving US had the most improvement and those receiving LLLT also improved more than the exercise-only group.
Shi & MacDermid (2011) https:/doi.org/10.1186/1749-799X-6-17	Level I SR $N = 5$ RCTs and 2 comparative trials. *Inclusion criteria:* Comparative trials evaluating surgical vs. nonsurgical interventions for CTS.	*Intervention* Comparison between a surgical and a nonsurgical intervention for CTS; nonsurgical interventions included splinting, laser therapy, and steroids.	• BCTQ • CTS assessment questionnaire • Nerve conduction • Surgical complications and side effects	All conservative treatments evaluated in this review showed significant positive results within a 3-mo time frame. Surgical interventions showed positive results at long-term follow-up and may have a more lasting effect.
Tascioglu, Degirmenci, Ozkan, & Mehmetoglu (2012) https:/doi.org/10.1007/s00296-010-1652-6	Level I RCT $N = 60$. Group 1, $n = 20$. Group 2, $n = 20$. Control group, $n = 20$. *Inclusion criteria:* Patients at a PT clinic with a recent idiopathic CTS diagnosis and no history of carpal tunnel release.	*Intervention* 5 sessions/wk for 3 wk. *Group 1:* High-dosage LLLT for 2 min at each of 5 points along the median nerve (1.2 J/point). *Group 2:* Low-dosage LLLT for 1 min at each of 5 points along the median nerve (0.6 J/point). *Control* LLLT device with no laser transmission applied for 2 min at each of 5 points along the median nerve.	• BCTQ SS • BCTQ FS • VAS Pain • Grip strength • Sonographic cross-sectional area of the median nerve • Nerve conduction	All groups reported improvements in BCTQ SS and BCTQ FS scores and a decrease in pain intensity and demonstrated increased grip strength, with no significant differences among groups. None of the groups showed significant changes in the cross-sectional area of the median nerve. The 2 treatment groups experienced significant improvements in sensory nerve velocity, but no other changes in nerve conduction were observed.
		Tendon Disorders		
Chesney, Chauhan, Kattan, Farrokhyar, & Thoma (2011) https:/doi.org/10.1097/PRS.0b013e318208d28e	Level I SR $N = 15$ studies, including 3 RCTs, 2 prospective cohorts, and 10 case series. *Inclusion criteria:* Studies evaluating rehabilitation of interventions for flexor tendon laceration in Zone II.	*Intervention* Kleinert-type, Duran-type, combined Kleinert- and Duran-type, and EAM protocols.	• Rate of tendon rupture • ROM	The combined Kleinert- and Duran-type protocols had the lowest rupture rate at 2.3%; no significant differences between the protocols were found for rupture rate. The EAM protocol had the highest rate of good or excellent results (94%) for ROM improvements, which were significantly better than those for other interventions.

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Supplemental Table 1. Evidence for Effectiveness of Occupational Therapy Interventions for Adults With Musculoskeletal Conditions of the Forearm, Wrist, and Hand (*cont.*)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control Groups	Outcome Measures	Results
Collis, Collocott, Hing, & Kelly (2013) https:/doi.org/10.1016/j.jhsa.2013.04.012	Level I RCT $N = 56$. Intervention group, $n = 26$. Control group, $n = 30$. *Inclusion criteria:* Patients of all ages who had surgical release of Dupuytren's contracture.	*Intervention* Thermoplastic finger extension orthosis worn nightly for 3 mo in addition to hand therapy. *Control* Hand therapy intervention, such as active tendon gliding, education, wound care, edema and scar management, graded return to activities, passive stretch with or without heat, intermittent finger-based dynamic PIP joint orthoses, and grip strengthening.	• ROM • Grip strength • DASH	No significant differences were observed between the groups on any outcome measure at 6-wk or 3-mo follow-up.
Hall, Lee, Page, Rosenwax, & Lee (2010) https:/doi.org/10.5014/ajot.2010.09091	Level I RCT $N = 18$ participants (27 fingers). Group 1, $n = 5$. Group 2, $n = 9$. Control group, $n = 4$. *Inclusion criteria:* Patients referred to OT by a hand surgeon ≤5 days after extensor tendon repair in Zones V and VI.	*Intervention* Splint immobilization in 30°–45° wrist extension and 0°–30° MCP flexion. *Group 1:* Early passive motion began with passive extension and active flexion of the MCP joint using a dynamic splint that blocks MCP flexion between 30° and 40° within the 1st 5 days postoperation. Splint use was discontinued at 6 wk; treatment lasted 12 wk total. *Group 2:* EAM began with active flexion and extension of the MCP joint with the IPs extended and composite motion in a splint blocking at 45° of MCP flexion within the 1st 5 days postoperation. Splint use was discontinued at 6 wk; treatment lasted 12 wk total. *Control* Immobilization for 3 wk, followed by a graded mobilization program with splint discontinuation at Wk 10.	• TAM • VAS Function • Extension lag • Grip strength	All groups showed significant increases in TAM across 3-, 6-, and 12-wk measurements. No significant differences among the groups were found on any outcome measure. Patients in the EAM group presented with the greatest recovery over time, resulting in the least extension lag and the greatest improvement in VAS function at 12 wk.
Hirth et al. (2011) https:/doi.org/10.1258/ht.2011.011012	Level II Nonrandomized comparative trial (retrospective) $N = 39$. Intervention group, $n = 23$. Control group, $n = 16$.	*Intervention* Modified relative motion splint formed over the proximal phalanges to keep the affected digit in 15°–20° of relative extension to the other fingers; the splint was worn during the daytime for functional activities, and a customized resting splint was worn at night, each for 4 wk, followed by an HEP and weekly therapy sessions.	• TAM • Return to work	The EAM group using the modified relative motion splint had significantly better TAM at 6 wk and returned to work significantly earlier than the immobilization group.

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Supplemental Table 1. Evidence for Effectiveness of Occupational Therapy Interventions for Adults With Musculoskeletal Conditions of the Forearm, Wrist, and Hand (*cont.*)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control Groups	Outcome Measures	Results
	Inclusion criteria: Consecutive adult patients who had undergone surgical repair for an extensor tendon injury in Zones V or VI on a single finger.	*Control* Customized resting splint worn at all times for 4 wk, followed by completion of an HEP and weekly therapy sessions.		
Jerosch-Herold et al. (2011) https:/doi.org/10.1186/1471-2474-12-136	Level I RCT *N* = 154. Intervention group, *n* = 77. Control group, *n* = 77. *Inclusion criteria:* Patients who had fasciectomy for Dupuytren's contracture.	*Intervention* Hand therapy intervention combined with a custom-made splint maintaining the MCP or PIP joints in the most extension tolerated without stressing the surgery site, to be worn only at night. *Control* Hand therapy without a splint.	• ROM • DASH • Patient satisfaction	No significant between-groups differences were found for DASH scores, AROM, or patient satisfaction at 3-, 6-, or 12-mo follow-up.
O'Brien & Bailey (2011) https:/doi.org/10.1016/j.apmr.2010.10.035	Level I RCT *N* = 64. Group 1, *n* = 21. Group 2, *n* = 21. Group 3, *n* = 22. *Inclusion criteria:* Patients with acute Type 1a or 1b mallet finger.	*Intervention* Full-time splint wear for 8 wk, followed by gradual reduction and initiation of exercise program for 4 additional wk. *Group 1:* Stack splint. *Group 2:* Dorsal padded aluminum splint. *Group 3:* Custom-made thermoplastic thimble splint.	• Extensor lag • ROM • VAS Pain • Incidence of treatment failure and complications • Patient compliance and satisfaction	No significant between-groups differences were noted for extensor lag, ROM, compliance, patient satisfaction, or pain at 12- or 20-wk follow-up. Stack and dorsal splints had significantly higher rates of treatment failure and complications, including skin maceration, irritation, splint breakage, and poor splint fitting, compared with thermoplastic splints.
Pike et al. (2010) https:/doi.org/10.1016/j.jhsa.2010.01.005	Level I RCT *N* = 87. Group 1, *n* = 29. Group 2, *n* = 30. Group 3, *n* = 28. *Inclusion criteria:* Patients with acute Doyle Type I mallet finger injuries.	*Intervention* 6 wk full-time extension splinting. *Group 1:* Volar padded aluminum splint. *Group 2:* Dorsal padded aluminum splint. *Group 3:* Custom-made thermoplastic splint.	• Radiographic lag difference • MHQ • Complications	No significant differences were noted for any outcome measure at 12-wk follow-up. Data trending suggested the superiority of the thermoplastic splint in reducing lag difference. Only 1 complication was observed as a full-thickness skin ulceration on the dorsal aspect of the DIP in the dorsal padded aluminum splint group.

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Supplemental Table 1. Evidence for Effectiveness of Occupational Therapy Interventions for Adults With Musculoskeletal Conditions of the Forearm, Wrist, and Hand (*cont.*)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control Groups	Outcome Measures	Results
Salim, Abdullah, Sapuan, & Haflah (2012) https:/doi.org/10.1177/1753193411415343	Level I RCT *N* = 74. Intervention group, *n* = 35. Control group, *n* = 39. *Inclusion criteria:* Adults diagnosed with Grade 0, 1, or 2 trigger finger.	*Intervention* 10 sessions of PT that included paraffin, US, stretching, and massage. *Control* Corticosteroid injection at the A1 pulley.	• VAS Pain • No. of triggering events • Hand function • Grip strength • Patient satisfaction • Success rate • Complications • Recurrence	Both groups presented with significant decreases in pain scores and no. of hand triggering events at 6 wk and 3 mo, and both groups had significant improvements in grip strength and hand function in daily activities at 3 mo. Success and patient satisfaction, measured as decrease in severity of pain and triggering events, were significantly better in the corticosteroid group. No instances of recurrence were reported in the PT group, whereas a significantly greater no. of participants reported recurrence of pain in the corticosteroid group.
Sameem, Wood, Ignacy, Thoma, & Strumas (2011) https:/doi.org/10.1016/j.jht.2011.06.005	Level I SR *N* = 17 studies (3 RCTs, 10 retrospective studies, and 4 prospective studies). *Inclusion criteria:* Research articles with a minimum of Level III evidence that evaluated treatments for participants who had surgical repair of extensor tendon Zones V–VIII.	*Intervention* Static rehabilitation, dynamic splinting, and early active rehabilitation.	• TAM • ROM • Grip strength	Dynamic splinting and EAM outperformed static splinting for short-term improvement in ROM and grip strength. Insufficient evidence was found of differences between dynamic splinting and EAM. The evidence is insufficient regarding long-term effects of any of the interventions.
Sultana, MacDermid, Grewal, & Rath (2013) https:/doi.org/10.1016/j.jht.2012.06.006	Level I SR *N* = 5 RCTs and 1 retrospective study. *Inclusion criteria:* Comparative trials that evaluated mobilization protocols after tendon transfers in the hand.	*Intervention* Immobilization vs. EAM, immobilization vs. early controlled motion, and early controlled motion vs. EAM.	• ROM • Grip strength • Pinch strength • Return to work • VAS Pain • Edema • Pinch pattern • Flexion deformity	Participants in the EAM conditions showed better hand strength and ROM than participants in immobilization conditions at 3- to 4-mo follow-up, but no significant difference was found between groups at long-term follow-up. Return to work was achieved significantly sooner with EAM. The evidence is conflicting and insufficient comparing EAM and early controlled motion, which may have comparable outcomes, adverse events, and duration of rehabilitation.

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Supplemental Table 1. Evidence for Effectiveness of Occupational Therapy Interventions for Adults With Musculoskeletal Conditions of the Forearm, Wrist, and Hand (*cont.*)

Author/Year	Level of Evidence/Study Design/ Participants/Inclusion Criteria	Intervention and Control Groups	Outcome Measures	Results
Tocco et al. (2013) https:/doi.org/10.1016/j.jht.2013.01.004	Level I RCT *N* = 57. Group 1, *n* = 30. Group 2, *n* = 27. *Inclusion criteria:* Adults with a minimum of 20˚ DIP joint active extensor lag as a result of mallet finger.	*Intervention* Full-time immobilization for 6–8 wk, followed by a progressive exercise program with a removable orthosis for 8–10 additional wk. *Group 1:* Quickcast orthosis worn full time. *Group 2:* Thermoplastic orthosis that could be removed daily for skin care and orthosis cleaning while keeping the finger extended by resting it on a flat surface.	• Extensor lag • Success rate • Flexion stiffness • Grip strength • Pinch strength • Edema • Hand function • Orthotic discomfort • Orthotic aesthetics • Patient satisfaction • Complications	The Quickcast group had significantly more edema reduction at 6–8 wk post-immobilization and greater active DIP extension at 12 wk postimmobilization than the thermoplastic group. The thermoplastic group reported significantly less pain than the Quickcast group at 6–8 wk. Participants in the thermoplastic group reported significantly higher aesthetic quality ratings than participants in the Quickcast group. No other significant differences between the groups were noted for other outcomes at any time point.
Wańczyk, Pieniazek, & Pelczar-Pieniazek (2008)	Level II 2 nonrandomized groups *N* = 50. Group 1, *n* = 32. Group 2, *n* = 18. *Inclusion criteria:* Patients with extensor tendon injuries in Digits II–V in Verdan's injury Zones I and II.	*Intervention* Individualized PT treatments including pegboard exercises, electrical stimulation, and visual biofeedback with tailored interventions for patients who had been treated operatively vs. nonoperatively. *Group 1:* Nonoperatively treated patients received Fluidotherapy, hydrotherapy, or magnetotherapy. *Group 2:* Operatively treated patients received polarized light, laser therapy, and iontophoresis.	• ROM • 2-point discrimination • Hand functionality tests • Duration of immobilization • Crawford's classification of treatment outcomes	Both groups showed significant improvement in hand function. Mean duration of immobilization and total duration of treatment were significantly shorter in operatively treated patients. Crawford's classification of treatment outcomes revealed significantly better results in operatively treated patients.

Note. Only evidence for diagnoses of the distal upper extremity is included for any study that reviewed or included diagnoses other than those specific to the distal upper extremity. ADLs = activities of daily living; AIMS II = Arthritis Impact Measurement Scales II; AROM = active range of motion; BCTQ FS = Boston Carpal Tunnel Questionnaire Function Scale; BCTQ SS = Boston Carpal Tunnel Questionnaire Symptom Scale; CMC = carpometacarpal; COPM = Canadian Occupational Performance Measure; CTS = carpal tunnel syndrome; DASH = Disabilities of the Arm, Shoulder and Hand Questionnaire; Dex-P = dexamethasone sodium phosphate; DIP = distal interphalangeal; EAM = early active motion; HEP = home exercise program; IP = interphalangeal; LLLT = low-level laser therapy; *M* = mean; MCP = metacarpophalangeal; MHQ = Michigan Hand Outcomes Questionnaire; OA = osteoarthritis; OT = occupational therapy/therapist; PIP = proximal interphalangeal; PMF = pulsed magnetic field; PPT = pressure pain threshold; PROM = passive range of motion; PRWE = Patient-Rated Hand and Wrist Evaluation; PT = physical therapy/therapist; RA = rheumatoid arthritis; RCT = randomized controlled/comparative trial; ROM = range of motion; SF–36 = 36-item Short Form Health Survey; SODA = Sequential Occupational Dexterity Assessment; SR = systematic review; SWM = Semmes–Weinstein monofilaments; TAM = total active motion; TERT = total end-range time; US = ultrasound; VAS = visual analog scale.

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Supplemental Table 2. Risk of Bias for Intervention Studies Included in the Review

Citation	Selection Bias		Performance Bias: Blinding of Participants and Personnel	Detection Bias: Blinding of Patient-Reported Outcome Assessment	Attrition Bias (Incomplete Data Outcome)		Reporting Bias: Selective Reporting
	Random Sequence Generation	Allocation Concealment			Short Term (2–6 Wk)	Long Term (>6 Wk)	
Bone, Joint, and General Hand Disorders							
Ayhan, Unal, & Yakut (2014)	+	?	−	+	+	NA	?
Becker, Bot, Curley, Jupiter, & Ring (2013)	+	+	−	−	−	−	+
Glasgow, Fleming, Tooth, & Peters (2012)	?	?	−	−	?	NA	+
Glasgow, Tooth, Fleming, & Peters (2011)	−	−	−	−	?	NA	+
Harth, Germann, & Jester (2008)	−	−	?	−	?	?	+
Hermann et al. (2014)	+	+	−	+	+	NA	+
Jongs, Harvey, Gwinn, & Lucas (2012)	+	+	+	?	−	NA	+
Knygsand-Roenhoej & Maribo (2011)	?	?	?	+	+	+	+
Krishack et al. (2009)	?	?	−	−	+	NA	+
Kuo et al. (2013)	+	+	−	?	+	NA	+
Magnus et al. (2013)	+	?	−	+	−	−	+
O'Brien, Jones, Mullis, Mulherin, & Dziedzic (2006)	+	+	−	+	?	−	+
Rostami, Arefi, & Tabatabaei (2013)	?	?	+	?	?	NA	+
Silva, Lombardi, Breitschwerdt, Poli Araújo, & Natour (2008)	?	+	−	+	+	NA	+
Souer, Buijze, & Ring (2011)	+	?	−	?	+	+	+
Szczegielniak, Łuniewski, Bogacz, & Sliwiński (2012)	−	−	−	−	?	NA	−
Thiele, Nimmo, Rowell, Quinn, & Jones (2009)	?	+	−	?	?	NA	+
Valdes (2009)	−	−	−	−	+	+	+
van der Giesen et al. (2009)	?	+	−	?	+	+	+
Villafañe, Silva, Bishop, & Fernandez-Carnero (2012)	+	?	+	+	+	NA	+
Peripheral Nerve Disorders							
Baker et al. (2012)	?	+	?	+	−	−	−
Bakhtiary, Fatemi, Emami, & Malek (2013)	+	+	?	+	?	NA	+
Chang, Wu, Jiang, Yeh, & Tsai (2008)	?	?	?	?	?	NA	+
Dakowicz, Kuryliszyn-Moskal, Kosztyła-Hojna, Moskal, & Latosiewicz (2011)	?	?	−	?	?	?	−
Goransson & Cederlund (2011)	−	−	−	−	+	NA	+
Gurcay, Unlu, Gurcay, Tuncay, & Cakci (2012)	+	+	?	?	+	NA	?
Hains, Descarreaux, Lamy, & Hains (2010)	+	+	+	NA	+	+	?
Hall et al. (2013)	?	?	?	−	?	−	+
Maddali Bongi et al. (2013)	−	−	−	−	+	+	+
Madenci, Altindag, Koca, Yilmaz, & Gur (2012)	−	?	?	?	?	−	+
Sawan, Sayed Mahmoud, & Hussien (2013)	+	+	?	+	?	?	+
Tascioglu, Degirmenci, Ozkan, & Mehmetoglu (2012)	+	+	+	+	+	NA	+

(*Continued*)

Supplemental Table 2. Risk of Bias for Intervention Studies Included in the Review (*cont.*)

Citation	Selection Bias		Performance Bias: Blinding of Participants and Personnel	Detection Bias: Blinding of Patient-Reported Outcome Assessment	Attrition Bias (Incomplete Data Outcome)		Reporting Bias: Selective Reporting
	Random Sequence Generation	Allocation Concealment			Short Term (2–6 Wk)	Long Term (>6 Wk)	
Tendon Disorders							
Collis, Collocott, Hing, & Kelly (2013)	+	+	−	−	+	NA	+
Hall, Lee, Page, Rosenwax, & Lee (2010)	?	?	−	−	?	?	+
Hirth et al. (2011)	−	−	−	−	+	NA	+
Jerosch-Herold et al. (2011)	+	+	−	−	+	+	+
O'Brien & Bailey (2011)	+	+	?	+	?	?	+
Pike et al. (2010)	?	−	?	−	?	−	+
Salim, Abdullah, Sapuan, & Haflah (2012)	+	?	?	+	?	?	+
Tocco et al. (2013)	+	+	+	+	+	?	+
Wańczyk, Pieniazek, & Pelczar-Pieniazek (2008)	−	−	−	−	?	?	−

Note. Categories for risk of bias: + = low risk of bias; ? = unclear risk of bias; − = high risk of bias. NA = not applicable. Risk of bias table format adapted from "Assessing Risk of Bias in Included Studies," by J. P. T. Higgins, D. G. Altman, and J. A. C. Sterne, in *Cochrane Handbook for Systematic Reviews of Interventions* (Version 5.1.0), by J. P. T. Higgins and S. Green (Eds.), March 2011, London: Cochrane Collection.

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Supplemental Table 3. Risk of Bias for Systematic Reviews Included in the Review

Citation	"A Priori Design" Included?	Duplicate Study Selection/ Data Extraction?	Comprehensive Literature Search Performed?	Status of Publication as Inclusion Criteria?	List of Included/ Excluded Studies Provided?	Characteristics of Included Studies Provided?	Quality of Studies Assessed and Documented?	Quality Assessment Used Appropriately?	Methods Used to Combine Results Appropriate?	Likelihood of Publication Bias Assessed?	Conflict of Interest Stated?
Bone, Joint, and General Hand Disorders											
Bruder, Taylor, Dodd, & Shields (2011)	+	−	+	+	−	+	+	?	+	−	−
Handoll, Madhok, & Howe (2006)	+	+	+	+	+	+	+	+	+	?	+
Heiser, O'Brien, & Schwartz (2013)	+	?	+	+	−	+	+	?	+	−	−
Moe, Kjeken, Uhlig, & Hagen (2009)	+	+	+	+	−	+	+	+	+	+	−
Poolman et al. (2005)	+	+	+	+	+	+	+	+	+	−	+
Peripheral Nerve Disorders											
Huisstede et al. (2010)	+	+	+	−	−	+	+	−	+	?	+
Medina McKeon & Yancosek (2008)	+	+	+	+	−	+	+	+	+	?	−
Miller, Chester, & Jerosch-Herold (2012)	+	+	+	+	−	+	+	+	+	−	−
O'Connor, Page, Marshall, & Massy-Westropp (2012)	+	+	+	+	+	+	+	+	+	+	+
Page, Massy-Westropp, O'Connor, & Pitt (2012)	+	+	+	+	+	+	+	+	+	+	+
Page, O'Connor, Pitt, & Massy-Westropp (2012)	+	+	+	+	+	+	+	+	+	+	+
Page, O'Connor, Pitt, & Massy-Westropp (2013)	+	+	+	+	+	+	+	+	+	+	+
Peters, Page, Coppieters, Ross, & Johnston (2013)	+	+	+	+	+	+	+	+	+	+	+
Piazzini et al. (2007)	+	+	+	−	−	+	+	+	+	−	−
Shi & MacDermid (2011)	+	+	+	+	+	+	+	−	+	−	+
Tendon Disorders											
Chesney, Chauhan, Kattan, Farrokhyar, & Thoma (2011)	+	+	+	+	−	?	+	?	+	−	+
Sameem, Wood, Ignacy, Thoma, & Strumas (2011)	+	+	?	+	−	+	+	−	+	−	+
Sultana, MacDermid, Grewal, & Rath (2013)	+	?	+	+	−	+	+	+	+	−	?

Note. Categories for risk of bias: + = low risk of bias; ? = unclear risk of bias; − = high risk of bias. Risk of bias table format adapted from "Development of AMSTAR: A Measurement Tool to Assess the Methodological Quality of Systematic Reviews," by B. J. Shea, J. M. Grimshaw, G. A. Wells, M. Boers, N. Andersson, C. Hamel, . . . L. M. Bouter, 2007, *BMC Medical Research Methodology, 7,* p. 10. https:/doi.org/10.1186/1471-2288-7-10

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