**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | | Bone (Humeral) Fractures | | |
| Bruder, Taylor, Dodd, & Shields (2011)[a]<br>https://doi.org/10.1016/S1836-9553(11)70017-0 | Level I<br>Systematic review<br>*N* = 5 RCTs on proximal humeral fractures.<br>*N* = 172 participants (*n* range = 18–86; ages 50–89 yr).<br>*Inclusion criteria:* RCT or quasi-RCT; participants with skeletal maturity; fractured scapula, clavicle, or humerus; any mode of exercise; any outcome measure classified by WHO. | *Intervention*<br>Exercise program and exercise program plus other therapy.<br>*Control*<br>Placebo or no exercise program; other modes of therapy; alternative therapy programs differing in duration, frequency, intensity, or method of administration. | *Pain*<br>• VAS<br>• Pain intensity<br>*Function*<br>• CMS<br>• OSS<br>• Subjective ADLs<br>• SF–36<br>• CDQ<br>• Shoulder lifting power<br>• Functional tests | *Pain*<br>2 studies reported ST decrease in pain with early exercises vs. exercise ≥3 wk post–nondisplaced fracture.<br>1 study reported LT benefits for pain in late exercise vs. early exercise initiation groups.<br>1 study found no benefits of early exercises after surgical fixation.<br>*Function*<br>1 study supported a home program without a supervised exercise program for improved function.<br>1 study reported improved function with both supervised exercise programs and supervised exercise programs that included a home program, with no SS difference between groups. |
| Handol, Ollivere, & Rollins (2012)<br>https://doi.org/10.1002/14651858.CD000434 | Level I<br>Cochrane review<br>*N* = 16 RCTs of proximal humerus fracture treatment (conservative management, *n* = 10; conservative vs. surgical management, *n* = 4; comparison of surgery methods, *n* = 2).<br>*N* = 805 participants (*n* range = 20–86; adults age <65 yr).<br>*Inclusion criteria:* RCTs or quasi-randomized studies comparing ≥2 interventions for surgical or conservative management, functional outcomes (ADLs, health-related QOL scores), clinical outcomes (strength, ROM, pain, patient satisfaction, complications), anatomical reduction. | *Intervention*<br>*Conservative interventions:* Immediate vs. delayed therapy after 3-wk immobilization in a collar and cuff sling; sling and body bandage for 1 wk vs. 3 wk; Gilchrist bandage vs. Desault bandage; rehabilitation started at 3 days after initial sling immobilization or home program vs. therapy delayed until 3 wk postinjury; swimming combined with self-training vs. self-training only; pulsed electromagnetic vs. sham device.<br>*Surgical vs. conservative treatment:* Reduction with external fixation vs. closed manipulation and sling; internal fixation vs. sling; hemiarthroplasty vs. closed manipulation and sling.<br>*Management after surgery:* Immobilization in sling for 1 wk vs. 3 wk after percutaneous fixation; early assisted mobilization after 2 wk vs. late mobilization after 6 wk. | *Pain*<br>• Pain with functional movements<br>• Neer classification<br>• Pain scores at rest and after movement<br>• Pain questionnaire<br>*Function*<br>• ADLs<br>• Functional movements<br>• CMS<br>• SF–36<br>• CDQ<br>• Neer function score<br>• Functional assessment<br>• Functional scale<br>• Subjective functional assessment<br>• DASH<br>*QOL*<br>• SF–36 | *Pain*<br>2 studies supported LT decreases in pain in early therapy groups with nondisplaced or stable fractures.<br>1 study reported LT improvements with supervised therapy and independent therapy, with no SS difference between groups.<br>1 study reported pain reduction with therapy interventions postsurgery.<br>The Neer replacement group demonstrated SS less pain with therapy. Both groups had decreased pain with electromagnetic therapy vs. sham, with no SS difference between groups.<br>*Function*<br>5 studies reported LT functional improvement in therapy groups, with no SS difference compared with other interventions.<br>2 studies reported improved outcomes with immediate therapy.<br>1 study reported no difference between types of bandage (Gilchrist vs. Desault); both groups improved with immobilization. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | | | | 1 study reported improved ST function in a surgical group (hemiarthroplasty) compared with conservative management (closed manipulation and sling).<br>*QOL*<br>1 study supported immediate therapy vs. immobilization with therapy at 3 wk for LT QOL.<br>1 study reported no difference between conservative management and plate fixation. |
| | | Joint Disorders Resulting in Adhesive Capsulitis and Stiffness | | |
| Blanchard, Barr, & Cerisola (2010)<br>https://doi.org/10.1016/j.physio.2009.09.003 | Level I<br>Systematic review<br>*N* = 6 RCTs.<br>*N* = 407 participants (*n* range = 20–109).<br>*Inclusion criteria:* Adults age >18 yr, diagnosis of adhesive capsulitis, restricted AROM and PROM on 2 planes. | *Intervention*<br>SI combined with therapy.<br>*Control*<br>Therapy only; therapy described as AROM mobilization, PROM mobilization, or both with or without electrotherapy. | *Pain*<br>• VAS<br>• Night pain<br>• Pain with motion<br>*Function*<br>• SDQ<br>• SPADI | *Pain*<br>Pain in both SI and therapy groups improved ST and LT.<br>A small ST effect (.18[b]; 95% CI [.50, .85]) at 12–16 wk favored SI.<br>A small LT effect (.36; 95% CI [.02, .70]) at 52 wk favored SI.<br>*Function*<br>SI and therapy groups improved in ST and LT function.<br>A small ST effect (.32; 95% CI [.02, .62]) at 12–16 wk favored SI, but a medium ST effect (.46; 95% CI [.01, .91]) at 12–16 wk favored therapy over no intervention.<br>A small LT effect (.13[b]; 95% CI [.21, .47]) at 52 wk favored SI. CI crossed 0.[b] |
| Celik (2010)<br>https://doi.org/10.3944/AOTT.2010.2367 | Level I<br>RCT<br>*N* = 29 (ages 38–65 yr, 22 women).<br>Intervention group, *n* = 14.<br>Control group, *n* = 15.<br>*Inclusion criteria:* ROM in external rotation, abduction, and flexion <50% in comparison with other shoulder; normal radiography (anteroposterior, lateral); secondary frozen shoulder diagnosis with MRI showing small RTC tear; secondary frozen shoulder with Type I SIS on physical examination and MRI. | *Intervention*<br>Glenohumeral ROM exercises and scapulothoracic exercise.<br>*Control*<br>Glenohumeral ROM exercises. | *Pain*<br>• VAS<br>*Function*<br>• CSS | *Pain*<br>Both groups demonstrated SS ST decreases in VAS scores.<br>*Function*<br>Both groups demonstrated SS ST increases in CSS, with no SS difference between groups. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| Dempsey, Mills, Karsch, & Branch (2011)<br>https://doi.org/10.1097/PHM.0b013e318214ed0d | Level II<br>Cohort<br>*N* = 36 (19 women).<br>Intervention group, *n* = 24.<br>Control group, *n* = 12.<br>*Inclusion criteria:* Chart review of patients initially treated with a customized therapy program specific to their injury or surgery; patients who failed 6 wk of supervised therapy who began a total end-range program. | *Intervention*<br>Patients classified as high or medium irritability received outpatient therapy, NSAIDs, and home use of a high-intensity stretch mechanical therapy device with instructions to wear the device for 6 daily 10-min end-range stretching sessions.<br>*Control*<br>Patients classified as low irritability received the same therapy program as the intervention group. | *Pain*<br>• ASES pain score<br>*Function*<br>• ASES score | *Pain*<br>Both groups demonstrated LT improvements in pain, but the high- to medium-irritability group reported SS reduction in pain compared with the low-irritability group.<br>*Function*<br>Both groups demonstrated LT improvements in ASES scores, but the high- to medium-irritability group reported SS improvement compared with the low-irritability group. |
| Dogru, Basaran, & Sarpel (2008)<br>https://doi.org/10.1016/j.jbspin.2007.07.016 | Level I<br>RCT<br>*N* = 49 (ages 41–72 yr, 28 women).<br>Intervention group, *n* = 25.<br>Control group, *n* = 24.<br>*Inclusion criteria:* Shoulder pain ≥3 mo with no major trauma; 25% loss of shoulder motion in all planes; pain with motion with a minimum VAS score of 40 mm; normal findings on radiographs of the glenohumeral joint; absence of arthritis, malignancy, and medical conditions such as cardiac disease, infection, and coagulation disorders. | *Intervention*<br>Exercise, superficial heat, and US.<br>*Control*<br>Exercise (Codman's exercises, wall climbing, and joint stretching to tolerance), superficial heat, and sham US. | *Pain*<br>• VAS<br>*Function*<br>• SPADI<br>• SF–36 | *Pain*<br>Both groups demonstrated SS ST decreases in pain, with no SS difference between groups.<br>*Function*<br>Both groups' SPADI scores improved, with no SS difference between groups.<br>No change in SF–36 scores was found in either group. |
| Favejee, Huisstede, & Koes (2011)<br>https://doi.org/10.1136/bjsm.2010.071431 | Level I<br>Systematic review<br>*N* = 18 RCTs.<br>*N* = 903 participants.<br>*Inclusion criteria:* RCTs; participants with frozen shoulder not caused by | *Intervention*<br>Oral steroids, physical modalities (laser, interferential electrotherapy), acupuncture therapy, arthrographic distension, suprascapular nerve block, mobilizations, exercises (not specified), acupuncture combined with exercises (not specified), | *Pain*<br>Outcome measures not specified | *Pain*[c]<br>7 studies favored SI for ST pain reduction over therapy.<br>3 studies found ST pain relief with varying therapy interventions favoring laser and exercises combined with joint mobilizations. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | acute trauma; interventions for frozen shoulder; outcomes of pain, function, and recovery; articles in German, English, French, or Dutch. | arthrographic distension and therapy, MUA, and exercise. | | 1 study reported ST pain relief with electroacupuncture and interferential acupuncture.<br>1 study supported acupuncture and exercise for pain relief. |
| Gleyze, Clavert, et al. (2011)<br>https://doi.org/10.1016/j.otsr.2011.09.004 | Level II<br>Cohort (6 groups nonrandomized)<br>$N = 235$ ($M$ age range = 49.5–69.0 yr, 50%–70% women).<br>Group 1, $n = 58$.<br>Group 2, $n = 59$.<br>Group 3, $n = 31$.<br>Group 4, $n = 11$.<br>Group 5, $n = 31$.<br>Group 6, $n = 45$.<br>*Inclusion criteria:* Patients with shoulder stiffness, described as PROM flexion <150, PROM ER <40, and reduction in IR compared with uninvolved side. | *Intervention*<br>*Group 1:* Conventional rehabilitation (not specified) under pain threshold.<br>*Group 2:* Self-rehabilitation (not specified) over pain threshold.<br>*Group 3:* Self-rehabilitation over pain threshold + supervision.<br>*Group 4:* Conventional rehabilitation under pain threshold + capsular distension.<br>*Group 5:* Conventional rehabilitation under pain threshold + local regional anesthesia.<br>*Group 6:* Conventional rehabilitation under pain threshold + local regional anesthesia + capsulotomy. | *Pain*<br>• Pain-free nights<br>*Function*<br>• CSS | *Pain*<br>Rehabilitation over the pain threshold resulted in ST benefits for pain-free nights.<br>*Function*<br>Self-rehabilitation over the pain threshold resulted in ST improvements in function. |
| Gleyze, Georges, et al. (2011)<br>https://doi.org/10.1016/j.otsr.2011.09.005 | Level II<br>Cohort (3 groups, nonrandomized)<br>$N = 148$.<br>Group 1, $n = 58$.<br>Group 2, $n = 59$.<br>Group 3, $n = 31$.<br>*Inclusion criteria:* Significant reduction in PROM compared with uninvolved side. | *Intervention*<br>*Group 1:* Classic rehabilitation below pain threshold (massage, joint mobilizations, joint centering, balneotherapy, and electrotherapy) 3–5×/wk for 5–6 mo.<br>*Group 2:* Nonsupervised home program (joint mobilization and exercises) with provocation above pain threshold for 6–12 wk.<br>*Group 3:* Supervised home program with provocation of pain and recommendations for progressions, 1–3 therapy sessions weekly. | *Function*<br>• CSS | *Function*<br>ST improvement in CSS occurred for all groups, but participants in the supervised home program demonstrated the best overall improvement. |
| Ibrahim et al. (2012)<br>https://doi.org/10.1615/JLongTermEffMedImplants.2013007061 | Level I<br>RCT<br>$N = 60$. | *Intervention*<br>Therapy 3×/wk for 4 wk; ROM home exercise, joint mobilizations, | *Pain*<br>• VAS<br>*Function*<br>• DASH | *Pain*<br>Both groups' ST VAS scores decreased. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | Intervention group, $n = 30$ ($M$ age = 52 yr, 15 women).<br>Control group, $n = 30$ ($M$ age = 51 yr, 16 women).<br>*Inclusion criteria:* Age >19 yr, diagnosis of adhesive capsulitis, loss of ≥50% of ROM, globally limited glenohumeral translation. | and static progressive shoulder orthosis ≤3×/day for 30 min.<br>*Control*<br>Same intervention with no static progressive orthosis. | | *Function*<br>Both groups demonstrated improved ST DASH scores, with no SS difference between groups. |
| Ma, Je, Jeong, Kim, & Kim (2013)<br>https://doi.org/10.1016/j.apmr.2012.07.013 | Level I<br>RCT<br>$N = 30$.<br>Intervention group, $n = 15$ ($M$ age = 56.1 ± 6.3 yr, 87% women).<br>Control group, $n = 15$ ($M$ age = 54.9 ± 6.7 yr, 73% women).<br>*Inclusion criteria:* Diagnosis of adhesive capsulitis, ages 47–56 yr. | *Intervention*<br>Modalities, joint mobilizations, and whole-body cryotherapy, 3×/wk for 4 wk.<br>*Control*<br>Modalities and joint mobilizations only, 3×/wk for 4 wk. | *Pain*<br>• VAS<br>*Function*<br>• ASES | *Pain*<br>Both groups demonstrated SS ST decreases in VAS scores.<br>The intervention group had SS ST improvements in VAS scores compared with the control group.<br>*Function*<br>Both groups demonstrated SS ST improvement in ASES scores, but the intervention group demonstrated SS greater improvement than the control group. |
| Maund et al. (2012)<br>https://doi.org/10.3310/hta16110 | Level I<br>Systematic review and meta-analysis<br>$N = 32$ studies (clinical effectiveness, $n = 31$ [$n = 12$ included therapy interventions]; cost utility, $n = 1$).<br>$N = 935$ participants.<br>*Inclusion criteria:* Participants with idiopathic frozen shoulder with or without diabetes; control groups; RCTs; case series of ≥50 participants (capsular release or MUA studies only); outcomes of pain, function, ROM, QOL, time to recovery, adverse events. | *Intervention*<br>Therapy interventions (joint mobilizations); gentle rhythmic exercises, function-based exercises to restore motion, or both; physical modalities (electrotherapies and US); arthrographic distension; SI; sodium hyaluronate injection; MUA; capsular release; watchful waiting. | *Pain*<br>• VAS<br>• Rest<br>• Motion<br>*Function*<br>• SPADI<br>• CMS<br>• SRQ<br>• ASES<br>• FLEX–SF<br>• SDQ<br>• DASH<br>• CDQ<br>• HAQ<br>*QOL*<br>• SF–36 | *Pain*[c]<br>2 pooled studies supported ST pain reduction after SI combined with therapy interventions.<br>3 studies reported ST pain reduction with therapy, but 1 study reported that LT pain reduction was SS only in therapy groups.<br>*Function*<br>4 studies reported improved function in groups combining SI with therapy.<br>1 study reported no change in CMS in groups combining therapy and sodium hyaluronate.<br>9 studies reported ST functional improvements in therapy groups.<br>1 study reported LT functional improvement in therapy groups. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | | | | *QOL*<br>1 study reported improvements in SI combined with therapy groups.<br>2 studies reported QOL improvements in therapy groups, but results did not favor specific interventions. |
| Yang, Jan, Chang, & Lin (2012)<br>https://doi.org/10.1016/j.math.2011.08.006 | Level I<br>RCT<br>$N = 32$ ($M$ age 54.3–56.8 ± 9.2–12.8 yr, 22 women).<br>Intervention group, $n = 10$ (less shoulder kinematics in 1 predetermined criterion; $M$ age = 56.8 ± 7.2 yr, 7 women).<br>Criteria control group, $n = 12$ (less shoulder kinematics in 1 predetermined criterion; $M$ age = 54.9 ± 10.3 yr, 10 women).<br>Control group, $n = 10$ (larger shoulder kinematics in all 3 predetermined criteria; $M$ age = 54.3 ± 7.6 yr, 5 women).<br>*Inclusion criteria:* Participants with ≥50% loss of passive shoulder motion compared with uninvolved shoulder for ≥3 mo. | *Intervention*<br>*Intervention group:* SEs (midrange joint mobilizations, stretching, physical modalities, active exercises) and scapular and glenohumeral mobilizations.<br>*Control*<br>*Criteria control group:* SEs as described for the intervention group.<br>*Control group:* SEs as described for the intervention group. | *Function*<br>• FLEX–SF | *Function*<br>Both groups demonstrated ST improvements in FLEX–SF scores, but ST improvements in the intervention group were SS greater compared with the control group. |
| | | Neck and Shoulder Pain | | |
| Andersen et al. (2008)<br>https://doi.org/10.1249/MSS.0b013e3181676640 | Level I<br>RCT<br>$N = 549$ (219 men, $M$ age = 45.7 yr; 397 women, $M$ age = 44.6 yr).<br>Group 1, $n = 180$.<br>Group 2, $n = 187$.<br>Control group, $n = 182$.<br>*Inclusion criteria:* Office workers with neck and shoulder pain and without hypertension, disc prolapse, history of severe trauma, or pregnancy. | *Intervention*<br>*Group 1:* SRT.<br>*Group 2:* APE.<br>*Control*<br>General health information. | *Pain*<br>• Computer-based pain questionnaire scored 0–9 | *Pain*<br>Results indicated SS ST decreases in pain in the SRT and APE groups but no LT changes.<br>No change was found for the control group. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| Andersen et al. (2012)<br>https://doi.org/10.1136/bjsports-2011-090813 | Level I<br>RCT<br>*N* = 449 (*M* age = 46 ± 10 yr, 279 women).<br>Group 1, *n* = 116 (*M* age = 47 ± 10 yr, 72 women).<br>Group 2, *n* = 126 (*M* age = 46 ± 10 yr, 87 women).<br>Group 3, *n* = 106 (*M* age = 45 ± 10 yr, 61 women).<br>Control group, *n* = 101 (*M* age = 46 ± 10 yr, 59 women).<br>*Inclusion criteria:* Office workers with pain in neck and shoulder, no history of herniated disc or cervical disorders, no history of severe trauma, not pregnant, no past shoulder or neck surgery, no hypertension or serious disease. | *Intervention*<br>*Group 1:* 1 hr strength training 1×/wk.<br>*Group 2:* 20 min strength training 3×/wk.<br>*Group 3:* 7 min strength training 9×/wk.<br>*Control*<br>No training. | *Pain*<br>• Pain scale scored 0–9<br>*Function*<br>• DASH | *Pain*<br>All intervention groups demonstrated SS ST decreases in shoulder pain compared with the control group.<br>*Function*<br>SS ST improvement in DASH scores occurred in all groups.<br>Group 2 demonstrated the largest ST effect size. |
| Ang, Monnier, & Harms-Ringdahl (2009)<br>https://doi.org/10.1097/BRS.0b013e3181aa6870 | Level I<br>RCT<br>*N* = 68.<br>Intervention group, *n* = 34.<br>Control group, *n* = 34.<br>*Inclusion criteria:* Eligible pilots who logged flying hours. | *Intervention*<br>Participants with no pain were assigned to exercise 2×/day for 10–15 min; participants with pain were assigned to exercise 1×/day for 10–15 min. Exercises progressed from nonpostural to postural and from low-forward muscle exercises to endurance strength exercises.<br>*Control*<br>Participants were encouraged to continue their regular exercise regimen. | *Pain*<br>• Pain questions from SNQ | *Pain*<br>ST and LT decreases in pain occurred in the prescribed exercise group.<br>No changes were found in the control group. |
| Damian & Zalpour (2011) | Level I<br>RCT<br>*N* = 26 (*M* age = 26 yr, 16 women). | *Intervention*<br>Radial shock-wave treatment to trigger points, neck and shoulder massage, and stretching. | *Pain*<br>• VAS<br>*Function*<br>• SPADI | *Pain*<br>ST benefits were found for both the intervention and control groups. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | Intervention group, $n = 13$ ($M$ age = 26 yr, 7 women).<br>Control group, $n = 13$ ($M$ age = 26 yr, 9 women).<br>*Inclusion criteria:* Professional musicians with unspecified shoulder and neck pain for previous 6 mo. | *Control*<br>Stretching exercises for shoulder and neck muscles. | • Neck Pain Disability Index Questionnaire | *Function*<br>ST improvements in function were found only in the intervention group. |
| Kanai, Taniguchi, & Okano (2011) | Level I<br>RCT<br>$N = 62$ ($M$ age = 34 yr, 33 women).<br>*Inclusion criteria:* Chronic neck and shoulder stiffness or pain (myofascial or cervical spondylosis without other comorbidities). | *Intervention*<br>Magnetotherapeutic device worn for 7 days except during sleep and bathing.<br>*Control*<br>Sham magnetotherapeutic device worn for 7 days except during sleep and bathing. | *Pain*<br>• VAS | *Pain*<br>ST decreases were found in both groups, but the intervention group experienced a SS greater decrease. |
| Lange, Toft, Myburgh, & Sjøgaard (2013)<br>https://doi.org/10.1097/AJP.0b013e3182478678 | Level I<br>RCT<br>$N = 55$ ($M$ age not reported, 1 woman).<br>Intervention group, $n = 27$.<br>Control group, $n = 28$.<br>*Inclusion criteria:* F-16 pilots (no other data provided). | *Intervention*<br>20 min of exercises (coordination training of deep neck muscles, strengthening exercises, body blade exercises) 3×/wk for 24 wk.<br>*Control*<br>Participants were encouraged to continue their regular exercise schedule. | *Pain*<br>• Muscle point tenderness, self-reported neck pain<br>*Self-Reported General Health*<br>• SNQ | *Pain*<br>The intervention group experienced a SS decrease in pain.<br>*Self-Reported General Health*<br>No significant change was found for either group. |
| Ma et al. (2011)<br>https://doi.org/10.1016/j.apmr.2010.12.037 | Level I<br>RCT<br>$N = 60$ ($M$ age = 30.0–35.3 ± 8.6–10.3 yr, 40 women).<br>Group 1, $n = 15$ ($M$ age = 31.3 ± 8.6 yr, 10 women).<br>Group 2, $n = 15$ ($M$ age = 34.2 ± 10.3 yr, 11 women).<br>Group 3, $n = 15$ ($M$ age = 35.2 ± 9.4 yr, 10 women). | *Intervention*<br>*Group 1:* Biofeedback on upper trapezius 2 days/wk for 2 hr when on computer.<br>*Group 2:* Active exercise group performing pain-free Theraband exercises targeting shoulder and neck muscles (≤4×/day for 20 min).<br>*Group 3:* Interferential treatment with heat packs 2×/wk for 15 min.<br>*Control*<br>Standard education booklet (provided to all groups) only. | *Pain*<br>• VAS<br>*Function*<br>• NDI<br>• Surface EMG | *Pain*<br>SS ST decreases in VAS scores were found in all intervention groups.<br>SS ST decreases in pain were found in the biofeedback group compared with other groups.<br>*Function*<br>NDI scores improved in all groups, but ST improvements in biofeedback groups were SS.<br>SS decreases in ST EMG activity were found in the biofeedback group for cervical erector spinae and upper trapezius muscles. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | Control group, $n = 15$ ($M$ age = 30.0 ± 10.3 yr, 9 women).<br>*Inclusion criteria:* Daily computer user, past and present history of computer-related neck and shoulder discomfort, worked on a computer for ≥5 yr, out of work ≤3 mo except for vacations during previous 5 yr, neck or shoulder pain ≥30 days during previous 1 yr, worked ≥20 hr/wk, <3 additional body regions with complaints on >30 days in previous 1 yr, neck or shoulder pain in previous 7 days. | | | |
| Skoglund, Josephson, Wahlstedt, Lampa, & Norbäck (2011)<br>https://doi.org/10.1016/j.ctcp.2010.09.003 | Level II<br>Nonrandomized cohort study (crossover design)<br>$N = 37$ (8 men ages 39–52 yr, 29 women ages 42–53 yr).<br>*Inclusion criteria:* Participants involved in administration, selling, and teaching duties with daily computer use. | *Intervention*<br>17 min of Qigong program.<br>*Control*<br>Regular daily work. | *Pain*<br>• Von Korff's questionnaire<br>*Function*<br>• Von Korff's questionnaire | *Pain*<br>Decreased ST neck pain occurred in the intervention participants.<br>*Function*<br>Improved ST scores were found for neck disability. |
| | | General Shoulder Pain | | |
| Abdelshafi et al. (2011) | Level I<br>RCT<br>$N = 63$ shoulders (50 participants).<br>Group 1, $n = 23$ shoulders.<br>Group 2, $n = 20$ shoulders.<br>Group 3, $n = 20$ shoulders.<br>*Inclusion criteria:* Patients with chronic shoulder pain that did not respond to conventional treatment. | *Intervention*<br>Exercise rehabilitation program consisting of warm-ups, pendulums, joint stretching, AAROM and AROM, and progression from isometric to isotonic strengthening.<br>*Group 1:* Exercise rehabilitation program plus suprascapular nerve block.<br>*Group 2:* Exercise rehabilitation program plus intra-articular injection.<br>*Group 3:* Exercise rehabilitation program only. | *Function*<br>• SPADI | *Function*<br>All groups demonstrated ST improvement in SPADI scores, but Group 1 had SS improvements. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| Alexander, Gilman, Brown, Brown, & Houghton (2010)<br>https://doi.org/10.2522/ptj.20080272 | Level I<br>Systematic review<br>*N* = 8 RCTs.<br>*N* = 543 participants.<br>*Inclusion criteria:* Participants age >18 yr; RCT design; acute or chronic soft-tissue shoulder injury; sufficient US intervention protocols reported to enable authors to calculate US power and energy delivered; ≥1 of the following outcome measures: pain scale, muscle strength testing, ROM, function, impairment, or disability questionnaire. | *Intervention*<br>US treatments; concurrent interventions included joint mobilizations, exercise (stretching, strengthening, and ROM), analgesics, NSAIDs, heat, IFC, massage, and patient education.<br>*Control*<br>Placebo US; similar concurrent treatments reported in 1 study. | *Pain*<br>• Yes–no responses reported for pain relief (outcome measure not specified)<br>*Function*<br>• Yes–no responses reported for functional improvement (outcome measure not specified)<br>*Disability*<br>• Yes–no responses reported for reduction in disability (outcome measure not specified) | *Pain*<br>2 studies reported ST pain relief (LT not tested) in participants with calcific tendinitis.<br>*Function and Disability*<br>1 study reported improvements in participants with calcific tendinitis.<br>LT follow-up was not reported.[b] |
| Brudvig, Kulkarni, & Shah (2011)<br>https://doi.org/10.2519/jospt.2011.3440 | Level 1<br>Systematic review and meta-analysis<br>*N* = 7 RCTs.<br>*N* = 290 participants (intervention groups, *M* age = 43.4 ± 14.7 yr; control groups, *M* age = 47.3 ± 20.1 yr).<br>*Inclusion criteria:* RCTs studying effect of exercise and joint mobilizations on participants with shoulder dysfunction resulting in pain, decreased ROM, or decreased function. | *Intervention*<br>Exercises and joint mobilizations. Studies varied in reported frequency and duration of exercise and types of exercise (ROM; isotonic or isometric strengthening exercises or both), neuromuscular control exercises.<br>*Control*<br>Exercise only. | *Pain*<br>• Pain with impingement test<br>• VAS<br>• Shoulder pain scale<br>• Pain with subacromial compression<br>• Pain questionnaire<br>*Function*<br>• SPADI<br>• Neer questionnaire<br>• Functional testing<br>• Functional reaching | *Pain*<br>*Systematic review:* 6 studies reported ST benefits of decreased pain, and 2 studies supported exercise combined with mobilizations over exercise only.<br>*Meta-analysis:* No effect for pain was found between exercise-only groups and exercise and mobilization groups on the basis of WSMD of .08 (95% CI [−1.99, 2.05]).<br>*Function*<br>*Systematic review:* 5 studies reported ST benefits for function; 1 study reported improvements in function and disability favoring the exercise and mobilization group; and 6 groups had a combined WSMD of .09 (95% CI [−.46, .64]), indicating that exercise with mobilization was not superior to exercise only.<br>*Meta-analysis:* Fisher exact test indicated no SS difference between groups. |
| Camarinos & Marinko (2009)<br>https://doi.org/10.1179/106698109791352076 | Level I<br>Systematic review<br>*N* = 7 studies. | *Intervention*<br>MWM, deep-friction massage, and Cyriax manipulation combined with exercises (stretching, pendulums, and | *Pain*<br>• Pain pressure<br>• VAS<br>• SPADI | *Pain*<br>7 studies reported ST reduction in pain with treatment in all groups, and 2 supported mobilization over standard treatment for ST pain reduction. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | *N* = 257 participants.<br><br>*Inclusion criteria:* RCTs, participants age ≥18 yr, participants referred to therapy for conservative treatment of shoulder pain. | strengthening), Maitland mobilizations, Grades I–IV mobilization combined with exercises (stretching, pendulums, and strengthening), AM and PM, Kaltenborn Grade III mobilization, MRM, ERM, HG and LG mobilizations.<br><br>*Control*<br>No mobilizations; interventions included exercise and modalities, home exercises, and patient education. | • Pain scale (with movement, at night, with active motion)<br><br>*Function*<br>• SPADI<br>• SRQ<br>• Function questions<br>• FLEX–SF<br>• QOL<br>• SDQ | *Function*<br>5 studies measured function, 4 reported ST benefits of improved function in all groups, and 1 reported LT benefits of improved function for all groups.<br><br>Studies favored end-range mobilization, MWM, and HG mobilizations. |
| Hains, Descarreaux, & Hains (2010)<br><br>https://doi.org/10.1016/j.jmpt.2010.05.003 | Level I<br><br>RCT<br><br>*N* = 59.<br><br>Intervention group, *n* = 41 (*M* age = 46.5 ± 8.8 yr, 20 women).<br><br>Control group, *n* = 18 (*M* age = 45.6 ± 7.4 yr, 13 women).<br><br>*Inclusion criteria:* Ages 30–60 yr, daily shoulder pain for ≥3 mo, pain aggravated with movement, inability to lift arm vertically, VAS pain score ≥5. | *Intervention*<br>5 treatments 3×/wk (15 treatments total) of trigger point release at supraspinatus, deltoid, infraspinatus, and biceps.<br><br>*Control*<br>5 treatments 3×/wk (15 treatments total) of sham trigger point therapy. | *Function*<br>• SPADI | *Function*<br>SS ST and LT improvements in SPADI scores were found in the intervention group. |
| Ho, Sole, & Munn (2009)<br><br>https://doi.org/10.1016/j.math.2009.03.008 | Level I<br><br>Systematic review<br><br>*N* = 14.<br><br>*N* = 755 participants (intervention groups, *n* = 380; control groups, *n* = 375).<br><br>*Inclusion criteria:* RCTs, English or German, participants with shoulder disorders (fracture, dislocation, degenerative arthritis or osteoarthritis, orthopedic surgery). | *Intervention*<br>Mobilizations (mobilizations with movement, Maitland techniques, soft tissue mobilizations, oscillatory techniques), exercise (pendulums and stretching exercises), modalities (ice therapy and hot packs).<br><br>*Control*<br>SIs, exercises (pendulums and stretching exercises), and physical modalities. | *Pain*<br>• VAS<br>• Night pain<br>• Pain with motion<br>• Pain questionnaire<br><br>*Function*<br>• SRFA<br>• SRFL<br>• UCLA Shoulder Rating<br>• SDQ<br><br>*Disability*<br>• FDM (used pictures) | *Pain*<br>*Adhesive capsulitis:* 1 study found benefits for mobilization but no difference between types of mobilization.<br><br>*Shoulder impingement:* 2 studies supported manual techniques, exercise, and conventional therapy, but manual therapy groups demonstrated SS improvements compared with other groups; 1 study found no benefits in treatment interventions.<br><br>*Nonspecific shoulder pain:* 1 study supported ST benefits of massage over no treatment, and 2 studies supported ST benefits of mobilization techniques.<br><br>*Function*<br>*Adhesive capsulitis:* 2 studies reported benefits of massage and mobilizations for improved shoulder function and benefits of HG mobilizations for LT function. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | | | | *Shoulder impingement:* 2 studies supported exercise and mobilizations with SS between-groups differences favoring mobilizations, and 1 study supported exercise and mobilizations, with no SS difference between groups.<br><br>*Nonspecific shoulder pain:* 2 studies supported manipulations for improving patient perceptions of recovery, 1 study supported LT functional improvement as a result of mobilizations and "other interventions" but found no between-groups differences between the interventions, and 1 study supported massage for LT functional benefits. |
| Kassolik et al. (2013)<br><br>https://doi.org/10.1016/j.jmpt.2013.06.004 | Level II<br><br>Case control<br><br>$N = 30$ (11 men, $M$ age = 43.6 ± 12.3 yr; 19 women, $M$ age 53.9 ± 16.0 yr).<br><br>Intervention group, $n = 15$.<br><br>Control group, $n = 15$.<br><br>*Inclusion criteria:* Adults with chronic shoulder pain for >3 mo, pain with active shoulder motion. | *Intervention*<br>10 sessions of Tensegrity massage therapy to shoulder 5×/wk for 2 wk.<br><br>*Control*<br>Classic massage to shoulder 5×/wk for 2 wk. | *Function*<br>• McGill Pain Questionnaire | *Function*<br>Both groups improved in McGill Pain Questionnaire scores, but the Tensegrity group had SS ST improvement. |
| Marinko, Chacko, Dalton, & Chacko (2011)<br><br>https://doi.org/10.1016/j.jse.2011.05.013 | Level I<br><br>Systematic review<br><br>$N = 17$.<br><br>$N$ of participants not reported.<br><br>*Inclusion criteria:* RCTs comparing exercise with another intervention or no intervention, PEDro score of ≥6, English language, participants ages 18–65 yr with primary complaint of shoulder pain. | *Intervention*<br>Exercise.<br><br>*Control*<br>Exercise combined with another intervention (not specified) or no intervention. | *Pain*<br>• Outcome measures not specified | *Pain*<br>4 of 5 studies supported exercise for pain reduction.<br><br>1 study supported a favorable effect (−1.65) of high-dosage exercise.<br><br>*Function*<br>4 studies pooled with a small effect (.15) supporting exercise over no intervention or an alternative intervention.<br><br>2 studies pooled with a small effect (.29) supporting exercise combined with manual techniques. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| Surenkok, Aytar, & Baltaci (2009)<br>https://doi.org/10.1123/jsr.2013-0120 | Level I<br>RCT<br>*N* = 39 (*M* age = 54.3 ± 14.16 yr, 22 women).<br>Scapular mobilization group, *n* = 13 (*M* age = 55.07 ± 13.36 yr, 10 women).<br>Sham group, *n* = 13 (*M* age = 54.30 ± 12.70 yr, 2 women).<br>Control group, *n* = 13 (*M* age = 55.53 ± 17.15 yr, 10 women).<br>*Inclusion criteria:* Painful shoulder movement >4 wk, unable to actively perform scapular plane elevation >100° because of anterior pain. | *Intervention*<br>*Scapular mobilization group:* Scapular distraction and mobilization, 10 sets with 30-s rest between sets (no. of repetitions of sets not reported).<br>*Sham group:* Sham scapular mobilization with hand positioning change.<br>*Control*<br>No manual contact. | *Pain*<br>• VAS<br>*Function*<br>• CSS | *Pain*<br>No SS ST improvement was found in any group.<br>*Function*<br>SS ST improvement in CSS was found only in the scapular mobilization group. |
| Yang, Chen, Hsieh, & Lin (2012)<br>https://doi.org/10.1186/1471-2474-13-46 | Level I<br>RCT<br>*N* = 52 (*M* age = 54 yr [range = 43–73 yr], 43 women).<br>Intervention group, *n* = 29 (*M* age = 54.8 ± 8.5 yr, 21 women).<br>Control group, *n* = 23 (*M* age = 54.6 ± 7.9 yr, 17 women).<br>*Inclusion criteria:* Limitation of ≥10% of internal rotation ROM compared with other side and tightness in posterior shoulder region. | *Intervention*<br>Massage of posterior deltoid, infraspinatus, and teres minor using petrissage and rolling techniques 2×/wk for 4 wk.<br>*Control*<br>Superficial massage to posterior deltoid, infraspinatus, and teres minor 18 min 2×/wk for 4 wk. | *Function*<br>• FLEX–SF | *Function*<br>ST improvements were noted in both groups but were SS in the treatment group compared with the control group. |
| Yiasemides, Halaki, Cathers, & Ginn (2011)<br>https://doi.org/10.2522/ptj.20100111 | Level I<br>RCT<br>*N* = 98.<br>*Inclusion criteria:* Painful active flexion and abduction >1 mo; pain, tenderness, or restrictions during passive glenohumeral, acromioclavicular joint, or PROM scapular motions. | *Intervention*<br>Patient education, neuromuscular reeducation, strengthening and stretching exercises, low-velocity mobilizations at shoulder joints (*M* = 9 sessions).<br>*Control*<br>Same as for intervention group, excluding mobilizations (*M* = 9 sessions). | *Function*<br>• SPADI | *Function*<br>Both groups had SS ST and LT improvements in SPADI scores, with no SS differences between groups. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | | Rotator Cuff Tears | | |
| Ainsworth & Lewis (2007)<br>https://doi.org/10.1136/bjsm.2006.032524 | Level I<br>Systematic review<br>*N* = 10 studies (8 observational case series, 2 single case studies).<br>*N* = 292 participants.<br>*Inclusion criteria:* RCTs or observational studies with adult participants with diagnosis of full thickness, massive, or inoperable RTC tears; ≥1 treatment group that included exercise or combined exercise with other interventions; outcome measures of shoulder impairment, shoulder disability, pain, patient-perceived effect or benefit, impact on QOL. | *Interventions*<br>Exercise or exercise combined with slings, NSAIDs, analgesics, SI, therapeutic US, or education. 4 studies included exercise-only groups, and 6 studies included groups with exercise combined with slings, analgesics, NSAIDs, corticosteroid injections, or therapeutic modalities (US or education).<br>*Control*<br>RCTs did not meet inclusion criteria, so review included only observational studies. Exercises were described as strengthening, proprioception training, stretching, and supervised and home programs. | *Pain*<br>• Night pain<br>• 0–4 scale<br>• VAS<br>• Patient's perception<br>*Function*<br>• Impairment<br>• Disability<br>• OSS<br>• CMS<br>• SPADI<br>• ASES<br>• SST<br>• UCLA Shoulder Rating<br>• JOAS<br>• MWC<br>• SF–36 | *Pain*<br>1 study reported ST improvements in pain with exercise therapy.<br>3 studies reported LT reduction in pain with exercise therapy.<br>In 1 study with exercise therapy, 57% of participants reported decreased LT pain.<br>1 study reported reduced LT pain in the exercise group, but better results were found in the surgical group.<br>*Function*<br>1 case series and 1 case report reported ST improvements in function in exercise groups.<br>Also supporting use of exercise groups were 1 study reporting LT improvements in ADLs, 1 study reporting that 59% of participants improved LT function, 1 study reporting 57% improvement in LT function, 2 studies reporting LT improvements in function, 1 case study reporting LT improvement in swimming length, and 1 study reporting improved function in surgical and conservative groups but more improvement in surgical groups.<br>*Disability*<br>1 study reported ST decreases in disability in the exercise group. |
| Baydar et al. (2009)<br>https://doi.org/10.1007/s00296-008-0733-2 | Level III<br>One group nonrandomized<br>*N* = 20 (13 women).<br>*Inclusion criteria:* Full-thickness RTC tears confirmed with MRI. | *Intervention*<br>3 wk of therapy including US, infrared radiation, TENS, and exercises including a home program and instructions on activity modification. | *Function*<br>• ASES<br>• SF–36 | *Function*<br>Participants demonstrated SS LT improvements in all functional outcomes. |
| Brady, Redfern, Macdougal, & Williams (2008)<br>https://doi.org/10.1002/pri.403 | Level II<br>Two groups, nonrandomized<br>*N* = 18. | *Intervention*<br>A 12-wk group-administered aquatic (buoyancy-assisted ROM, buoyancy-supported ROM, and resistive phases) and land-based rehabilitation program (PROM, AAROM, and resistive phases). | *Function*<br>• WORC | *Function*<br>Both groups demonstrated SS ST improvements in WORC scores, with no SS difference between groups. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | Intervention group, $n = 12$ ($M$ age = 56.3 ± 9.06 yr, 4 women).<br>Control group, $n = 6$ ($M$ age = 53.5 ± 16.02 yr, 3 women).<br>*Inclusion criteria:* Age >18 yr, RTC tear identified through diagnostic testing, symptoms >3 mo and <12 mo. | *Control*<br>12-wk individually administered land-based program (PROM, AAROM, and resistive phases). | | |
| Du Plessis et al. (2011)<br>https://doi.org/10.1177/0269215510380835 | Level I<br>Systematic review<br>$N = 3$ studies.<br>$N$ of participants not reported.<br>*Inclusion criteria:* English language, RCTs measuring effects of CPM in addition to standard rehabilitation interventions after RTC repair, comparisons with varying types of therapies, adult participants. | *Intervention*<br>Standard postoperative therapy (passive and active exercises, joint mobilizations, shoulder strengthening, and cryotherapy).<br>*Control*<br>CPM. | *Pain*<br>• VAS<br>• CMS | *Pain*<br>2 studies reported no ST difference between the CPM combined-therapy group and the therapy-only group. 1 study reported SS ST pain reduction in the CPM group 1 wk postoperation, but no differences were found between groups on future pain and functional measures. |
| Düzgün, Baltacı, & Atay (2011)<br>https://doi.org/10.3944/AOTT.2011.2386 | Level I<br>RCT<br>$N = 29$.<br>Intervention group, $n = 13$ ($M$ age = 55.85 ± 7.8 yr).<br>Control group, $n = 16$ ($M$ age = 56.63 ± 10.99 yr, 17 women).<br>*Inclusion criteria:* Diagnosis of RTC tear by an orthopedic surgeon, ages 39–75 yr. | *Intervention*<br>Preoperative therapy (manual techniques and exercise) and accelerated post-RCR rehabilitation (early active motion at Wk 3 with therapy completed at Wk 8).<br>*Control*<br>Preoperative therapy (manual techniques and exercises) and slow-protocol post-RCR rehabilitation (active motion at Wk 6 with therapy completed at Wk 22). | *Pain*<br>• VAS<br>*Function*<br>• DASH | *Pain*<br>Both groups experienced ST and LT improvements. The accelerated rehabilitation group had significant LT decreases in pain compared with the slow rehabilitation group.<br>*Function*<br>Both groups experienced improved ST and LT function, but function was SS improved in accelerated program participants. |
| Keener, Galatz, Stobbs-Cucchi, Patton, & Yamaguchi (2014)<br>https://doi.org/10.2106/JBJS.M.00034 | Level I<br>RCT<br>$N = 124$.<br>Intervention group, $n = 59$ (tear size 13.1 mm × 14.5 mm). | *Intervention*<br>Sling wear for 6 wk postoperation and therapy initiated 6 wk postoperation (slow protocol). | Pain<br>• VAS<br>*Function*<br>• SST<br>• ASES<br>• CMS | *Pain*<br>Both groups had improved ST and LT decreases in pain, with no difference between groups.<br>*Function*<br>Both groups improved in ST and LT function, with no difference between groups. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | Control group, $n = 65$ (tear size 13.6 mm × 14.3 mm).<br><br>*Inclusion criteria:* Painful RTC tear, age ≥65 yr, consent to postoperative rehabilitation randomization, committed to 2-yr clinical trial. | *Control*<br>Sling wear for 6 wk postoperation and therapy initiated 1st day postoperation. | | |
| Krischak et al. (2013)<br><br>https://doi.org/10.1016/j.jse.2013.01.008 | Level I<br><br>RCT<br><br>$N = 38$.<br><br>Intervention group, $n = 16$ ($M$ age = 53.7 ± 12.9 yr, 8 women).<br><br>Control group, $n = 22$ ($M$ age = 56.4 ± 10.8 yr, 6 women).<br><br>*Inclusion criteria:* Ages 18–75 yr, ≥1 positive clinical sign of impingement, shoulder pain >3 mo during ADLs, pain at rest, weakness with abduction. | *Intervention*<br>Formal occupational therapy program of therapist-selected interventions (no standard program) 3×/wk for 8 wk.<br><br>*Control*<br>Exercise booklet and link to detailed online instruction and demonstration. | *Pain*<br>• VAS<br><br>*Function*<br>• CMS<br><br>*QOL*<br>• EQ–5D | *Pain*<br>Two-thirds of each group had ST improvements in pain, with no difference between groups.<br><br>*Function*<br>Both groups had ST improvements in function, with no difference between groups.<br><br>*QOL*<br>Both groups had ST improvements in QOL, with no difference between groups. |
| Seida et al. (2010)<br><br>https://doi.org/10.7326/0003-4819-153-4-201008170-00263 | Level 1<br><br>Systematic review<br><br>$N = 25$ studies (of 137 total) relevant to occupational therapy (10 postoperative rehabilitation studies, 10 nonoperative intervention studies, 5 studies comparing operative and nonoperative interventions).<br><br>$N$ of participants not reported; range of individual study $N$s = 12–224 ($M$ age = 41.2–80.0 yr).<br><br>*Inclusion criteria:* English language for operative studies and English, German, or French language for nonoperative or postoperative | *Intervention*<br>*Postoperative interventions:* PROM and AROM, mobilization, shoulder strengthening, cryotherapy, CPM, inpatient vs. outpatient rehabilitation, home exercise.<br><br>*Nonoperative interventions:* sodium hyaluronate with dexamethasone injections, exercises to protect the RTC, SIs with and without therapy.<br><br>*Operative interventions:* open or mini-open RTC repair, arthroscopic repair, debridement, acromioplasty, surgical augmentation. | *Pain*<br>• VAS<br>• CMS<br><br>*Function*<br>• Return to work<br>• Outcome measures not specified | *Pain*[b]<br>*Postoperative interventions:* 2 studies reported no ST difference between the CPM combined-therapy group and the therapy-only group. 1 study reported SS ST benefits of CPM 1 wk postoperation vs. no CPM for pain reduction, but no LT differences were found between groups. 1 study reported pain reduction with progressive resistive loading vs. traditional resistive loading. 1 study supported outpatient therapy vs. inpatient therapy.<br><br>Operative vs. nonoperative interventions: All groups reported SS improvements.<br><br>*Function*<br>*Postoperative interventions:* 1 study supported CPM combined therapy for early return to work vs. standard treatment. 1 study reported SS improvement in |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | studies; trials and cohort and prospective uncontrolled studies evaluating nonoperative or operative treatment or postoperative treatment for adults with RTC tears. | | | function with therapy vs. nonstandardized care. 1 study reported improvements in QOL and function in a therapy group (no comparison between groups).<br>*Nonoperative interventions*[b]*:* 1 study reported improved function in the exercise group vs. no rehabilitation. 1 study reported improvements in function with SIs combined with therapy vs. therapy only. Evidence for all other studies was of low strength.<br>*Operative vs. nonoperative interventions*[b]*:* All groups reported SS improvements. |
| | | Subacromial Impingement Syndrome | | |
| Abrisham et al. (2011)<br>https://doi.org/10.1007/s10067-011-1757-7 | Level I<br>RCT<br>$N = 80$.<br>Intervention group, $n = 40$ ($M$ age = 52.2 ± 5.7 yr, 24 women).<br>Control group, $n = 40$ ($M$ age = 51.2 ± 6.7 yr, 26 women).<br>*Inclusion criteria:* Age ≥18 yr; positive Neer, Hawkins–Kennedy, Jobe, or Speed test. | *Intervention*<br>Clinic and home shoulder exercise program and infrared laser radiation.<br>*Control*<br>Clinic and home shoulder exercise program (strengthening, stretching, and mobilizations) and placebo laser. | *Pain*<br>• VAS | *Pain*<br>Both groups demonstrated SS ST decreases in pain, but laser and exercise therapy groups demonstrated SS decreases in VAS pain scores compared with placebo laser and exercise groups. |
| Akyol et al. (2012)<br>https://doi.org/10.1007/s00296-011-2097-2 | Level I<br>RCT<br>$N = 40$.<br>Intervention group, $n = 20$ ($M$ age = 55.35 ± 14.50 yr, 15 women).<br>Control group, $n = 20$ ($M$ age = 51.20 ± 6.82 yr, 15 women).<br>*Inclusion criteria:* Shoulder pain with overhead activities, loss of shoulder motion or painful arc, no therapy during past 6 mo, MRI as reference standard. | *Intervention*<br>Therapeutic MD, hot packs, and exercise.<br>*Control*<br>Sham MD, hot packs, and exercises (AROM, scapular and glenohumeral muscle strengthening). | *Pain*<br>• VAS<br>*Function*<br>• SPADI<br>• SDQ<br>*QOL*<br>• SF–36<br>• BDI | *Pain*<br>Both groups had SS ST improvements in pain, with no difference between groups.<br>*Function*<br>Both groups reported SS ST improvements on the SPADI and SDQ, with no difference between groups.<br>*QOL*<br>No ST changes in SF–36 and BDI scores were found in either group, with no difference between groups. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| Bae, Lee, Shin, Kim, & Lee (2011)<br>https://doi.org/10.1589/jpts.23.687 | Level I<br>RCT<br>$N = 35$.<br>Intervention group, $n = 17$ ($M$ age = 49.9 ± 7.7 yr, 11 women).<br>Control group, $n = 18$ ($M$ age = 48.3 ± 4.3 yr, 12 women).<br>*Inclusion criteria:* Positive results with 1 clinical impingement test. | *Intervention*<br>Conservative therapy (resistive strengthening exercises) adding 30 min of motor control activities 3×/wk for 4 wk.<br>*Control*<br>Conservative therapy (resistive strengthening exercises) 3×/wk for 4 wk. | *Pain*<br>• SPADI pain scale<br>*Function*<br>• SPADI | *Pain*<br>Both groups demonstrated ST decreases in pain, but the motor control group showed SS improvements compared with the control group.<br>*Function*<br>Both groups demonstrated ST improvements in functional scores, but the motor control group showed SS improvement compared with the control group. |
| Başkurt, Başkurt, Gelecek, & Özkan (2011)<br>https://doi.org/10.3233/BMR-2011-0291 | Level I<br>RCT<br>$N = 40$ ($M$ age = 24–71 yr, 27 women).<br>Intervention group, $n = 20$ ($M$ age = 51.25 ± 11.55 yr).<br>Control group, $n = 20$ ($M$ age = 51.50 ± 8.40 yr).<br>*Inclusion criteria:* Positive Hawkins–Kennedy, Jobe, or Neer test; ultrasonography and radiography to confirm diagnosis; ability to elevate arm to ≥140°. | *Intervention*<br>Standard therapy exercises (flexibility, Codman's, and strengthening exercises) with added scapular stabilization exercises.<br>*Control*<br>Standard therapy exercises (same as for intervention group). | *Pain*<br>• VAS<br>*Function*<br>• WORC | *Pain*<br>Both groups demonstrated ST decreases in pain, but the intervention group showed SS improvement compared with the control group.<br>*Function*<br>Both groups improved in ST function, with no SS difference between groups. |
| Beaudreuil et al. (2011)<br>https://doi.org/10.1136/ard.2010.14769 | Level I<br>RCT<br>$N = 69$.<br>Intervention group, $n = 34$ ($M$ age = 57.9 ± 10.7 yr, 21 women).<br>Control group, $n = 35$ ($M$ age = 59.4 ± 10.0 yr, 19 women).<br>*Inclusion criteria:* Age >30 yr, shoulder pain >1 mo, 2 positive clinical impingement tests, CMS score <80. | *Intervention*<br>10-min massage, training to lower humeral head in passive abduction and then to lower humeral head with cocontraction of pectoralis major and latisimus dorsi, and home program for working on the cocontraction.<br>*Control*<br>10-min massage, passive pain-free mobilization of the shoulder, home program (pendulums, anterior elevation), and mobilization of the shoulder with light resistance. | *Pain*<br>• CMS for pain<br>*Function*<br>• CMS | *Pain*<br>Both groups demonstrated ST decreases in pain, but the decrease was SS only in the intervention group.<br>A non-SS trend for LT decreases in pain was found in the intervention group.<br>*Function*<br>Both groups showed ST and LT improvements in function, with no SS difference between groups. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| Bennell et al. (2010)<br>https://doi.org/10.1136/bmj.c2756 | Level I<br>RCT<br>*N* = 120.<br>Intervention group, *n* = 59 (*M* age = 59.3 ± 10.1 yr, 25 women).<br>Control group, *n* = 61 (*M* age = 60.8 ± 12.4 yr, 31 women).<br>*Inclusion criteria:* Chronic RTC disease confirmed by a physician, pain with AROM abduction and external rotation, positive impingement test. | *Intervention*<br>Scapula and RTC muscle strengthening, posture exercises, soft tissue massage, mobilizations, taping, and home program 1–2×/wk for 10 wk followed by instructions to continue daily exercises for 12 wk.<br>*Control*<br>Sham US therapy sessions 1–2×/wk for 10 wk, then instructions to continue daily exercises for 12 wk. | *Pain*<br>• VAS<br>*Function*<br>• SPADI<br>• Perceived global rating of change<br>• Overall SPADI<br>*QOL*<br>• SF–36<br>• Assessment of QOL | *Pain*<br>Both groups demonstrated ST improvements in pain reduction, but results were not SS for pain with movement.<br>*Function*<br>Both groups demonstrated improvement in perceived overall success, with no SS difference between groups.<br>Both groups improved in shoulder disability pain and SPADI scores, but only the intervention group had SS improvements.<br>*QOL*<br>Both groups improved ST, but only the treatment group had SS improvements. |
| Białoszewski & Zaborowski (2011)<br>https://doi.org/10.5604/15093492.933789 | Level I<br>RCT<br>*N* = 30.<br>Intervention group, *n* = 15 (*M* age = 50 yr, 7 women).<br>Control group, *n* = 15 (*M* age = 50 yr, 7 women).<br>*Inclusion criteria:* Confirmed chronic RTC disease supplemented by radiographic and sonographic assessment. | *Intervention*<br>Glenohumeral and soft tissue mobilization, TENS, US to supraspinatus insertion, ROM, and strengthening exercises (frequency and duration not reported).<br>*Control*<br>TENS and US to supraspinatus insertion, ROM, and strengthening exercises. | *Pain*<br>• VAS | *Pain*<br>Both groups improved on pain, but only the intervention group had SS improvements. |
| Cacchio et al. (2006) | Level I<br>RCT<br>*N* = 90.<br>Intervention group, *n* = 45 (*M* age = 56.12 ± 1.98 yr, 18 women).<br>Control group, *n* = 45 (*M* age = 56.42 ± 2.09 yr, 17 women).<br>*Inclusion criteria:* Calcific tendinitis of the shoulder, detected on standardized radiographs, with Type I (homogeneous in structure and with well- | *Intervention*<br>4 sessions of RSWT at 1-wk intervals (50 impulses with a pressure of 1.5 bar and a frequency of 4.5 Hz and 2,000 impulses with a pressure of 2.5 bar and a frequency of 10 Hz).<br>*Control*<br>4 sessions of RSWT at 1-wk intervals (5 impulses with a pressure of 1.5 bar and a frequency of 4.5 Hz and 20 impulses with a pressure of 2.5 bar and a frequency of 10 Hz). | *Pain*<br>• VAS<br>*Function*<br>• UCLA Shoulder Rating score | *Pain*<br>Both groups demonstrated decreased pain scores ST and LT, with no SS difference between groups.<br>*Function*<br>No ST differences were found in function between groups, but SS LT improvements were found in the treatment group. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | defined borders) or Type II (heterogeneous in structure with sharp outline or homogeneous in structure with no defined border) calcifications according to the Gartner and Simons radiographic classification; VAS pain score of >4 cm at the moment of the evaluation; symptoms ≥6 mo; failure of previous conservative treatments (anti-inflammatory drugs, US and exercises, laser therapy and exercises, electrical stimulation and exercises, acupuncture, SI). | | | |
| Crawshaw et al. (2010)<br>https://doi.org/10.1136/bmj.c3037 | Level I<br>RCT<br>*N* = 232.<br>Intervention group, *n* = 115 (*M* age = 57.02 ± 10.3 yr, 60 women).<br>Control group, *n* = 117 (*M* age = 54.9 ± 10.0 yr, 67 women).<br>*Inclusion criteria:* Age ≥40 yr, unilateral shoulder pain with no capsular pattern, positive Neer or Hawkins–Kennedy test. | *Intervention*<br>Injection, exercise, and manual techniques.<br>*Control*<br>Exercise (described as "commonly used") and manual techniques. | *Pain*<br>• SPADI pain scale<br>*Function*<br>• SPADI<br>• Global assessment of change | *Pain*<br>ST and LT improvements were found in SPADI pain scores, with no SS difference between groups.<br>*Function*<br>ST and LT improvements were found in SPADI functional scores, with no SS difference between groups.<br>ST and LT improvements were found in both groups for global change, with SS ST improvements in the intervention group but no LT differences. |
| Djordjevic, Vukicevic, Katunac, & Jovic (2012)<br>https://doi.org/10.1016/j.jmpt.2012.07.006 | Level I<br>RCT<br>*N* = 20.<br>Intervention group, *n* = 10 (*M* age = 51.8 ± 5.3 yr, 6 women).<br>Control group, *n* = 10 (*M* age = 54.10 ± 6.8 yr, 7 women).<br>*Inclusion criteria:* Physician diagnosis of impingement or RTC lesion, shoulder pain restricting ADLs, ages 34–79 yr. | *Intervention*<br>Movement with mobilization and elastic taping.<br>*Control*<br>Exercise. | *Pain*<br>• Pain-free ROM | *Pain*<br>ST improvements in pain-free ROM were found in both groups, with SS improvements in the intervention group compared with the control group. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| Dorrestijn, Stevens, Winters, van der Meer, & Diercks (2009)<br>https://doi.org/10.1016/j.jse.2009.01.010 | Level I<br>Systematic review<br>*N* = 4 RCTs.<br>*N* = 303 participants (*M* age = 42–59 yr, 136 women).<br>*Inclusion criteria:* RCT, age >18 yr, shoulder abduction pain, positive impingement test (Neer and Hawkins–Kennedy), studies comparing arthroscopic decompression with conservative management, outcome measures of pain or function. | *Intervention*<br>Conservative management (scapular and glenohumeral stabilization and strengthening, heat and cold packs, soft tissue manual techniques, education, NSAIDs, cortisone injection) vs. surgery (e.g., arthroscopic debridement). | *Function*<br>• CMS<br>• Subjective shoulder rating scale | *Function*<br>1 study showed improved CMS scores in the conservative management group. At 12-mo follow-up, *M* change = 23.0 (16.9–29.1), SMD = .003 (−.010–.004). At 4- to 8-yr follow-up, *M* change = 11.4 (8.7–14.11), SMD = 2.4 (−2.0–6.8).<br>1 study showed improved subjective shoulder rating scale scores in the conservative management group. |
| Eslamian, Shakouri, Ghojazadeh, Nobari, & Eftekharsadat (2012)<br>https://doi.org/10.1007/s10103-011-1001-3 | Level I<br>RCT<br>*N* = 49.<br>Intervention group, *n* = 25 (*M* age = 50.16 ± 12.10 yr, 10 women).<br>Control group, *n* = 24 (*M* age = 50.28 ± 11.74 yr, 15 women).<br>*Inclusion criteria:* 2 of 5 signs or symptoms of shoulder pain or RTC disorders. | *Intervention*<br>Laser and therapy (superficial and deep heat, TENS), exercises (not specified), and LLLT 3×/wk for 10 sessions.<br>*Control*<br>Usual PT and sham laser 3×/wk for 10 sessions. | *Pain*<br>• VAS<br>*Function*<br>• SDQ | *Pain*<br>Both groups demonstrated ST decreases in VAS pain, but a SS difference favored the intervention group over the control group.<br>*Function*<br>Both groups demonstrated ST improvements in SDQ functional scores, but a SS difference favored the intervention group over the control group. |
| Galasso, Amelio, Riccelli, & Gasparini (2012)<br>https://doi.org/10.1186/1471-2474-13-86 | Level I<br>RCT<br>*N* = 20.<br>Intervention group, *n* = 11 (*M* age = 50.7 ± 8.44 yr, 4 women).<br>Control group, *n* = 9 (*M* age = 51.11 ± 13.26 yr, 5 women).<br>*Inclusion criteria:* Patients with noncalcifying supraspinatus tendinopathy that did not respond to conservative management for ≥4 mo, ≥6 mo shoulder pain and pain on Jobe or full can test, age >18 yr, ≥90° of active abduction. | *Intervention*<br>2 sessions of extracorporeal shock-wave therapy with a 7-day interval between sessions.<br>*Control*<br>2 sessions of sham extracorporeal shock-wave therapy with a 7-day interval between sessions. | *Function*<br>• CMS | *Function*<br>The intervention group demonstrated SS ST improvements in CMS compared with the control group. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| Hanratty et al. (2012)<br>https://doi.org/10.1016/j.semarthrit.2012.03.015 | Level I<br>Systematic review and meta-analysis<br>*N* = 16 RCTs.<br>*N* = 1,162 participants (602 women [1 study did not report gender]).<br>*Inclusion criteria:* RCTs, English language, investigating any mode of exercise for Stages I or II of SIS or RTC disease or tendinopathy. | *Intervention*<br>Stretching and flexibility, elastic band strengthening, closed chain scapular stability exercises, isometric and isotonic strengthening without weights, push-ups, wall presses, deloaded pulley exercises, dumbbell weights to strengthen the RTC, AROM, AAROM, PROM, sling suspension, cane-assisted ROM.<br>*Control*<br>REST, placebo electrotherapy, usual care, manual therapy combined with exercise, placebo inactive US, patient education, arthroscopic surgery followed by therapy. | • Cochrane Risk of Bias tool for pain<br>• PRF<br>• QOL<br>• van Tulder Scale (scores >6) | *Pain*<br>*Systematic review:* 6 articles with low risk of bias reported ST reduction in pain between groups favoring the intervention groups. 1 article reported LT pain reduction in the intervention group.<br>*Meta-analysis:* Data from 4 studies indicated no significant effect on ST pain reduction.<br>*Function*<br>*Systematic review:* 4 articles with low risk of bias reported SS ST improvements in function in the intervention groups. 2 articles reported SS LT improvements in the exercise and control groups.<br>*Meta-analysis:* Data from 5 studies indicated no significant effect on ST improvements in PRF; a small effect was found for LT improvements in PRF.<br>*QOL*<br>*Systematic review:* 1 article with low risk of bias reported significant between-groups ST improvements in QOL.<br>*Meta-analysis:* No significant effect on QOL was found. |
| Holmgren, Öberg, Sjöberg, & Johansson (2012)<br>https://doi.org/10.2340/16501977-0889 | Level I<br>RCT<br>*N* = 33.<br>Intervention group, *n* = 15 (*M* age = 51 ± 10.2 yr, 8 women).<br>Control group, *n* = 18 (*M* age = 55 ± 7.2 yr, 8 women).<br>*Inclusion criteria:* Underwent arthroscopic acromioplasty, ages 30–60 yr, positive impingement test, symptoms ≥6 mo, unsatisfactory results after<br>3 mo of therapy, pain in C5 dermatome. | *Intervention*<br>Subacromial decompression, HEP 1st wk postoperation, and therapy consisting of graded posture and strengthening exercises 2×/wk for 12 wk.<br>*Control*<br>Subacromial decompression and HEP 1st wk postoperation for 12 wk with emphasis on mobility. | *Pain*<br>• VAS<br>*Function*<br>• CMS<br>• DASH<br>*QOL*<br>• EQ–5D | *Pain*<br>Both groups improved, with no SS difference between groups.<br>*Function*<br>Both groups demonstrated ST improvements in DASH and CMS scores, with SS differences between groups favoring therapy.<br>*QOL*<br>Both groups demonstrated LT improvements, with no SS difference between groups. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| Hultenheim Klintberg, Gunnarsson, Styf, & Karlsson (2008)<br>https://doi.org/10.1177/0269215508090771 | Level I<br>RCT<br>*N* = 33 (34 shoulders; *M* age = 46 ± 0.7 yr, 13 women).<br>Intervention group, *n* = 20.<br>Control group, *n* = 14.<br>*Inclusion criteria:* Primary impingement based on Neer's classification II, underwent arthroscopic acromioplasty. | *Intervention*<br>Traditional therapy including regaining ROM, correct posture, and improved RTC and scapular muscle strength.<br>*Control*<br>Progressive therapy group starting therapy earlier with increased emphasis on RTC control with special attention to proper shoulder kinematics and manual techniques to stretch posterior capsule. | *Pain*<br>• VAS<br>*Function*<br>• CMS<br>• FIS | *Pain*<br>Both groups demonstrated ST and LT decreases in pain.<br>*Function*<br>Both groups demonstrated ST and LT increases in CMS. |
| Jowett et al. (2013)<br>https://doi.org/10.1093/rheumatology/ket149 | Level I<br>RCT<br>*N* = 232.<br>Intervention group, *n* = 115.<br>Control group, *n* = 117.<br>*Inclusion criteria:* Patients recruited from primary care. | *Intervention*<br>Corticosteroid injection combined with therapy exercises (not specified).<br>*Control*<br>Exercise only (not specified). | *Function*<br>• QALY<br>• SPADI | *Function*<br>The intervention group showed SS ST improvements in QALY and SPADI scores, but no LT differences were found between groups. |
| Kaya, Zinnuroglu, & Tugcu (2011)<br>https://doi.org/10.1007/s10067-010-1475-6 | Level II<br>Cohort, 2 groups, nonrandomized<br>*N* = 55.<br>Intervention group, *n* = 30 (*M* age = 56.2 ± 7.2 yr).<br>Control group, *n* = 25 (*M* age = 59.5 ± 7.9 yr).<br>*Inclusion criteria:* Pain with active shoulder ROM before 150°, positive empty can test, positive Hawkins–Kennedy test, reports of difficulty with ADLs, ages 18–70 yr. | *Intervention*<br>Elastic tape and home program consisting of stretching and strengthening exercises.<br>*Control*<br>Daily therapy (US, TENS, exercise, hot packs) 2×/wk for 2 wk and home program (same as intervention group). | *Pain*<br>• VAS<br>*Function*<br>• DASH | *Pain*<br>Both groups demonstrated ST benefits of pain reduction. The intervention group demonstrated SS reduction in pain compared with the control group, but no differences were found at 2 wk.<br>*Function*<br>Both groups demonstrated ST improvements in function. |
| Kelly, Wrightson, & Meads (2010)<br>https://doi.org/10.1177/0269215509342336 | Level I<br>Systematic review | *Intervention*<br>Exercise or exercise combined with other conservative management. | *Pain*<br>• Patient-rated pain<br>• VAS | *Pain*<br>6 studies reported SS ST improvements with exercise. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | $N = 8$.<br><br>$N = 407$ participants (age range = 18–66 yr).<br><br>*Inclusion criteria:* Ages 16–66 yr, nonacute Neer Stages I and II, RCT, exercise or exercise with other conservative management. | *Control*<br>Nonexercise intervention or combinations of exercise with different surgical or conservative treatments. | *Function*<br>• Neer shoulder scale<br>• DASH<br>• UCLA Shoulder Rating criteria<br>• Graded overhead function tasks<br><br>*QOL*<br>• SF–36 | 2 of 6 studies showed SS ST improvements with exercise combined with manual techniques.<br><br>2 studies reported LT improvements. 1 of the 2 studies reported SS LT improvements.<br><br>*Function*<br>8 studies reported ST improvements in function.<br><br>5 of 8 studies reported SS ST improvements.<br><br>1 study reported SS ST improvements with exercise combined with manual techniques.<br><br>1 study reported LT improvements with exercise.<br><br>1 study reported LT improvements after surgery.<br><br>*QOL*<br>1 study reported ST improvements. |
| Kromer, de Bie, & Bastiaenen (2013)<br><br>https://doi.org/10.2340/16501977-1142 | Level I<br><br>RCT<br><br>$N = 90$.<br><br>Intervention group, $n = 46$ ($M$ age = 50.1 ± 12.2 yr, 22 women).<br><br>Control group, $n = 44$ ($M$ age = 53.7 ± 9.9 yr, 24 women).<br><br>*Inclusion criteria:* Ages 18–75 yr, symptoms ≥4 wk, main complaint in joint region or proximal arm, presence of 1 of the following: Neer impingement sign, positive Hawkins–Kennedy test, painful arc of active motion, pain with resistive testing. | *Intervention*<br>Individualized exercise and manual techniques (10 sessions within 5 wk).<br><br>*Control*<br>Individualized exercise (10 sessions within 5 wk). | *Function*<br>• SPADI<br>• PGIC<br>• GPSS | *Function*<br>Both groups demonstrated ST improvements in SPADI and GPSS scores, with no SS difference between groups.<br><br>Neither group demonstrated change in PGIC. |
| Kromer, Tautenhahn, de Bie, Staal, & Bastiaenen (2009)<br><br>https://doi.org/10.2340/16501977-0453 | Level I<br><br>Systematic review<br><br>$N = 16$.<br><br>$N = 929$ participants (median $n = 56$). | *Intervention*<br>Therapist-led exercise programs, manual techniques, exercise combined with manual techniques, home-based exercises, centering training, US, LLLT, electromagnetic field. | *Pain*<br>• VAS<br>• Work-related pain<br>• Pain scale scored 1–9<br>• CSS<br>• Pain index | *Pain*<br>7 studies reported ST benefits.<br><br>5 of 7 reported significant effects for exercise; 1 reported effects for pulsed electromagnetic field therapy, and 1 reported positive effects for laser therapy. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | *Inclusion criteria:* English, German, or Dutch language; SIS diagnosis, typical signs of SIS, or both; age >16 yr; all forms of active or passive therapy interventions, including exercises, proprioceptive training, manual therapy, massage therapy, education, and electrophysical procedures. | *Control*<br>No intervention, home program compared with supervised therapy, manual combined exercises compared with exercise only, surgery, sham US, acupuncture, sham laser, sham electromagnetic field, healthy controls. Exercises described as pendulums, AROM, PROM, centering training, rhythmic training, and isometric and isotonic strengthening. | *Function*<br>• CMS<br>• SRQ<br>• SRFL<br>• Overhead function<br>• Neer scores<br>• ADL index<br>• ADL limitations<br>*Disability*<br>• SDQ<br>• Work-related disability<br>• Refused surgery | 1 study reported LT improvement with surgery combined with therapy exercises and supervised exercise therapy only.<br>*Function*<br>4 studies reported ST benefits as follows: 1 study for exercise, 2 for exercise combined with mobilization, and 1 for surgery combined with exercise and exercise only.<br>1 study supported LT benefits for surgery combined with exercise and exercise only.<br>*Disability*<br>1 study reported ST improvements in work-related disability for the exercise intervention. |
| Kuhn (2009)<br>https://doi.org/10.1016/j.jse.2008.06.004 | Level I<br>Systematic review<br>$N = 11$.<br>$N = 556$ participants ($M$ age = 42–58 yr, 237 women).<br>*Inclusion criteria:* Level I or II studies; compared therapy with other treatments or placebo; used outcome measures of pain, function, or disability with validated assessments; diagnosis of impingement. | *Intervention*<br>SE, HEP, exercise combined with manual therapy, exercise after subacromial decompression, instruction in exercise.<br>*Control*<br>SE (ROM, stretching or flexibility, and strengthening) combined with manual techniques vs. SE alone, placebo laser, supervised exercises, no intervention, surgery, SE vs. HEP, HEP vs. supervised therapy vs. functional brace. | *Pain*<br>• VAS<br>• 1–9 scale<br>• Pain with activity<br>• Pain score<br>*Function*<br>• Perception of function<br>• FAQ<br>• Neer scores<br>• Hopkins Scale<br>• CSS<br>• Functional skills<br>• SPADI<br>• SRQ<br>• Modified CSS | *Pain*<br>7 studies reported ST pain benefits, 2 studies for exercise and HEPs and 5 for exercise combined with manual techniques.<br>5 studies reported SS ST improvement in pain between groups as follows: 2 for exercise combined with manual techniques, 1 for exercise combined with surgery, 1 for home exercise combined with manual techniques, and 1 for exercise.<br>2 studies reported clinically significant ST differences between groups in pain reduction supporting exercise and exercise combined with surgery or manual techniques.<br>5 studies reported LT pain reduction within groups: 2 studies showed SS benefits for exercise, and 3 studies showed nonsignificant results for exercises combined with surgery (2 studies) and placebo laser (1 study).<br>1 study reported LT SS and clinically significant benefits of exercise for pain reduction.<br>*Function*<br>2 studies reported ST improvements in function as follows: 1 study showed SS benefits for exercise and |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | | | | exercise combined with manual techniques but no SS or clinically significant between-group differences, and 1 study showed benefits for exercise and exercise combined with surgery.<br><br>2 studies reported LT improvements in function as follows: 1 reported within-group benefits for exercise, and both supported exercise combined with surgery.<br><br>*Function outcomes not validated or included in final appraisal:* 3 studies reported ST improvements in function as follows: All 3 demonstrated SS improvement for exercise, and 2 demonstrated SS within-group improvement for exercise combined with manual techniques. 1 study reported between-group differences for exercise combined with manual techniques. No LT studies were included. |
| Littlewood, Ashton, Chance-Larsen, May, & Sturrock (2012)<br><br>https://doi.org/10.1016/j.physio.2011.08.002 | Level I<br><br>Systematic review<br><br>$N = 4$.<br><br>$N = 337$ participants ($M$ age range = 47.6–55.6 yr).<br><br>*Inclusion criteria:* Adults presenting with symptoms of RTC tendinopathy, symptoms >3 mo, minimal resting pain, largely preserved ROM, pain exacerbated with resistive testing, no cervical involvement. | *Intervention*<br>Exercise, exercise combined with electrotherapy, manual therapy.<br><br>*Control*<br>No intervention, placebo, surgery, functional brace, multimodal therapy interventions, loaded exercises. | *Pain*<br>• VAS<br><br>*Function*<br>• Neer scores<br>• DASH<br>• SRQ<br>• CMS<br><br>*Disability*<br>• DASH | *Pain*<br>1 study reported SS ST and LT improvements for exercise.<br><br>3 studies reported ST improvements in pain for supervised exercise, self-trained exercise, and functional brace.<br><br>*Function*<br>One study reported SS improvement in ST function for exercise and SS LT improvement favoring exercise over surgery, but this outcome was not validated.<br><br>2 studies reported ST improvement in function for exercise.<br><br>*Disability*<br>1 study reported ST improvement for exercise. |
| Maenhout, Mahieu, De Muynck, De Wilde, & Cools (2013)<br><br>https://doi.org/10.1007/s00167-012-2012-8 | Level I<br><br>RCT<br><br>$N = 61$.<br><br>Intervention group, $n = 31$ ($M$ age = 40.2 ± 12.9 yr, 16 women). | *Intervention*<br>Traditional RTC strengthening with heavy-load eccentric training.<br><br>*Control*<br>Traditional RTC strengthening. | *Function*<br>• SPADI | *Function*<br>Both groups demonstrated SS ST improvements in SPADI scores, with no difference between groups. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | Control group, $n = 30$ ($M$ age = 39.4 ± 13.1 yr, 20 women).<br>*Inclusion criteria:* Age >18 yr, pain ≥3 mo, painful arc, 2 of 3 impingement tests (Hawkins–Kennedy, Jobe, or Neer test) and 2 of 4 resistive tests positive. | | | |
| Martins & Marziale (2012)<br>https://doi.org/10.1590/S1413-35552012005000057 | Level I<br>RCT<br>$N = 16$.<br>Intervention group, $n = 8$ (7 women).<br>Control group, $n = 8$ (7 women).<br>*Inclusion criteria:* Employment in a medical setting, diagnosis of impingement. | *Intervention*<br>Stretching, strengthening, proprioception drills, and cold packs.<br>*Control*<br>Stretching and strengthening followed by cold packs. | *Pain*<br>• VNRS<br>*Function*<br>• WORC<br>QOL<br>• OSI | *Pain*<br>Both groups demonstrated a SS ST decrease in pain, with no difference between groups.<br>*Function*<br>Both groups demonstrated ST improvements, and the intervention group showed SS ST improvements.<br>*QOL*<br>Both groups demonstrated ST improvements, and the intervention group showed SS ST improvements. |
| Montes-Molina, Martínez-Rodríguez, Rodríguez, Martínez-Ruiz, & Prieto-Baquero (2012)<br>https://doi.org/10.1177/0269215512445068 | Level I<br>RCT<br>$N = 30$.<br>Intervention group, $n = 15$ ($M$ age = 59.2 ± 11.0 yr, 12 women).<br>Control group, $n = 15$ ($M$ age = 59.0 ± 8.9 yr, 10 women).<br>*Inclusion criteria:* Age >18 yr; acute pain from tendinopathy; diagnosis evaluated with ultrasonography, X-ray, or MRI. | *Intervention*<br>Interferential light therapy.<br>*Control*<br>Conventional light therapy. | *Pain*<br>• VAS<br>*Function*<br>• UCLA Shoulder Rating score | *Pain*<br>Both groups showed ST decreases in pain, with SS between-groups differences favoring the intervention group.<br>*Function*<br>Both groups improved in function, with no difference between groups. |
| Nakra, Quddus, Khan, Kumar, & Meena (2013)<br>https://doi.org/10.12968/ijtr.2013.20.9.450 | Level III<br>Pre–post<br>$N = 30$.<br>Intervention group, $n = 15$ ($M$ age = 45.9 ± 8.4 yr, 7 women).<br>Control group, $n = 15$ ($M$ age = 47.8 ± 8.4 yr, 8 women). | *Intervention*<br>9 sessions of conventional therapy (cold packs, stretching, and isometric exercises progressed to isotonics) plus proprioceptive neuromuscular facilitation exercises.<br>*Control*<br>Conventional therapy only (same as intervention group). | *Function*<br>• SPADI | *Function*<br>Both groups demonstrated improved ST SPADI scores, with SS between-groups differences favoring the intervention group. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | *Inclusion criteria:* Ages 30–55 yr, diagnosis of secondary impingement, positive Neer's sign, positive Hawkins–Kennedy test. | | | |
| Nyberg, Jonsson, & Sundelin (2010)<br>https://doi.org/10.1179/1743288X10Y.0000000016 | Level I<br>Systematic review<br>*N* = 20.<br>*N* = 1,947 participants.<br>*Inclusion criteria:* RCTs reporting on conservative treatments other than surgery, pharmacological treatment, and SIs. | *Intervention*<br>Acupuncture, modalities (electrotherapy, cryotherapy, high-intensity laser, radial extracorporeal shock wave), exercises, mixed modalities, change in posture, functional bracing.<br>*Control*<br>Acupuncture vs. placebo; TENS–physiotherapy or continuous US–exercise; electrotherapy (PEMF, HILT, or LLLT) vs. sham, home exercise, US, supervised exercise, exercise and manual therapy, or arthroscopic decompression; individualized rehabilitation vs. control group; shoulder brace vs. supervised exercises; thoracic taping vs. placebo taping. | *Pain*<br>• VAS<br>• NRS<br>• Likert scale<br>*Function*<br>• CMS<br>• DASH<br>• UCLA Shoulder Rating score<br>• ALS<br>• SST<br>• SPADI<br>• SRQ<br>• PRIM<br>• FAQ<br>• Neer score<br>• SFMPQ<br>• Posture change | *Pain*<br>2 studies reported SS ST benefits for acupuncture.<br>1 study reported ST evidence favoring HILT vs. US.<br>2 studies reported no SS difference for LLLT vs. exercise.<br>2 studies reported ST benefits for exercise vs. control.<br>2 studies reported ST benefits for exercise combined with manual techniques vs. exercise only.<br>1 study reported ST benefits for exercise vs. REST.<br>1 study found no ST difference between specific exercise groups.<br>1 study supported ST high-dose vs. low-dose exercise.<br>1 study reported ST benefits of taping for posture.<br>1 study reported no ST benefits of functional bracing vs. exercise.<br>2 studies reported no SS ST and LT differences for supervised exercise vs. surgery.<br>1 study reported LT benefits for mixed modalities vs. normal activities.<br>1 study reported SS LT benefits for acupuncture.<br>*Function*<br>2 studies reported SS ST benefits for acupuncture.<br>2 studies reported ST benefits for exercise vs. control. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | | | | 2 studies reported ST benefits for exercise combined with manual techniques vs. exercise only.<br>1 study supported ST benefits of exercise vs. REST.<br>1 study found no ST differences between specific exercise groups.<br>1 study reported ST benefits of high-dose vs. low-dose exercise.<br>1 study reported no ST benefits of functional bracing vs. exercise.<br>2 studies reported no SS ST and LT differences between supervised exercise and surgery.<br>1 study reported SS LT benefits for acupuncture.<br>1 study reported LT benefits for mixed modalities vs. normal activities. |
| Østerås, Torstensen, & Østerås (2010)<br>https://doi.org/10.1002/pri.468 | Level I<br>RCT<br>$N = 61$.<br>Intervention group, $n = 31$ ($M$ age = 46.1 ± 11.2 yr, 22.1% women).<br>Control group, $n = 30$ ($M$ age = 41.8 ± 14.5 yr, 18.8% women).<br>*Inclusion criteria:* Ages 18–60 yr; positive impingement test; IR in scapular plane at 90°; shoulder pain ≤3 mo; no history of dislocation, subluxation, fracture, or related thoracic or cervical involvement; no neurological signs; no symptoms from the elbow, wrist, or hand; no neurological disease; no vestibular disturbances; no conservative therapy including cortisone injections within past 6 mo. | *Intervention*<br>High-dose exercise (progressive weight strengthening), 3 sets of 30 repetitions 3×/wk for 12 wk.<br>*Control*<br>Low-dose exercise (progressive weight strengthening), 2 sets of 10 repetitions 3×/wk for 12 wk. | *Pain*<br>• VAS<br>*Function*<br>• SRQ | *Pain*<br>Both groups had ST and LT improvements, but improvements were SS only in the intervention group.<br>*Function*<br>Both groups had ST and LT improvements, but improvements were SS only in the intervention group. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| Otadi, Hadian, Olyaei, & Jalaie (2012)<br>https://doi.org/10.3233/BMR-2012-0305 | Level I<br>RCT<br>*N* = 42.<br>Intervention group, *n* = 21 (*M* age = 49.48 ± 8.5 yr, 21 women).<br>Control group, *n* = 21 (*M* age = 48.05 ± 7.9 yr, 21 women).<br>*Inclusion criteria:* Women with pain at supraspinatus, LHB, or both; painful arc in abduction; pain with isometric resistance to supraspinatus and biceps; positive Speeds test. | *Intervention*<br>US and laser at supraspinatus 3×/wk for 10 sessions and exercise.<br>*Control*<br>US 3×/wk for 10 sessions and exercise. | *Pain*<br>• VAS<br>• Langemark and Olesen tenderness scoring<br>*Function*<br>• CMS | *Pain*<br>Both groups demonstrated ST decreases in pain, but no SS differences were found between groups in VAS scores and tenderness scores.<br>*Function*<br>Both groups demonstrated improvement, but the intervention group demonstrated SS improvement compared with the control group. |
| Şimşek, Balki, Keklik, Öztürk, & Elden (2013)<br>https://doi.org/10.3944/AOTT.2013.2782 | Level I<br>RCT<br>*N* = 38.<br>Intervention group, *n* = 19.<br>Control group, *n* = 19.<br>*Inclusion criteria:* Ages 18–70 yr, pain interfering with daily routines, pain >1 mo, positive Neer and Hawkins–Kennedy tests. | *Intervention*<br>Elastic taping (3-day intervals for 12 days) and shoulder stabilization exercises.<br>*Control*<br>Sham elastic taping (3-day intervals for 12 days) and shoulder stabilization exercises. | *Function*<br>• DASH<br>• CSS | *Pain*<br>Both groups had a decrease in pain; the intervention group had a SS decrease.<br>*Function*<br>SS ST improvements in DASH scores were found in the intervention group. |
| Struyf et al. (2013)<br>https://doi.org/10.1007/s10067-012-2093-2 | Level I<br>RCT<br>*N* = 22.<br>Intervention group, *n* = 12 (*M* age = 46.2 ± 13.5 yr, 7 women).<br>Control group, *n* = 10 (*M* age = 45.4 ± 15.1 yr, 5 women).<br>*Inclusion criteria:* Age ≥18 yr, ability to complete questionnaires, shoulder impingement symptoms lasting >30 days. | *Intervention*<br>Joint mobilizations, stretching, strengthening external rotators, and motor control training focused on scapular orientation, 9 30-min sessions.<br>*Control*<br>Exercise (eccentric training, band exercises, home exercises), US, and manual therapy (passive mobilizations and friction massage), 9 30-min sessions. | *Pain*<br>• VNRS<br>• VAS<br>*Function*<br>• SDQ | *Pain*<br>Both groups demonstrated ST decreases in VNRS and VAS pain scores, but the motor control training group had SS improvement compared with the control group.<br>*Function*<br>Both groups demonstrated ST improvement in SDQ scores, but the motor control training group reported a SS improvement compared with the control group. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| Taskaynatan, Ozgul, Ozdemir, Tan, & Kalyon (2007)<br>https://doi.org/10.1300/J094v15n04_06 | Level I<br>RCT<br>*N* = 47.<br>Intervention group, *n* = 26 (*M* age = 58.46 ± 8.77 yr, 16 women).<br>Control group, *n* = 21 (*M* age = 53.43 ± 10.84 yr, 12 women).<br>*Inclusion criteria:* Nonspecific shoulder pain >4 wk; soft tissue shoulder US examination. | *Intervention*<br>US, hot packs, and SE program plus hydrocortisone acetate with negative electrode.<br>*Control*<br>US, hot packs, and SE program plus electrotherapy interferential current. | *Pain*<br>• PSS pain<br>*Function*<br>• PSS<br>• CSS | *Pain*<br>Both groups demonstrated pain reduction, with no SS ST difference between groups.<br>*Function*<br>Both groups demonstrated SS ST improvement in function, with no SS ST difference between groups. |
| Thelen, Dauber, & Stoneman (2008)<br>https://doi.org/10.2519/jospt.2008.2791 | Level I<br>RCT<br>*N* = 42.<br>Intervention group, *n* = 21 (*M* age = 19.8 ± 1.5 yr, 4 women).<br>Control group, *n* = 21 (*M* age = 21.3 ± 1.7 yr, 2 women).<br>*Inclusion criteria:* Pain onset before 150° of AROM elevation, positive empty can test, positive Hawkins–Kennedy test, complaints of difficulty with ADLs, ages 18–50 yr. | *Intervention*<br>Elastic taping (Kasi technique) worn 48–72 hr.<br>*Control*<br>Sham elastic taping worn 48–72 hr. | *Pain*<br>• VAS<br>*Function*<br>• SPADI | *Pain*<br>ST decreases in pain were found in the intervention group.<br>*Function*<br>Both groups improved in ST function, with no difference between groups. |
| Trampas & Kitsios (2006)<br>https://doi.org/10.1179/108331906X99065 | Level I<br>Systematic reviews<br>*N* = 5.<br>*N* = 371 participants.<br>*Inclusion criteria:* RCT, published 2003 and later, participants diagnosed with SIS, exercise prescribed by a therapist. | *Intervention*<br>Therapeutic exercises; functional bracing; manual therapy; main treatment identified as exercise (muscle strengthening and flexibility training); manual therapy combined with thermotherapy, or both; cryotherapy or electrotherapy; massage (transverse vs. friction); arthroscopic subacromial decompression. | *Pain*<br>• VAS<br>*Function*<br>• CMS<br>• UCLA Shoulder Rating score<br>• ALS | *Pain*<br>1 study reported ST and LT improvement in pain for exercise.<br>1 study reported SS ST improvement in pain for exercise.<br>2 moderate-quality studies reported improvement for exercise, combined interventions with exercise, and functional bracing.<br>1 study reported LT improvement for exercise.<br>1 study reported SS ST improvements for exercise and manual treatment.<br>*Function*<br>1 study reported SS ST improvement in function. |

(*Continued*)

**Supplemental Table 1. Evidence Table for Musculoskeletal Shoulder Conditions (*cont.*)**

| Author/Year | Level/Design/Participants/ Inclusion Criteria | Intervention and Control | Outcome Measures | Results |
|---|---|---|---|---|
| | | | | 1 study reported LT improvements for exercise combined with modalities.<br><br>2 studies reported ST (1 SS) improvement for exercise with functional bracing.<br><br>1 study reported LT benefits for exercise.<br><br>1 study reported SS ST improvements for exercise and manual treatment. |
| Yildirim, Ones, & Celik (2013)<br><br>https://doi.org/10.1589/jpts.25.1151 | Level I<br><br>RCT<br><br>*N* = 100.<br><br>Intervention group, *n* = 50 (*M* age = 55.4 ± 7.3 yr, 34 women).<br><br>Control group, *n* = 50 (*M* age = 54.7 ± 8.67 yr, 27 women).<br><br>*Inclusion criteria:* Age >40 yr, clinical and radiographic finding of impingement, symptoms >6 mo, <30% PROM compared with uninvolved side. | *Intervention*<br>US (superficial heat) 15× for 4 min, TENS, exercises (pendulums, stretching, and strengthening) including HEP, and infrared therapy.<br><br>*Control*<br>Same as above except US for 8 min. | *Pain*<br>• VAS<br><br>*Function*<br>• UCLA Shoulder Rating score<br>• CMS | *Pain*<br>SS ST decreases in VAS scores were found in both groups; the decrease in the 8-min US group was SS compared with that in the 4-min US group.<br><br>*Function*<br>SS ST improvements were found in function scores. The 8-min US group showed SS improvement in all function scores except daily living. |

*Note.* AAROM = active assistive range of motion; ADLs = activities of daily living; ALS = Adolfsson–Lysholm shoulder score; AM = anterior mobilization; APE = all-round physical exercise; AROM = active range of motion; ASES = American Shoulder and Elbow Surgeons Questionnaire; BDI = Beck Depression Inventory; CDQ = Croft Disability Questionnaire; CI = confidence interval; CMS = Constant Murley Score; CPM = continuous passive motion; CSS = Constant Shoulder Score; DASH = Disabilities of Arm, Shoulder and Hand; EMG = electromyography; ER = external rotation; ERM = end-range mobilizations; FAQ = functional assessment questionnaire; FDM = functional disability measure; FIS = Functional Index of the Shoulder; FLEX–SF = Flexilevel Scale of Shoulder Function; GPSS = generic patient-specific scale; HAQ = Health Assessment Questionnaire; HEP = home exercise program; HG = high grade; HILT = high-intensity laser therapy; IFC = interferential current; IR = internal rotation; JOAS = Japanese Orthopedic Association Scale; LG = low grade; LHB = long head of biceps; LLLT = low-level laser therapy; LT = long term (>6 mo); *M* = mean; MD = microwave diathermy; MRM = mid-range mobilizations; MUA = manipulation under anesthesia; MWC = Modified Wolfgang's Criteria; MWM = mobilizations with movement; NDI = Neck Disability Index; NRS = 11-point numerical rating scale; NSAIDs = nonsteroidal anti-inflammatory drugs; OSI = occupational stress indicator; OSS = Oxford Shoulder Score; PEDro = Physiotherapy Evidence Database; PEMF = pulsed electromagnetic field; PGIC = patient global impression of change; PM = posterior mobilization; PRF = patient-rated function; PRIM = Project on Research and Intervention in Monotonous Work; PROM = passive range of motion; PSS = Penn Shoulder Scale; QALY = quality-adjusted life years; QOL = quality of life; RCR = rotator cuff repair; RCT = randomized controlled trial; REST = radial extracorporeal shock-wave treatment; ROM = range of motion; RSWT = radial shock-wave therapy; RTC = rotator cuff; SDQ = Shoulder Disability Questionnaire; SE = standard exercise; SFMPQ = Short-Form McGill Pain Questionnaire; SF–36 = 36-item Short Form Health Survey; SI = steroid injection; SIS = subacromial impingement syndrome; SMD = standardized mean difference; SNQ = Standardized Nordic Questionnaire; SPADI = Shoulder Pain and Disability Index; SRFA = self-reported functional assessment questionnaire; SRFL = self-reported functional limitation; SRQ = Shoulder Rating Questionnaire; SRT = specific resistance training; SS = statistically significant; SST = Simple Shoulder Test; ST = short term (≤6 mo); TENS = transcutaneous electrical nerve stimulation; UCLA = University of California, Los Angeles; US = ultrasound; VAS = visual analog scale; VNRS = visual numeric rating scale; WHO = World Health Organization; WORC = Western Ontario Rotator Cuff; WSMD = weighted standard mean difference (scale ≥6–10).

[a]Extracted data relevant to shoulder only. [b]No follow-up time reported. [c]Synthesized studies included therapy interventions or controls only.



*Suggested citation:* Marik, T. L., & Roll, S. C. (2017). Effectiveness of occupational therapy interventions for musculoskeletal shoulder conditions: A systematic review (Suppl. Table 1). *American Journal of Occupational Therapy, 71,* 7101180020. https://doi.org/10.5014/ajot.2017.023127

**Supplemental Table 2. Risk of Bias Table for Systematic Reviews Included in the Shoulder 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 (Humeral) Fractures** | | | | | | | | | | | |
| Bruder, Taylor, Dodd, & Shields (2011) | + | + | + | ? | − | + | + | + | + | + | − |
| Handoll, Ollivere, & Rollins (2012) | + | + | + | + | + | + | + | + | + | + | + |
| **Joint Disorders Resulting in Adhesive Capsulitis and Stiffness** | | | | | | | | | | | |
| Blanchard, Barr, & Cerisola (2010) | + | + | + | − | + | + | + | + | + | + | − |
| Favejee, Huisstede, & Koes (2011) | + | + | − | ? | + | − | + | + | − | − | − |
| Maund et al. (2012) | + | + | + | + | + | + | + | + | − | + | + |
| **General Shoulder Pain** | | | | | | | | | | | |
| Alexander, Gilman, Brown, Brown, & Houghton (2010) | + | + | + | + | + | + | + | + | − | − | − |
| Brudvig, Kulkarni, & Shah (2011) | + | + | + | + | − | + | + | + | + | + | − |
| Camarinos & Marinko (2009) | + | + | + | + | − | + | + | + | − | − | − |
| Ho, Sole, & Munn (2009) | + | + | + | + | − | + | + | − | + | + | − |
| Marinko, Chacko, Dalton, & Chacko (2011) | + | + | + | + | − | − | + | + | − | + | − |
| **Rotator Cuff Tears** | | | | | | | | | | | |
| Ainsworth & Lewis (2007) | + | + | + | + | − | − | − | + | − | − | − |
| Du Plessis et al. (2011) | + | + | + | + | − | − | + | + | − | − | − |
| Seida et al. (2010) | + | + | − | + | − | + | + | + | − | − | − |
| **Subacromial Impingement Syndrome** | | | | | | | | | | | |
| Dorrestijn, Stevens, Winters, van der Meer, & Diercks (2009) | + | + | + | + | − | + | + | + | − | − | − |
| Hanratty et al. (2012) | + | + | + | + | − | + | + | + | + | + | − |
| Kelly, Wrightson, & Meads (2010) | + | + | + | − | − | + | + | + | − | − | − |
| Kromer, Tautenhahn, de Bie, Staal, & Bastiaenen (2009) | + | + | + | + | + | + | + | + | − | − | − |
| Kuhn (2009) | + | + | + | ? | − | + | − | + | − | − | − |
| Littlewood, Ashton, Chance-Larsen, May, & Sturrock (2012) | + | + | + | + | − | + | − | − | − | − | − |
| Nyberg, Jonsson, & Sundelin (2010) | + | + | + | + | − | + | + | + | − | − | − |
| Trampas & Kitsios (2006) | + | + | + | − | − | + | + | + | − | − | − |

*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 "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



*Suggested citation:* Marik, T. L., & Roll, S. C. (2017). Effectiveness of occupational therapy interventions for musculoskeletal shoulder conditions: A systematic review (Suppl. Table 2). *American Journal of Occupational Therapy, 71,* 7101180020. https://doi.org/10.5014/ajot.2017.023127

**Supplemental Table 3. Risk of Bias Table for Randomized Controlled Trials for Shoulder Review**

| Citation | Random Sequence Generation (Selection Bias) | Allocation Concealment (Selection Bias) | Blinding of Participants and Personnel (Performance Bias) | Blinding of Outcome Assessment (Detection Bias; Patient-Reported Outcomes) | Blinding of Outcome Assessment (Detection Bias; All Cause Mortality) | Incomplete Outcome Data (Attrition Bias; Short-Term [2–6 Wk]) | Incomplete Outcome Data (Attrition Bias; Long-Term [>6 Wk]) | Selective Reporting (Reporting Bias) |
|---|---|---|---|---|---|---|---|---|
| **Joint Disorders Resulting in Adhesive Capsulitis and Stiffness** | | | | | | | | |
| Celik (2010) | + | ? | ? | ? | NA | + | NA | + |
| Dogru, Basaran, & Sarpel (2008) | – | ? | ? | + | NA | + | NA | + |
| Ibrahim et al. (2012) | + | + | + | + | NA | + | NA | + |
| Ma, Je, Jeong, Kim, & Kim (2013) | + | + | – | + | NA | – | NA | – |
| Yang, Jan, Chang, & Lin (2012) | + | + | – | + | NA | + | NA | + |
| **Neck and Shoulder Pain** | | | | | | | | |
| Andersen et al. (2012) | + | ? | – | ? | NA | + | NA | + |
| Andersen et al. (2008) | + | ? | + | + | NA | + | + | + |
| Ang, Monnier, & Harms-Ringdahl (2009) | + | ? | ? | + | NA | + | + | + |
| Damian & Zalpour (2011) | ? | ? | ? | + | NA | – | NA | + |
| Kanai, Taniguchi, & Okano (2011) | ? | + | + | + | NA | + | NA | + |
| Lange, Toft, Myburgh, & Sjøgaard (2013) | + | + | – | + | NA | NA | + | + |
| Ma et al. (2011) | + | ? | – | ? | NA | + | – | + |
| **General Shoulder Pain** | | | | | | | | |
| Abdelshafi et al. (2011) | ? | + | – | ? | NA | + | NA | + |
| Hains, Descarreaux, & Hains (2010) | + | + | – | – | NA | + | – | – |
| Surenkok, Aytar, & Baltaci (2009) | + | + | – | ? | NA | + | NA | + |
| Yang, Chen, Hsieh, & Lin (2012) | + | + | – | + | NA | + | NA | + |
| Yiasemides, Halaki, Cathers, & Ginn (2011) | + | + | – | – | NA | + | + | + |
| **Rotator Cuff Tears** | | | | | | | | |
| Düzgün, Baltacı, & Atay (2011) | ? | ? | – | ? | NA | + | NA | + |
| Keener, Galatz, Stobbs-Cucchi, Patton, & Yamaguchi (2014) | + | + | – | + | NA | + | + | + |
| Krischak et al. (2013) | + | + | ? | – | NA | + | NA | + |
| **Subacromial Impingement Syndrome** | | | | | | | | |
| Abrisham et al. (2011) | + | + | ? | + | NA | – | NA | + |
| Akyol et al. (2012) | – | – | + | + | NA | + | NA | + |
| Bae, Lee, Shin, Kim, & Lee (2011) | ? | ? | ? | ? | NA | + | NA | + |
| Başkurt, Başkurt, Gelecek, & Özkan (2011) | ? | ? | ? | ? | NA | + | NA | + |

(*Continued*)

**Supplemental Table 3. Risk of Bias Table for Randomized Controlled Trials for Shoulder Review (*cont.*)**

| Citation | Random Sequence Generation (Selection Bias) | Allocation Concealment (Selection Bias) | Blinding of Participants and Personnel (Performance Bias) | Blinding of Outcome Assessment (Detection Bias; Patient-Reported Outcomes) | Blinding of Outcome Assessment (Detection Bias; All Cause Mortality) | Incomplete Outcome Data (Attrition Bias; Short-Term [2–6 Wk]) | Incomplete Outcome Data (Attrition Bias; Long-Term [>6 Wk]) | Selective Reporting (Reporting Bias) |
|---|---|---|---|---|---|---|---|---|
| Beaudreuil et al. (2011) | + | + | + | + | NA | + | + | + |
| Bennell et al. (2010) | + | + | – | + | NA | + | NA | + |
| Białoszewski & Zaborowski (2011) | ? | ? | ? | ? | NA | ? | ? | + |
| Cacchio et al. (2006) | + | + | ? | + | NA | NA | + | + |
| Crawshaw et al. (2010) | + | + | ? | ? | NA | + | + | + |
| Djordjevic, Vukicevic, Katunac, & Jovic (2012) | + | + | + | + | NA | + | NA | + |
| Eslamian, Shakouri, Ghojazadeh, Nobari, & Eftekharsadat (2012) | ? | + | – | ? | NA | + | NA | + |
| Galasso, Amelio, Riccelli, & Gasparini (2012) | + | + | + | + | NA | + | NA | + |
| Holmgren, Öberg, Sjöberg, & Johansson (2012) | – | + | – | + | NA | – | NA | + |
| Hultenheim Klintberg, Gunnarsson, Styf, & Karlsson (2008) | – | ? | ? | ? | NA | + | NA | + |
| Jowett et al. (2013) | ? | ? | – | – | NA | ? | ? | + |
| Kromer, de Bie, & Bastiaenen (2013) | + | + | ? | ? | NA | + | NA | + |
| Maenhout, Mahieu, De Muynck, De Wilde, & Cools (2013) | – | ? | ? | ? | NA | + | NA | + |
| Martins & Marziale (2012) | – | ? | ? | + | NA | + | NA | + |
| Montes-Molina, Martínez-Rodríguez, Rodríguez, Martínez-Ruiz, & Prieto-Baquero (2012) | + | + | + | + | NA | + | NA | + |
| Østerås, Torstensen, & Østerås (2010) | + | + | + | – | NA | + | + | + |
| Otadi, Hadian, Olyaei, & Jalaie (2012) | – | + | – | + | NA | + | NA | + |
| Şimşek, Balki, Keklik, Öztürk, & Elden (2013) | ? | ? | ? | + | NA | + | NA | + |
| Struyf et al. (2013) | ? | + | ? | + | NA | + | NA | + |
| Taskaynatan, Ozgul, Ozdemir, Tan, & Kalyon (2007) | ? | + | ? | + | NA | + | NA | + |
| Thelen, Dauber, & Stoneman (2008) | ? | + | – | + | NA | + | NA | + |
| Yildirim, Ones, & Celik (2013) | + | ? | ? | ? | NA | + | NA | + |

*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.



*Suggested citation:* Marik, T. L., & Roll, S. C. (2017). Effectiveness of occupational therapy interventions for musculoskeletal shoulder conditions: A systematic review (Suppl. Table 3). *American Journal of Occupational Therapy, 71,* 7101180020. https://doi.org/10.5014/ajot.2017.023127