Extraspinal Manipulation and/or Mobilization

Policy Statement
In the absence of contraindications, Optum* by OptumHealth Care Solutions, LLC considers extraspinal manipulation/mobilization medically necessary and/or proven for patients presenting with the following disorders:

- hip joint osteoarthritis (for individuals who have not undergone previous arthroplasty)
- plantar fascitis

Optum considers an initial trial (4-6 weeks) of extraspinal manipulation/mobilization clinically appropriate for patients presenting with neuromusculoskeletal disorders involving the shoulder, elbow (see exclusions below), wrist/hand (see exclusions below), hip, knee, ankle and foot (see exclusions below), when the following criteria are satisfied:

- a neuromusculoskeletal diagnosis for an extremity complaint has been documented
- there are no contraindications to manipulation or mobilization
- the patient expresses a defined preference for manipulation or mobilization
- plausible alternative treatment options have not been shown to be more effective
- the patient healthcare record documents manipulation or mobilization of an extremity joint or joints directly related to the diagnosis

Optum considers extraspinal manipulation/mobilization unproven, not medically necessary and/or not clinically supported for the treatment of neuromusculoskeletal disorders other than those described above including:

- Spinal disorders e.g., neck pain, low back pain
- Temporomandibular joint dysfunction/pain
- Lateral epicondylitis or epicondylalgia
- Hallux abducto valgus (bunion)
- Morton’s neuroma

The use of the extraspinal manipulation and/or mobilization for these neuromusculoskeletal disorders is either supported by some positive published data regarding safety and/or efficacy; however, a beneficial impact on health outcomes has not been proven for one or more of the following reasons: (1) internal validity is compromised by serious limitations; (2) data are sparse and/or imprecise; and/or (3) data are inconsistent or conflicting; or the research evidence regarding the use of extraspinal manipulation and/or mobilization is so limited that an appraisal of safety and efficacy cannot be made.

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Purpose
This policy serves as the criterion for peer-reviewer decisions concerning extraspinal manipulation and/or mobilization therapy for the treatment of neuromusculoskeletal disorders.

This policy also serves as a resource for peer-to-peer interactions in describing the position of Optum on the application of extraspinal manipulation/mobilization procedures for neuromusculoskeletal disorders.

Scope
In-scope:
All in and out of network programs (exclusive of Medicare and Medicaid products for chiropractic) involving all provider types, where utilization review determinations are rendered for extraspinal manipulation/mobilization services in the treatment of neuromusculoskeletal disorders.

Out-of-scope:
- extraspinal manipulation and/or mobilization for the treatment of nonmusculoskeletal disorders
- manipulation under anesthesia

Key Policy Question
Is there sufficient research evidence of the efficacy and safety of extraspinal manipulative or mobilization treatment, either as a combined or monotherapy, to conclude this intervention is an appropriate therapeutic option for a specific patient population suffering from neuromusculoskeletal disorders?

Summary
- A literature review identified 39 primary studies, mostly small randomized clinical trials, which met criteria for formal appraisal of extraspinal manipulation/mobilization for various neuromusculoskeletal disorders. Of these, 34 studies were rated as either low or very low.
- Only two trials were rated high and three were viewed as having moderate utility for making confident judgments about efficacy and safety.
- No studies were identified that investigated the effects of extraspinal manipulation for spinal disorders e.g., neck disorder, low back and related complaints, etc.
- The clinical evidence regarding the use of manipulative/mobilization therapy for temporomandibular joint (TMJ) disorders is so limited that an appraisal of safety and efficacy cannot be made.
- Most of the other literature reviews that were assessed identified the need for higher-level evidence before confident conclusions can be established on the proven status of extraspinal manipulation and/or mobilization for neuromusculoskeletal disorders.
- Documents published by several professional work groups offered recommendations concerning a range of upper and lower extremity disorders. The general direction of conclusions suggests stronger evidence in support of short-term benefit vs. sustained effects from extraspinal manipulation and/or mobilization.
- The literature review allows for some pragmatic conclusions suited for making evidence-informed decisions about the clinical appropriateness of extraspinal manipulation/mobilization for many neuromusculoskeletal disorders.

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Definitions

**Manipulation** – Passive movement usually of short amplitude and high-velocity that moves the joint into the paraphysiologic range i.e., Grade V mobilization procedure

**Accessory Movements** – movements within the joint and surrounding tissues that are necessary for normal range of motion (ROM), but can not be voluntarily performed

**Mobilization** – Passive rhythmic oscillations of varying speeds and amplitudes within the physiologic joint space for the purpose of influencing accessory movements to increase overall range of joint motion and/or reduce pain

**Extraspinal Manipulation or Mobilization** – The application of manipulation or mobilization to joints other than those of the spine, i.e., shoulder, elbow, wrist/hand/finger, hip, knee, ankle/foot/toe.

**Neuromusculoskeletal Diagnosis** – The conclusion reached following the analysis of a neuromusculoskeletal disorder, which is supported by an individual patient’s presenting complaints, pertinent history, and evaluation. A neuromusculoskeletal diagnosis is stated by using a valid ICD-10 diagnostic code.

Description

The Current Procedural Terminology (CPT) code to be applied to extraspinal manipulation or mobilization should most accurately describe the services rendered.

CPT code 98943 describes chiropractic manipulative treatment (CMT) when applied to one or more extraspinal regions.[1] One unit of 98943 is supported regardless of the number of extraspinal regions manipulated or the number of manipulations rendered to a specific region.

Extraspinal regions include:
- Head – Temporomandibular joint (TMJ), excludes the atlanto-occiputal articulation
- Lower Extremities
- Upper Extremities
- Rib Cage – anterior ribs, excludes costovertebral/costotransverse joints and posterior ribs
- Abdomen
- Viscera [2]

CPT code 97140, Manual Therapy Techniques, describes a range of manual therapies (eg, mobilization/manipulation procedures, manual lymphatic drainage, manual traction) typically performed in physical and occupational therapy practice. 97140 is a time-based procedural code – one or more regions, each 15 minutes.[1]
Background

Overview:
The application of extraspinal manipulative or mobilization for the treatment for neuromusculoskeletal disorders has been the subject of a number of literature reviews.[3-13] While there is an increasing volume of research evidence for various upper and lower extremity disorders, the quality generally remains low. Most of these reviews identify the need for higher-level evidence before confident conclusions can be established on the proven status of extraspinal manipulation/mobilization for neuromusculoskeletal disorders.

A qualitative literature review was conducted by a multidisciplinary workgroup. Databases searched included MEDLINE, PEDro, ChiroACCESS (MANTIS), The Index to Chiropractic Literature, and consumer-oriented search engines e.g., Google. Evidence identified from hand searches of bibliographies and other documents, primarily texts and non-indexed studies was also included in the literature review.

Studies were included if they represented primary research of experimental design i.e., randomized clinical trials or observational studies i.e., cohort, and large case series (N=100), and the study objective was to evaluate the efficacy and/or safety of extraspinal manipulation or mobilization for a particular neuromusculoskeletal disorder in a clinical setting. [Table 1] Case reports, small case series, physiologic/anatomic studies, commentaries, and opinion articles were excluded from critical appraisal. Additionally, studies were excluded if manipulative or mobilization treatment was solely delivered to spinal (including lumbopelvic) articulations or extraspinal manipulation/mobilization was not explicitly described. Extraspinal manipulative or mobilization treatment for nonmusculoskeletal disorders was also excluded, as this topic is addressed in policy 342. (see related policies)

Extracted literature was critically appraised for utility in answering the key policy question using “The Grading of Recommendations Assessment, Development and Evaluation” (GRADE) evidence grading scheme.[14] The findings of the workgroup were assessed in the context of externally conducted literature reviews, evidence syntheses, and guidelines.

Literature Review:

Shoulder disorders
A critical appraisal of twelve randomized clinical trials and a single prospective cohort design for various shoulder disorders (adhesive capsulitis, shoulder impingement syndrome, and nonspecific shoulder pain and dysfunction) showed all studies were rated as being of low to very low utility for making informed judgments about the efficacy and safety of manipulative/mobilization treatment either alone or in combination with other therapies. [Table 2] These studies typically suffered from a high risk of bias due to methodological limitations that diminished the internal validity of the results and/or sparse data analyses.[15-28] Some of these studies also had inconsistent data and/or did not allow for the independent assessment of manipulative/mobilization treatment. Only a few trials explicitly monitored and reported on adverse events.

A moderate quality study designed to identify the effects of manipulative therapy in addition to usual medical care for shoulder dysfunction and pain was excluded. The treatment protocol did not explicitly describe extraspinal manipulation.[29] Attempts to clarify the treatment condition were unsuccessful.

A recently published systematic review on the effectiveness of manual therapy (including manipulation and mobilization) for musculoskeletal disorders of the shoulder arrived at similar conclusions (Ho, 2009). The review found inconsistent evidence for the effectiveness manual therapy when compared to control interventions and no treatment for a range of outcomes (pain, impairment, and disability).

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Elbow disorders
Two randomized clinical trials that investigated manipulation and mobilization respectively for lateral epicondylitis were appraised.[30,31] [Table 3] Both trials suffered from small sample sizes resulting in a high risk of error when interpreting the results. Additionally, both studies reported inconsistent outcomes, which elevated the degree of uncertainty in the results.

Two systematic reviews encompassing a range of physiotherapies for lateral epicondylitis concluded the evidence is insufficient for most physiotherapy interventions including manipulation or mobilization.[10,11] Bisset concluded, “The evidence suggests that extracorporeal shock wave therapy is not beneficial in the treatment of tennis elbow. There is a lack of evidence for the long term benefit of physical interventions in general. However, further research with long term follow-up into manipulation and exercise as treatments is indicated.”[10] Similarly, Smidt stated, “There is insufficient evidence either to demonstrate benefit or lack of effect of lasertherapy, electrotherapy, exercises and mobilisation techniques for lateral epicondylitis.”[11]

Wrist and Hand disorders
Three randomized trials involving mobilization for the wrist were identified and evaluated. [See Table 4] These trials sought to assess the effects of mobilization procedures for carpal tunnel syndrome.[32,33,61] All studies suffered from a number of methodological shortcomings that resulted in a high risk of bias. The trial authored by Tal-Akabi, et al did not describe concealed allocation of randomization, comparative baseline characteristics of the subject population, the treatment conditions, assessor blinding, and did not include follow-up (outcome assessed immediately after intervention). In addition, statistical methodologies were limited by the small sample size.[32] An earlier trial by Davis did not report on critical outcomes i.e., pain, symptom severity, and function.[33] No differences in those outcomes measured were found between treatment groups. The study was also limited by an absence of equivalence criteria, lack of assessor blinding and loss to follow-up. A more recent pilot randomized clinical trial (moderate quality) sought to assess the relative effects of two different mobilization techniques for patients diagnosed with mild/moderate carpal tunnel syndrome.[61] Both groups demonstrated similar clinically meaningful improvements in pain intensity, symptom severity, function, nerve conduction and physical measures at the end of 6-weeks of treatment. Results were maintained at 3-month follow-up. The study had two significant flaws, omission of important baseline prognostic characteristics and failure to account for all subjects in the analysis of results. Additionally, the study would have benefited from having a control group. Confidence in the conclusions of sustained benefit for pain intensity and symptom severity was increased (high and moderate respectively) due to the large (1.12) and moderate (.67) treatment effects.

Four systematic reviews that included an assessment of extraspinal manipulation or mobilization for carpal tunnel syndrome reached disparate conclusions. A Cochrane review of non-surgical treatment (other than steroid injection) for carpal tunnel syndrome concluded, “Current evidence shows significant short-term benefit from oral steroids, splinting, ultrasound, yoga and carpal bone mobilisation... More trials are needed to compare treatments and ascertain the duration of benefit.”[12] Conclusions about extraspinal mobilization were based upon a single pilot study that the authors viewed as not being generalizable.[32] Goodyear-Smith also authored a systematic review of nonsurgical treatment options for carpal tunnel syndrome. This review found, “The evidence does not support the use of nonsteroidal anti-inflammatory drugs, diuretics, pyridoxine (vitamin B6), chiropractic [manipulative] treatment, or magnet treatment.”[13] Huissstede, et al conducted a recent systematic review of nonsurgical treatments for carpal tunnel syndrome.[62] The authors concluded there is limited evidence that carpal bone mobilization is effective, based upon a single study.[61] The RCT published by Tal-Akabi was rated to be of low-quality. The review concluded there were, “No significant results were found on any outcome regarding pain, function, or improvement comparing neurodynamic with carpal bone mobilization after 3 weeks of follow-up.” A comprehensive review by Bronfort et al. (2010) evaluated the effectiveness of manual therapies including manipulation for a broad range of extremity disorders.[63] The evidence for manipulation/mobilization in
the treatment of carpal tunnel syndrome was viewed as inconclusive and favorable. This review also recorded that splinting represented an established treatment option. Splinting has been shown to demonstrate short-term effects but not sustained benefit.[64]

A single preliminary RCT found that the group receiving joint mobilization achieved superior improvement in range of motion versus "no treatment" controls following immobilization for metacarpal fracture.[34] Since there were no a priori criteria established for clinical significance, the study did not allow for definitive conclusions about efficacy to be reached. Additionally, methodological flaws relating to the randomization scheme, and assessor blinding very seriously compromised the internal validity of the results. The follow-up period was insufficient to evaluate sustained effects. The sample size was small (N=18), increasing the risk of error. Adverse event reporting was not described.

Hip disorders
A single well-conducted clinical trial arrived at results supporting the application of manipulation for osteoarthritis of the hip. [Table 5] In a study with a low risk of bias i.e., high quality, the addition of extremity manipulation for the treatment of hip osteoarthritis resulted in a moderate to large clinically meaningful benefit across relevant outcomes. Adverse event (AE) reporting was conducted. There was a low risk of AE sufficient to withdraw from manual therapy, which was comparable to AE reported for the exercise group.[35]

In another trial, the addition of extremity manipulation for the treatment of post-surgical rehabilitation for knee or hip osteoarthritis, or hip fracture resulted in a lack of demonstrable benefit across relevant outcomes. The study was of moderate quality with the absence of adverse event reporting the most notable shortcoming in this trial.[36]

Knee disorders
A critical appraisal of five randomized clinical trials and three prospective cohort designs for various knee disorders (patellofemoral syndrome, post-knee arthroplasty, and osteoarthritis) showed all but one of the studies were rated as being of low to very low utility for making informed judgments about the efficacy and safety of manipulative therapy either alone or in combination with other therapies. [Table 6] Some of the studies suffered from a high risk of bias due to methodological limitations that diminished the internal validity of the results.[37-41] Other studies did not allow for the independent assessment of manipulative/mobilization treatment.[41-43] Most of the trials reported on adverse events.

Two studies were reviewed that described the use of mobilization for the treatment of patellofemoral pain syndrome (PFPS). A methodologically rigorous randomized clinical trial evaluated mobilization in combination with several other interventions.[41] This protocol did not permit assessment of any discrete treatment effects for mobilization. A prospective cohort study was designed primarily to identify prognostic variables for the application of manipulation for PFPS.[37] The conclusions suggest it may be possible to prospectively identify individuals with PFPS, who are most likely to respond to manipulation. This study has a high risk of bias for making judgments about efficacy due to its design, the timing of assessment, and imprecise data.

Four studies that explicitly evaluated the effect of manipulative therapies for knee osteoarthritis were assessed. Deyle authored two randomized clinical trials, both of which did not allow for assessment of the independent effects of manipulative therapy.[42,43] These studies did provide consistent evidence of safety, as adverse events were monitored and none occurred. A more recent randomized trial also found no adverse events associated with mobilization for knee osteoarthritis.[38] Confidence in the results of this trial was mitigated by conflicting outcomes within the study.

A cohort study, which was designed primarily to identify prognostic variables for the application of manipulation for knee osteoarthritis (OA), suggested it may be possible to prospectively identify individuals with knee OA who are most likely to respond to manipulation.[39] The study includes a high

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risk of bias for rendering judgments about efficacy due to its design, potential for assessment bias, and a lack of sustained outcomes data.

Another study attempted to assess immediate responsiveness to a single hip mobilization for patients undergoing provocative testing for symptomatic knee osteoarthritis.[40] The cohort design, which was appropriate for the testing arm of the study, limits conclusions about treatment efficacy. Accordingly, there was a high risk of bias in the study due to serious limitations in methodological quality, some uncertainty about the directness of the results, and imprecise and sparse data. Adverse events were not reportedly assessed.

Ankle and Foot disorders
Ten studies met inclusion criteria for critical appraisal. [Table 7] Disorders for which manipulation/mobilization was assessed included ankle sprains [44-49], plantar heel pain [50,51], symptomatic bunion [52], and Morton’s neuroma.[53]

Six clinical trials were identified that assess the efficacy of mobilization for stable ankle sprains. Of these, one randomized clinical trial reported short-term statistical and clinically significant change across all outcome variables when extremity mobilization was applied to individuals having recurrent ankle sprains.[48] This study was rated as moderate quality. The study, however, had several notable shortcomings i.e., non-patient-centric outcome variables, an outcome measure of uncertain validity, and an atypical population. There were four additional randomized clinical trials and a single cohort design – all of which were rated as low to very low quality for making judgments about the efficacy of manipulative therapy for ankle sprains.[44-47,49] Broadly, these studies suffered from a combination of methodological shortcomings that serve to seriously compromise their internal validity and data analyses.

Two randomized clinical trials pertaining to mobilization for plantar heel pain were assessed.[50,51] In a high quality study, the addition of extremity manipulation for the treatment of plantar heel pain resulted in short-term and sustained statistical and clinically significant change across all outcome variables (pain, function, and satisfaction with outcome). The absence of adverse events did aid in making judgments concerning safety.[50] The second study was appraised as being of very low utility for making judgments about the effectiveness of manipulation for plantar fascitis.[51] This clinical trial suffered from a high risk of bias due to very serious limitations in methodological quality, important inconsistencies across outcomes over time, inability to isolate the specific treatment effects from manipulation, and sparse and imprecise statistical analysis. The study did, however, assess for patient safety – no adverse events reportedly occurred.

Single trials seeking to investigate the efficacy of mobilization/manipulation for symptomatic bunion and Morton’s neuroma exhibited similar shortcomings as found in the study authored by Dimou.[52,53]

Spinal Disorders
Searches of biomedical databases and consumer-oriented search engines did not identify any studies meeting inclusion criteria that investigated the effects of extraspinal manipulation for spinal disorders e.g., neck disorder, low back and related complaints, etc.

Temporomandibular Joint Disorders
The clinical evidence regarding the use of manipulative or mobilization therapy for temporomandibular joint (TMJ) disorders is so limited that an appraisal of safety and efficacy cannot be made. The literature search identified a single small randomized clinical trial (RCT) and a small prospective case series. Case reports comprised the balance of research evidence.

A RCT (N=28) used kinesiographic tracings to assess the effects of osteopathic manipulative treatment (OMT) on the parameters of maximal mouth opening and movement velocities.[54] The clinical meaningfulness of the primary outcome variables were not measured in this study. A small case series
(N=8) found all participants who completed outcome assessments improved following a course of instrument-based manipulative therapy.[55] The study design did not allow for any firm conclusions to be drawn. The authors noted the need for additional study.

Positions and Guidelines of Professional Groups
Several professional work groups have published documents containing positions on conservative management interventions for a range of upper and lower extremity disorders. [Table 8] The recommendations concerning manipulation and/or mobilization were not always arrived at solely by the assessment of the discrete effects of extraspinal manipulation or mobilization. The general direction of conclusions suggests stronger evidence in support of short-term benefit vs. sustained effects from extraspinal manipulation and/or mobilization.

A multidisciplinary panel published guidelines regarding the appropriateness of exercises and manual therapy, including manipulation and mobilization, for individuals suffering symptomatic osteoarthritis of extremity joints.[56] The panel concluded that manual therapy in combination with therapeutic exercise provides short-term pain relief for hip and knee osteoarthritis. Manual therapy was also viewed as having a favorable impact on ROM and functional status in the treatment of hip osteoarthritis.

The Council on Chiropractic Guidelines and Practice Parameters (CCGPP) and the Orthopaedic Section of the American Physical Therapy Association (APTA) have published documents topical to the management of upper and lower extremity disorders.[57-60] Varying degrees of positive recommendations were recorded for shoulder pain, osteoarthritis of the hip and knee, patellofemoral pain, ankle sprain, plantar fasciitis, metatarsalgia, and hallux limitus/rigidus. The evidence was deemed insufficient for extraspinal manipulation or mobilization of hallux abducto valgus (bunion). The evidence for mobilization of the elbow or wrist for lateral epicondylitis suggests an immediate benefit. Evidence about sustained effects was viewed as absent. Similarly, the evidence for manipulative treatment is lacking. The evidence for treatment of carpal tunnel syndrome was limited to a single trial, rated as moderate quality, which did not permit assessment of the independent effects of wrist manipulation. Expert opinion was provided in support of wrist manipulation for carpal tunnel syndrome.

Conclusions
The clinical evidence reviewed includes two studies rated as being of high quality for answering the key policy question. There is sufficient evidence of high quality to support the medically necessary or proven application of hip joint manipulation for osteoarthritis of the hip, and mobilization of the foot and ankle for plantar heel pain. In contrast, the clinical evidence regarding the use of extraspinal manipulative or mobilization therapy for spinal conditions and temporomandibular joint (TMJ) disorders is so limited that an appraisal of safety and efficacy cannot be made.

This literature review allows for some pragmatic conclusions suited for making evidence-informed decisions about the clinical appropriateness of extraspinal manipulation/mobilization for many neuromusculoskeletal disorders. Practical considerations in the clinical setting include the potential benefits vs. the risks, patient preferences, and the current use of extraspinal manipulation/mobilization for neuromusculoskeletal disorders.

The potential benefits associated with extraspinal manipulation/mobilization for neuromusculoskeletal disorders likely outweigh risks to patient safety. In the absence of known contraindications to extraspinal manipulation or mobilization, adverse events tend to be mild, transient and similar to other more established non-operative interventions e.g., exercise, and are less significant than pharmaceutical management. The research evidence suggests consistent findings of favorable outcomes when care management is instituted, which may or may not be attributable to a particular intervention, for a number of the disorders reviewed. Since a significant response to treatment can reasonably be assessed early during a period of care, the risk of failing to pursue a potentially beneficial different treatment approach is likely modest.

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Utilization Management Policy

Some individuals may demonstrate a preference for manipulative/mobilization treatment vs. more established interventions e.g., pharmacological treatments, exercise, injections, etc. Preferences in favor of manipulative or mobilization treatment may reflect patients who: a) have poor tolerance for these established treatments; b) have medical contraindications for pharmacological and/or interventional treatments; c) experience insufficient relief from or are unresponsive to established treatments; or d) simply prefer to avoid medication use and/or interventional strategies.

Extraspinal manipulation and/or mobilization are frequently used by physical therapists, occupational therapists, chiropractors and osteopaths. Educational institutions provide training and certification programs. Professional organizations have established positions and guidelines supportive of extraspinal manipulation/mobilization for various upper and lower extremity disorders.

Coding Information

Note: The Current Procedural Terminology (CPT) codes listed in this policy may not be all inclusive and are for reference purposes only. The listing of a service code in this policy does not imply that the service described by the code is a covered or non-covered health service. Coverage is determined by the member’s benefit document.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>98943</td>
<td>Chiropractic manipulative treatment (CMT); extraspinal, one or more regions</td>
</tr>
<tr>
<td>97140</td>
<td>Manual therapy techniques (e.g., mobilization/manipulation, manual lymphatic drainage, manual traction), one or more regions, each 15 minutes</td>
</tr>
</tbody>
</table>

References


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33. Davis PT. Comparative efficacy of conservative medical and chiropractic treatments for carpal tunnel syndrome. *Journal of Manipulative and Physiological Therapeutics* 1998; 21:317-326


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Additional Resources

- Haldeman S. Guidelines for chiropractic quality assurance and practice parameters. 1993; Aspen Pub, Gaithersburg, MD

Tables

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- Table 3: Elbow
- Table 4: Wrist and Hand
- Table 5: Hip
- Table 6: Knee
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- Table 8: Positions of Professional Groups

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**Table 1: Clinical Studies Meeting Selection Criteria for Quality Appraisal for Extraspinal Manipulation/Mobilization for the Treatment of Neuromusculoskeletal Disorders**

<table>
<thead>
<tr>
<th>Author Date</th>
<th>Study Design</th>
<th>Disorder</th>
<th>Population and Setting</th>
<th>Interventions &amp; Schedule</th>
<th>Outcome Variables</th>
<th>Follow-up Assessments</th>
<th>Results</th>
</tr>
</thead>
</table>
- Mean age 53 years  
- Primary shoulder impingement  
- Private clinic | Each group:  
- 3 sessions per week  
- 3 weeks duration  
Standard care group:  
- Hot packs  
- Active ROM exercise  
- Physiologic stretching  
- Strengthening exercise  
- Soft-tissue mobilization  
- Patient education  
Experimental group:  
- Joint mobilization  
- Standard care (as above) | - VAS  
- ROM (active)  
- Reaching (function) | - End of treatment period | (+) (=)  
- Mobilization in addition to standard care was associated with decreased 24-hour pain and pain with subacromial compression  
- There were no differences between groups for active ROM and reaching activities  
- There were no adverse events reported |
- Ages 18 to 65 years  
- Primary shoulder impingement  
- Multiple clinics | Each group:  
- 6 sessions over 3 weeks  
Exercise group:  
- Stretching exercises  
- Strengthening exercises  
Manual therapy group:  
- Joint mobilization primarily of the gleno-humeral joint but may have included the shoulder girdle, cervical and thoracic regions  
- Exercise as above | - VAS  
- Functional assessment questionnaire  
- Electronic dynamometer | - 2-months post index visit | (+)  
- Mobilization in addition to standard exercise therapy achieved statistical and clinically significant within and between group improvements in measures of pain, function and strength |

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<table>
<thead>
<tr>
<th>Author</th>
<th>Study Type</th>
<th>Condition</th>
<th>Patient Characteristics</th>
<th>Intervention Details</th>
<th>Outcome Measures</th>
<th>Follow-up</th>
<th>Notes</th>
</tr>
</thead>
</table>
| Citaker (2005) | RCT | Shoulder impingement syndrome | - N = 40  
- Mean age 53 years  
- Academic outpatient clinic | Each group:  
- Number and duration of treatment period was unclear  
Mobilization group:  
- Hot packs  
- Manual mobilization  
- Home exercise program  
PNF group:  
- Hot packs  
- PNF theraband exercises  
- Home exercise program | - VAS  
- ROM  
- UCLA criteria values | - 2-weeks  
- 6-weeks  
- 11-weeks | - Between group comparisons showed similar statistical and clinically meaningful decreases in pain perception  
- Similar statistically significant increases in ROM were experienced by both groups  
- Mobilization was reportedly tolerated better than PNF |
| Munday (2007) | RCT | Shoulder impingement syndrome | - N = 34  
- Ages 16 to 38 years  
- Symptoms >6 weeks duration  
- Academic outpatient clinic | Each group:  
- 8 sessions over 3 weeks  
Placebo group:  
- Detuned ultrasound  
PNF group:  
- Shoulder girdle HVLA adjustments (acromioclavicular joint most frequently) | - Pain pressure threshold  
- ROM  
- VAS  
- SFMPQ | - End of treatment period  
- 1-month post treatment | - Both groups achieved statistically significant improvement at 1-month post treatment pain pressure threshold, VAS, and the SFMPQ  
- Clinically meaningful change was reported for pain scales at the end of treatment and sustained at 1-month follow-up for both groups  
- Between group comparisons showed a statistically significant treatment effect favoring the adjustment group for pain pressure threshold at the end of treatment and at 1-month follow-up  
- Adverse events (AE) were assessed. Five subjects experienced minor transient post treatment soreness. No subjects withdrew due to AE. |

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## Utilization Management Policy

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Conditions</th>
<th>Intervention</th>
<th>Outcomes</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atkinson (2008) [19]</td>
<td>RCT</td>
<td>Rotator cuff tendinopathy</td>
<td>Group 1: HVLA shoulder manipulation (6 sessions; duration of treatment plan not stated)</td>
<td>Pain pressure threshold, ROM, NRS</td>
<td>- Between group comparisons showed statistical improvement for both groups in pain pressure threshold and ROM, which favored those receiving manipulation. - Between group comparison showed no statistical differences in pain intensity. - The degree of change in pain intensity reached clinical significance only for Group 1</td>
</tr>
<tr>
<td>Winters (1997) [20]</td>
<td>RCT (pilot)</td>
<td>Shoulder girdle and synovial complaints</td>
<td>Group 2: Sham laser therapy (6 sessions; duration of treatment plan not stated)</td>
<td>Group 1: HVLA shoulder manipulation (6 sessions; duration of treatment plan not stated)</td>
<td>Group 2: Sham laser therapy (6 sessions; duration of treatment plan not stated)</td>
</tr>
<tr>
<td>Winters (1999) [21]</td>
<td>RCT (follow-up data)</td>
<td>Shoulder girdle and synovial complaints</td>
<td>Follow up survey data obtained from 136 (76%) of the original sample</td>
<td>Perceived outcome i.e., cured/not cured, Recurrence rate</td>
<td>Follow up survey data obtained from 136 (76%) of the original sample</td>
</tr>
</tbody>
</table>

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<table>
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<tr>
<th>Study</th>
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<th>Interventions</th>
<th>Outcomes</th>
<th>Results</th>
</tr>
</thead>
</table>
| Teys (2008) [22] | RCT | Painfully limited shoulder movement | N = 24  
- Ages 20 to 64 years  
- University physical therapy clinic | All participants:  
- A three sessions over ~ 1 week of each...  
Treatment group:  
- shoulder mobilization  
Sham group:  
- simulated mobilization  
Control group:  
- No treatment | ROM  
- Pain pressure threshold | The treatment group experienced an immediate and statistically significant increase in pain pressure threshold and ROM when compared to the sham and control groups.  
There were no adverse events associated with mobilization |
| Knebl (2002) [23] | RCT (pilot) | Shoulder dysfunction and chronic pain | N = 31  
- Elderly subjects with diagnoses of tendinitis, bursitis, osteoarthritis, healed fracture or neurologic impairment  
- University affiliated osteopathic clinic | All participants:  
- Treatment period = 14 weeks:  
Two sessions every other week for 3 weeks followed by two sessions every 4 weeks  
Total of 10 sessions @ 30 minutes each  
Treatment group:  
- OMT (Spencer technique)  
Sham group:  
- simulated OMT | ROM (active & passive)  
NRS  
Modified physical functioning scale (dressing, bathing, grooming) | Significant increases between most baseline and final active and passive ROM measures were achieved - favoring the OMT group.  
Both groups achieved similar reductions in reported pain intensity  
Adverse events were not described |
- Ages 20 to 77 years  
- Hospital-based university physical therapy department | All participants:  
- Two to three sessions per week over 4 week of each...  
Experimental group:  
- mobilization  
- active exercises  
Control group:  
- active exercises | ROM  
- Pain pressure threshold | All motions, except for internal rotation in the control group, increased significantly from baseline in both groups.  
Passive abduction showed significantly greater improvement in the mobilization group.  
Pain scores improved more in the mobilization group; however, the differences were not significant |

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<thead>
<tr>
<th>Study</th>
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<th>Outcome Measures</th>
<th>Results</th>
</tr>
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<tbody>
<tr>
<td>Vermeulen (2006)</td>
<td>RCT</td>
<td>Adhesive capsulitis</td>
<td>All participants:</td>
<td>• High-grade mobilization group:</td>
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<td></td>
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<td></td>
<td>• Two sessions per week up to 12 weeks of each...</td>
<td>- ROM</td>
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<td></td>
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<td>• Grade III and IV mobilization</td>
<td>- VAS</td>
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<td></td>
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<td></td>
<td>• Passive and active exercises</td>
<td>- Shoulder disability questionnaire</td>
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<td>• Low-grade mobilization group:</td>
<td>- SF-36</td>
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<td>• Grade I mobilization</td>
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<td></td>
<td>• Passive and active exercises</td>
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<td></td>
<td>N = 100</td>
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<td>Mean age 52 years</td>
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<td>Hospital-based university physical therapy clinic</td>
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<td>[25]</td>
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<td></td>
<td>Both groups reported similar subjective overall improvement (82% to 91%) at 3-month follow up</td>
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<td></td>
<td>Over the total follow-up period of 12 months, there was a trend toward significantly greater increase in active abduction and active external rotation in the HGMT group vs. the LGMT group</td>
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<td></td>
<td>Similarly, the HGMT group experienced greater improvements in passive abduction at 3 and 12 months</td>
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<td></td>
<td>Passive external rotation at 12 month follow-up favored the HGMT group</td>
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<td>Shoulder disability measures showed significantly greater improvement over the 12 month period in the HGMT group</td>
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<td>Passive abduction showed significantly greater improvement in the mobilization group</td>
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<td>Pain scores improved more in the mobilization group; however, the differences were not significant</td>
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<tr>
<td>Guler-Uysal (2004)</td>
<td>RCT</td>
<td>Adhesive capsulitis</td>
<td>N = 40</td>
<td>Similar reduced pain scores and ROM values were obtained in both groups at the end of the first week</td>
</tr>
<tr>
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<td>[26]</td>
<td></td>
<td>Ages 40 to 85 years</td>
<td>At the end of the second week, 95% of the manual therapy group and 65% of the physical therapy group reached ROM targets. Recovery rates were statistically significant in favor of the manual therapy group.</td>
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<td>University out-patient clinic</td>
<td>The mean number of manual therapy sessions for those patients achieving recovery was 3.0 visits. The mean for the physical therapy group was 8.2 visits</td>
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</tbody>
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### Utilization Management Policy

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<tr>
<th>Study</th>
<th>Design</th>
<th>Condition</th>
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<th>Control Group</th>
<th>Recovery Curves</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>Bürgen (1984) [27]</td>
<td>RCT</td>
<td>Adhesive capsulitis</td>
<td>N = 42, Ages 44 to 74 years, Duration = 1 to 12 months, Hospital-based research facility</td>
<td>Steroid group: Three weekly injections, Mobilisation group: 3 times per week for 6 weeks, Maitland Ice group: 3 times per week for 6 weeks, Ice packs, PNF Control group: No treatment, Home exercise, Analgesia</td>
<td>Recovery curves for: Pain, ROM</td>
<td>Weekly for 6 weeks (treatment period), Monthly for 6 months</td>
</tr>
<tr>
<td>Rainbow (2008) [28]</td>
<td>Cohort (prospective)</td>
<td>Adhesive capsulitis</td>
<td>N = 8, Ages 30 to 65 years, 3-15 months duration, Academic outpatient clinic</td>
<td>Group 1: 12 sessions of HVLA (over 6-weeks) manipulation to the glenohumeral joint, cervical and thoracic spine, Home exercise (daily) Group 2: Grade-IV mobilization of the glenohumeral joint (12 sessions over 6-weeks), Home exercise (daily)</td>
<td>SPADI</td>
<td>Weekly</td>
</tr>
<tr>
<td>Struijs (2003) [30]</td>
<td>RCT (pilot)</td>
<td>Lateral epicondylitis</td>
<td>N = 31, Mean = 47 years, Orthopedic research center</td>
<td>Both groups: 9 sessions over 6 weeks Manipulation group: Wrist manipulation Standard therapy group: Ultrasound, friction massage, stretching/strengthening exercises</td>
<td>GRS, VAS, Pain pressure threshold</td>
<td>3-weeks, 6-weeks</td>
</tr>
</tbody>
</table>

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# Utilization Management Policy

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<thead>
<tr>
<th>Study</th>
<th>Design</th>
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<th>Participants</th>
<th>Interventions</th>
<th>Outcomes</th>
<th>Notes</th>
</tr>
</thead>
</table>
| Vicenzino (2001) [31] | RCT | Lateral epicondylalgia | *N = 24*  
- Ages 34 to 66 years  
- Unilateral epicondylalgia for a minimum of 6 weeks  
- University affiliated clinic |  
- Treatment group: elbow mobilization  
- Placebo group: firm manual contact  
- Control group: no treatment | *Pain-free grip strength*  
- *Pain pressure threshold* |  
- The treatment group experienced a statistically significant increase in pain-free grip, while neither the placebo or control groups achieved noticeable improvement.  
- None of the groups showed significant change in pain pressure threshold  
- There were no adverse events reported |
- Ages 29 to 85 years  
- Symptom duration ranged from 1 to 3 years  
- Satisfied criteria for decompressive surgery  
- Setting - unknown |  
- Group I: median nerve mobilization  
- Group II: carpal bone mobilization  
- Control group: no treatment | *Active ROM*  
- *ULTT2a*  
- *VAS*  
- *Functional box scale*  
- *Pain relief scale*  
- *Surgical referral* |  
- Statistically significant differences between groups, which favored the two mobilization groups, were noted for measure of pain (VAS and PRS)  
- In the mobilization groups, 3 of 14 subjects went on to have surgery, while 6 of 7 did so from the control group  
- There were no other statistically significant between group differences for the other outcomes measured  
- The study failed to show significant differences in the effectiveness of median nerve mobilization vs. carpal bone mobilization |

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## Utilization Management Policy

**Davis (1998)**

**RCT**

**Carpal tunnel syndrome**

- N = 91
- Ages 21 to 45 years
- CTS diagnosed by correlation of presenting symptoms, physical exam, and nerve conduction study
- University affiliated research center

**Medical group:**
- Ibuprofen (800 mg 3x/day for 1 wk; 800 mg 2x/day 1 wk; 800 mg as needed for 7 wks)
- Nocturnal splint

**Chiropractic group:**
- HVLA manipulation - discretionary to the wrist, elbow, shoulder, cervical and upper thoracic vertebrae (3x/wk for 2 wks; 2x/wk for 3 wks; 1x/wk for 4 wks)
- Ultrasound
- Nocturnal splint

**Self reported measures of mental and physical stress:**
- CTOA-M
- CTOA-P
- Nerve conduction studies
- Vibrometry
- SF-36 (1-month f/u only)

- **End of treatment period**
- **1-month**

- There was significant improvement in perceived comfort and function, nerve conduction and finger sensation overall, but no significant differences between groups in the efficacy of either treatment.
- Overall improvement was clinically significant
- Because there were no a priori equivalence criteria established, the findings neither prove the equivalence of the two interventions nor do the results indicate that either treatment approach is more efficacious than ‘watchful waiting’
- 22% of the medical care group reported adverse events. Two subjects dropped out as a result.
- One subject assigned to the chiropractic group experienced transient neck soreness.

**Burke (2007)**

**RCT** (pilot)

**Carpal tunnel syndrome**

- N = 26 (data reported for 22)
- Ages 31 to 49 years
- Symptom duration not reported
- Satisfied criteria for diagnosis of CTS
- Setting – research laboratory

**Both groups:**
- 6 week treatment period
- 2 treatments per week for 4 weeks; 1 treatment per week for 2 weeks
- Home exercise program (stretching and strengthening)

**Graston Technique Protocol:**
- (N=14)
- Instrument-assisted soft-tissue mobilization

**Soft Tissue Mobilization:**
- (N=12)
- Manual mobilization

**Sensory and motor nerve conduction studies**
- VAS
- Boston carpal tunnel questionnaire (symptom severity and functional status)
- Physical measures of sensory and motor functions

- **Within 1 week of the last treatment**
- 3 months post-treatment

- Both groups achieved similar improvements across all outcomes
- Results were maintained at the 3-month follow up
- Data for the “control hand” did not change during the study period
- Clinically meaningful change was achieved for pain, symptom severity and function
- Many subjects reported mild transient soreness and bruising
- One subject withdrew from the study due to profound bruising and swelling that required medical treatment

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<thead>
<tr>
<th>Author</th>
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<th>Intervention</th>
<th>Control</th>
<th>Outcome Measures</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Randall (1992)</td>
<td>RCT</td>
<td>Post metacarpal fracture</td>
<td>Intervention group (N=9): Joint mobilization, 3 sessions/1 week, Home exercise program</td>
<td>Control group (N=9): No outpatient treatment, Home exercise program</td>
<td>- Active ROM, Torque ROM</td>
<td>Both groups improved during the treatment period, Change in active and torque ROM were significantly greater in the treatment group than in the control group, The clinical significance of between group differences was not calculated</td>
</tr>
<tr>
<td>Hoeksma (2004)</td>
<td>RCT</td>
<td>Osteoarthritis of hip</td>
<td>Both groups: 9 sessions over 5 weeks</td>
<td>Manual therapy group: hip manipulation/mobilization, Exercise therapy group: structured exercise program</td>
<td>- GRS, VAS, SF-36, Harris Hip Score, Walking test</td>
<td>The effects on general improvement, hip function, and pain were significantly better for subjects who received manual therapy, Patient rating of successful outcome for the manual therapy group was 81% vs. 50% for the exercise group, For the manual therapy group, effect sizes for pain and stiffness were moderate and large for range of motion, Most of the beneficial effects of manual therapy persisted at 3 and 6 months follow up</td>
</tr>
</tbody>
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<tr>
<th>Study</th>
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<th>Intervention</th>
<th>Sample Characteristics</th>
<th>Outcome Measures</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Liciardone (2004) [36] | RCT | Post-hip arthroplasty for osteoarthritis or fracture; or post-knee arthroplasty for osteoarthritis | - N = 60  
- Ages ≥50 years  
- Underwent surgery within 1 week before starting rehabilitation  
- Hospital-based acute rehabilitation unit | - FIM  
- Analgesic use  
- Length of stay  
- Rehabilitation efficiency  
- SF-36 | OMT was not significantly better than sham treatment in any primary outcome, even after adjusting for baseline group differences  
Among patients with hip fracture, there were no significant between group differences in primary outcomes  
For patients with osteoarthritis (knee or hip), OMT was associated with greater length of stay and lower rehabilitation efficiency |
| Crossley (2002) [41] | RCT | Patello-femoral pain | - N = 71  
- Ages ≥40 years  
- Pain ≥1 month duration  
- Multiple private clinics | - VAS  
- FIQ  
- AKPS  
- GRS | The physical therapy group experienced significantly greater treatment effects vs. the placebo group for pain, disability, impairment, and perceived response to treatment |
| Iverson (2008) [37] | Cohort | Patello-femoral pain | - N = 50  
- Ages 18 to 45 years  
- Pain provoked by ≥2 of the following: squatting, stair ascent, stair descent, prolonged sitting, kneeling, or isometric quadriceps contraction  
- Ambulatory outpatient military clinic | - NRS  
- GRS | The most powerful predictor of treatment success was a side-to-side difference in hip internal rotation of >14 degrees  
If this variable was present, then the odds of a successful outcome improved from 45% to 80% |

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<th>Interventions</th>
<th>Outcomes</th>
<th>Post treatment</th>
</tr>
</thead>
</table>
| Moss (2007) [38] | RCT | Knee osteoarthritis | N = 38 | - Mean age 63 years  
- Moderate knee pain  
- Academic research facility | - All participants:  
  - A single session over ~ 1 week of each...  
  - Treatment group:  
    - Mobilization  
  - Sham group:  
    - Manual contact without movement  
  - Control group:  
    - No treatment (assessment only) | - Pressure pain threshold  
- 3-m timed ‘up and go’ test  
- VAS during 3-m timed ‘up and go’ test  
- WOMAC – pain subscale  
- VAS  
- Sit-to-Stand time | Post treatment | (+) 
- The treatment group achieved statistically and clinically significant improvements in pain pressure threshold (sensitivity to mechanical pain) when compared to the sham and control groups  
- Pain intensity measures, both during activity and 24 hours post treatment demonstrated minimal change across groups  
- The treatment group experienced significant improvement in the sit-to-stand functional test when compared to the control group but not the sham group  
- The between group differences for the 3-m ‘up and go’ test favored the treatment group but differences were not significant |
| Deyle (2000) [42] | RCT | Knee osteoarthritis | N = 83 | - Mean age 61 years  
- Ambulatory outpatient military clinic | - Both groups:  
  - 8 sessions over 4 weeks  
  - Treatment group:  
    - Manual therapy including mobilization of the knee (and possibly hip, ankle, or lumbar spine)  
    - Standardized supervised exercise  
    - Home exercise program  
  - Placebo group:  
    - Detuned ultrasound | - 6-minute walk test  
- WOMAC | 4 weeks  
8 weeks  
1 year | (+) 
- The intervention group experienced clinically and statistically significant improvements in self-perceptions of pain, stiffness, functional ability, and distance walking.  
- These beneficial effects persisted at 4 weeks and 1 year |

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<tr>
<th>Study</th>
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<th>Cohort/Setting/Study Details</th>
<th>Outcome Measures</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deyle (2005)</td>
<td>RCT</td>
<td>Knee osteoarthritis: N = 134, Mean age 63 years, Ambulatory</td>
<td>Treatment group: 8 sessions over 4 weeks</td>
<td>Both groups demonstrated clinically significant improvement at 4-weeks, which were maintained at 8-weeks. Treatment group achieved twice the improvement in self-perceptions of pain, stiffness, and functional ability (52% vs. 26%). At 4 and 8 weeks both groups exhibited similar improvement. At 1-year, both groups were substantially and about equally improved over baseline measurements.</td>
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<td></td>
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<td>outpatient military clinic</td>
<td>Home exercise group:</td>
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<td>Detailed verbal and hands-on instruction in a home-based exercise program</td>
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<td>WOMAC</td>
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<td>6-minute walk test</td>
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<td>4 weeks</td>
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<td>8 weeks</td>
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<td>1 year</td>
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<tr>
<td>Currier (2007)</td>
<td>Cohort</td>
<td>Knee osteoarthritis: N = 60, Ages 51 to 79 years, Moderate knee</td>
<td>All participants: 4 hip mobilizations during a single session</td>
<td>The presence of one predictive variable increased the probability of a successful short-term outcome from 68% to 92%. If two variables were present, the probability of success increased to 97%.</td>
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<tr>
<td></td>
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<td>pain, Academic research facility</td>
<td>NRS, GRS, PSFS</td>
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<td>WOMAC</td>
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<td>2-days post treatment</td>
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<td>asymptomatic subjects, Ages 50 to 79 years, Military hospital-</td>
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<td>affiliated outpatient physical therapy clinic</td>
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<td>NRS, ROM</td>
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<td>Immediately following treatment</td>
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<td>Study</td>
<td>Study Type</td>
<td>Outcome</td>
<td>Participants</td>
<td>Interventions</td>
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<tr>
<td>Pellow (2001)</td>
<td>Controlled Pilot Clinical Trial</td>
<td>Ankle sprain (Grade I &amp; II)</td>
<td>N = 30, Ages 15 to 50 years, Subacute &amp; chronic grade I and II ankle inversion sprains, Academic research clinic</td>
<td>Both groups: Up to 8 sessions over 4 weeks Treatment group: Ankle manipulation Placebo group: Detuned ultrasound</td>
</tr>
<tr>
<td>Eisenhart (2003)</td>
<td>RCT</td>
<td>Ankle sprain (Grade I &amp; II)</td>
<td>N = 55, Ages ≥18 years, Acute grade I and II ankle inversion sprains, University affiliated hospital emergency room</td>
<td>Both groups: Current standard of care for ankle sprains – RICE Anti-inflammatory meds OMT group: Ankle manipulation Control group: No additional services</td>
</tr>
<tr>
<td>Green (2001)</td>
<td>RCT</td>
<td>Acute ankle inversion sprain</td>
<td>N = 41, Ages 15 to 48 years, Acute ankle inversion sprains, Hospital outpatient clinic</td>
<td>Both groups: Up to 6 sessions over 2 weeks Current standard of care for ankle sprains – RICE Experimental group: Ankle manipulation Control group: No additional services</td>
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</tbody>
</table>

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<th>Follow-up</th>
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<tbody>
<tr>
<td>Lopez-Rodriquez (2007) [47]</td>
<td>Prospective, sham-controlled, repeated measures</td>
<td>Ankle sprain</td>
<td>Both groups: &lt;li&gt;N = 52&lt;/li&gt; &lt;li&gt;Ages 18 to 49 years&lt;/li&gt; &lt;li&gt;Field-hockey players&lt;/li&gt; &lt;li&gt;Ankle sprain — Grade II&lt;/li&gt; &lt;li&gt;Hospital outpatient clinic&lt;/li&gt; &lt;li&gt;Intervention group: Ankle manipulation (two techniques)&lt;/li&gt; &lt;li&gt;Placebo group: Sham manipulation&lt;/li&gt;</td>
<td>Baropodometric measures</td>
<td>Immediately following treatment</td>
<td>The intervention group revealed statistically significant differences between pre and post manipulation values for the percentage of posterior load and percentage of bilateral anterior load on the foot. Other variables did not achieve significance for the within-group analysis. Between group analysis favored the intervention group for most of the outcome variables.</td>
</tr>
<tr>
<td>Vicenzino (2006) [48]</td>
<td>RCT</td>
<td>Recurrent ankle sprain</td>
<td>Both groups: &lt;li&gt;N = 16&lt;/li&gt; &lt;li&gt;Ages 18 to 27 years&lt;/li&gt; &lt;li&gt;University physical therapy clinic&lt;/li&gt;</td>
<td>Posterior talar glide</td>
<td>Immediately following treatment</td>
<td>Both intervention groups exhibited statistically significant differences between pre and post manipulation (both techniques) values for posterior talar glide and dorsiflexion. There was little difference in treatment effect between intervention groups. For the intervention groups, treatment effect sizes for posterior talar glide were large &gt; .8 and small for dorsiflexion.</td>
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<tr>
<th>Study</th>
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<th>Interventions</th>
<th>Outcomes</th>
</tr>
</thead>
</table>
- Ages 18 to 50 years  
- Ankle sprain — Grade II  
- University physical therapy clinic | All participants:  
- A single session over one week of each...  
Intervention group:  
- Ankle mobilization  
Placebo group:  
- Sham mobilization  
Control group:  
- No treatment | - Weight-bearing ankle dorsiflexion  
- Pressure pain algometry  
- Thermal pain threshold | - Immediately following each session  
- The intervention group demonstrated statistically significant immediate increased dorsiflexion  
- No significant effects on mechanical and thermal pain thresholds were achieved by the intervention group  
- The placebo group showed a small but statistically significant improvement in pressure pain threshold.  
- No other significant within or between group outcomes were noted. |
| Cleland (2009) [50] | RCT | Plantar heel pain | - N = 60  
- Ages 18 to 60 years  
- LEFS score < 65  
- Outpatient orthopaedic physical therapy clinics | Both groups:  
- 6 visits over 4 weeks  
EPAX group:  
- Iontophoresis  
- Strengthening exercise  
- Ultrasound  
- Cryotherapy  
MTEX group:  
- Soft-tissue mobilization  
- Foot mobilization  
- Discretionary mobilizations of the lower extremity joints | - LEFS  
- FAAM  
- NRS  
- GRS | - 4 weeks  
- 6 months  
- Statistically significant and clinically meaningful change at 4-weeks and 6-months, as measured by the LEFS and FAAM, favored the MTEX group.  
- The MTEX group exhibited significantly larger improvement in pain measurement (NRS) at 4-weeks. Between group differences were not significant at 6-months  
- The MTEX group demonstrated significantly higher GRS scores at both 4-week and 6-month follow-up |

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<tr>
<th>Author</th>
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<th>Age Range</th>
<th>Protocol</th>
<th>Outcomes</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Dimou (2004)</td>
<td>RCT</td>
<td>Plantar Fascitis</td>
<td>20</td>
<td>18 to 60 years</td>
<td>Group 1: Foot and ankle manipulation (twice a week for 4 weeks, and at 1-month follow-up)</td>
<td>NRS, First-step pain scale, Effect of heel pain on leisure, work, and exercise, Pain pressure threshold</td>
<td>Statistically significant changes within each group were reported at the end of the treatment period for worst pain, first-step pain, effect on leisure activity, and pain pressure threshold.</td>
</tr>
<tr>
<td>Dimou (2004)</td>
<td>RCT</td>
<td>Plantar Fascitis</td>
<td>20</td>
<td>18 to 60 years</td>
<td>Group 2: Custom-made orthotics (worn daily over 8-weeks)</td>
<td></td>
<td>Intragroup analysis did not find any significant improvement in least pain intensity, and effect on work and sports activities. Early differences between groups in worst pain were not sustained after 15-day follow-up. All other outcomes showed no statistically significant differences between groups at any follow-up period.</td>
</tr>
<tr>
<td>Brantingham (2005)</td>
<td>RCT (pilot)</td>
<td>Bunion (symptomatic)</td>
<td>60</td>
<td>18 to 65 years</td>
<td>Group 1: First MPJ, foot and ankle mobilization/manipulation (6 treatments over 2-weeks) Cryotherapy</td>
<td>Pain pressure threshold, HAL, NRS, Foot function index</td>
<td>There were statistically significant changes between groups that favored those receiving manipulation for mechanical pain threshold, function, and pain intensity at each follow-up interval. Within group analysis showed statistically significant changes across all outcome variables for group 1.</td>
</tr>
<tr>
<td>Govender (2007)</td>
<td>RCT</td>
<td>Morton’s neuroma</td>
<td>40</td>
<td>23 to 79 years</td>
<td>Group A: Detuned ultrasound (6 sessions over 3-weeks)</td>
<td>NRS, SFMPQ, Foot function index, Pain pressure threshold</td>
<td>There were statistically significant changes between groups that favored those receiving mobilization/manipulation for mechanical pain threshold, function, and pain intensity (NRS) at 6-weeks follow-up. There were no statistically significant differences between groups for pain and function.</td>
</tr>
</tbody>
</table>

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Abbreviations:
FIM – Functional independence measure
LEFS – Lower extremity functional scale
FAAM – Foot and ankle ability measure
GRS – Global rating scale
EPAX – Electrophysical agents and exercise treatment approach
MTEX – Manual physical therapy and exercise approach
WOMAC – Western Ontario and McMaster Universities osteoarthritis index
ULTT2a – Upper limb tension test 2a with a median nerve bias
CTOA-P – Carpal tunnel outcome assessment – physical distress
SFMPQ – Short-from McGill pain questionnaire
HAL – Hallux-metatarsophalangeal-interphalangeal scale

FIQ – Functional index questionnaire
AKPS – Anterior knee pain scale
VAS – Visual analog scale
NRS – Numeric rating scale
ROM – Range of motion
PSFS – Patient specific functional scale
SF-36 – Short form 36
CTOA-M – Carpal tunnel outcome assessment – physical distress
PNF – Proprioceptive neuromuscular facilitation
SPADI – Shoulder pain and disability index

Legend:
(+): Outcomes favor manipulative therapy
(-): Outcomes favor the control group
(=): Outcomes are equivalent across groups
(N/A): Outcomes not comparable

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Key Question: Is there sufficient research evidence of the efficacy and safety of manipulative therapy, either as a combined or monotherapy, to conclude this intervention is an appropriate therapeutic option for a specific patient population suffering from musculoskeletal disorders involving the shoulder?

Critical Outcome Variables: Pain, Impairment, Disability, and Self-Report (using various scales assessed at variable time periods)

<table>
<thead>
<tr>
<th>Author</th>
<th>Disorder</th>
<th>Design</th>
<th>Quality</th>
<th>Consistency</th>
<th>Directness</th>
<th>Other Modifying Factors</th>
<th>Clinical Significance / Magnitude of Effect</th>
<th>Adverse Events</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conroy (1998)</td>
<td>Impingement syndrome (pilot)</td>
<td>RCT</td>
<td>serious limitations</td>
<td>important inconsistency</td>
<td>N/A</td>
<td>sparse data</td>
<td>not calculated</td>
<td>not reported</td>
<td>Very Low</td>
</tr>
<tr>
<td>Bang (2000)</td>
<td>Impingement syndrome</td>
<td>RCT</td>
<td>very serious limitations</td>
<td>no important inconsistencies</td>
<td>N/A</td>
<td>sparse and imprecise data</td>
<td>not calculated</td>
<td>not reported</td>
<td>Very Low</td>
</tr>
<tr>
<td>Citaker (2005)</td>
<td>Impingement syndrome</td>
<td>RCT</td>
<td>very serious limitations</td>
<td>no important inconsistency</td>
<td>N/A</td>
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<td>not calculated</td>
<td>not reported</td>
<td>Very Low</td>
</tr>
<tr>
<td>Munday (2007)</td>
<td>Impingement syndrome</td>
<td>RCT</td>
<td>very serious limitations</td>
<td>no important inconsistency</td>
<td>N/A</td>
<td>sparse and imprecise data</td>
<td>Clinical significance reported/ effect size not calculated</td>
<td>reported</td>
<td>Very Low</td>
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<tr>
<td>Atkinson (2008)</td>
<td>Rotator cuff tendinopathy</td>
<td>RCT</td>
<td>very serious limitations</td>
<td>no important inconsistency</td>
<td>some uncertainty</td>
<td>sparse and imprecise data</td>
<td>not calculated</td>
<td>reported</td>
<td>Very Low</td>
</tr>
<tr>
<td>Winters (1997 &amp; 1999)</td>
<td>Shoulder girdle &amp; synovial complaints</td>
<td>RCT (pilot)</td>
<td>very serious limitations</td>
<td>no important inconsistencies</td>
<td>N/A</td>
<td>sparse data</td>
<td>not calculated</td>
<td>not reported</td>
<td>Very Low</td>
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<tr>
<td>Teys (2008)</td>
<td>Painfully limited shoulder movement</td>
<td>RCT</td>
<td>serious limitations</td>
<td>no important inconsistencies</td>
<td>N/A</td>
<td>sparse data</td>
<td>not calculated</td>
<td>reported</td>
<td>Low</td>
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</table>

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## Utilization Management Policy

<table>
<thead>
<tr>
<th>Study</th>
<th>Condition</th>
<th>Study Design</th>
<th>Methodology</th>
<th>Limitations</th>
<th>Consistency</th>
<th>Uncertainty</th>
<th>Data Quality</th>
<th>Effect Size</th>
<th>Reporting</th>
<th>Quality</th>
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<tbody>
<tr>
<td>Knebl (2002)</td>
<td>Shoulder dysfunction and chronic pain</td>
<td>RCT</td>
<td>very serious limitations</td>
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<td>major uncertainty</td>
<td>imprecise and sparse data</td>
<td>not calculated</td>
<td>Not reported</td>
<td>Very Low</td>
<td></td>
</tr>
<tr>
<td>Nicholson (1985)</td>
<td>Adhesive capsulitis</td>
<td>RCT</td>
<td>very serious limitations</td>
<td>important inconsistencies</td>
<td>N/A</td>
<td>imprecise and sparse data</td>
<td>not calculated</td>
<td>not reported</td>
<td>Very Low</td>
<td></td>
</tr>
<tr>
<td>Vermeulen (2006)</td>
<td>Adhesive Capsulitis</td>
<td>RCT</td>
<td>no serious limitations</td>
<td>no important inconsistencies</td>
<td>major uncertainty</td>
<td>imprecise data</td>
<td>clinical significance of results could be calculated; effect sizes not recorded</td>
<td>not reported</td>
<td>Very Low</td>
<td></td>
</tr>
<tr>
<td>Guler-Uysal (2004)</td>
<td>Adhesive capsulitis</td>
<td>RCT</td>
<td>serious limitations</td>
<td>no important inconsistencies</td>
<td>N/A</td>
<td>sparse data</td>
<td>not calculated</td>
<td>not reported</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Bulgen (1984)</td>
<td>Adhesive capsulitis</td>
<td>RCT</td>
<td>very serious limitations</td>
<td>no important inconsistencies</td>
<td>N/A</td>
<td>imprecise and sparse data</td>
<td>not calculated</td>
<td>not reported</td>
<td>Very Low</td>
<td></td>
</tr>
<tr>
<td>Rainbow (2008)</td>
<td>Adhesive capsulitis</td>
<td>Cohort (prospective)</td>
<td>very serious limitations</td>
<td>no important inconsistencies</td>
<td>major uncertainty</td>
<td>imprecise data</td>
<td>clinical significance calculated; effect sizes not recorded</td>
<td>reported</td>
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</tr>
</tbody>
</table>

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### Assessment Summary of Elbow Studies

**Table 3**

**Key Question:** Is there sufficient research evidence of the efficacy and safety of manipulative therapy, either as a combined or monotherapy, to conclude this intervention is an appropriate therapeutic option for a specific patient population suffering from musculoskeletal disorders involving the elbow?

**Critical Outcome Variables:** Pain, Impairment, Disability, and Self-Report (using various scales assessed at variable time periods)

<table>
<thead>
<tr>
<th>Author</th>
<th>Disorder</th>
<th>Design</th>
<th>Quality</th>
<th>Consistency</th>
<th>Directness</th>
<th>Other Modifying Factors</th>
<th>Clinical Significance / Magnitude of Effect</th>
<th>Adverse Events</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Struijs</td>
<td>Lateral epicondylitis</td>
<td>RCT (pilot)</td>
<td>no serious limitations</td>
<td>important inconsistency</td>
<td>N/A</td>
<td>sparse and imprecise data</td>
<td>clinical significance of results could be calculated; effect sizes not reported</td>
<td>not reported</td>
<td>Low</td>
</tr>
<tr>
<td>Vicenzino</td>
<td>Lateral epicondylitis</td>
<td>RCT</td>
<td>serious limitations</td>
<td>important inconsistencies</td>
<td>N/A</td>
<td>sparse and imprecise data</td>
<td>not calculated</td>
<td>reported</td>
<td>Very Low</td>
</tr>
</tbody>
</table>
Assessment Summary of Wrist and Hand Studies

**Key Question:** Is there sufficient research evidence of the efficacy and safety of manipulative therapy, either as a combined or monotherapy, to conclude this intervention is an appropriate therapeutic option for a specific patient population suffering from musculoskeletal disorders involving the wrist and hand?

**Critical Outcome Variables:** Pain, Impairment, Disability, and Self-Report (using various scales assessed at variable time periods)

<table>
<thead>
<tr>
<th>Author</th>
<th>Disorder</th>
<th>Design</th>
<th>Quality</th>
<th>Consistency</th>
<th>Directness</th>
<th>Other Modifying Factors</th>
<th>Clinical Significance / Magnitude of Effect</th>
<th>Adverse Events</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tal-Akabi (2000)</td>
<td>Carpal tunnel syndrome</td>
<td>RCT (pilot)</td>
<td>very serious limitations</td>
<td>no important inconsistencies</td>
<td>N/A</td>
<td>sparse and imprecise data</td>
<td>not calculated</td>
<td>not reported</td>
<td>Very Low</td>
</tr>
<tr>
<td>Davis (1998)</td>
<td>Carpal tunnel syndrome</td>
<td>RCT</td>
<td>very serious limitations</td>
<td>no important inconsistencies</td>
<td>some uncertainty</td>
<td>N/A</td>
<td>clinical significance of results were calculated; effect size not calculated</td>
<td>reported</td>
<td>Very Low</td>
</tr>
<tr>
<td>Burke (2007)</td>
<td>Carpal tunnel syndrome</td>
<td>RCT (pilot)</td>
<td>serious limitations</td>
<td>no important inconsistencies</td>
<td>N/A</td>
<td>imprecise data</td>
<td>clinical significance of results were calculated; effect sizes were moderate (.67) for symptom severity; and large for pain intensity (1.12)</td>
<td>reported</td>
<td>Moderate</td>
</tr>
<tr>
<td>Randall (1992)</td>
<td>Post metacarpal fracture</td>
<td>RCT</td>
<td>very serious limitations</td>
<td>no important inconsistencies</td>
<td>some uncertainty</td>
<td>sparse and imprecise data</td>
<td>not calculated</td>
<td>not reported</td>
<td>Very Low</td>
</tr>
</tbody>
</table>

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### Assessment Summary of Hip Studies

| Key Question: | Is there sufficient research evidence of the efficacy and safety of manipulative therapy, either as a combined or monotherapy, to conclude this intervention is an appropriate therapeutic option for a specific patient population suffering from musculoskeletal disorders involving the hip? |

**Critical Outcome Variables:** Pain, Impairment, Disability, and Self-Report (using various scales assessed at variable time periods)

<table>
<thead>
<tr>
<th>Author</th>
<th>Disorder</th>
<th>Design</th>
<th>Quality</th>
<th>Consistency</th>
<th>Directness</th>
<th>Other Modifying Factors</th>
<th>Clinical Significance / Magnitude of Effect</th>
<th>Adverse Events</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hoeksma</td>
<td>Osteoarthritis of hip</td>
<td>RCT</td>
<td>no serious limitations</td>
<td>no important inconsistencies</td>
<td>N/A</td>
<td>N/A</td>
<td>large effect size calculated</td>
<td>reported</td>
<td>High</td>
</tr>
<tr>
<td>(2004)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Licciardone</td>
<td>Post-hip arthroplasty</td>
<td>RCT</td>
<td>no serious limitations</td>
<td>no important inconsistencies</td>
<td>N/A</td>
<td>sparse data</td>
<td>clinical significance could be calculated; effect sizes not measured</td>
<td>not reported</td>
<td>Moderate</td>
</tr>
<tr>
<td>(2004)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Assessment Summary of Knee Studies**

**Table 6**

**Key Question:** Is there sufficient research evidence of the efficacy and safety of manipulative therapy, either as a combined or monotherapy, to conclude this intervention is an appropriate therapeutic option for a specific patient population suffering from musculoskeletal disorders involving the knee?

**Critical Outcome Variables:** Pain, Impairment, Disability, and Self-Report (using various scales assessed at variable time periods)

<table>
<thead>
<tr>
<th>Author</th>
<th>Disorder</th>
<th>Design</th>
<th>Quality</th>
<th>Consistency</th>
<th>Directness</th>
<th>Other Modifying Factors</th>
<th>Clinical Significance / Magnitude of Effect</th>
<th>Adverse Events</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crossley (2002)</td>
<td>Patello femoral syndrome</td>
<td>RCT</td>
<td>no serious limitations</td>
<td>no important inconsistency</td>
<td>major uncertainty</td>
<td>N/A</td>
<td>clinical significance of results were calculated; effect sizes not measured</td>
<td>reported</td>
<td>Low</td>
</tr>
<tr>
<td>Iverson (2008)</td>
<td>Patello femoral syndrome</td>
<td>Cohort</td>
<td>serious limitations</td>
<td>no important inconsistencies</td>
<td>N/A</td>
<td>imprecise data</td>
<td>clinical significance of results were calculated; effect size was moderate to large</td>
<td>N/A</td>
<td>Very Low</td>
</tr>
<tr>
<td>Licciardone (2004)</td>
<td>Post-knee arthroplasty</td>
<td>RCT</td>
<td>no serious limitations</td>
<td>no important inconsistencies</td>
<td>N/A</td>
<td>sparse data</td>
<td>clinical significance could be calculated; effect sizes not measured</td>
<td>not reported</td>
<td>Moderate</td>
</tr>
<tr>
<td>Deyle (2000)</td>
<td>Knee osteoarthritis</td>
<td>RCT</td>
<td>serious limitations</td>
<td>no important inconsistencies</td>
<td>major uncertainty</td>
<td>N/A</td>
<td>clinical significance of results could be calculated; effect sizes not measured</td>
<td>reported</td>
<td>Very Low</td>
</tr>
<tr>
<td>Deyle (2005)</td>
<td>Knee osteoarthritis</td>
<td>RCT</td>
<td>no serious limitations</td>
<td>no important inconsistencies</td>
<td>major uncertainty</td>
<td>N/A</td>
<td>clinical significance of results could be calculated; effect sizes not measured</td>
<td>reported</td>
<td>Low</td>
</tr>
<tr>
<td>Moss (2007)</td>
<td>Knee osteoarthritis</td>
<td>RCT</td>
<td>serious limitations</td>
<td>important inconsistencies</td>
<td>N/A</td>
<td>N/A</td>
<td>clinical significance of results could be calculated; effect sizes not measured</td>
<td>reported</td>
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</tbody>
</table>

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<table>
<thead>
<tr>
<th>Study</th>
<th>Condition</th>
<th>Study Design</th>
<th>Limitations</th>
<th>Inconsistencies</th>
<th>Effect Size</th>
<th>Significance</th>
<th>Reporting</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currier (2007)</td>
<td>Knee osteoarthritis</td>
<td>Cohort</td>
<td>serious limitations</td>
<td>important inconsistencies</td>
<td>N/A</td>
<td>N/A</td>
<td>clinical significance of results was calculated; effect sizes were moderate</td>
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</tr>
<tr>
<td>Cliborne (2004)</td>
<td>Knee osteoarthritis</td>
<td>Cohort</td>
<td>serious limitations</td>
<td>no important inconsistencies</td>
<td>some uncertainty</td>
<td>imprecise and sparse data</td>
<td>not calculated</td>
<td>not reported</td>
</tr>
</tbody>
</table>
## Assessment Summary of Ankle & Foot Studies

### Key Question:
Is there sufficient research evidence of the efficacy and safety of manipulative therapy, either as a combined or monotherapy, to conclude this intervention is an appropriate therapeutic option for a specific patient population suffering from musculoskeletal disorders involving the ankle or foot?

### Critical Outcome Variables:
- Pain, Impairment, Disability, and Self-Report (using various scales assessed at variable time periods)

<table>
<thead>
<tr>
<th>Author</th>
<th>Disorder</th>
<th>Design</th>
<th>Quality</th>
<th>Consistency</th>
<th>Directness</th>
<th>Other Modifying Factors</th>
<th>Clinical Significance / Magnitude of Effect</th>
<th>Adverse Events</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pellow (2001)</td>
<td>Ankle sprain: grade I &amp; II</td>
<td>Non-randomized pilot clinical trial</td>
<td>very serious limitations</td>
<td>no important inconsistency</td>
<td>N/A</td>
<td>imprecise and sparse data</td>
<td>clinical significance of results could not be calculated</td>
<td>not reported</td>
<td>Very Low</td>
</tr>
<tr>
<td>Eisenhart (2003)</td>
<td>Ankle sprain: grade I &amp; II</td>
<td>RCT</td>
<td>very serious limitations</td>
<td>no important inconsistencies</td>
<td>some uncertainty</td>
<td>imprecise and sparse data</td>
<td>clinical significance of results was not calculated</td>
<td>not reported</td>
<td>Very Low</td>
</tr>
<tr>
<td>Green (2001)</td>
<td>Ankle inversion sprain</td>
<td>RCT</td>
<td>serious limitations</td>
<td>no important inconsistencies</td>
<td>N/A</td>
<td>imprecise and sparse data</td>
<td>clinical significance could not be calculated</td>
<td>not reported</td>
<td>Very Low</td>
</tr>
<tr>
<td>Lopez-Rodriguez (2007)</td>
<td>Ankle sprain</td>
<td>Cohort</td>
<td>very serious limitations</td>
<td>no important inconsistencies</td>
<td>major uncertainty</td>
<td>sparse data</td>
<td>clinical significance of results could not be calculated</td>
<td>not reported</td>
<td>Very Low</td>
</tr>
<tr>
<td>Vicenzino (2006)</td>
<td>Recurrent ankle sprain</td>
<td>RCT</td>
<td>serious limitations</td>
<td>no important inconsistencies</td>
<td>major uncertainty</td>
<td>N/A</td>
<td>clinical significance of results was calculated; effect sizes were large</td>
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<td>Collins (2004)</td>
<td>Subacute ankle sprain</td>
<td>RCT</td>
<td>serious limitations</td>
<td>no important inconsistencies</td>
<td>some uncertainty</td>
<td>imprecise and sparse data</td>
<td>clinical significance of results not calculated</td>
<td>not reported</td>
<td>Very Low</td>
</tr>
<tr>
<td>Study</td>
<td>Condition</td>
<td>Design</td>
<td>Limitations</td>
<td>Inconsistencies</td>
<td>NNT</td>
<td>NNT</td>
<td>Clinical Significance of Results</td>
<td>Reporting</td>
<td>Quality</td>
</tr>
<tr>
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</tr>
<tr>
<td>Cleland (2009)</td>
<td>Plantar heel pain</td>
<td>RCT</td>
<td>no serious</td>
<td>no important</td>
<td>N/A</td>
<td>N/A</td>
<td>clinical significance of results was calculated (NNT)</td>
<td>reported</td>
<td>High</td>
</tr>
<tr>
<td>Dimou (2004)</td>
<td>Plantar Fascitis</td>
<td>RCT</td>
<td>very serious</td>
<td>important</td>
<td>major uncertainty</td>
<td>imprecise and sparse data</td>
<td>not calculated</td>
<td>reported</td>
<td>Very Low</td>
</tr>
<tr>
<td>Brantingham (2005)</td>
<td>Bunion (symptomatic)</td>
<td>RCT</td>
<td>very serious</td>
<td>no important</td>
<td>some uncertainty</td>
<td>imprecise data</td>
<td>not calculated</td>
<td>reported</td>
<td>Very Low</td>
</tr>
<tr>
<td>Govender (2007)</td>
<td>Morton’s neuroma</td>
<td>RCT</td>
<td>very serious</td>
<td>important</td>
<td>some uncertainty</td>
<td>imprecise data</td>
<td>clinical significance of results could be assessed; effect sizes were not calculated</td>
<td>not reported</td>
<td>Very Low</td>
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</tbody>
</table>

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## Positions of Professional Groups

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<thead>
<tr>
<th>Group</th>
<th>Disorder</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ottawa Panel</td>
<td>Osteoarthritis (all joints except the spine)</td>
<td>For patients with OA, exercise alone or in combination with manual therapy (mobilization and manipulation) is recommended</td>
</tr>
<tr>
<td>CCGPP</td>
<td>Shoulder pain</td>
<td>There is moderate evidence that manipulation (i.e. mobilization not including grade 5 Maitland [cavitation] may be of short-term benefit, and limited evidence for long-term benefit for patients with shoulder pain. There is limited evidence for the use of HVLA adjustments of the shoulder girdle</td>
</tr>
<tr>
<td>CCGPP</td>
<td>Lateral epicondylitis</td>
<td>There is moderate evidence to suggest that mobilization of either the elbow or wrist may produce some immediate benefit but no evidence for or against long-term benefit. There is no evidence for or against high-velocity, short amplitude (HVSA) adjusting of the elbow</td>
</tr>
<tr>
<td>CCGPP</td>
<td>Carpal tunnel syndrome</td>
<td>There is limited evidence from one moderate quality RCT to support the use of a chiropractic multi-therapy approach to CTS that includes adjusting the wrist and cervical spine. Our group’s expert opinion supports the use of adjusting of the wrist (most often the lunate and distal radioulnar joint) for CTS</td>
</tr>
<tr>
<td>APTA</td>
<td>Hip osteoarthritis</td>
<td>Clinicians should consider the use of manual therapy procedures to provide short-term pain relief, and improve hip mobility and function in patients with mild hip osteoarthritis</td>
</tr>
<tr>
<td>CCGPP</td>
<td>Hip osteoarthritis</td>
<td>There is limited evidence for manipulative therapy combined with multimodal or exercise therapy of the hip</td>
</tr>
<tr>
<td>CCGPP</td>
<td>Knee osteoarthritis</td>
<td>There is fair evidence for manipulative therapy of the knee and/or full kinetic chain combined with multimodal or exercise therapy</td>
</tr>
<tr>
<td>CCGPP</td>
<td>Patellofemoral pain</td>
<td>There is fair evidence for manipulative therapy of the knee and/or full kinetic chain combined with multimodal or exercise therapy</td>
</tr>
<tr>
<td>CCGPP</td>
<td>Ankle inversion sprain</td>
<td>There is fair evidence for manipulative therapy of the ankle and/or foot combined with multimodal or exercise therapy</td>
</tr>
<tr>
<td>APTA</td>
<td>Plantar fascitis</td>
<td>There is minimal evidence to support the use of manual therapy and nerve mobilization procedures short-term (1 to 3 months) for pain and function improvement</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>CCGPP</th>
<th>Condition</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCGPP</td>
<td>Plantar fascitis</td>
<td>There is limited evidence for manipulative therapy of the ankle and/or foot combined with multimodal or exercise therapy</td>
</tr>
<tr>
<td>CCGPP</td>
<td>Metatarsalgia</td>
<td>There is limited evidence for manipulative therapy of the ankle and/or foot combined with multimodal or exercise therapy</td>
</tr>
<tr>
<td>CCGPP</td>
<td>Hallux limitus/rigidus</td>
<td>There is limited evidence for manipulative therapy of the ankle and/or foot combined with multimodal or exercise therapy</td>
</tr>
<tr>
<td>CCGPP</td>
<td>Hallux abducto valgus/bunion</td>
<td>There is insufficient evidence for manipulative therapy of the ankle and/or foot combined with multimodal or exercise therapy</td>
</tr>
</tbody>
</table>

Legend:
CCGPP: Council on Chiropractic Guidelines and Practice Parameters
APTA: American Physical Therapy Association (Orthopaedic Section)
Utilization Management Policy

Policy History/Revision Information

<table>
<thead>
<tr>
<th>Date</th>
<th>Action/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/26/2004</td>
<td>Original effective date</td>
</tr>
<tr>
<td>1/2005</td>
<td>Annual review completed</td>
</tr>
<tr>
<td>3/2006</td>
<td>Annual review completed</td>
</tr>
<tr>
<td>4/2007</td>
<td>Annual review completed</td>
</tr>
<tr>
<td>4/10/2008</td>
<td>Annual review completed</td>
</tr>
<tr>
<td>1/15/2009</td>
<td>Policy placed into new format</td>
</tr>
<tr>
<td>4/30/2009</td>
<td>Annual review completed</td>
</tr>
<tr>
<td>1/14/2010</td>
<td>Policy revised. Augmented literature extraction; GRADE appraisal scheme applied; Policy statement revised to describe specific disorders; Plain Language Summary appended</td>
</tr>
<tr>
<td>4/08/2010</td>
<td>Annual review completed</td>
</tr>
<tr>
<td>10/26/2010</td>
<td>Policy rebranded to “OptumHealth Care Solutions, Inc. (OptumHealth)”</td>
</tr>
<tr>
<td>1/27/2011</td>
<td>The Wrist and Hand Disorders portion of the Background section was updated to reflect additional evidence. Tables 1 and 4 were revised. The Policy Statement was updated to show that manipulation/mobilization for carpal tunnel syndrome has been determined to be clinically appropriate.</td>
</tr>
<tr>
<td>4/07/2011</td>
<td>Annual review completed</td>
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<tr>
<td>4/19/2012</td>
<td>Annual review completed</td>
</tr>
<tr>
<td>4/18/2013</td>
<td>Annual review completed</td>
</tr>
<tr>
<td>4/17/2014</td>
<td>Annual review completed; Policy rebranded “Optum* by OptumHealth Care Solutions, Inc.”</td>
</tr>
<tr>
<td>4/16/2015</td>
<td>Annual review completed</td>
</tr>
<tr>
<td>4/21/2016</td>
<td>Annual review completed</td>
</tr>
<tr>
<td>4/20/2017</td>
<td>Annual review completed; Legal entity name changed from “OptumHealth Care Solutions, Inc.” to “OptumHealth Care Solutions, LLC.”</td>
</tr>
</tbody>
</table>

Contact Information

Please forward any commentary or feedback on Optum utilization management policies to: policy.inquiry@optumhealth.com with the word “Policy” in the subject line.

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Extraspinal Manipulation and/or Mobilization

Utilization Management Policy # 81

Plain Language Summaries are a service provided by Optum by OptumHealth Care Solutions, LLC to help patients better understand the complicated and often mystifying language of modern healthcare.

Plain Language Summaries are presented to supplement the associated clinical policy or guideline. These summaries are not a substitute for advice from your own healthcare provider.

What is extraspinal manipulative or mobilization treatment for musculoskeletal disorders and what is known about it so far?

Spinal manipulative and mobilization (a gentler version of manipulation) therapy have been shown to be effective treatment options for common spinal pain of musculoskeletal origin. Clinicians and patients have observed that manipulation and mobilization of the extremity (extraspinal) joints appear to have been helpful for treating certain conditions.

There are scientific mechanisms and theories suggesting it is possible that manipulative or mobilization treatment of the extremities can help in the treatment of these types of conditions. There is limited high quality research, however, to support these theories in clinical practice. The conclusions of others who evaluated the literature generally found the evidence to be inconsistent and conflicting.

How was extraspinal manipulative/mobilization therapy for musculoskeletal disorders evaluated?

A work group of clinicians was assigned to review the available research. The internet was searched for articles about manipulation and/or mobilization of the extremities and/or jaw for the treatment of a wide range of musculoskeletal disorders. The work group independently examined the selected research studies. A broadly accepted rating scale was used. Possible ratings were high, moderate, low, or very low quality. Additionally, the positions and guidelines of other professional groups were evaluated.

Before it was approved, the policy was presented to a series of committees that included independent health care practitioners.

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What did the work group find?

Documents published by several professional work groups offered recommendations concerning a range of upper and lower extremity disorders. The general direction of conclusions suggests stronger evidence in support of safety and short-term benefit from extraspinal manipulation and/or mobilization for disorders involving the shoulder, hip, knee, ankle and foot.

The benefits from treatment (reduced pain and improved ability to perform daily activities) should be noticeable early during a course of care (within several visits).

Patient values about the type treatment you prefer should be discussed with your healthcare provider.

The information on extraspinal manipulation and/or mobilization for spinal disorders (neck and low back pain), jaw pain (TMJ), and elbow pain was too limited to make confident decisions about potential benefit.

What were the limitations of the information?

The research supporting manipulation and/or mobilization of the extremities is based upon limited study. For the most part, manipulation and/or mobilization of the extremities have not been compared to commonly used medications. Additional research will help in more accurately defining the benefit from these services.

What are the conclusions?

There is sufficient clinical evidence to consider that for individuals diagnosed as having osteoarthritis of the hip, and who have not had hip replacement surgery, might benefit from a trial of manipulation or mobilization of the hip. Similarly, some individuals, who have been diagnosed with persistent heel pain (plantar fascitis), may find benefit from a short trial of manipulation or mobilization of the foot and/or ankle.

An initial trial (4-6 weeks) of extraspinal manipulation/mobilization may be clinically appropriate for patients presenting with disorders involving the shoulder, hip, knee, ankle, foot, and certain elbow, wrist and hand complaints.

Extraspinal manipulation or mobilization for spinal disorders (neck and low back pain), jaw pain (TMJ), and lateral epicondylitis (tennis elbow) is considered unproven and/or not medically necessary.