



Manipulation Under Anesthesia

Effective: March 1, 2025

Next Review: November 2025

Last Review: January 2025

IMPORTANT REMINDER

Medical Policies are developed to provide guidance for members and providers regarding coverage in accordance with contract terms. Benefit determinations are based in all cases on the applicable contract language. To the extent there may be any conflict between the Medical Policy and contract language, the contract language takes precedence.

PLEASE NOTE: Contracts exclude from coverage, among other things, services or procedures that are considered investigational or cosmetic. Providers may bill members for services or procedures that are considered investigational or cosmetic. Providers are encouraged to inform members before rendering such services that the members are likely to be financially responsible for the cost of these services.

DESCRIPTION

Manipulation under anesthesia consists of a series of mobilization, stretching, and traction procedures performed while the patient is sedated (usually with general anesthesia or moderate sedation).

MEDICAL POLICY CRITERIA

Notes: Services described in this medical policy are not routinely reviewed; however, claims may be subject to audit including but not limited to review of member benefit application, medical appropriateness, frequency utilization, documentation requirements, accurate code selection, and reimbursement. Some devices or services may be subject to the health plan's reimbursement policy manual or may not be covered based on benefit contracts. Claim adjudication is also subject to claim processing guidelines and provider contracts.

- I. Manipulation under anesthesia (MUA) of the knee or shoulder may be considered **medically necessary** when all of the following Criteria are met:
 - A. If surgery or trauma has occurred in the affected knee or shoulder, the surgery or trauma occurred at least 6 weeks prior; and

- B. A minimum of 6 weeks of conservative therapy has failed to restore range of motion in the affected knee including medications with or without articular injections, home exercise program, and physical therapy; and
- C. Either of the following Criteria are met:
 - 1. For the treatment of significant knee arthrofibrosis following total knee arthroplasty, knee surgery, or fracture when range of motion in the affected knee is less than 90 degrees; or
 - 2. For the treatment of adhesive capsulitis of the shoulder when range of motion in at least one plane of motion of the affected shoulder is reduced by 50% or more.
- II. Manipulation under anesthesia of the knee or shoulder is considered **not medically necessary** when Criterion I is not met.
- III. Manipulation under anesthesia is considered **investigational** in all other situations including serial treatment sessions, multiple body joints, or for any other joint, including but not limited to the spine, hip, elbow, temporomandibular joint, and ankle.

NOTE: A summary of the supporting rationale for the policy criteria is at the end of the policy.

POLICY GUIDELINES

This policy does not address manipulation under anesthesia for fractures or completely dislocated joints.

CROSS REFERENCES

None

BACKGROUND

MANIPULATION UNDER ANESTHESIA

Manipulation is intended to break up fibrous and scar tissue to relieve pain and improve range of motion. Anesthesia or sedation is used to reduce pain, spasm, and reflex muscle guarding that may interfere with the delivery of therapies and to allow the therapist to break up joint and soft tissue adhesions with less force than would be required to overcome patient resistance or apprehension. Manipulation under anesthesia is generally performed with an anesthesiologist in attendance. Manipulation under anesthesia is an accepted treatment for isolated joint conditions, such as arthrofibrosis of the knee and adhesive capsulitis. It is also used to reduce fractures (e.g., vertebral, long bones) and dislocations.

Manipulation under anesthesia has been proposed as a treatment modality for acute and chronic pain conditions, particularly of the spine, when standard care, including manipulation, and other conservative measures have failed. Manipulation under anesthesia of the spine has been used in various forms since the 1930s. Complications from general anesthesia and forceful long-lever, high-amplitude nonspecific manipulation procedures led to decreased use of the procedure in favor of other therapies. Manipulation under anesthesia was modified and revived in the 1990s. This revival has been attributed to increased interest in spinal

manipulative therapy and the advent of safer, shorter-acting anesthesia agents used for conscious sedation.

MANIPULATION UNDER ANESTHESIA ADMINISTRATION

Manipulation under anesthesia of the spine is described as follows: after sedation, a series of mobilization, stretching, and traction procedures to the spine and lower extremities are performed and may include passive stretching of the gluteal and hamstring muscles with straight-leg raise, hip capsule stretching and mobilization, lumbosacral traction, and stretching of the lateral abdominal and paraspinal muscles. After the stretching and traction procedures, spinal manipulative therapy is delivered with high-velocity, short-amplitude thrust applied to a spinous process by hand, while the upper torso and lower extremities are stabilized. Spinal manipulative therapy may also be applied to the thoracolumbar or cervical area when necessary to address low back pain.

Manipulation under anesthesia takes 15 to 20 minutes, and after recovery from anesthesia, the patient is discharged with instructions to remain active and use heat or ice for short-term analgesic control. Some practitioners recommend performing the procedure on three or more consecutive days for best results. Care after manipulation under anesthesia may include four to eight weeks of active rehabilitation with manual therapy, including spinal manipulative therapy and other modalities. Manipulation has also been performed after injection of local anesthetic into lumbar zygapophyseal (facet) and/or sacroiliac joints under fluoroscopic guidance (manipulation under joint anesthesia/analgesia) and after epidural injection of corticosteroid and local anesthetic (manipulation postepidural injection). Spinal manipulation under anesthesia has also been combined with other joint manipulation during multiple sessions. Together, these therapies may be referred to as medicine-assisted manipulation.

EVIDENCE SUMMARY

Evidence reviews assess the clinical evidence to determine whether the use of technology improves the net health outcome. Broadly defined, health outcomes are length of life, quality of life, and ability to function, including benefits and harms. Every clinical condition has specific outcomes that are important to patients and managing the course of that condition. Validated outcome measures are necessary to ascertain whether a condition improves or worsens; and whether the magnitude of that change is clinically significant. The net health outcome is a balance of benefits and harms.

To assess whether the evidence is sufficient to draw conclusions about the net health outcome of technology, two domains are examined: the relevance, and quality and credibility. To be relevant, studies must represent one or more intended clinical use of the technology in the intended population and compare an effective and appropriate alternative at a comparable intensity. For some conditions, the alternative will be supportive care or surveillance. The quality and credibility of the evidence depend on study design and conduct, minimizing bias and confounding that can generate incorrect findings. The randomized controlled trial (RCT) is preferred to assess efficacy; however, in some circumstances, nonrandomized studies may be adequate. RCTs are rarely large enough or long enough to capture less common adverse events and long-term effects. Other types of studies can be used for these purposes and to assess generalizability to broader clinical populations and settings of clinical practice.

MANIPULATION UNDER ANESTHESIA

Clinical Context and Therapy Purpose

The purpose of manipulation under anesthesia is to provide a treatment option that is an alternative to or an improvement on existing therapies, such as conservative management, in patients with pain and/or reduced range of motion related to adhesive capsulitis (frozen shoulder), knee arthrofibrosis, or chronic spinal, sacroiliac, or pelvic pain.

The existing literature evaluating manipulation under anesthesia as a treatment for chronic spinal, sacroiliac, or pelvic pain has varying lengths of follow-up, ranging from 2 weeks to 6 months. While studies described below all reported at least 1 outcome of interest, longer follow-up was necessary to fully observe outcomes. Therefore, 6 months of follow-up is considered necessary to demonstrate efficacy.

Table 1 summarizes the patient-reported outcome measures described in this review.

Table 1. Patient Self-Administered Outcome Measure Tools

Name	Description	Scoring	MCID
Numeric Pain Scale ^[1]	Numbered scale by which patients rate their pain, similar to VAS	0-10 scale: • 10=excruciating pain • 0=no pain	Reduction of ≥ 2 points ($\approx 30\%$) to be clinically important
Roland-Morris Disability Questionnaire ^[2]	24 questions that measure low back pain-related disability	“Yes” answers are totaled to determine disability (1-24) Score of ≥ 14 represents significant disability	Change of ≥ 4 points required for clinically applicable change to be measured accurately
Bournemouth Questionnaire ^[3]	7-question, multidimensional tool to assess outcome of care in a routine clinical setting Takes into account cognitive and affective aspects of pain Two versions: low back pain and nonspecific neck pain	Each question rated on a numeric rating scale from 0 to 10: • 0=much better • 5=no change • 10=much worse Scores are totaled, for minimum of 0 and maximum of 70	Percentage improvement of 47% in back pain and 34% neck pain
Patient’s Global Impression of Change ^[3]	7-point scale of how a patient perceives the efficacy of treatment, a rating of overall improvement from baseline	Scale of 1 to 7: • 1=no change or condition is worse • 2=almost the same • 3=a little better, but no noticeable change • 4=somewhat better, but no real difference • 5=moderately better, slight noticeable change • 6=better, definite improvement with real difference	Clinically relevant improvement, response of ± 6

Name	Description	Scoring	MCID
		7=a great deal better, considerable improvement	
Oxford Shoulder Score	12-item patient reported measure of shoulder pain and function.	5 response categories with overall score from 0 (worst) to 48 (best)	2-sided 5% statistical level.

MCID: minimal clinically important difference; VAS: visual analog scale.

STUDY SELECTION CRITERIA

Methodologically credible studies were selected using the following principles:

1. To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
2. In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
3. To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.

Studies with duplicative or overlapping populations were excluded.

Dagenais et al (2008) conducted a comprehensive review of the history of manipulation under anesthesia or medicine-assisted manipulation and the published experimental literature.^[4] They noted there was no research to confirm theories about a mechanism of action for these procedures and that the only RCT identified was published in 1971 when the techniques for spinal manipulation differed from those used presently.

REVIEW OF EVIDENCE

Systematic Review

Zhao (2024) published a systematic review and meta-analysis that compared MUA to arthroscopic capsular release (ACR) for refractory frozen shoulder.^[5] The review included eight comparative studies involving 768 participants. Four studies were RCTs. Regarding pain, the review found that the ACR group had a significantly better change in visual analog scale (VAS) at 12 months, but the difference did not surpass the minimal clinically important difference (MCID) threshold (1.4-point change). Differences in function and range of motion were not significantly different at any time point. The ACR group had significantly more severe complications (OR, 4.14; 95% CI, 1.01 to 16.94; $I^2 = 0\%$; $p = 0.05$). The authors concluded that the pooled data suggests that ACR is not superior to MUA for refractory frozen shoulder. Limitations of the study include short follow-up durations in the included studies.

Nonrandomized Comparative Studies

Two systematic reviews on treatment for arthrofibrosis, a common complication after total knee arthroplasty (TKA), were recently published. Neither review included RCTs. Haffar (2022) compared outcomes of MUA, arthroscopic lysis of adhesions (aLOA), and revision TKA (rTKA). Of 40 studies, 14 included MUA. The studies were generally deemed to be of poor quality using standardized assessment tools. Of the fourteen studies involving MUA, average time to MUA was 0.24 years and average follow-up time was 4.7 years. While MUA, aLOA, and rTKA all led to improved pain scores, pain scores were lowest for patients undergoing

MUA. aLOA and MUA showed better improvement in ROM compared to rTKA, but that could have been influenced by differences in underlying causes of arthrofibrosis or the timing of the procedures after TKA.^[6]

A second systematic review of literature on the treatment of arthrofibrosis after TKA by Fackler (2022) compared outcomes of aLOA with MUA to pre-procedure measures in patients who had both interventions. Eight studies with 240 patients were included. With an average follow-up time of 31.2 months, all studies noted significant improvement in knee function and pain. The studies used a wide variety of tools to document outcomes. Both literature reviews found that MUA after TKA was safe.^[7]

A comprehensive review of the literature by Digiorgi (2013)^[8] described studies by Kohlbeck (2005)^[9] and Palmieri (2002)^[2] as being the best evidence available for medicine-assisted manipulation and manipulation under anesthesia of the spine.

Kohlbeck (2005) reported on a nonrandomized comparative study that included 68 patients with chronic low back pain. All patients received an initial 4-6 week trial of spinal manipulation therapy, after which 42 patients received supplemental intervention with manipulation under anesthesia and 26 continued with spinal manipulative therapy. Low back pain and disability measures favored the manipulation under anesthesia group over the spinal manipulative therapy only group at 3 months (adjusted mean difference on a 100-point scale, 4.4 points; 95% confidence interval [CI], -2.2 to 11.0). This difference attenuated at 1 year (adjusted mean difference, 0.3 points; 95% CI, -8.6 to 9.2). The relative odds of experiencing a 10-point improvement in pain and disability favored the manipulation under anesthesia group at 3 months (odds ratio, 4.1; 95% CI, 1.3 to 13.6) and 1 year (odds ratio, 1.9; 95% CI, 0.6 to 6.5).

Palmieri (2002) evaluated the efficacy of self-reported questionnaires to study manipulation under anesthesia in a convenience sample of 87 subjects from 2 ambulatory surgery centers and 2 chiropractic clinics. Thirty-eight patients with low back pain received manipulation under anesthesia and 49 received traditional chiropractic treatment. A numeric rating scale for pain and the Roland-Morris Disability Questionnaire were administered at baseline, after the procedure, and 4 weeks later. Average pain scale scores in the manipulation under anesthesia group decreased by 50% and by 26% in the traditional treatment group; Roland-Morris Disability Questionnaire scores decreased by 51% and 38%, respectively. Although the authors concluded that the study supported the need for large-scale studies on manipulation under anesthesia and that the assessments were easily administered and dependable, no large-scale studies comparing manipulation under anesthesia with traditional chiropractic treatment have been identified.

Randomized Studies

The UK Frost Study (2020) was a three-arm superiority randomized trial that compared surgical manipulation under anesthesia (MUA) to two other treatments for adhesive capsulitis (frozen shoulder). 503 patients in 35 UK hospitals were randomized to receive either MUA, arthroscopic capsular release (ACR), a surgical procedure performed under anesthesia, or early structured physical therapy plus steroid injection (PTSI). The primary outcome measure was Oxford Shoulder Score (OSS), a patient-reported tool of shoulder pain and function, at 12 months post-randomization. All three interventions resulted in significant improvement in shoulder pain and function from the mean baseline OSS score of 20 points. At 12-months OSS scores were statistically significantly higher in the ACR group (40.3 points; $p=0.011$) than MUA (38.3 points) and PTSI (37.2 points). However, at three months post randomization, the ACR

group had worse outcomes (OSS 26.9 vs. 30.2 for MUA and 31.6 for PTSI; $p < 0.0001$). A total of ten serious adverse events were reported and eight were from the ACR group. While the study outcomes achieved statistical significance, the researchers concluded that none of the treatments was clearly superior^[10].

The UK Frost Study was included in a 2021 systematic review of interventions for frozen shoulder by Rex. The review included nine RCTs that compared at least one of four interventions for frozen shoulder (MUA, ACR, PTSI, or hydrodilatation) to at least one of the other interventions, or to supportive care. The UK Frost study was the largest study with 503 patients. The other eight studies included between 26 and 136 patients. Four of the eight studies (including the UK Frost study) included MUA as a therapy arm. Kivimaki (2007) found that MUA plus home exercises was not associated with improved shoulder function at 12 months compared to home exercises alone (i.e., supportive care) in 125 patients^[11]. Two studies compared MUA to hydrodilatation (large volume steroid/saline injection under imaging guidance). One found no statistically significant difference in pain at 16 weeks and the other found the MUA group had more pain at 6 months compared to patients that received hydrodilatation. Both studies had small samples with fewer than 100 randomized subjects^[12, 13]. Overall, the review did not find conclusive evidence that any of the four interventions is clearly superior in the treatment of frozen shoulder.^[14]

A recent small prospective randomized trial compared ACR to MUA in 85 patients. Both groups experienced significant improvement in shoulder pain, range of motion, and functional scores from the surgical interventions. At 24 weeks there was no significant difference between the two groups, but MUA was noted to be more cost-effective than ACR.^[15]

Observational Studies

Peterson (2014) reported on a prospective study of 30 patients with chronic pain (17 lower back, 13 neck) who underwent a single manipulation under anesthesia session with follow-up at 2 and 4 weeks.^[16] The primary outcome measure was the Patient's Global Impression of Change. At 2 weeks, 52% of the patients reported clinically relevant improvement (better or much better), with 45.5% improved at 4 weeks. There was a statistically significant reduction in numeric rating scale scores for pain at 4 weeks ($p = 0.01$), from a mean baseline score of 4.0 to 3.5 at 2 weeks post-manipulation under anesthesia. Bournemouth Questionnaire scores improved from 24.17 to 20.38 at 2 weeks ($p = 0.008$) and 19.45 at 4 weeks ($p = 0.001$). This study lacked a sham group to control for a potential placebo effect. Also, the clinical significance of improved numeric rating scale and Bournemouth Questionnaire scores is unclear, although Hurst and Bolton (2004) described the Bournemouth Questionnaire as a percentage improvement of 47% in back pain and 34% in neck pain.^[3]

West (1999) reported on a series of 177 patients with pain arising from the cranial, cervical, thoracic, and lumbar spine, as well as the sacroiliac and pelvic regions who had failed conservative and surgical treatment.^[17] Patients underwent three sequential manipulations with intravenous sedation followed by 4 to 6 weeks of spinal manipulation and therapeutic modalities; all had 6 months of follow-up. On average, visual analog scale scores improved by 62% in patients with cervical pain and by 60% in patients with lumbar pain. Dougherty et al (2004) retrospectively reviewed outcomes of 20 cervical and 60 lumbar radiculopathy patients who underwent spinal manipulation after epidural injection.^[18] After epidural injection of lidocaine (guided fluoroscopically or with computed tomography), methylprednisolone acetate flexion distraction mobilization and then high-velocity, low-amplitude spinal manipulation were

delivered to the affected spinal regions. Outcome criteria were empirically defined as a significant improvement, temporary improvement, or no change. Among lumbar spine patients, 22 (37%) noted significant improvement, 25 (42%) reported temporary improvement, and 13 (22%) no change. Among patients receiving a cervical epidural injection, 10 (50%) had significant improvement, 6 (30%) had temporary relief, and 4 (20%) had no change.

The only study on manipulation under joint anesthesia or analgesia found evaluated 4 subjects; it was reported by Dreyfuss (1995).^[19] Later, Michaelsen (2000) noted that joint-related manipulation under anesthesia should be viewed with “guarded optimism because its success is based solely on anecdotal experience.”^[20]

Table 2. Summary of Characteristics of Key Observational Comparative Studies of Manipulation Under Anesthesia

Study	Study Type	Country	Dates	Participants	Treatment	Follow Up
Peterson (2014) ^[16]	Prospective	Switzerland	NR	Patients (N=30) with chronic pain who underwent single MUA session	MUA for those with low back pain (N=17); MUA for those with neck pain (n=13)	2 and 4 weeks
West (1999) ^[17]	Case series	US	July 1995-Feb 1997	177 patients with pain arising from the cranial, cervical, thoracic, and lumbar spine, as well as the sacroiliac and pelvic regions who had failed conservative and surgical treatment	Patients underwent 3 sequential manipulations with intravenous sedation followed by 4 to 6 weeks of spinal manipulation and therapeutic modalities	6 months
Dougherty (2004) ^[18]	Retrospective	US	Nov 1996-Nov 2000	20 cervical and 60 lumbar radiculopathy patients who underwent spinal manipulation after epidural injection. The patients ranged in age from 21-76 years with an average age of 43 years. Forty-three percent of the patients were female and 57% were male.	Following epidural injection of lidocaine (guided fluoroscopically or with computed tomography), methylprednisolone acetate flexion distraction mobilization and high-velocity, low-amplitude spinal manipulation were delivered to the affected spinal regions	1-year

MUA: manipulation under anesthesia; NR: not reported.

Table 3. Summary of Results of Key Observational Comparative Studies of Manipulation Under Anesthesia

Study	Improvement as Reported by Participant	Bournemouth Questionnaire Scores	Patient's Global Impression of Change
Peterson (2014) ^[16]			
Baseline		24.17	
2-weeks post		20.38 (p=0.008)	
4-weeks post		19.45 (p=0.001)	
"better or much better" reported at 2 weeks post			52%
"better or much better" reported at 4 weeks post			45.5%
West (1999) ^[17]			
% of cervical pts with improvement			62%
% of lumbar pts with improvement			60%
Dougherty (2004) ^[18]			
<i>Lumbar spine pts.</i>			
% noting significant improvement	22 (37%)		
% noting temporary improvement	25 (42%)		
% noting no improvement	13 (22%)		
<i>Pts. receiving cervical epidural injection</i>			
% noting significant improvement	10 (50%)		
% noting temporary improvement	6 (30%)		
% noting no improvement	4 (20%)		

Pts: Patients.

SUMMARY OF EVIDENCE

MUA as a surgical intervention for the treatment of adhesive capsulitis is supported by high quality evidence including randomized trials. However, the benefit from MUA is not clearly superior to treatment alternatives. For people with arthrofibrosis after TKA, there is evidence of benefit from MUA compared to rTKA based on multiple low-quality studies.

For individuals who have chronic spinal, sacroiliac, or pelvic pain who receive manipulation under anesthesia, the evidence includes case series and nonrandomized comparative studies. Relevant outcomes are symptoms, functional outcomes, quality of life, and treatment-related morbidity. Scientific evidence on spinal manipulation under anesthesia, spinal manipulation with joint anesthesia, and spinal manipulation after epidural anesthesia and corticosteroid injection is very limited. No randomized controlled trials have been identified. Evidence on the efficacy of manipulation under anesthesia over several sessions or for multiple joints is also

lacking. The evidence is insufficient to determine the effects of the technology on health outcomes.

PRACTICE GUIDELINE SUMMARY

AMERICAN ASSOCIATION OF MANIPULATION UNDER ANESTHESIA PROVIDERS

In 2014, The American Association of Manipulation Under Anesthesia Providers published consensus-based guidelines for the practice and performance of manipulation under anesthesia.^[21] The guidelines included patient selection criteria (see below), establishing medical necessity, frequency and follow-up procedures, parameters for determining manipulation under anesthesia progress, general post-manipulation under anesthesia therapy, and safety. The guidelines recommended 3 consecutive days of treatment, based on the premise that serial procedures allow a gentler yet effective treatment plan with better control of biomechanical force. The guidelines also recommended follow-up therapy without anesthesia over 8 weeks after manipulation under anesthesia that includes all fibrosis release and manipulative procedures performed during the manipulation under anesthesia procedure to help prevent re-adhesion.

Patient selection criteria include, but are not limited to, the following:

- "The patient has undergone an adequate trial of appropriate care...and continues to experience intractable pain, interference to activities of daily living, and/or biomechanical dysfunction.
- "Sufficient care has been rendered prior to recommending manipulation under anesthesia. A sufficient time period is usually considered a minimum of 4-8 weeks, but exceptions may apply depending on the patient's individual needs....
- "Physical medicine procedures have been utilized in a clinical setting during the 6-8 week period prior to recommending manipulation under anesthesia.
- "Diagnosed conditions must fall within the recognized categories of conditions responsive to manipulation under anesthesia. The following disorders are classified as acceptable conditions for utilization of manipulation under anesthesia:
 1. "Patients for whom manipulation of the spine or other articulations is the treatment of choice; however, the patient's pain threshold inhibits the effectiveness of conservative manipulation.
 2. "Patients for whom manipulation of the spine or other articulations is the treatment of choice; however, due to the extent of the injury mechanism, conservative manipulation has been minimally effective...and a greater degree of movement of the affected joint(s) is needed to obtain patient progress.
 3. "Patients for whom manipulation of the spine or other articulations is the treatment of choice by the doctor; however due to the chronicity of the problem, and/or the fibrous tissue adhesions present, in-office manipulation has been incomplete and the plateau in the patient's improvement is unsatisfactory.
 4. "When the patient is considered for surgical intervention, MUS is an alternative and/or an interim treatment and may be used as a therapeutic and/or diagnostic tool in the overall consideration of the patient's condition.
 5. "When there are no better treatment options available for the patient in the opinions of the treating doctor and patient."

SUMMARY

There is enough evidence to support MUA in surgical settings for the treatment of adhesive capsulitis of the shoulder and arthrofibrosis after TKA. MUA for these conditions is associated with improved range of motion, function, and pain relief.

There is a lack of evidence demonstrating the efficacy of any form of spinal manipulation under anesthesia with or without manipulation of other joints performed during the procedure (e.g., hip joint) on patient health outcomes. Therefore, any form of spinal manipulation under anesthesia with or without manipulation of other joints performed during the procedure (e.g., hip joint) considered investigational.

There is a lack of evidence demonstrating the efficacy of manipulation under anesthesia of any other joints, manipulation over several sessions, or for manipulation of multiple joints on patient health outcomes. Therefore, the use of manipulation under anesthesia for any other joints, manipulation over several sessions, and manipulation of multiple joints is considered investigational.

REFERENCES

1. Farrar JT, Young JP, Jr., LaMoreaux L, et al. Clinical importance of changes in chronic pain intensity measured on an 11-point numerical pain rating scale. *Pain*. 2001;94:149-58. PMID: 11690728
2. Palmieri NF, Smoyak S. Chronic low back pain: a study of the effects of manipulation under anesthesia. *J Manipulative Physiol Ther*. 2002;25(8):E8-E17. PMID: 12381983
3. Hurst H, Bolton J. Assessing the clinical significance of change scores recorded on subjective outcome measures. *J Manipulative Physiol Ther*. 2004;27:26-35. PMID: 14739871
4. Dagenais S, Mayer J, Wooley JR, et al. Evidence-informed management of chronic low back pain with medicine-assisted manipulation. *Spine J*. 2008;8(1):142-9. PMID: 18164462
5. Zhao Y, Yang T, Feng C, et al. Arthroscopic Capsular Release Versus Manipulation under Anesthesia for Refractory Frozen Shoulder: A Systematic Review with Meta-Analysis. *Orthop Surg*. 2024;16(7):1517-29. PMID: 38747000
6. Haffar A, Goh GS, Fillingham YA, et al. Treatment of arthrofibrosis and stiffness after total knee arthroplasty: an updated review of the literature. *Int Orthop*. 2022;46(6):1253-79. PMID: 35301559
7. Fackler N, Chin G, Karasavvidis T, et al. Outcomes of Arthroscopic Lysis of Adhesions for the Treatment of Postoperative Knee Arthrofibrosis: A Systematic Review. *Orthop J Sports Med*. 2022;10(9):23259671221124911. PMID: 36186712
8. Digiorgi D. Spinal manipulation under anesthesia: a narrative review of the literature and commentary. *Chiropr Man Therap*. 2013;21:14. PMID: 23672974
9. Kohlbeck FJ, Haldeman S, Hurwitz EL, et al. Supplemental care with medication-assisted manipulation versus spinal manipulation therapy alone for patients with chronic low back pain. *J Manipulative Physiol Ther*. 2005;28(4):245-52. PMID: 15883577

10. Rangan A, Brealey SD, Keding A, et al. Management of adults with primary frozen shoulder in secondary care (UK FROST): a multicentre, pragmatic, three-arm, superiority randomised clinical trial. *Lancet*. 2020;396(10256):977-89. PMID: 33010843
11. Kivimäki J, Pohjolainen T, Malmivaara A, et al. Manipulation under anesthesia with home exercises versus home exercises alone in the treatment of frozen shoulder: a randomized, controlled trial with 125 patients. *J Shoulder Elbow Surg*. 2007;16(6):722-6. PMID: 17931902
12. Jacobs LG, Smith MG, Khan SA, et al. Manipulation or intra-articular steroids in the management of adhesive capsulitis of the shoulder? A prospective randomized trial. *J Shoulder Elbow Surg*. 2009;18(3):348-53. PMID: 19393928
13. Quraishi NA, Johnston P, Bayer J, et al. Thawing the frozen shoulder. A randomised trial comparing manipulation under anaesthesia with hydrodilatation. *J Bone Joint Surg Br*. 2007;89(9):1197-200. PMID: 17905957
14. Rex SS, Kottam L, McDaid C, et al. Effectiveness of interventions for the management of primary frozen shoulder : a systematic review of randomized trials. *Bone Jt Open*. 2021;2(9):773-84. PMID: 34555926
15. Sundararajan SR, Dsouza T, Rajagopalakrishnan R, et al. Arthroscopic capsular release versus manipulation under anaesthesia for treating frozen shoulder - a prospective randomised study. *Int Orthop*. 2022;46(11):2593-601. PMID: 36048234
16. Peterson CK, Humphreys BK, Vollenweider R, et al. Outcomes for chronic neck and low back pain patients after manipulation under anesthesia: a prospective cohort study. *J Manipulative Physiol Ther*. 2014;37(6):377-82. PMID: 24998720
17. West DT, Mathews RS, Miller MR, et al. Effective management of spinal pain in one hundred seventy-seven patients evaluated for manipulation under anesthesia. *J Manipulative Physiol Ther*. 1999;22(5):299-308. PMID: 10395432
18. Dougherty P, Bajwa S, Burke J, et al. Spinal manipulation postepidural injection for lumbar and cervical radiculopathy: a retrospective case series. *J Manipulative Physiol Ther*. 2004;27(7):449-56. PMID: 15389176
19. Dreyfuss P, Michaelsen M, Horne M. MUJA: manipulation under joint anesthesia/analgesia: a treatment approach for recalcitrant low back pain of synovial joint origin. *J Manipulative Physiol Ther*. 1995;18(8):537-46. PMID: 8583177
20. Michaelsen MR. Manipulation under joint anesthesia/analgesia: a proposed interdisciplinary treatment approach for recalcitrant spinal axis pain of synovial joint origin. *J Manipulative Physiol Ther*. 2000;23:127-9. PMID: 10714542
21. Gordon R, Cremata E, Hawk C. Guidelines for the practice and performance of manipulation under anesthesia. *Chiropr Man Therap*. 2014;22(1):7. PMID: 24490957

CODES

Codes	Number	Description
CPT	21073	Manipulation of temporomandibular joint(s) (TMJ), therapeutic, requiring an anesthesia service (ie, general or monitored anesthesia care)
	22505	Manipulation of spine requiring anesthesia, any region
	23700	Manipulation under anesthesia, shoulder joint, including application of fixation apparatus (dislocation excluded)
	24300	Manipulation, elbow, under anesthesia
	25259	Manipulation, wrist, under anesthesia
	26340	Manipulation, finger joint, under anesthesia, each joint
	27198	Closed treatment of posterior pelvic ring fracture(s), dislocation(s), diastasis or subluxation of the ilium, sacroiliac joint, and/or sacrum, with or without anterior

Codes	Number	Description
		pelvic ring fracture(s) and/or dislocation(s) of the pubic symphysis and/or superior/inferior rami, unilateral or bilateral; with manipulation, requiring more than local anesthesia (ie, general anesthesia, moderate sedation, spinal/epidural)
	27275	Manipulation, hip joint, requiring general anesthesia
	27570	Manipulation of knee joint under general anesthesia (includes application of traction or other fixation devices)
	27860	Manipulation of ankle under general anesthesia (includes application of traction or other fixation apparatus)
HCPCS	None	

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