UnitedHealthcare Community Plan

UnitedHealthcare® Community Plan
Medical Policy

MANIPULATION UNDER ANESTHESIA

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Instructions for Use

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COVERAGE RATIONALE

Manipulation under anesthesia (MUA) is proven and medically necessary for:
- ~~Elbow joint for arthrofibrosis following elbow surgery or fracture~~
- Knee joint for arthrofibrosis following total knee arthroplasty, knee surgery, or fracture
- ~~Pelvis for acute traumatic fracture or dislocation~~
- Shoulder joint for adhesive capsulitis (frozen shoulder)

MUA is unproven and not medically necessary for all other conditions (whether for single or serial manipulations) including but not limited to the following, due to insufficient evidence of efficacy:
- Ankle
- Finger~~*~~
- Hip joint or adhesive capsulitis of the hip
- Knee joint ~~-for~~ any condition other than for arthrofibrosis following total knee arthroplasty, knee surgery, or fracture
- Pelvis ~~for diastasis or subluxation~~
- Shoulder ~~-for~~ any condition other than adhesive capsulitis (frozen shoulder)
- Spine
- Temporomandibular joint (TMJ)
- Toe
- Wrist

~~*~~This policy does not apply to the following:
- Manipulation of the finger on the day following the injection of collagenase clostridium histolyticum (Xiaflex®) to treat Dupuytren's contracture
- Closed reduction of a fracture or joint dislocation unless specified
- **Elbow joint for arthrofibrosis following elbow surgery or fracture**

DEFINITIONS

Arthrofibrosis: a complication of injury or trauma where an excessive scar tissue response leads to painful restriction of joint motion, with scar tissue forming within the joint and surrounding soft tissue spaces and persisting despite rehabilitation exercises and stretches (International Pain Foundation).

APPLICABLE CODES

The following list(s) of procedure and/or diagnosis codes is provided for reference purposes only and may not be all inclusive. Listing of a code in this policy does not imply that the service described by the code is a covered or non-covered health service. Benefit coverage for health services is determined by federal, state or contractual requirements and applicable laws that may require coverage for a specific service. The inclusion of a code does not imply any right to reimbursement or guarantee claim payment. Other Policies and Coverage Determination Guidelines may apply.

CPT Code	Description
21073	Manipulation of temporomandibular joint(s) (TMJ), therapeutic, requiring an anesthesia service (i.e., 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 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 (i.e., 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 Code	Description
D7830	Manipulation under anesthesia

ICD-10 Diagnosis Code	Description
~~Elbow~~	
~~M24.621~~	~~Ankylosis, right elbow~~
~~M24.622~~	~~Ankylosis, left elbow~~
~~M24.629~~	~~Ankylosis, unspecified elbow~~
Knee	
M24.661	Ankylosis, right knee
M24.662	Ankylosis, left knee
M24.669	Ankylosis, unspecified knee
Pelvis	
M99.14	Subluxation complex (vertebral) of sacral region

ICD-10 Diagnosis Code	Description
S32.10XA	Unspecified fracture of sacrum, initial encounter for closed fracture
S32.111A	Minimally displaced Zone I fracture of sacrum, initial encounter for closed fracture
S32.112A	Severely displaced Zone I fracture of sacrum, initial encounter for closed fracture
S32.119A	Unspecified Zone I fracture of sacrum, initial encounter for closed fracture
S32.121A	**Minimally displaced Zone II fracture of sacrum, initial encounter for closed fracture**~~Unspecified Zone I fracture of sacrum, initial encounter for closed fracture~~
S32.122A	Severely displaced Zone II fracture of sacrum, initial encounter for closed fracture
S32.129A	Unspecified Zone II fracture of sacrum, initial encounter for closed fracture
S32.131A	Minimally displaced Zone III fracture of sacrum, initial encounter for closed fracture
S32.132A	Severely displaced Zone III fracture of sacrum, initial encounter for closed fracture
S32.139A	Unspecified Zone III fracture of sacrum, initial encounter for closed fracture
S32.14XA	Type 1 fracture of sacrum, initial encounter for closed fracture
S32.15XA	Type 2 fracture of sacrum, initial encounter for closed fracture
S32.16XA	Type 3 fracture of sacrum, initial encounter for closed fracture
S32.17XA	Type 4 fracture of sacrum, initial encounter for closed fracture
S32.19XA	Other fracture of sacrum, initial encounter for closed fracture
S32.2XXA	Fracture of coccyx, initial encounter for closed fracture
S32.301A	Unspecified fracture of right ilium, initial encounter for closed fracture
S32.302A	Unspecified fracture of left ilium, initial encounter for closed fracture
Pelvis	
S32.309A	Unspecified fracture of unspecified ilium, initial encounter for closed fracture
S32.311A	Displaced avulsion fracture of right ilium, initial encounter for closed fracture
S32.312A	Displaced avulsion fracture of left ilium, initial encounter for closed fracture
S32.313A	Displaced avulsion fracture of unspecified ilium, initial encounter for closed fracture
S32.391A	Other fracture of right ilium, initial encounter for closed fracture
S32.392A	Other fracture of left ilium, initial encounter for closed fracture
S32.399A	Other fracture of unspecified ilium, initial encounter for closed fracture
S32.401A	Unspecified fracture of right acetabulum, initial encounter for closed fracture
S32.402A	Unspecified fracture of left acetabulum, initial encounter for closed fracture
S32.409A	Unspecified fracture of unspecified acetabulum, initial encounter for closed fracture
S32.411A	Displaced fracture of anterior wall of right acetabulum, initial encounter for closed fracture
S32.412A	Displaced fracture of anterior wall of left acetabulum, initial encounter for closed fracture
S32.413A	Displaced fracture of anterior wall of unspecified acetabulum, initial encounter for closed fracture
S32.421A	Displaced fracture of posterior wall of right acetabulum, initial encounter for closed fracture
S32.422A	Displaced fracture of posterior wall of left acetabulum, initial encounter for closed fracture
S32.423A	Displaced fracture of posterior wall of unspecified acetabulum, initial encounter for closed fracture

ICD-10 Diagnosis Code	Description
S32.431A	Displaced fracture of anterior column [iliopubic] of right acetabulum, initial encounter for closed fracture
S32.432A	Displaced fracture of anterior column [iliopubic] of left acetabulum, initial encounter for closed fracture
S32.433A	Displaced fracture of anterior column [iliopubic] of unspecified acetabulum, initial encounter for closed fracture
S32.441A	Displaced fracture of posterior column [ilioischial] of right acetabulum, initial encounter for closed fracture
S32.442A	Displaced fracture of posterior column [ilioischial] of left acetabulum, initial encounter for closed fracture
S32.443A	Displaced fracture of posterior column [ilioischial] of unspecified acetabulum, initial encounter for closed fracture
S32.451A	Displaced transverse fracture of right acetabulum, initial encounter for closed fracture
S32.452A	Displaced transverse fracture of left acetabulum, initial encounter for closed fracture
S32.453A	Displaced transverse fracture of unspecified acetabulum, initial encounter for closed fracture
S32.461A	Displaced associated transverse-posterior fracture of right acetabulum, initial encounter for closed fracture
S32.462A	Displaced associated transverse-posterior fracture of left acetabulum, initial encounter for closed fracture
S32.463A	Displaced associated transverse-posterior fracture of unspecified acetabulum, initial encounter for closed fracture
S32.471A	Displaced fracture of medial wall of right acetabulum, initial encounter for closed fracture
S32.472A	Displaced fracture of medial wall of left acetabulum, initial encounter for closed fracture
S32.473A	Displaced fracture of medial wall of unspecified acetabulum, initial encounter for closed fracture
S32.481A	Displaced dome fracture of right acetabulum, initial encounter for closed fracture
Pelvis	
S32.482A	Displaced dome fracture of left acetabulum, initial encounter for closed fracture
S32.483A	Displaced dome fracture of unspecified acetabulum, initial encounter for closed fracture
S32.491A	Other specified fracture of right acetabulum, initial encounter for closed fracture
S32.492A	Other specified fracture of left acetabulum, initial encounter for closed fracture
S32.499A	Other specified fracture of unspecified acetabulum, initial encounter for closed fracture
S32.501A	Unspecified fracture of right pubis, initial encounter for closed fracture
S32.502A	Unspecified fracture of left pubis, initial encounter for closed fracture
S32.509A	Unspecified fracture of unspecified pubis, initial encounter for closed fracture
S32.511A	Fracture of superior rim of right pubis, initial encounter for closed fracture
S32.512A	Fracture of superior rim of left pubis, initial encounter for closed fracture
S32.519A	Fracture of superior rim of unspecified pubis, initial encounter for closed fracture
S32.591A	Other specified fracture of right pubis, initial encounter for closed fracture
S32.592A	Other specified fracture of left pubis, initial encounter for closed fracture

ICD-10 Diagnosis Code	Description
S32.599A	Other specified fracture of unspecified pubis, initial encounter for closed fracture
S32.601A	Unspecified fracture of right ischium, initial encounter for closed fracture
S32.602A	Unspecified fracture of left ischium, initial encounter for closed fracture
S32.609A	Unspecified fracture of unspecified ischium, initial encounter for closed fracture
S32.611A	Displaced avulsion fracture of right ischium, initial encounter for closed fracture
S32.612A	Displaced avulsion fracture of left ischium, initial encounter for closed fracture
S32.613A	Displaced avulsion fracture of unspecified ischium, initial encounter for closed fracture
S32.614A	Nondisplaced avulsion fracture of right ischium, initial encounter for closed fracture
S32.615A	Nondisplaced avulsion fracture of left ischium, initial encounter for closed fracture
S32.616A	Nondisplaced avulsion fracture of unspecified ischium, initial encounter for closed fracture
S32.691A	Other specified fracture of right ischium, initial encounter for closed fracture
S32.692A	Other specified fracture of left ischium, initial encounter for closed fracture
S32.699A	Other specified fracture of unspecified ischium, initial encounter for closed fracture
S32.810A	Multiple fractures of pelvis with stable disruption of pelvic ring, initial encounter for closed fracture
S32.811A	Multiple fractures of pelvis with unstable disruption of pelvic ring, initial encounter for closed fracture
S32.82XA	Multiple fractures of pelvis without disruption of pelvic ring, initial encounter for closed fracture
S32.89XA	Fracture of other parts of pelvis, initial encounter for closed fracture
S32.9XXA	Fracture of unspecified parts of lumbosacral spine and pelvis, initial encounter for closed fracture
S33.2XXA	Dislocation of sacroiliac and sacrococcygeal joint, initial encounter
Shoulder	
M24.611	Ankylosis, right shoulder
M24.612	Ankylosis, left shoulder
M24.619	Ankylosis, unspecified shoulder
M75.00	Adhesive capsulitis of unspecified shoulder
M75.01	Adhesive capsulitis of right shoulder
M75.02	Adhesive capsulitis of left shoulder

DESCRIPTION OF SERVICES

Manipulation under anesthesia (MUA) is a non-invasive procedure which combines manual manipulation of a joint or the spine with an anesthetic. Individuals who are unable to tolerate manual procedures due to pain, spasm, muscle contractures, or guarding may benefit from the use of an anesthetic agent prior to manipulation. Anesthetics may include intravenous general anesthesia or mild sedation, injection of an anesthetic to the affected area, oral medication such as muscle relaxants, inhaled anesthetics, or any other type of anesthetic medication therapy. Because the patient's protective reflex mechanism is, absent under anesthesia, manipulation using a combination of specific short lever manipulations, passive stretches, and specific articular and postural kinesthetic maneuvers in order to break up fibrous adhesions and scar tissue around the joint~~, spine~~ and surrounding tissue is made less difficult. Manipulation procedures can be performed under either: general anesthesia, mild sedation, or local injection of an anesthetic agent to the affected area (Reid, 2002).

~~MUA may be accompanied by fluoroscopically guided intra-articular injections with corticosteroid agents to reduce inflammation or manipulation under joint anesthesia/analgesia (MUJA). Manipulation under epidural anesthesia (MUEA) employs an epidural, segmental anesthetic, often with simultaneous epidural steroid injections, followed by spinal manipulation therapy. Other therapies may combine manipulation with cortisone injections into paraspinal tissues or joint spaces.~~

Spinal manipulation under anesthesia (SMUA) consists of spinal manipulation and stretching procedures performed on the patient after an anesthetic is administered (e.g., mild sedation, general anesthesia) ~~and may be recommended when standard chiropractic care and other conservative measures have been unsuccessful~~. This is typically performed by chiropractors, osteopathic physicians, and orthopedic physicians along with an anesthesiologist. Theoretically, SMUA is thought to stretch the joint capsules to break up adhesions within the spinal column to allow for greater mobility and reduced back pain; however, this has not been proven **to be safe and effective** in the peer-reviewed literature.

CLINICAL EVIDENCE

~~Clinical evidence was not identified regarding manipulation under anesthesia for treating any condition (for single or serial manipulations) related to the following:~~

- ~~Ankle~~
- ~~Finger~~
- ~~Hip~~
- ~~Pelvis~~
- ~~Wrist~~

~~**Elbow**~~

~~In a retrospective case series, Spitler et al. (2018) followed 45 patients over a 10-year period treated with MUA for posttraumatic elbow stiffness after elbow injuries treated both operatively and nonoperatively. Average time from most recent surgical procedure or date of injury to MUA was 115 days. Average pre-manipulation flexion arc was 57.9 degrees; average flexion arc at the final follow-up was 83.7 degrees. The improvement in elbow flexion arc of motion was statistically significant (P < 0.001). Post hoc analysis of the data revealed 2 distinct groups: 28 patients who underwent MUA within 3 months of their most recent surgical procedure (early manipulation), and 17 patients who underwent MUA after 3 months (late manipulation). Average improvement in elbow flexion arc in the early MUA group was 38.3 degrees (P < 0.001); improvement in the late MUA group was 3.1 degree. Comparison of improvement between the early and late MUA groups found a significant difference (P < 0.001) in mean flexion arc improvement from pre-manipulation to postmanipulation, favoring the early group. One patient had a complication directly attributable to MUA. Nineteen patients required additional procedures on the injured extremity after MUA. The authors concluded that MUA is a safe and effective adjunct to improving motion in posttraumatic elbow stiffness when used within 3 months from the original injury or time of surgical fixation. After 3 months, they found that MUA does not reliably increase elbow motion.~~

~~Araghi and colleagues (2010) have used a technique of elbow examination (manipulation) under anesthesia in select patients. The study comprised 51 consecutive patients who underwent an examination under anesthesia. Forty-four patients with a minimum of 12 months follow-up revealed a mean pre-examination arc of 33 degrees, which improved to 73 degrees at the final assessment. Three patients had no appreciable change (less than 10 degrees) in the total arc, and 1 patient lost motion. Four patients underwent a second examination under anesthesia at a mean of 119 days after the first examination. The average pre-examination arc of 40 degrees increased to 78 degrees at the final assessment (mean improvement of 38 degrees). The only complication was worsening of ulnar paresthesias in 3 patients; with 2 resolving spontaneously, and 1 requiring anterior ulnar nerve transposition. The authors concluded that because this was not a controlled series, additional studies should be conducted to better identify those not likely to benefit from this procedure. In addition, this study is limited by its small sample size and lack of a control group.~~

~~A retrospective review by Tan et al. (2006) looked at 52 patients who underwent open surgical treatment for post-traumatic elbow contracture at an average of 14 months from the time of injury. Indication for operative release was functional loss of elbow arc of motion that failed non-operative therapy and a splinting program. Follow-up was 18.7~~

~~months. Of the 52 patients, 14 required closed manipulation under anesthesia, in the early postoperative period. Five patients required a second contracture release at an average of 12 months after the index release. Four patients failed because of painful motion and elbow instability. The authors concluded that recurrence of post-traumatic stiffness in the postoperative period is common but is responsive to manipulation under anesthesia and repeat releases. The relatively small number of patients and lack of randomization and a control group are weaknesses of this study.~~

~~Antuna et al. (2002) reported in a study for ulnohumeral arthroplasty for primary degenerative arthritis of the elbow that 2 patients underwent elbow manipulation under anesthesia to improve the range of motion after the ulnohumeral arthroplasty. The indication for this procedure was loss of preoperative motion or of motion attained at surgery. Both patients underwent manipulation twice, and ulnar nerve symptoms developed after the second manipulation. The arc of motion increased 40° in one patient and 45° in the other. However, because of the ulnar symptoms they no longer recommend manipulation of the elbow in the early postoperative period if the nerve has not been decompressed or translocated. They felt that patients with postoperative stiffness after ulnohumeral arthroplasty might be better treated by progressive stretching with static splints.~~

Knee

Gu et al. (2018) conducted a systematic review of the efficacy of MUA for stiffness following total knee arthroplasty (TKA). Twenty-two studies (1488 patients) reported on ROM after MUA, and 4 studies (81 patients) reported ROM after repeat MUA. **However, none of the studies appeared to include a comparison group without MUA, limiting the conclusions that can be drawn.** All studies reported pre-MUA motion of less than 90°, while mean ROM at last follow-up exceeded 90° in all studies except 2. For studies reporting ROM improvement following repeat MUA, the mean pre-manipulation ROM was 80° and the mean post-manipulation ROM was 100.6°. The authors concluded that MUA remains an efficacious, minimally invasive treatment option for post-operative stiffness following TKA, and provides clinically significant improvement in ROM for most patients, with the best outcomes occurring in patients treated within 12 weeks post-operatively. **The quality of studies, variability of inclusion criteria and methods for reporting the data, the lack of comparison groups and variability in the physical therapy (PT) regimens were just a few limitations identified in this systematic review. Additional research is expected to provide clarity regarding timing of MUA interventions and post-procedure PT protocol.**

Fabricant et al. (2018) evaluated (not included in the Gu, et al. systematic review) ninety patients aged 18 years and younger who underwent lysis of adhesions (LOA) and MUA at an urban tertiary care hospital following prior knee surgery. The primary purpose of this study was to report improvements in range of motion (ROM) following LOA/MUA in children and adolescents with knee arthrofibrosis, and, secondarily, to evaluate for any effect of preoperative dynamic splinting on ROM outcomes. Demographic, clinical, ROM, and revision data were all compiled. Mean time from index surgery to LOA/MUA was 6.0±4.4 months, and follow-up was 42±56 months. The authors found 62% of the participants had full ROM at follow up, and 25% had functional ROM. It was concluded that LOA/MUA for children with arthrofibrotic knees results in significant improvements in ROM with 90% revision-free success. Limitations of the study included lack of comparison group and small sample size.

A matched case control study **(excluded from the Gu, et at. Systematic review)** was conducted by Pierce et al. (2017) to assess the incidence of revision total knee arthroplasty (TKA) **among patients who underwent or did not undergo**~~and outcomes of those undergoing~~ manipulation under anesthesia (MUA) **after initial TKA**~~and compare it with a matched cohort who did not require MUA~~. A prospectively collected database of two high-volume institutions was assessed for patients who required a single MUA following TKA between 2005 and 2011. The study included138 knees with a mean 8.5-year follow-up post-MUA. This was compared with a matched cohort (1:1) who underwent TKA during the same time period but did not require an MUA. Incidence of revision surgery and clinical outcomes were compared between the two cohorts. Nine knees underwent revision in the MUA cohort and seven revisions were performed in the matched cohort. The mean Knee Society Score (KSS) and clinical scores were similar between the two cohorts. The authors concluded that undergoing an MUA was not associated with an increased risk of revision TKA. **However, patients requiring MUA after an initial TKA may have been different from those not requiring MUA, limiting the conclusions that can be derived from this study.**

Sassoon et al. (2015) performed a retrospective review on 22 patients (not included in the Gu, et al. systematic review) to evaluate whether closed manipulations performed under anesthesia (MUA) were an effective means to treat posttraumatic knee arthrofibrosis. Injuries included fractures of the femur, tibia, and patella as well as ligamentous injuries and traumatic arthrotomies. The mean time from treatment to manipulation was 90 days and a mean follow-up after manipulation was 7 months. The authors found improvement of motion (ROM) for the knee was the primary outcome. It was concluded MUA is a safe and effective method to increase knee ROM in the setting of posttraumatic arthrofibrosis. Limitations of the study included lack of comparison group and small sample size.

~~Issa et al. (2016) evaluated repeat MUAs by assessing: (1) demographic characteristics, (2) range-of-motion, (3) clinical outcomes, and (4) rate of revision surgery in post-TKA patients with persistent knee stiffness that either underwent a single MUA or repeat MUAs. One-hundred-and-sixty-seven post-TKA who had undergone an MUA at two institutions were reviewed. Patients were stratified into those who had a single MUA (138 knees) and those who had a repeat MUA (29 knees). The mean follow-up period was 63 months (range, 36 to 90 months). Demographics and ROM were compared using Student t-test and Chi-square as appropriate. Functional outcomes were assessed using Knee Society scores (KSS) and compared between the two cohorts. Among the 167 patients who underwent a MUA, 29 (17%) required repeat manipulations. The repeat MUA cohort was younger and more likely to have osteonecrosis as the underlying cause of knee disease. For the repeat MUA cohort, 17 patients (59%) had achieved satisfactory mean gains in ROM after their repeat MUAs. These patients had also achieved excellent mean Knee Society objective and functional scores. However, another seven knees (24%) had further persistent knee stiffness requiring arthrolysis of adhesions and five patients (17%) had undergone revision of the polyethylene spacer or patellar component to improve range-of-motion. The authors reported that a majority of patients who had undergone a repeat MUA were able to achieve improvements in flexion range-of-motion and functional outcomes. However, the remaining patients required more invasive procedure to treat persistent knee stiffness. In patients who have persistent knee stiffness after MUAs, a repeat MUA may be helpful to increase range-of-motion and function.~~

~~Dzaja et al. (2015) identified seventy-two patients who underwent MUA following TKA from their prospective database and compared with a matched cohort of patients who had undergone TKA without subsequent MUA. The purpose of this study was to compare clinical outcomes of total knee arthroplasty (TKA) after manipulation under anesthesia (MUA) for post-operative stiffness with a matched cohort of TKA patients who did not require MUA. Patients were evaluated for range of movement (ROM) and clinical outcome scores (Western Ontario and McMaster Universities Arthritis Index, Short-Form Health Survey, and Knee Society Clinical Rating System) at a mean follow-up of 36.4 months. In patients who required MUA, mean flexion deformity improved from 10° (0° to 25°) to 4.4° (0° to 15°), and mean range of flexion improved from 79.8° (65° to 95°) to 116° (80° to 130°). There were no statistically significant differences in ROM or functional outcome scores at three months, one year, or two years between those who required MUA and those who did not. There were no complications associated with manipulation.~~

Fitzsimmons et al. (2010) conducted a systematic review to **outcomes between studies that used either** ~~compare manipulation under anesthesia (~~MUA~~) with~~ arthroscopy ~~and~~ **with or without MUA, or** open arthrolysis for knee stiffness following total knee arthroplasty. The review evaluated ~~14,421 studies of which~~ 23 **studies.** ~~were deemed relevant~~. MUA alone resulted in a mean gain in knee motion of 30 to 47 degrees. Range of motion in the arthroscopy group increased between 18.5 to 60 degrees. The open arthrolysis group had less gain in range of motion with gains between 19 and 31 degrees. The authors concluded that both MUA and arthroscopy provide similar gains in range of motion for patients with knee stiffness following total knee arthroplasty. Open athrolysis had less favorable results. **While this review compared outcome between treatments, all comparisons were indirect, as each included study used one of the approaches only.**

~~Pariente et al. (2006) conducted a retrospective review on 333 patients who were unable to achieve adequate range of motion after total knee arthroplasty. The study was conducted to compare the efficacy of a modified manipulation technique, which uses epidural anesthesia continued for postoperative analgesia, hospital stay of one to three days, continuous passive motion (CPM) for two to three days, and daily physical therapy (PT) to standard manipulation under anesthesia. Manipulation using a standard technique was performed on 273 patients (334 knees) and manipulation using a modified technique was performed on 60 patients (65 knees). Average follow-up time was 18.4 months. With the modified technique, ROM improved from 71 degrees to 102 degrees, and knee society pain, function, and total clinical scores improved as well. Successful results were observed in 48 (74%) knees with 4 additional knees~~

~~having a successful result after a subsequent manipulation. The authors concluded that manipulation under epidural anesthesia represents a viable option for treatment of persistent stiffness after total knee arthroplasty.~~

~~Keating et al. (2007) studied 90 patients (113 knees) who underwent manipulation for postoperative flexion of < or =90 degrees at a mean of ten weeks after surgery. Flexion was measured with a goniometer prior to total knee arthroplasty, at the conclusion of the operative procedure, before manipulation, immediately after manipulation, at six months, and at one, three, and five years postoperatively. Of the 90 patients, 81 (90%) achieved improvement of ultimate knee flexion following manipulation. The average flexion was 102 degrees prior to total knee arthroplasty, 111 degrees following skin closure, and 70 degrees before manipulation. There was no significant difference in the mean improvement in flexion when patients who had manipulation within twelve weeks postoperatively were compared with those who had manipulation more than twelve weeks postoperatively. The authors concluded that manipulation generally increases ultimate flexion following total knee arthroplasty and patients with severe preoperative pain are more likely to require manipulation.~~

~~Namba and Inacio (2007) reviewed 195 patients who had undergone manipulation under anesthesia; 102 within 90 days of total knee arthroplasty and 93 more than 90 days after total knee arthroplasty. Average pain (10-point scale), satisfaction (10-point scale), flexion (degrees), and extension (degrees) were recorded before and after MUA. Flexion was significantly improved after MUA for both groups: early MUA from 68.4 degrees (+/- 17.2 degrees) to 101.4 degrees (+/- 16.15 degrees); and late MUA from 81.0 degrees (+/- 13.3 degrees) to 98.0 degrees (+/- 18.0 degrees). Pain decreased significantly with early MUA from 4.92 (+/- 2.25) to 3.34 (+/- 2.67) and with late MUA from 4.51 (+/- 2.62) to 3.44 (+/- 2.78). Extension improved only in the early MUA group from 7.15 (+/- 10.1) to 2.50 (+/- 4.98). Satisfaction scores were not improved. The authors concluded that both early and late manipulation can improve TKA pain and flexion.~~

Shoulder

In a case series, Woods and Loganathan (2017) studied recurrence of frozen shoulder after MUA through prospectively collected data on 730 patients at a single institution. Further MUA was undertaken in 141 shoulders (17.8%), for which complete data was available for 126. The mean improvement in OSS for all patients undergoing MUA was 16 (26 to 42), and the mean post-operative OSS in those requiring a further MUA was 14 (28 to 42; *t*-test, no difference between mean improvements, p = 0.57). Improvement was seen after a further MUA, regardless both of the outcome of the initial MUA, and of the time of recurrence. This study is however limited by lack of comparison group.~~Patients with type 1 diabetes mellitus were at a 38% increased risk of requiring a further MUA, compared with the 18% increased risk of the group as a whole (p < 0.0001). The authors concluded that patients with a poor outcome or recurrent symptoms of a frozen shoulder after a MUA should be offered a further MUA with the expectation of a good outcome and a low complication rate.~~

In another case series, Bidwai et al. (2016) conducted a prospective single surgeon patient reported outcome study to determine the results of limited anterior capsular release and controlled manipulation under anesthesia (MUA) in the treatment of primary frozen shoulder. Fifty-two patients were followed at regular intervals for a minimum of 6 months and a maximum of 12 months. Patients underwent pre and postoperative passive range of motion measurements (forward flexion, abduction, external rotation). Fifty-one patients (98%) achieved 160 degrees of forward flexion at a 6-month follow-up, with one patient only having 110 degrees. Fifty patients (96%) achieved 140 degrees of abduction at a 6-month follow-up, with one patient achieving 160 degrees and one patient limited to 90 degrees. No patients required surgical re-intervention. The authors concluded that there was a significant improvement in both pain and function modules of the Oxford Shoulder Score (OSS), and range of motion at 6 months. The median postoperative score was 41 from a maximum of 48 points, with an average mean improvement of 24 points. A combination of limited capsular release and MUA for the treatment of primary frozen shoulder is a safe and effective procedure resulting in marked improvement in pain, function and range of motion. **This study is however limited by lack of comparison group.**

A prospective randomized controlled study was performed by Mun and Baek (2016) to compare the clinical efficacy of hydrodistention with joint manipulation under an interscalene block with that of intra-articular corticosteroid injection. The study included 121 patients presenting with frozen shoulder. Patients were randomized into 2 groups; those in group A (60 patients) were treated by hydrodistention with joint manipulation under an interscalene block, and those in group B (61 patients) were managed with intra-articular corticosteroid injection. The visual analog scale (VAS) was

utilized to assess the pain intensity and patient satisfaction. Functional outcomes were assessed by the Constant score and the range of shoulder motion. The degree of pain and function were evaluated before treatment and at 2 weeks, 6 weeks, 12 weeks, 6 months, and 1 year. Group A demonstrated better patient satisfaction and earlier restoration of range of motion than group B at 6 weeks. At 12 weeks, the pain score was lower and the Constant score was better in group A. At 12 months after treatment, pain score, patient satisfaction, range of motion, and Constant score were similar in the 2 groups. The authors concluded that the study demonstrated earlier recovery with hydrodistention and manipulation compared with corticosteroid injection alone, and it was not associated with any complications.

A **systematic** ~~literature~~ review by Grant and colleagues (2013) looked at whether there is a difference in the clinical effectiveness of arthroscopic capsular release compared to MUA for adhesive capsulitis. There were 9 MUA studies and 17 capsular release studies that were evaluated. The authors concluded that evidence quality is low (definitions, timing and outcomes inconsistent) so that the data available demonstrates no clear difference between a capsular release and an MUA. **This review however did not compare these two approaches to medical therapy or other approaches.**

A blinded, randomized trial with a 1 year follow-up, by Kivimaki et al. (2007) evaluated 125 patients with a frozen shoulder to determine the effect of **MUA**~~manipulation under anesthesia~~. Patients were randomly assigned to either a manipulation group (65 patients) or a control group (60 patients). Both the intervention group and the control group were instructed in specific therapeutic exercises by physiotherapists. Clinical data was gathered at baseline and at 6 weeks and 3, 6, and 12 months after randomization. The 2 groups did not differ at any time of the follow-up in terms of shoulder pain or working ability. Small differences in the range of movement were detected in favor of the manipulation group. Perceived shoulder pain decreased during follow-up equally in the 2 groups, and at 1 year after randomization, only slight pain remained. The authors concluded that manipulation under anesthesia does not add effectiveness to an exercise program carried out by the patient after instruction.

~~Ng et al. (2009) conducted a prospective trial of 50 patients to examine the efficacy of manipulation under anesthesia (MUA) followed by early physiotherapy in treating frozen shoulder syndrome. Disabilities of the Arm, Shoulder and Hand (DASH) score and visual analogue score (VAS) for pain and range of movement were measured preoperatively and at 6 weeks post-procedure. The mean DASH score decreased from 48.07 to 15.84 and the mean VAS reduced from 6.07 to 1.88. Flexion improved from 104.18 to 157.56; abduction from 70.48 to 150.00; and external rotation from 13.88 to 45.62. The authors concluded that MUA combined with early physiotherapy alleviates pain and facilitates recovery of function in patients with frozen shoulder syndrome.~~

~~In a prospective trial conducted between 2001 and 2003 by Loew et al. (2005), 30 patients with primary frozen shoulder manipulated under general anesthesia were evaluated for post manipulative intra-articular lesions. Patients with secondary stiffness caused by rotator cuff tears and glenohumeral arthritis were excluded. Arthroscopy was used after manipulation to document any intra-articular lesions. All patients noted an improvement in range of motion. Flexion improved on average from 70 degrees (+/- 33 degrees) to 180 degrees (+/- 15 degrees), abduction from 50 degrees (+/- 20 degrees) to 170 degrees (+/- 25 degrees), and external rotation from -5 degrees (+/- 10 degrees) to +40 degrees (+/- 20 degrees). Localized synovitis was detected in 22 of the patients in the area of the rotator interval, whereas disseminated synovitis was observed in 8 patients. After manipulation, the capsule was seen to be ruptured superiorly in 11 patients, the anterior capsule was ruptured up to the infraglenoid pole in 24 patients, and 16 patients each had a capsular lesion located posteriorly. In 18 patients no additional joint damage was found and in 4 patients, iatrogenic superior labrum anterior posterior lesions were observed. The authors concluded that even though manipulation under anesthesia is effective in terms of joint mobilization, the method can cause iatrogenic intra-articular damage.~~

~~Flannery et al. (2007) evaluated 180 consecutive patients to determine what influence timing of manipulation under anesthesia (MUA) had on long-term outcomes for adhesive capsulitis of the shoulder. Of the 180 patients, 145 were available for follow-up after a mean period of 62 months (range of 12 to 125). All patients underwent MUA with intra-articular steroid injection. Improvement was noted in range of motion and function utilizing the Oxford Shoulder Score (OSS) and Visual Analogue Score (VAS) following manipulation. Eighty-three percent of the patients had MUA performed less than 9 months from onset of symptoms (early MUA). The remainder had MUA performed 9 to 40 months (late MUA) from onset of symptoms. The authors found that both groups had better mobility and Oxford Shoulder Score as well as less pain; however the early intervention group had the most improvement.~~

~~In a study by Farrell et al. (2005), manipulation under anesthesia was performed in 25 patients (26 shoulders) for whom non-operative treatment for idiopathic frozen shoulder had failed. All of the patients had physical therapy for a mean of 6.2 months. Long-term follow-up was obtained in 18 patients (19 shoulders) by questionnaire and averaged 15 years (range, 8.1 to 20.6 years). There were significant improvements in forward elevation from a mean of 104 degrees before manipulation to 168 degrees and in external rotation from 23 degrees to 67 degrees. There were 16 shoulders with no pain or slight pain and 3 with occasional moderate or severe pain. Of the 19 shoulders, 18 required no further surgery. The mean Simple Shoulder Test score was 9.5 out of 12 and the mean American Shoulder and Elbow Surgeons score was 80 out of 100. The authors conclude that treatment of idiopathic frozen shoulder by manipulation under anesthesia leads to sustained improvement in shoulder motion and function at a mean of 15 years after the procedure.~~

Spine

Methodological limitations of studies reported in a narrative review (DiGiorgio, 2013) of the literature investigating spinal manipulation under anesthesia (SMUA) concluded that, "the evidence of treatment efficacy [SMUA] remains limited, with published studies that are generally weak in their methodological quality and consistently varied across multiple domains which do not permit comparative analysis toward generalization." Similarly, a review (Dagenais, et al, 2008) of medication-assisted manipulation for patients having chronic low back pain reported, "there is insufficient research to guide clinicians, policy makers, and especially patients' decision whether to consider this treatment [spinal medication-assisted manipulation] approach." MUA for low back pain has been used for many years however there is insufficient evidence in the published literature to support the long-term safety and efficacy of its use.

Taber et al. (2014) performed a retrospective chart review of 18 cases treated with manipulation under anesthesia (MUA) for lumbopelvic pain at an outpatient ambulatory surgical center. Patients with pre- and postintervention Oswestry Low Back Pain Disability Index (ODI) scores were included along with patients having lumbopelvic and hip complaints. ODI scores were assessed within one week prior to MUA and again two weeks after the procedure. The participants underwent two to four chiropractic MUA procedures over the course of a week per the National Academy of Manipulation Under Anesthesia physicians' protocols. Preprocedure ODI scores ranged from 38 to 76; postprocedure scores range from 0 to 66. For each patient, the ODI scores were lower with average decrease of 20.6 . The authors identified sixteen of the eighteen patients experienced meaningful improvement of their pain. Limitations of the study included small study size, no control group, potential bias, and insufficient data on long-term safety. The authors suggested future large scale, carefully controlled prospective studies be performed .

~~Recently published literature reviews have critically appraised the evidence concerning spinal manipulation under anesthesia (SMUA). A narrative review (Di Giorgio, 2013) of the literature investigating SMUA concluded, "…the evidence of treatment efficacy [SMUA] remains limited, with published studies that are generally weak in their methodological quality and consistently varied across multiple domains which do not permit comparative analysis toward generalization." Similarly, a review (Dagenais, et al, 2008) of medication-assisted manipulation for patients having chronic low back pain reported, "…there is insufficient research to guide clinicians, policy makers, and especially patients' decision whether to consider this treatment [spinal medication-assisted manipulation] approach."~~

In a prospective study of 68 **patients with** chronic low-back pain ~~patients~~, Kohlbeck et al. (2005) compared changes in pain and disability for chronic low-back pain patients receiving treatment with medication-assisted manipulation (MAM) to patients receiving spinal manipulation only. All patients received an initial 4- to 6-week trial of spinal manipulation therapy (SMT), after which 42 patients received supplemental intervention with MAM and the remaining 26 patients continued with SMT. Low back pain and disability measures favored the MAM group over the SMT-only group at 3 months. The authors concluded that medication-assisted manipulation appears to offer some patients increased improvement in low back pain and disability; however the study is limited by lack of randomization, small sample size **insufficient data on long-term safety**, and significant baseline differences between groups for the primary outcome variable (pain/disability scale).

In a prospective controlled study by Palmieri and Smoyak (2002), 87 patients who received either **spinal manipulation under anesthesia (**SMUA**)** or traditional chiropractic treatment for low back pain were evaluated. The participants were assigned to one of two groups: 38 to an intervention group who received SMUA and 49 patients to a

nonintervention group who received traditional chiropractic treatment. Patients were followed for 4 weeks. Self-reported outcomes, including back pain severity and functional status, were used to evaluate changes. The SMUA group had an average decrease of 50% in the Numeric Pain Scale scores while the nonintervention group had a 26% decrease. The SMUA group had an average decrease of 51% in the Roland-Morris Questionnaire scores while the nonintervention group had a 38% decrease. The authors concluded that while there was greater improvement in the intervention group, additional studies are needed to evaluate the safety and effectiveness of MUA. This study has a high risk of bias due to the methods used to select subjects, lack of assessor blinding, failure to isolate the effects of the active intervention, and interpretation of outcomes. Subjects were selected largely based upon 2 criteria: meeting NAMUAP eligibility requirements and having insurance coverage for SMUA. This led to significant baseline heterogeneities between intervention and control groups. Sample size (N=87; SMUA group = 38; SMT group = 49) did not reach anticipated number of participants. The attempt to measure the difference in treatment effect between SMUA and SMT was confounded by the addition of a specific exercise protocol for the SMUA group vs. an undefined "home exercise" program for the SMT group. Follow-up period was limited **and therefore insufficient data on long-term safety are available**. Problems with obtaining timely follow-up data were reported. The use of a percentile difference in outcome scores between groups does not take into account if each outcome of interest exhibited a clinically meaningful difference between each group. In fact, there were no statistical or clinically meaningful differences between groups. There was a difference of 1.52 points on the NRS at initial follow-up and 1.32 points difference at final follow-up (the minimal clinically important change has been widely reported as 2 points). The difference at initial follow-up for the RMDQ was 2.2 points and at final follow-up was 1 point (as noted in the study, a 4 point difference is necessary for it to be clinically meaningful).

~~Cremata et al. (2005) reported the results of SMUA for 4 patients with chronic spinal, sacroiliac, and/or pelvic and low back pain. Patients with chronic pain who had not adequately responded to conservative medical and/or a reasonable trial (4 months minimum) of chiropractic adjustments, and had no contraindications to anesthesia or adjustments, were selected. The 4 patients went through 3 consecutive days of SMUA followed by an 8-week protocol of the same procedures plus physiotherapy in-office without anesthesia. Data included pre- and post-SMUA passive ranges of motion, changes in the visual analog scale, neurologic and orthopedic examination findings. The patients had follow-up varying from 9 to 18 months and showed improvement in passive ranges of motion, decreases in the visual analog scale rating, and diminishment of subsequent visit frequency. The authors concluded that manipulation under anesthesia was an effective approach to restoring articular and myofascial movements in patients who did not adequately respond to either medical in-office conservative chiropractic adjustments and/or adjunctive techniques. Weaknesses of this study include small sample size and lack of randomization. Additional studies are needed to evaluate the safety and effectiveness of SMUA.~~

Temporomandibular Joint (TMJ)

~~Available evidence for manipulation under anesthesia for temporomandibular joint syndrome is limited to small, uncontrolled studies with limited follow-up.~~

TMJ may spontaneously resolve or reoccur or respond to warm compresses, non-steroidal anti-inflammatory drugs (NSAIDs) splint therapy or physical therapy. However, the available evidence for manipulation under anesthesia for temporomandibular joint syndrome is limited to small, uncontrolled studies with limited follow-up.

Foster et al. (2000) studied 55 patients receiving manipulation under general anesthesia of the temporomandibular joint to determine the success rate of MUA effectiveness in an effort to reduce the number of patients being referred for invasive surgery. Of the 55 patients participating in this study, 15 improved, 15 did not, 6 showed partial improvement and 19 were not treated. The median pre-treatment opening was 20mm (range 13-27). Among those who improved after manipulation, the median opening after treatment was 38mm (range 35-56). The authors concluded that MUA may help some patients; however, some of those who improved experienced a return of TMJ clicking but not of joint or muscle tenderness. **Furthermore, this study is limited by lack of comparison group.**

Toe

The available evidence for manipulation under anesthesia for a toe is insufficient to consider the procedure proven to be effective and safe.

Feuerstein et al. (2016) performed a medical records review study (n-38) to investigate the intermediate and long-term outcomes of first metatarsophalangeal (MTP) joint manipulation for arthrofibrosis that developed, specifically, as a complication of hallux valgus surgery. Medical records were reviewed at the Weil Foot and Ankle Institute, IL to identify those patients who had undergone first metatarsophalangeal (MTP) joint manipulation under anesthesia. Before the patient's visit, the medical records were reviewed to assess the course and timing of the procedures, visual analog scale (VAS) score before manipulation and range of motion (ROM) of the first MTP joint after hallux valgus correction and before manipulation and first MTP joint ROM immediately after manipulation. Manipulation procedures occurred at a mean 1.2 years from the date of the initial hallux valgus correction. The research visits occurred at a mean 6.5 years after the first MTP joint manipulation. Before manipulation, the patients had a mean VAS score of 6.5. At the research visit, the mean VAS score was 2.3. The authors concluded that joint motion was significantly improved in the direction of dorsiflexion and plantar flexion from before manipulation to both immediately after manipulation and at the final follow-up visit. They stated that the study demonstrated that joint manipulation under anesthesia could be a useful treatment modality to increase mobility and decrease pain in the patient. The limitations of the study include the lack of randomization, lack of a control or comparison group, and potential selection bias.

Clinical evidence was not identified regarding manipulation under anesthesia for treating any condition (for single or serial manipulations) related to the following:

- **Ankle**
- **Finger**
- **Hip**
- **Pelvis**
- **Wrist**

Other

The Work Loss Data Institute Official Disability Guidelines (ODG) (2014) for neck, upper back; lumbar and thoracic and disorders state that, "except in urgent situations as a closed orthopedic procedure in the treatment (reduction) of vertebral fracture or dislocation. In the absence of vertebral fracture or dislocation, MUA is not supported by quality evidence in the management of spine-based neuromusculoskeletal conditions (i.e., those involving chronic pain and/or fibrotic adhesions/scar tissue). Existing studies are poor quality and vary across numerous domains including technique application, potential use of co-interventions and dosage, so any favorable outcomes reported cannot be generalized."

Professional Societies

American Academy of Orthopaedic Surgeons (AAOS)

The AAOS lists manipulation under anesthesia as an option for treatment of adhesive capsulitis (frozen shoulder).

American College of Occupational and Environmental Medicine (ACOEM)

In a recommendation regarding SMUA, the ACOEM (2012) has concluded that SMUA and medication-assisted spinal manipulations are not recommended due to insufficient evidence of safety and effectiveness for acute, subacute and chronic cervicothoracic and low back pain.

U.S. FOOD AND DRUG ADMINISTRATION (FDA)

Manipulation is a procedure and therefore not subject to FDA regulation.

CENTERS FOR MEDICARE AND MEDICAID SERVICES (CMS)

Medicare covers manipulation when criteria are met. Refer to the National Coverage Determination (NCD) for Manipulation (150.1).

Medicare does not have an NCD that specifically addresses manipulation under anesthesia (MUA). Local Coverage Determinations (LCDs) exist; see the LCDs for Manipulation Under Anesthesia (MUA) and Noncovered Services other than CPT® Category III Noncovered Services.

(Accessed December 19, 2019)

~~Medicare does cover manipulation under anesthesia (MUA) when criteria are met. Refer to the National Coverage Determination (NCD) for Manipulation (150.1). Local Coverage Determinations (LCDs) exist; see the LCDs for Manipulation Under Anesthesia (MUA), Noncovered Services and Noncovered Services other than CPT® Category III Noncovered Services.~~
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POLICY HISTORY/REVISION INFORMATION

Date	Action/Description
TBD	**Coverage Rationale** **• Removed Elbow and Pelvis from proven statement** **Supporting Information**

Date	Action/Description
	• **Updated Clinical Evidence, FDA, CMS, and References sections to reflect the most current information.** • **Archived previous policy version CS075.K**

INSTRUCTIONS FOR USE

This Medical Policy provides assistance in interpreting UnitedHealthcare standard benefit plans. When deciding coverage, the federal, state or contractual requirements for benefit plan coverage must be referenced as the terms of the federal, state or contractual requirements for benefit plan coverage may differ from the standard benefit plan. In the event of a conflict, the federal, state or contractual requirements for benefit plan coverage govern. Before using this policy, please check the federal, state or contractual requirements for benefit plan coverage. UnitedHealthcare reserves the right to modify its Policies and Guidelines as necessary. This Medical Policy is provided for informational purposes. It does not constitute medical advice.

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