MANIPULATION UNDER ANESTHESIA

Policy Number: ANESTHESIA 004.17 T2 **Effective Date**: November 1, 2018

Instructions for Use

Table of Contents **Page**

Related Policies
None

CONDITIONS OF COVERAGE

Applicable Lines of Business/Products	This policy applies to Oxford Commercial plan membership.
Benefit Type	General benefits package [2]
Referral Required (Does not apply to non-gatekeeper products)	No
Authorization Required (Precertification always required for inpatient admission)	Yes[1]
Precertification with Medical Director Review Required	No
Applicable Site(s) of Service (If site of service is not listed, Medical Director review is required)	Office[1], Outpatient
Special Considerations	[1]**Participating Providers in the Office Setting**: Precertification is required for services performed in the office of a participating provider. **Non-Participating/ Out-of-Network Providers in the Office Setting**: Precertification is not required, but is encouraged for out-of-network services performed in the office. If precertification is not obtained, Oxford will review for out-of-network benefits and medical necessity after the service is rendered. [2]This policy applies to specific CPT codes, regardless of the specialty of the treating provider, with the exception of chiropractic providers. If a chiropractor provides the services specified by a CPT code in this policy, those services will continue to accrue separately towards the chiropractic benefit.

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 (e.g., frozen shoulder)

Manipulation under anesthesia is unproven and not medically necessary for:

- 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

Published studies which are available are of relatively small sample size, short-term outcomes and lack of randomization or a control group.

*This policy does not apply to manipulation of the finger on the day following the injection of collagenase clostridium histolyticum (Xiaflex®) to treat Dupuytren's contracture.

Manipulation under anesthesia is unproven and not medically necessary for serial manipulations for any body part or multiple body joints for the management of acute or chronic pain conditions.
There is a lack of peer-reviewed published evidence supporting the need for multiple, repeat sessions of MUA for multiple body joints.

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 the member specific benefit plan document 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 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

ICD-10 Diagnosis Code	Description
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
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	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
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
Pelvis	
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
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
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

ICD-10 Diagnosis Code	Description
Pelvis	
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 a general anesthetic. In patients 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).

Manipulation under anesthesia (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 in the peer-reviewed literature.

Note: Unless otherwise specified, this policy does not address closed reduction of a fracture or joint dislocation.

CLINICAL EVIDENCE

Manipulation under anesthesia (MUA) is intended to reduce pain and improve range of motion. It is a treatment modality that consists of manipulation and stretching procedures performed while the patient has received anesthesia (e.g., conscious sedation, general anesthesia). The rationale for this approach is that fibrotic changes in the peri-articular and intra-articular soft tissues hinder movement, and sometimes it is necessary to anesthetize patients to reduce muscle tone and protective reflex mechanisms so that the joints can be manipulated effectively. Those who advocate this procedure assert that it will break up adhesions within the surrounding joints and stretch the restricting fibrotic tissue to a length compatible with motion, thereby, increasing joint function and reducing pain.

Manipulation under anesthesia may be performed for a variety of musculoskeletal conditions which may include the ankle, elbow, hip, knee, shoulder, pelvis and pelvic ring fracture, dislocation, diastatis or subluxation, and the spine.

Ankle

No evidence was identified within the evidence-based peer-reviewed literature concerning ankle manipulation under anesthesia for the treatment of any condition.

Elbow

There is little data within the evidence-based, peer reviewed literature concerning the safety and effectiveness of using manipulation under anesthesia of the elbow. Although some studies suggest that it may be useful in the early-post operative recovery of patients with joint contractures, there is a lack of substantial evidence that validates this use.

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. 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 (Tan, 2006). 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. 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. (Antuna, 2002)

Finger

No studies that provide substantial evidence regarding the use of manipulation under anesthesia of the finger were identified.

Hip

No studies that provide substantial evidence regarding the use of manipulation under anesthesia of the hip joint were identified.

Knee

Arthrofibrosis is a condition that may occur following trauma, surgery or joint replacement. It is often seen after procedures such as ACL reconstruction surgery or knee replacement. Arthrofibrosis is due to inflammation and proliferation of scar tissue. In particular, traumatic injury to the knee leads to the formation of internal scar tissue which is followed by shrinking and tightening of the joints knee capsule. In some cases, tendons outside the joint shrink and tighten, all of which lead to decreased motion of the joint.

The use of knee joint manipulation following total knee arthroplasty appears to be effective as a means of improving flexion of the joint. It also appears that this procedure may lead to a decrease in pain scores as reported within the literature.

A matched case control study was conducted by Pierce et al. (2017) to assess the incidence of revision total knee arthroplasty (TKA) and outcomes of those undergoing manipulation under anesthesia (MUA) 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.

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 compare manipulation under anesthesia (MUA) with arthroscopy and open arthrolysis for knee stiffness following total knee arthroplasty. The review evaluated 14,421 studies of which 23 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.

Pariente et al. conducted a retrospective review on 333 patients who were unable to achieve adequate range of motion after total knee arthroplasty (Pariente, 2006). 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 ≤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.

Multiple Joints

Evidence supporting the need for multiple, repeat sessions of MUA for these conditions was not found in the published medical literature.

Pelvis

No literature was found to support manipulation under anesthesia of the pelvis for diastasis or subluxation.

Shoulder

Adhesive capsulitis, also referred to as frozen shoulder, describes a painful restriction (both passive and active) of shoulder motion in an individual whose x-rays are typically normal.

The use of shoulder manipulation under anesthesia to reduce pain and improve range of motion appears to be effective in patients with adhesive capsulitis (frozen shoulder) when conservative non-surgical treatment has failed.

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.

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 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.

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 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

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 [S MUA] 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 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 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 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. 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.

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.

Toe

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.

Wrist

Available evidence for manipulation under anesthesia for wrist is limited to small, uncontrolled studies with limited follow-up or case studies.

Professional Societies

The American College of Occupational and Environmental Medicine (ACOEM)

ACOEM has published recommendations concerning SMUA within two disability guidelines. The ACOEM 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 (ACOEM, 2012).

Two recently updated ODG guidelines (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."

U.S. FOOD AND DRUG ADMINISTRATION (FDA)

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

REFERENCES

The foregoing Oxford policy has been adapted from an existing UnitedHealthcare national policy that was researched, developed and approved by UnitedHealthcare Medical Technology Assessment Committee. [*2018T0515P*]

American College of Occupational and Environmental Medicine (ACOEM). Cervical and thoracic spine disability guidelines. Reed Group, Medical Disability Advisor, MDGuidelines.

American College of Occupational and Environmental Medicine (ACOEM). Low back disorders disability guidelines. Reed Group, Medical Disability Advisor, MDGuidelines.

American College of Occupational and Environmental Medicine (ACOEM). Methods by which ACOEM adheres to the AGREE Criteria. Elk Grove Village, Ill: American College of Occupational and Environmental Medicine; 2009.

Antuna SA, Morrey BF, Adams RA, et al. Ulnohumeral arthroplasty for primary degenerative arthritis of the elbow: Long-term outcome and complications. Journal of Bone and Joint Surgery - Series A. 84(12)(pp 2168-2173), 2002.

Araghi A, Celli A, Adams R, Morrey B. The outcome of examination (manipulation) under anesthesia on the stiff elbow after surgical contracture release. J Shoulder Elbow Surg. 2010; 19(2):202-208.

Bidwai AS, Mayne A, Nielsen M, et al. Limited capsular release and controlled manipulation under anaesthesia for the treatment of frozen shoulder. Shoulder and Elbow. January 1, 2016;8(1) 9-13

Cremata E, Collins S, Clauson W, et al. Manipulation under anesthesia: A report of four cases. Journal of Manipulative and Physiological Therapeutics. 28(7)(pp 526-533), 2005.

Dagenais S, Mayer J, Wooley JR, Haldeman S. Evidence-informed management of chronic low back pain with medicine-assisted manipulation. Spine J 2008;8(1):142–149.

Digiorgi D. Spinal manipulation under anesthesia: a narrative review of the literature and commentary. Chiropr Man Therap. 2013 May 14;21(1):14.

Dzaja I, Vasarhelyi EM, Lanting BA, et al. Knee manipulation under anaesthetic following total knee arthroplasty: a matched cohort design. Bone Joint J. 2015 Dec;97-B(12):1640-4.

Feuerstein C, Weil Jr. L, Weil Sr. L, Joint Manipulation Under Anesthesia for Arthrofibrosis After Hallux Valgus Surgery. The Journal of Foot & Ankle Surgery 55 (2016) 76–80.

Fitzsimmons SE, Vazquez EA, Bronson MJ. How to treat the stiff total knee arthroplasty?: a systematic review. Clin Orthop Relat Res. 2010 Apr;468(4):1096-106. Epub 2010 Jan 20.

Flannery O, Mullett H, Colville J. Adhesive shoulder capsulitis: does the timing of manipulation influence outcome?. Acta Orthopaedica Belgica. 73(1):21-5, 2007 Feb.

Foster ME, Gray RJ, Davies SJ, et al. Therapeutic manipulation of the temporomandibular joint. Br J Oral Maxillofac Surg. 2000;38(6):641-644.

Grant JA, Schroeder N, Miller BS, Carpenter JE. Comparison of manipulation and arthroscopic capsular release for adhesive capsulitis: a systematic review. J Shoulder Elbow Surg. 2013; 22(8):1135-1145.

Keating EM. Ritter MA. Harty LD. et al. Manipulation after total knee arthroplasty. Journal of Bone & Joint Surgery - American Volume. 89(2):282-6, 2007 Feb.

Kivimaki 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. Journal of Shoulder and Elbow Surgery. 16(6)(pp 722-726), 2007.

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 May;28(4):245-52.

Loew M, Heichel TO, Lehner B. Intraarticular lesions in primary frozen shoulder after manipulation under general anesthesia. Journal of Shoulder & Elbow Surgery. 14(1):16-21, 2005 Jan-Feb.

Mun S and Baek C. Clinical efficacy of hydrodistention with joint manipulation under interscalene block compared with intra-articular corticosteroid injection for frozen shoulder: a prospective randomized controlled study. J Shoulder Elbow Surg (2016) 25, 1937–1943.

Namba R.S. Inacio M. Early and Late Manipulation Improve Flexion After Total Knee Arthroplasty. Journal of Arthroplasty. 22(6 SUPPL.)(pp 58-61), 2007. Date of Publication: Sep 2007.

Ng CY, Amin AK, Narborough S, et al. Manipulation under anaesthesia and early physiotherapy facilitate recovery of patients with frozen shoulder syndrome. Scott Med J 2009; 54:29-31.

ODG Low Back Integrated Treatment/Disability Duration Guidelines - Lumbar & Thoracic (Acute & Chronic). *Work Loss Data Institute,* Updated 11/21/14.

ODG Treatment Integrated Treatment/Disability Duration Guidelines Neck and Upper Back (Acute & Chronic). *Work Loss Data Institute,* Updated 11/18/14.

ODG. Methodology description using the AGREE instrument. *Work Loss Data Institute* 2014.

Palmieri NF. Smoyak S. Chronic low back pain: a study of the effects of manipulation under anesthesia. Journal of Manipulative & Physiological Therapeutics. 25(8):E8-E17, October 2002.

Pariente GM, Lombardi AV Jr, Berend KR, et al. Manipulation with prolonged epidural analgesia for treatment of TKA complicated by arthrofibrosis. Surgical Technology International. 15:221-4, 2006.

Pierce TP, Issa K, Festa A. Does manipulation under anesthesia increase the risk of revision total knee arthroplasty? A matched case control study. J Knee Surg. 2017 Sep;30(7):730-733.

Reid R, Desimone R. Manipulation under anesthesia for pain. Spine-health.com. October 23, 2002.

Tan V, Daluiski A, Simic P, et al. Outcome of open release for post-traumatic elbow stiffness. Journal of Trauma - Injury, Infection and Critical Care. 61(3)(pp 673-678), 2006. Date of Publication: Sep 2006.

Work Loss Data Institute. Low back - lumbar & thoracic (acute & chronic). Encinitas, CA: Work Loss Data Institute; 2011.

Yeoh D, Nicolaou N, Goddard R, Manipulation under anesthesia post total knee replacement: long term follow up. Knee. 2012; 19(4): 329-331.

POLICY HISTORY/REVISION INFORMATION

Date	Action/Description
12/01/2018	• Reformatted list of applicable ICD-10 diagnosis codes

11/01/2018	• Reorganized policy template:
	  ○ Simplified and relocated *Instructions for Use*
	  ○ Removed *Benefit Considerations* section
	• Updated conditions of coverage/special considerations; modified notation to clarify:
	  ○ For **participating providers in the office setting**: Precertification is required for services performed in the office of a participating provider
	  ○ For **non-participating/out-of-network providers in the office setting**: Precertification is not required, but is encouraged for out-of-network services performed in the office; if precertification is not obtained, Oxford will review for out-of-network benefits and medical necessity after the service is rendered
	• Updated coverage rationale; modified language to clarify the listed services are:

Date	Action/Description
	○ Proven ***and*** medically necessary (as described) ○ Unproven ***and*** not medically necessary (as described) • Archived previous policy version ANESTHESIA 004.16 T2

INSTRUCTIONS FOR USE

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

The term Oxford includes Oxford Health Plans, LLC and all of its subsidiaries as appropriate for these policies. Unless otherwise stated, Oxford policies do not apply to Medicare Advantage members.

UnitedHealthcare may also use tools developed by third parties, such as the MCG™ Care Guidelines, to assist us in administering health benefits. UnitedHealthcare Oxford Clinical Policies are intended to be used in connection with the independent professional medical judgment of a qualified health care provider and do not constitute the practice of medicine or medical advice.