INTRODUCTION
At the ACA Convention in Washington, D.C. last summer, the House of Delegates chose not to act on the proposed Manipulation Under Anesthesia (MUA) policy statement. The Delegates felt that insufficient information was available upon which to make a decision on the technique. Later, one of the Delegates reviewed my file and reported to me that, had the Delegates been aware of the information which was available, they may have agreed to consider the proposal.

The purpose of this article is to bring the various individuals interested in this topic up-to-speed on the current state of the art by review, discussion, and critique of the available literature, the technique as it is currently being practiced, recommendation for further study, and the proposed position statement.

LITERATURE REVIEW
Clybourne's article, Manipulation of the Low-Back Region Under Anesthesia, is the earliest dated publication from 1948. He states, "I have had the opportunity to use manipulation under anesthesia on a sufficiently large number of cases to realize its scope and its limitations." He begins with "three very important principles which must be carefully followed if it is to be successful." 1) selection of cases, 2) application of technic, and 3) careful, well-planned postmanipulative care personally supervised by the "surgeon performing the manipulation".

Under selection he first lists the contraindications to MUA:
- TB of the spine or sacroiliac joints
- Syphilitic articular or periarticular lesions
- An excessive tendency toward spondylosis or arthritis of the spinal joints with evidence of destructive or progressive joint pathology
- Gonorrheal spinal arthritis
- Excessive spinal osteoporosis
- Any roentgenologic evidence of cord or caudal compression by tumor, disc prolapse, hypertrophic ligamentum flavum, or other pathology.

Clybourne identifies "the type of case most amenable to treatment by manipulation is that in which the main pathological cause is the interference with joint motion by the presence of adhesions." He goes on to discuss early stages of adhesions which may be, "drawn asunder" by gentle manipulation, whereas chronic fibrosis becomes too powerful to be separated without producing internal damage. He concludes that adhesions will reform rapidly unless manipulation is immediately followed by treatment which will...
insure complete and rapid resorption of inflammation, restore normal tissue nutrition, and maintain mobility of the articular units.

His goal, when performing MUA, is to relieve rigidity, correct postural defects, and relieve local as well as radiating pain.

Siehl and Bradford published in 1952, *Manipulation of the Low Back under General Anesthesia*; this was a review of 100 low back MUAs on 87 different patients. They reported that "the method was first used on those cases which were not responding or were responding very slowly to the usual manipulative management." In addition, acute low back cases were treated under anesthesia when the manipulators felt it was more convenient to handle the patient this way or when there was an economic factor making early return to work essential.

The ultimate aim is the normalization of structure and function. By using anesthesia, the authors felt more could be accomplished in a shorter period because of the absence of pain and protective muscle spasm.

These authors used MUA in the presence of marked arthritis, but only with the most careful choice of technic. They did not hesitate to use the procedure in the presence of spinal fusion, postoperatively following laminectomy, and in patients with moderate osteoporosis, pointing out that the technic and force used, take into consideration the pathology present.

Although the authors identify poor or slow response to usual manipulative procedures as indication for MUA, the article does not state whether the 87 patients upon whom these statistics are based underwent standard spinal manipulation (SM) prior to MUA. Indeed, they make a point of emphasizing that management of the chronic low-back case was not limited to MUA but was frequently combined with x-rays, therapy, braces, and exercises.

In rating their results, they followed patients for several months. The method of rating was based chiefly on patients' subjective response concerning the procedure. 28 patients were rated as having excellent results, 32 had good results, 20 had fair results, and 10 had poor results.

They concluded that herniated intervertebral disk (HNP) cases of long standing did not respond well; but good results were obtained in approximately 50% of recent cases (one-third of HNP cases reviewed).

Siehl is again published in 1963, *Manipulation of the Spine Under General Anesthesia*, in a follow-up study of 723 cases representing 666 different patients treated over the eleven year interim. Concerning the value of manipulation he quotes Mensor's conclusion: "A conservative regimen which includes manipulative treatment of lower lumbar intervertebral disc syndrome under anesthesia eventuates a sufficiently high percentage of satisfactory results to warrant its use as an essential part of conservative therapy."

He further defines the "myofibrositic syndrome" listing chronic lumbago, chronic osteopathic lesion pathology, sacroiliac strain, structural imbalance, myofascitis, myofibrosis, torticollis, sciatic scoliosis, "and many others". He particularly favors "intramuscular fibrositis" and "periarticular fibrositis" as most descriptive. These are the chronic low back cases included in this study. "In a large number of these cases, the follow-up ran into several years because of subsequent care of the patient for the same or other conditions."

Today, the insurance industry would have a field day with that statement!

Rating results were better defined and simplified. "Good" was a symptom-free patient who returned to normal activity. "Fair" was the patient who demonstrated improvement and returned to relatively normal activity with some residual symptoms, or who was temporarily good but later required surgery or another MUA. Little or no improvement or aggravation of symptoms rated "poor". Laminectomy was performed subsequent to MUA in 112 cases. Laminectomy was performed prior to MUA in 45 cases.

Specific diagnosis of the patients distributed as follows:
Over-all results in the 723 cases were:
- "good" 431 cases (60%)
- "fair" 218 cases (30%)
- "poor" 74 cases (10%)

In patients with the final diagnosis of HNP (185 cases):
- "good" 49 cases (26.4%)
- "fair" 82 cases (44.3%)
- "poor" 54 cases (29.3%)
A total of 95 (51%) underwent disc surgery after MUA.

In patients with the final diagnosis of myofibrositis or similar pathologic states without HNP the results were:
- "good" 382 cases (71%)
- "fair" 136 cases (25.3%)
- "poor" 20 cases (3.7%)

In conclusion, Siehl states that 96.3% of patients diagnosed with "myofibrositis" improved with MUA, and 70.7% of patients with HNP improved (albeit temporarily) with MUA. Again, no mention is made in the article whether these patients qualified for this study by fulfilling the original requirement, that they were not responding or responding very slowly to SM.

Pressure Caudal Anesthesia and Back Manipulation by Brown, was published in 1960. Patients whose low back pain was not ameliorated by other conservative measures, or who refused surgical treatment were given caudal injection of a local anesthetic agent, then saline and a corticoid were injected and finally, manipulation in flexion was performed. Improvement was reported in 84% of the 62 patients in this series and no important undesirable effects were noted. Manipulative rupture of adhesions were credited with restitution of normal motion.

"Excellent" results were obtained in those patients whom complete and persistent relief of sciatic root pain was obtained for a minimum of 3 months (33 cases, 53%). "Good" results occurred in 19 cases (31%) with either transitory elimination of persistent root pain for periods of days or one to two weeks following each procedure, and when definite and striking diminution in the severity of root pain was noted following a course of MUAs. In 10 cases (16%), no appreciable benefit was obtained after the first procedure and no further procedures were done. Several of the cases in the "excellent" and "good" categories, with recurrence of pain in 3 to 6 months, found it valuable therapeutically to have a repeat procedure done.


In this study, the clinical criteria used were:
- absent or diminished Achilles or patellar reflexes,
- muscular weakness of extensor hallucis longus, tibialis anterior and/or gastrocnemius muscles,
- dermatomal sensory impairment pattern, orthopedic exam, i.e. SLR,
- and muscular atrophy of specific myotome.
The EMG criteria included:

- finding of spontaneous or transient fibrillation potentials,
- persistent positive sharp waves,
- decreased motor unit activity, and
- appearance of neuropathic motor units.

Patients were randomly assigned to one of two groups, but could default into a third: 1. "conservative therapy utilizing osteopathic [MUA]", 2. conservative therapy without MUA. And 3. patients who did not respond to either form of therapy with progressive symptoms or marked neurologic deficit. These patients underwent surgery for HNP. Results of that study were not available at the time this article was sent to publication.

Also in 1968, Rumney was published, *Manipulation of the Spine and Appendages Under Anesthesia: An Evaluation*¹. This article is much more than an evaluation; I believe it to be the lecture notes from perhaps a four hour lecture. He is the first to specifically state:

"The indications for manipulative procedures under general anesthesia are primarily conditions in which manipulation is the therapy of choice, but which do not respond satisfactorily to manipulation without anesthesia."

He lists the musculoskeletal conditions which respond well to MUA: nerve entrapment, chronic myositis/fibrositis, anomalies with restricted motion following trauma, chronic muscular contraction, and occasionally, acute muscle spasms associated with subluxation. Conditions which may need immediate MUA include "acute knee injury, acute low-back strain, and injuries to the neck [from] whiplash injury".

Rumney reports that Siehl "is now using [MUA] on all patients with disk problems before attempting surgical correction. Many of the patients become symptom free and do not require surgery."

[MUA] "...is not looked upon favorably by some physicians for three possible reasons. 1. The person knows nothing about the procedure and thinks it's something done by "unqualified

individuals. 2. Numerous physicians have used crude techniques....'popping' the joints only increases mobility of the already hypermobile joint; soft tissue mobilization is what's needed. The manipulation was traumatic not therapeutic. 3. Anesthesia is being used inappropriately, to make a greater impression on the patient...."

In today's economic society, we could add a fourth reason doctors have given me why they do not trust the use of MUA; anesthesia is being used inappropriately, because insurance is paying big money for it.

Patient selection boiled down to the "pathologic changes in joint dysfunction...: initially there is intra-articular or periarticular irritation with muscle spasm. The muscle spasm and the irritation lead to inflammation, edema, and fibrous reaction, and the fibrous reaction leads to limited mobility. It is much easier to reverse the process in the stage of inflammation and edema than after fibrosis has occurred. When the condition advances to fibrosis one is faced with a prolonged program, and it is at this point that [MUA] is most frequently indicated. Even after manipulative procedures break up the fibrosis, one must institute an adequate program of physical therapy and exercise. Such a program is necessary for sufficient circulation and mobility to prevent the reformation of fibrous tissue. If one does not prevent, or lessen, the formation of fibrous tissue, the patient's original problem will recur."

The author continues with a thorough evaluation of the patient including history, physical/orthopedic exam, laboratory, x-ray, pre-operative prep, and finally the manipulative procedures. He describes operator forces which "have to be of high velocity-low amplitude for breaking up adhesions [in soft tissues], and of low velocity-high amplitude for stretching periarticular tissues. Most frequently the forces would be a combination of traction, rotation, and side-bending, with the velocity and amplitude selected for the problem at hand."

He goes on to describe manipulative therapies for radial/ulnar subluxation of the elbow, cervical lateral and AP gliding motions, low back problems involving a classic lumbar roll of the lower lumbar vertebrae as well as bilateral sacroiliac fixation with an anterior sacral base. He begins and ends
this lesson with the statement that anesthesia may or may not be necessary to successfully treat the patient. Rumney believes there is a place for MUA but summarizes, "whose success is directly related to the quality of the operator’s manipulative skills."

1973 saw the publication of Morey’s, *Osteopathic Manipulation under General Anesthesia*[^10]. This author would limit MUA "to the few patients who have specific musculoskeletal disorders that:
1. have failed to respond to conservative therapy in office or hospital;
2. are chronic and recurrent;
3. may be so severe that narcotic analgesics are of little benefit;
4. cause disability which could be relieved by such manipulation; or
5. have severe symptoms that may be relieved temporarily by such treatment."

He also recommends that to maintain the privilege, experience, and skill to perform MUA on hospital staff, the physician should be required to perform a minimum of 10-12 cases per year.

This paper reports on 119 cases (93 low back, 26 neck/extremity) treated by 11 physicians in a hospital setting. The statistics bear out that the more skilled the manipulator [the instructors were better than the students], the shorter the period of stay post-op in the hospital. Pre-operative treatment does not list SM.

One conclusion of the study suggested, "that a decision should be made within the first week of hospitalization as to whether [MUA] should be considered. If the musculoskeletal disorder is acute or severe or not improving satisfactorily, if the patient meets the criteria for successful major surgery, and if correct diagnosis has been established, there is no need to prolong the disability for weeks or months. ....delay may lead to permanent musculoskeletal problems."

It is the author’s opinion that “Most insurance companies, when the procedure is fully explained to them, would rather pay a reasonable fee for [MUA] than have the patient languish in a hospital for weeks or even months at $75 or $100 per day.!” Some carriers, however, refuse to recognize [MUA] except for fracture, dislocation, or capsulitis of the shoulder. This uncompromising attitude and incomplete coverage by those who should know better frequently has an adverse psychologic effect on the patient or results in unnecessary, prolonged hospitalization."

The next article reviewed from the medical/osteopathic fields (Australia) was *Serious Complications of Lumbar Spinal Manipulation*[^10] by Dan and Saccasan published in 1983. “In 1980, approximately 3800 manipulations were performed in New South Wales hospitals alone. Of these, 75% were performed under general anesthesia.” Seven case reports follow. In light of previous articles, the Discussion from this paper is enlightening.

"The probability of injury is increased during [MUA], because the erector spine muscles which ordinarily protect the underlying tissues become relaxed. Consequently, a comparatively large amount of stress can be applied to deep structures during such manipulation. Traumatized muscle fibers may already be injured through stretching. Laxity of the ligaments may result from the repeated stretching of joints whose primary function is stability rather than movement. Vascular injury, such as trauma to the vertebral arteries as they pass through the foraminae transversaria, is well described. ...as may initiation or exacerbation of [HNP] and temporary or permanent damage to the spinal cord or to nerve roots, secondary to vascular, bony, or disc disruption with impairment of the function of target organs."

In 1989 the ACA /Journal published, *Spinal Manipulation under General Anesthesia: a Chiropractic Approach in a Hospital Setting*[^12] by Robert Francis, D.C. Dr. Francis holds medical appointments in a Texas hospital and is dean and director at Texas Chiropractic College.

Dr. Francis prescribes to Morey’s 5 indications for MUA. He refines the list of contraindications:
1. highly acute symptoms or severe sprains or when passive motion results in severe pain,
2. presence of primary or metastatic carcinoma,
3. possibility of fracture,
4. local bone infection,
5. acute arthritis or gout,
6. diabetic neuropathy.
Post-op follow-up has also been updated to "2 days rest from activity, then one week of daily [SM] to prevent recurrence of intra-articular or capsular fibroblastic proliferation. ...the next 2 weeks with [SM] every other day before release from active care."

A single case report follows. The patient is diagnosed with sacroiliac joint dysfunction, posterior facet syndrome, DJD, and facet imbrication. Of note, "this patient received SM in my office 3 times per week for 8 weeks after which all symptoms were resolved except the left 'hip' and radiating posterior thigh pain. Significant articular releases were accomplished that had not been possible to achieve in the office due to the intra-articular adhesions and the tight muscles and ligaments about the facets and sacroiliac joints. She is now on a once a month follow-up care program to prevent recurrence of fibroblastic proliferation."

The author reports similar results in over 20 MUAs but points out that "excellent results are directly dependent upon patient selection. Not all patients who meet the criteria for indications will benefit from this procedure." And finally, he recommends longitudinal prospective blinded studies to demonstrate medical necessity of chiropractic in a hospital setting.

Several additional articles by or about Dr. Francis and his work with MUA appeared over the next few years. But while they added to the body of literature, little was added to the body of knowledge. The third article reiterated, "The need for further studies and outcome assessments for this procedure cannot be overemphasized."

Mennell was published in JMPT in 1990, The Validation of the Diagnosis "Joint Dysfunction" in the Synovial Joints of the Cervical Spine. In Discussion he states, "I have never understood why my colleagues frown on this practice when they see nothing wrong when a dentist uses these aids in their offices to facilitate difficult dental work or for the removal of teeth." He finds it interesting that, "when asleep the patient's restricted joint movement (amount of loss of function) is exactly the same as when he/she is awake."

Another 8 articles appeared over the next four years, most involving individual or multiple case studies. Points of interest from each article are noted below.

Talcott provides a "minisummary of individual cases", a total of 21 cases. He makes two interesting reports. "One of the very noticeable outcomes of the experience of these people is that, while they may have tried exercise and different forms of therapy in the past and/or prework hardening or work hardening programs in rehab centers and were unable to perform those functions, they were later able to perform the functions after [MUA]. It is also apparent that many of the people who did not get full effectiveness of the treatment were people who did not follow through with the proper rehabilitative protocols."

Greenman reported complications in the form of temporary flare-up of symptoms attributed to stretching of adhesions and mobilization of inflamed soft tissues. SM is not listed as a pre-MUA treatment.

JMPT published Management of Cervical Disc Syndrome Utilizing Manipulation Under Anesthesia in 1993. Dr. Hughes reports on a serial approach dubbed the Texas Chiropractic College protocol, after the work of Francis and Capps. "The protocol offers a rationale for serial application of the procedure and is now considered the industry standard, especially with regard to credentialing for the chiropractic physician." In regard to this case, the author reported, "had the patient continued to respond favorably to in-office care and not developed myelopathy signs of hyperreflexia, clonus, and Babinski response, the procedure may not have been considered."

Follow-up care included daily treatment for 2 weeks, then diminishing frequency for 4-6 weeks. Treatment included manipulation, ultrasound, ice, trigger point stretch, and therapeutic exercise. Dr. Hughes feels "there is an increased chance, not likelihood, of basivertebral and/or vertebral artery injury. However, some patients and doctors feel that avoidance of surgery is worth the minimal increased risk of the MUA."
Anesthesia: Case Studies and Recurrent Epidural Steroid Manipulation under Anesthesia Combined with Manipulation of the Low Back surgery or post-surgery/prior to syndromes involving contracted soft-tissues due to syndrome. Neither patient received exhausted, including chiropractic.

The corticosteroid may exert its effects by reducing neural inflammation initiated by direct mechanical nerve root compression, by an indirect mechanical insult involving localized neural stretch and ischemia, or by chemical and possibly immunological insult to the nerve root from exposure to degenerating glycoprotein of the nucleus pulposus. Reported success rates vary widely and range between 40% and 95%.

Manipulation under Anesthesia Combined with Epidural Steroid Injection is the second article on local injection rather than general anesthesia. "Epidural steroid injection (ESI) is medically used in the treatment of lumbosacral radiculopathy. The corticosteroid may exert its effects by reducing neural inflammation initiated by direct mechanical nerve root compression, by an indirect mechanical insult involving localized neural stretch and ischemia, or by chemical and possibly immunological insult to the nerve root from exposure to degenerating glycoprotein of the nucleus pulposus. Reported success rates vary widely and range between 40% and 95%.

Manipulation Under Anesthesia; A Cost-Effective Approach is a report on 57 patients who were assigned to one of 3 groups. Group 1 received SM; group 2 received both MUA and concurrent epidural injections of a local anesthetic, combination of narcotics, and low dose steroid: group 3 received MUA alone. Prior to MUA the 57 patients had an average of 8.6 manipulations. Post-MUA adjustments dropped to an average of 2.7. 85% of patients reported GOOD to EXCELLENT response. Less than 5% of patients claimed no benefit from MUA.

Serial MUA is recommended for two reasons. The first is to prevent severe reaction and shock by attempting too much at one procedure. Physicians recommended a second MUA if the patient had at least a 50% decrease in pain or if the patient had no response to MUA but the physician considered the patient's condition chronic and required another treatment to break up chronic fixations. A third procedure is done only in a patient when the first two procedures have helped. The patient who receives a third MUA is usually one who has an exacerbation at a later date, commonly, discogenic radiculopathy.

The authors found and reported on an article in which a review of the medical literature from 1911 to 1989 found 26 cases of cauda equina syndrome associated with lumbar manipulation; of those, 16 cases were associated with MUA, the most recent in 1959. The researchers acknowledge that all cases of cauda equina syndrome may not have been reported in the medical literature.

And finally, Francis describes additional training protocol. Most programs "call for a first assistant also trained in the procedure". The first assistant's job is to help the primary doctor position the anesthetized patient on the table and hold them while the doctor proceeds. "The team approach is required in achieving proper vector forces, both intrinsic and extrinsic, in order to coordinate the optimal manipulation....The most accepted protocol for the serial approach appears to be 3 to 5 procedures performed on consecutive days.
Multiple references are cited in support of this approach.

This is a representative overview of the available literature; it is not a comprehensive review. A "literature search" performed by Logan College Library revealed many more articles, some included interesting abstracts: restoration of vision by MUA one year after a motor vehicle accident resulted in loss of vision, traumatic posterior hip dislocation with reduction of the dislocation under anesthesia, mobilization of frozen shoulder, adhesion release of knee MUA following ACL reconstruction, locked carpal phalanges responding well to MUA, headache following saddle block analgesia in obstetrics being relieved by SM, and two articles (1953, 1962) which recommended avoidance of anesthesias. "I'd like to persuade physicians to manipulate without general anesthesia or local injections of procaine, and especially, I want to dissuade any who depend on the use of procaine alone without manipulation".

In addition to these "published" articles, additional material was received and reviewed by the committee on MUA.

The North Carolina Board of Chiropractic Examiners released a position statement in August 1994 which stated, "...manipulation of a patient under anesthesia by a MUA trained chiropractic physician is within the scope of chiropractic in North Carolina. MUA is an exceptional combination of effective pain management procedures that has expanded the option to help relieve persistent pain. [MUA] is not an experimental procedure. It is well established within the chiropractic and medical communities and the utilization of MUA has been enhanced by the professional cooperation of these two professions."

In April 1994 NCMIC began coverage for MUA. A minimum of $200,000/$600,000 limits of liability is required, and an additional 10% of the annual premium must be paid. Additional information is required concerning the certification of the chiropractor, the medical/professional staff of the facility, the equipment used, and the distance to the nearest hospital if not performed at one.

And finally there is a patient information article prepared by The Vanguard Corporation of America, Department of Acute and Chronic Pain Management, out of Florida (32). This appears to be a beautiful facility which provides various services including: nerve blocks, epidural, management by analgesics, biofeedback/stress management, and MUA. According to the information, "The paraspinal muscles cause a splinting or guarding at these adhesion sites which makes the traditional chiropractic manipulation impossible to accomplish. [And] ... the manipulation takes approximately 7 to 10 minutes."

KEY ASPECTS OF MUA
Definition:
MUA is described as manipulation of the spine while under general anesthesia. The anesthesia is employed to relieve pain, muscle spasm, and protective guarding that may limit other forms of manipulation. In addition to the use of general anesthesia, there is a movement of doctors using local anesthetic followed by manipulation [MUA/ESI].

MUA is an alternative mechanical procedure appropriate in certain circumstances where traditional in-office manipulation has failed or is not feasible. It's intended to restore normal joint motion and musculoskeletal function. It's advocated particularly for patients with chronically fibroscd and hypomobile spine segments.

Clinical Appearance
"In acute back pain, when there is severe pain and spasm, an anesthetic may be desirable for manipulation. In chronic back pain, when the patient has received regular manipulative
treatments over a long enough period of time to produce results and no improvement either symptomatic or in character of range of articular motion has occurred, MUA may be desirable. In testing, these patients appear to have a very rigid vertebral column and the spinal musculature is spastic. The rigidity and spasticity is increased when motion is attempted.7

**Indications for Procedure**:8

The literature and committee document submissions support the following contentions: MUA is indicated in musculoskeletal conditions with biomechanical dysfunction nonresponsive to conservative treatment. Medical necessity should decide on either a single application, an intermittent application, or a serial application. The history and physical as supplied by the treating doctor of chiropractic should be the supporting document to substantiate the medical necessity.

A single or intermittent serial approach would be indicated in an acute or subacute condition in a patient with an intractable musculoskeletal condition that is not responsive to initial treatment because the pain and muscle spasm preclude standard clinical manipulation. A single application of MUA is warranted in these cases with a subsequent application following in six to seven days if the patient is not significantly improved.

A consecutive serial approach is indicated in a patient with a musculoskeletal condition in the chronic phase (usually a seven-week minimum post onset), presenting with chronic fibrosis and/or myofibrosis that has failed to respond to conservative care over a sufficient period of time to produce objective and/or subjective results. The chronic patient would then be indicated for MUA with consecutive daily application for up to three to four days. Conservative measures should include SM, physical therapy, medical co-management of anti-inflammatory, muscle relaxers and/or pain medication or any other measure deemed necessary by medical indication. The burden of proof for medical necessity rests with the treating doctor of chiropractic. It should be substantially documented in the history and physical as presented by that chiropractic physician with specific emphasis on failure to respond to conservative means in the history, indications of fibrosis and/or myofibrosis in the physical examination and any supportive diagnostic testing as indicated and expected positive outcomes of the patient's condition.

Some specific neuromusculoskeletal conditions have been identified for the MUA procedure8,9:

1. Nerve entrapment.
2. Chronic myositis with pain.
3. Chronic fibrosis with pain.
4. Anomalies with restricted motion following trauma with pain.
5. Chronic muscle contracture.
6. Acute muscle spasm associated with without subluxation.
7. Chronic productive arthritis, such as spondylosis, spondyloarthritis, spondyloarthrosis.
8. Lumbarization associated with chronic/acute pain.
10. Chronic disc changes with pain.
12. Traumatic torticollis.
13. Acute or chronic cervical, thoracic, or lumbar pain without response to previous treatment.
14. Limited range of motion in cervical, thoracic, or lumbar spines.
15. Aberrant cervical or lumbar lordosis due to muscle contracture.
17. Recurrent disc herniation with poor surgical results expected.
18. Discitis.
19. Lateral stenosis.
20. Vertebral instability.
21. Epidural fibrosis.
22. Chronic or acute cervicobrachial syndrome.
23. Nonresponsive cervicocranial syndrome.

**Contraindications**

Specific Contraindications to MUA include8,9:

1. Acute sprain where passive motion results in acute pain.
2. Presence of primary or metastatic disease in the area of concern.
3. Possibility of existing fracture.
4. Acute joint inflammation.
5. Uncontrolled diabetic neuropathy.
6. Foot drop.
7. Local bone infection (acute of chronic).
8. Tuberculosis of the bone.
10. Spinal osteoporosis (significant).
11. Acute disc rupture.
12. Spinal Tumors.
17. Excessive spinal arthritis.
18. Cord or caudal compression by tumor.
19. Ankylosis.
20. Malacic bone disease (softening).

General Contraindications to MUA include: contraindications to anesthesia which is the responsibility of the licensed medical co-manager (anesthesiologist). Contraindications to manual manipulation of high velocity, low velocity and/or soft tissue techniques exist for articular derangements, bone weakening and destructive disorders, circulatory and cardiovascular disorders, or neurological disorders.

Selection of patients:
Patient selection is important for the success of MUA. Five categories of patients have been outlined as possible candidates of MUA:

1. Failed response to previous care.
2. Chronic and recurrent spinal pain.
3. Severe pain that cannot be helped with narcotics.
4. Disability that could be relieved by the procedure.
5. Severe symptoms that could be relieved by the procedure.

MUA Technique:
Manipulation techniques applied to a patient under anesthesia will vary from patient to patient as medical necessity indicates by the involved tissues, any existing relative contraindications and/or possible complications. With the patient fully anesthetized, the techniques applied to the conscious patient are not appropriate. It is extremely important to insure proper selection of the technique and forces suited for the tissues involved in the patient’s condition.

Due to the effects of anesthesia on a fully anesthetized patient, there exists no one single appropriate technique for manipulation. Rather, a combined method of techniques in sequence will insure the maximum therapeutic goals. Restoration of function should be guided by the involved tissues. Technique combination and sequences should be directed to the involved periarticular, articular and intra-articular tissues:

I. Soft tissue (periarticular) procedures - lateral, stretching, linear stretching, deep pressure, traction and/or separation of muscle origin and insertion to decrease muscle spasm and increase tissue mobility.

II. Articulatory procedures (mobilization without impulse, low velocity technique placing articulation through full anatomic range of motion) - A passive serial repetitive oscillatory rhythmic springing force in the direction of restriction. Single articulation or group of articulations application to restore range of motion and restore normal elastic end-feel.

III. Specific joint mobilization procedure (mobilization with impulse, high velocity technique) - extrinsic operator applied thrust overcoming restrictive articular movement. Engagement of the restrictive barrier and thrust through the barrier to achieve normal joint motion and stretch shortened fibroed connective tissues.

To insure that the pathological restrictive barriers of the involved segments are adequately reduced, a two-physician procedure is recommended. With a properly trained and qualified assistant doctor, the risk factors involved in the MUA will be tremendously reduced. The assistant doctor must be as equally qualified as the treating doctor to achieve proper positioning, apply stabilization and appropriate counter forces, thus insuring 1) that proper technique forces are initiated and maintained by the treating doctor to adequately restore full range of normal motion available, 2) that pathological restrictive barriers due to fibrosis and/or myofibrosis are effectively reduced, and 3) the normal anatomic barrier of the involved treated segments is not compromised. The presence of an equally qualified doctor insures maximum effectiveness of the operative technique as well as reduces the possible compromise of the
anatomic barrier which might produce complications that would prolong the patient's care.

**Scope of Effectiveness:** Conditions Improved (11)
1. Chronic sciatica 87%
2. Chronic sacroiliac strain 92%
3. Disc herniation 50% - 70%
4. Nerve root compression 50%
5. Myofibrositis 96%

Conditions of fibrosis and scarring may be responsive to MUA.

**Scope of Practice Laws** - License to practice chiropractic is a state's right. Individual state laws govern whether MUA is within the scope of chiropractic practice. The committee suggests each chiropractic doctor considering this procedure as part of their practice, contact their state board for an opinion.

**Informed Consent** - As there has been increasing responsibility to inform patients of the potential risks as well as the benefits of all health care procedures, it would stand to reason this would be very important with respect to MUA procedures. The following are adverse potential consequences to MUA:

- **Overly forceful manipulation could result in injury.**
  1. Sprain.
  2. Strain.
  3. Fracture.
  4. Dislocation.
  5. Disc injury.
  6. Paralysis, either partial or permanent.

- **Inadequate manipulative force could result in failure.**
  1. Prolonged disability.
  2. Patient looking for help elsewhere when the proper force would have done the job.

- **Inadequate or improper post-procedure care may result in failure.**
  1. Recurrence of the problem/condition.
  2. Patient looking for help elsewhere when the proper care would have done the job.

**Cost of Procedure**
Discussion with two chiropractors in the claims review department indicated that the bills received were usually about $10,000 per case. The services included 3-5 sessions of MUA, doctor fees, nursing fees, and the facility costs. The cost per area of manipulation is approximately $300; routinely, two or three areas are manipulated. He indicated the usual billing for the doctor's fee was about $900 for the treating D.C. and $450 for the attendant D.C. per session. The total D.C. costs ran about $6,700 per case.

In addition, he indicated that MUA was not an authorized procedure under general health care benefit policies. He indicated that claims for MUA had been paid on rare occasion when involving motor vehicle or worker's compensation claims. He was pretty sure that Medicare and medical benefits did not provide for MUA services. His greatest concern was the apparent lack of specific patient screening protocols and selection criteria.

**DISCUSSION / CRITIQUE**
My stubborn nature encourages me to dismiss many of the articles listed above for the reason indicated. I don't believe I could find a chiropractor who would disagree with me; SM is proven on a daily basis in each of our offices to be beneficial when all other forms of conservative treatment have failed. If SM was not performed prior to MUA, the results of these studies are highly suspect. While I'm not an expert on osteopathic manipulation, videos I've seen and doctors with whom I've spoken, lead me to believe that the osteopathic manipulation of the 1940s and 50s was crude and extremely forceful; I would not want to be manipulated so. Perhaps the medical and osteopathic authors felt that SM without anesthesia was torture to their patients.

The cost of MUA appears exorbitant to the chiropractor performing SM. Obviously, the insurance companies are none too happy about it either. Perhaps the second greatest concern about MUA is the cost. Under today's insurance circumstances, pre-authorization of this procedure is likely to be withheld unless and until the authorized gatekeeper/treating chiropractor can substantiate medical necessity and cost effectiveness [ie. avoid more costly surgery].

Of paramount concern to most DCs with whom I talked, is the philosophical issue of the use of drugs in our drugless profession. I suspect, like
other political and moral issues of our time, it depends upon where each individual draws the line. And like other moral questions, I would prefer to leave that decision up to each practitioner. The procedure of MUA requires a licensed anesthesiologist who is responsible for the administration of the drug. The chiropractor depends upon the anesthesiologist for that aspect of the procedure. The chiropractor is responsible to perform the manipulative technique. Has the chiropractor stepped out of his area of expertise and license; has he 'used drugs'? Not directly, no.

Manipulation under anesthesia as a procedure appears to be well within the province of chiropractic. The most basic tenant of chiropractic remains intact. Traditionally, chiropractic has intended to restore and maintain the welfare of the human body. To this end, MUA does not run cross-current to that goal. The responsible chiropractor is concerned with appropriateness, necessity, utility, identifiable goals and objectives, utilization standards, protocols, indications, contraindications, patient needs, patient selection, patient safety, defensive practices, collaboration, and a limited scientific basis. The information reviewed by the committee provides adequate explanation for the procedure to state that we believe MUA is within the ethic of Chiropractic.

While MUA is not a pervasive technique of chiropractic practice, the committee recognizes that three of the CCE accredited chiropractic colleges are teaching this procedure to doctors of chiropractic. We are aware that MUA seems to provide a unique circumstance in which different specialties and disciplines collaborate to benefit patients. We believe this is not only good for the well-being of the patient but the chiropractic profession as a whole. Therefore, we believe there is a place for MUA within the cadre of treatment options for a select number of patients with neuromusculoskeletal disorders.

RECOMMENDATIONS
While the committee has been able to address many topics of concern relating to MUA in a satisfying manner, it has not been able to gather all available data, expert and professional opinions that may exist.

We believe patient selection criteria and protocols must be developed by researchers to better identify those patients who are good candidates for MUA. For instance, the list of submitted indications for MUA include many conditions well treated by traditional in-office manipulation and soft tissue techniques. Prior to scheduling a patient for MUA, the patient should be offered an alternative manipulative technique performed by another chiropractor and/or soft tissue technique performed by a practitioner (ie. Rolfing).

Outcome studies and longitudinal prospective blinded studies to demonstrate medical necessity are needed to support third party payment of claims as well as professional understanding and acceptance.

The Committee supports and encourages the ACA to officially recognize MUA as a chiropractic specialty technique. We do not see a conflict with ACA's master plan nor any of the prescribed organizational policies and opinions. We offer the following as an official statement regarding MUA for the ACA:

PROPOSED POLICY STATEMENT
"The American Chiropractic Association affirms the practice of manipulation under anesthesia (MUA) as a procedure within the province of chiropractic. MUA is recognized when practiced by a doctor of chiropractic who has completed and passed the appropriate course of study from a CCE accredited chiropractic college and is within the state practice rights of the governing law. Appropriate patient selection criteria for MUA shall be considered important. Only certain patient profiles with expected positive outcomes should be considered for MUA. The practice of MUA requires collaborative efforts of disciplines and specialties outside chiropractic to work in concert for the welfare of the patient. This collaborative effort shall be considered necessary and ethical."

References


18. Haldeman, S., Rubinstein, S. [Study to be published in a future issue of Spine magazine].


24. NCMIC, letter concerning malpractice coverage of MUA, April 7, 1994.


30. Texas Chiropractic College Postgraduate Division. Manipulation Under Anesthesia, course manuscript.