

M.U.A. in Modern Pain Management

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Introduction

The primary goal of this chapter is to examine the use of manipulation under anesthesia (MUA) in the modern pain management arena. The active health care provider involved in musculo-skeletal and spinal pain management has many tools, procedures, modalities, and treatment options at his or her disposal. Exposure to the tools available or treatment options available come from either scholastic training or clinical practice. Most seasoned providers know when, where and how to utilize the standard clinical treatment options on which patients and at which point in the patients' care to utilize them.

The utilization or referral for MRI, CT, and other diagnostic tools lead us to the use of or referral for physical therapy, manipulation, rehabilitation, epidurals, facet blocks, prolotherapy, and various other key-hole procedures. This scale of treatment options moves from conservative to invasive, ranging from minimally invasive spinal procedures to open surgical procedures. The timing and introduction of choosing a procedure is common educational knowledge or is quickly learned in clinical practice. However, for some reason, the knowledge of when to use MUA has eluded the average practitioner. Perhaps this is due to the lack of information those who provide MUA to make it available to other health care providers for treatment referral. Or, the MUA practitioner may assume that the other health care providers already know and understand the bio-mechanical components, responsive conditions, clinical outcomes of MUA or achievable patient goals through the use of MUA. Currently, the author feels the number of practitioners using MUA is not large enough to make a consistent and geographical presence. Bridging the gap is difficult because MUA has not been presented appropriately in literature, in lectures, or in scholastic arenas. Nevertheless, it would be the most illustrious task or goal for this chapter to

educate health care providers to understand MUA as it provides patients with a more conservative, safe procedure to treat musculo-skeletal, spinal, and joint related disorders effectively.

Why Choose MUA?

Those who perform MUA procedures have the same clinical goals as of any other therapy.

Those goals include: (a) Decrease the patient's signs and symptoms; (b) increase normal everyday function; (c) allow the patient to enter into an active rehabilitative phase and into a normal, full activities of daily living (ADL) lifestyle. As health care providers, we must understand when and why to use MUA. MUA seems to lend itself best to the patient with functional failure. Identifying why a patient has functional failure is probably the hardest and largest idea for the health care provider to understand or learn. There may be increased clinical findings with activity. Or, increased clinical findings after activity, under weight bearing, axial loading, after axial loading, and/or during rest?

Many patients will have low signs and symptoms present on evaluation under normal or low ADL's. But when under stress or load conditions such as: (a) Physical activity; (b) high bio-mechanical stress; (c) static loading; (d) tissue failure; and (e) osseous failure will cause these signs and symptoms to begin to ramp up. This increase in load indicates either kinetic tissue failure or static load tissue failure, which in turn, starts the thought process of white tissue failure or muscle tissue failure. If white tissue failure is noted on exam and x-ray then appropriate correction can be made for that ligamentous tissue to be treated and rehabilitated. Then, if muscle and tendon is diagnosed, you must also delineate -- is the muscle failing under

static load or kinetic load. Which will tell you if its failing as prime mover or stabilizer. This too can be treated accordingly. This initiation and progression of pain can then be categorized in the aforementioned factors in mind that will aid in proper diagnosis and proper treatment. The mechanical diagnosis often reveals three general pain generators: (a) Primary pain generator; (b) pain generator surrounding secondary tissue failure; and (c) pain generator tethered to the bystanding tissue.

Although this may seem cumbersome in diagnosis, a few properly asked questions in the patient's history will quickly shake fruit from the tree. More information will come from any competent musculo-skeletal examination. The remaining crucial information often comes from a bio-mechanical evaluation of plain film radiography. In this case, the key here is obtaining as many views as possible to attempt to get a 3D image of the spine. It is more reliable to have skeletal films under load for this analysis, preferably seated, to create increased compressions forces and increases Euler buckling of weak tissues²⁷. Seated x-ray views of the spine show the most load or stress on the spine and are recommended over lying studies for this reason²⁶. These pieces of the puzzle will separate the MUA candidate from the pathological patient, the anatomically altered patient, or the patient that has such tissue damage and disruption that resuming any proper or restorative function is either not wanted, is detrimental to stability, or will create tissue failure and rupture.

Perhaps the second largest clinical hurdle would be to NOT be fooled by the innocent bystander. Meaning, the pathology that is seen on scan or x-ray is there but is not the pain generator. More aggressive clinical procedures have resulted in poor outcomes because of a bad looking disc,

joint, or surrounding tissue that may have been forced into a contributory pain problem.

Discography proves to be a very useful tool to aid in this difficult diagnosis and aids in making a proper diagnosis for a mechanical failure.

After further thought, this may be the hardest and largest hurdle to overcome in identifying the MUA candidate. Even so, often a very poor looking pathological disc on motion unit can often be treated above and below, as well as the rigid core white tissue of that level, with surprising functional results. But again, the concept and benefit of creating function has to be accepted and understood by the health care provider.

Once this pain generating lesion is identified, the clinician can then offer treatment options to the patient. The restoration of function to the osseous structures, surrounding capsules, and other hard white tissues are needed. This can be achieved through several methods. Standard office-based manipulation, physical therapy, modalities, rehabilitation, passive soft tissue work, and deep tissue techniques, are often combined with appropriately placed and timed injection procedures or prescriptions. After several weeks of rehabilitation and reconditioning, a patient can often function normally with only minimal amounts of pain. Obviously, increased function with decreased reactive swelling or reactive irritation to the tissues will allow the patient to make desired progression through passive into active care and to achieve all treatment goals.

This writing is about the percentage of patients that do not obtain the results described above or who have tried those treatments and failed. These patients come to the health care provider with a previous history of: (a) Medication usage; (b) injection therapy; (c) bouts with physical

therapy; (d) chiropractic care; (e) work conditioning programs; or (f) surgery. Each of these conditions have failed or have increased the patients' signs and symptoms, have provided short-term relief that may not provide any ADL changes, or have failed to increase patient-functional abilities while still maintaining low to moderate level signs and symptoms²⁵.

This is the MUA candidate. Once the previous is identified and understood, then "Why choose MUA?" is easy.

Now in the year 2004, there is no longer a dispute of any well-read, modern health care provider that joint manipulation, soft tissue treatment, and associated modalities are clinically beneficial or simply that they work. The goals of increased ranges of motion, decreased clinical findings, and restored function occur on an hourly basis across the country. Manipulation of the spine, hips, elbows, shoulders, knees, wrists, and ankles has been occurring for more than 60 years³⁴. The use of manual medicine techniques was first discovered by the ancient Greeks and pre-dates modern medicine¹⁴.

The introduction of anesthesia is not going to change the anticipated outcome. If you are having poor in-office or conscious outcomes, poor post-x-rays and poor technique, the addition of anesthesia is not going to change this. It merely allows the health care provider to make a pain-free or non-pain perceived or remembered correction to the patient. The bio-mechanical correction can now be made and tolerated by the patient. The unattainable entry into the paraphysiological space for joint correction and tough soft tissue restoration is now achievable without pain. The same treatment that perhaps failed because physiological tissue change was

not achievable now is, allowing all of the clinical benefits to go with it.

Now, all of the established and accepted physical changes will occur. Healing cycles or re-healing cycles begin. This patient is now at the phase where the non-MUA patient was when all of the office based care worked. Health care providers can then include all necessary ranges of motion, physical therapy, manipulative and passive care, modalities, soft tissue treatment, rehabilitation, etc. to control the re-healing of this "new" re-healing wound. The health care provider can control the re-organization patterns of the newly forming tissues, scarring, fibrosis, musculo-skeletal capsuling tissue elasticity, or control tissue remodeling. In essence, the same therapies that have failed on these patients when used in the wrong or unprepared environment are now very effective when used post-MUA. Again, this is not new. The orthopedic profession has used it for years on all parts of the spine and extremities with good results, both pre- and post-surgically.

Confusion with MUA usage:

There is none, really, or perhaps there should be none. The only thing that is new is the delivery method. As far back as the 60's and into the 80's, the health care delivery person for MUA was the orthopedic and osteopath. But with the advent of new surgical techniques, keyhole procedures, product and technology advancements in the allopathic field, most have abandoned these procedures. A philosophical change has led some osteopathic providers away from this technique.

So, the new part is the chiropractor now delivers this service. What also is new are the

techniques used under anesthesia. There has been a shift from long-lever arm techniques to short-lever arm techniques. The short-lever arm techniques are now combined with soft tissue techniques and passive end range techniques, as well as newer bio-mechanical or vector x-ray analysis of the spine prior to treatment and state-of-the-art modalities which are available for post-op care.

The chiropractor has filled this void for the most evident of reasons. The manual manipulation niche is provided overwhelmingly by the chiropractic profession so it is a normal progression to combine highly-developed skills with years of technique development for use in the operating room₂.

As previously stated, the same established and accepted procedure is there regarding MUA. The same established and accepted office-based treatment or conscious manipulation is also there. The only difference is the I.V. for sedation and the varied techniques of the health care provider.

Any usage of the terms P.O.C.Q.U. and experimental are unfounded. If that thought process or argument is to be used, then all office-based and extremity manipulations, physical therapy, MUA's of the spine, hip, shoulders, and knees performed by any and ALL licensed providers must be included in this statement. That would also include the time period from the 1900's to now. This would preclude any treatment of any manual technique from chiropractors, physical therapists, osteopaths, orthopedics, etc., from any third party reimbursement. Furthermore, the statement "More research is needed" is frequently thrown about and is true with any treatment. We as health care providers could always use more research to improve on clinical outcomes.

The CPT and AMA assign CPT codes for all procedures. Prior to assigning these codes, the CPT and AMA require the following:

1. The service or procedure has received approval from the Food and Drug Administration (FDA) for the specific use or device or drugs.
2. The suggested service or procedure is a distinct service performed by many physicians and practitioners across the United States.
3. The clinical efficacy of the service or procedure is well established and documented in the United States per review literature.
4. The suggested service or procedure is neither a fragmentation of an existing service or procedure nor is currently reportable by one or more existing codes.
5. The suggested service or procedure is not requested as a means to report extraordinary circumstances related to the performance of a service or procedure already having a specific CPT code¹.

As with any procedure, MUA has already stood up to the rigors of health care scrutiny. The coding assigned to MUA is not a new code and was first introduced in 1960²⁵. Therefore, any prejudices or difficulties with acceptance may be due to alternate reasons.

Clearly, why continue to research and prove something that has already been researched over and over? What should be published and researched are the methods used to improve the results. Practitioners need to do research on and publish the manipulative techniques that work best (i.e.: short-lever arm vs. long, low amplitude/high duration vs. high amplitude/short duration, sustained static stretch, vs. multiple repetitive stretch, 3 serial procedures vs. 5 serial procedures). This is the type of continuing research that is needed to improve the quality of the procedure and the outcomes for standardization nationwide.

The author believes that the other third-party insured position that MUA is experimental. This argument is unfounded because the introduction of anesthesia does not change all of the benefits of the existing established clinical procedures that are part of MUA that are used on a daily basis

by a D.C., M.D., D.O. or P.T. for the last 100 years on the conscious patient in office-based care.

Patient Selection: MUA Criteria

The manual techniques used by the MUA physician are of importance. The manual adjustive skills of the physician are of note as well. These skills include using proper adjustive techniques and skills, and a prudent bio-mechanical evaluation of the patient's radiography. The use of pre- and post-radiography and fluoroscopy is sound basis outcome assess progress, or lack of progress, as well as pre- and post-instabilities if present via video fluoroscopy.

If the manual health care provider is having good clinical outcomes and good pre- and post-x-rays and other bio-mechanical connectors leading into a successful rehabilitation program, then you can expect the same or better results with MUA.

If the provider is using poor adjustive techniques and gross maneuvers, and is not monitoring pre- and post-x-rays and examinations, then the office based results will be varied and questionable or will produce varied clinical outcome assessments.

For a patient to be a candidate for MUA: (one of the following criteria must be met)¹² :

1. Patients whereby manipulation of the spine or other articulations is the treatment of choice; however, the patient's pain threshold will not allow conscious spinal manipulative therapy (SMT) to be performed.
2. Patients whereby manipulation of the spine or other articulations is the treatment of choice; however, due to the extent of the injury mechanism, conservative manipulation has not been effective in 2-6 weeks of care and a greater degree of movement to the affected joint(s) is needed to be effective. The sole exception to these criteria is one in which manipulation of the spine or other articulations are believed to be the treatment of choice; however, due to severe contraction of the supporting tissues and/or the splinting mechanism, conscious SMT is presently

ineffective.

3. The patient is being considered for spinal disc surgery and the MUA procedure is viewed as an alternative or interim step, in overall consideration of the patient's condition.
4. Patients whereby manipulation of the spine or other articulations is the treatment of choice by the physician; however, due to the chronicity of the problem and/or the fibrous tissue adhesions present, conservative manipulation is incomplete.
5. Patients whereby a combination of MUA and conservative spinal injection will potentiate the therapeutic benefit of either treatment alone.

It should be noted that in each of the above criteria the patient's pain problem has affected

Activities of Daily Living.

Patient Selection:

A percentage of these patients will ultimately fail to respond to conscious SMT, based on one or more of the following criteria:

1. Chronicity of the case due to joint and/or soft tissue fibrosis which has inhibited restoration of appropriate joint mechanics.
2. Acute myofascial rigidity and painful inhibition which disallows conscious SMT.
3. Severe joint dysfunction and subluxation such that correction of evident spinal biomechanic misalignment is not achievable through conscious SMT.
4. Contained disc herniation (bulge) of less than 5mm which has become refractory to conscious SMT.
5. Multiple recurrences during the active-resistive phase of joint rehabilitation.

A larger description of patient selection criteria can be obtained from reading National Academy of Manipulation Under Anesthesia Physicians Guidelines and from reading *Effective management of spinal pain in 177 patients evaluated for MUA*^{25,34}. The following algorithm was created and published in 1999, and has proven itself as a very good and easily used tool for patient selection for MUA³⁴. This will aid in guiding the health care provider through all aspects of patient selection and avoiding those cases or patients that would make for less than favorable outcomes, (See Figure 1).

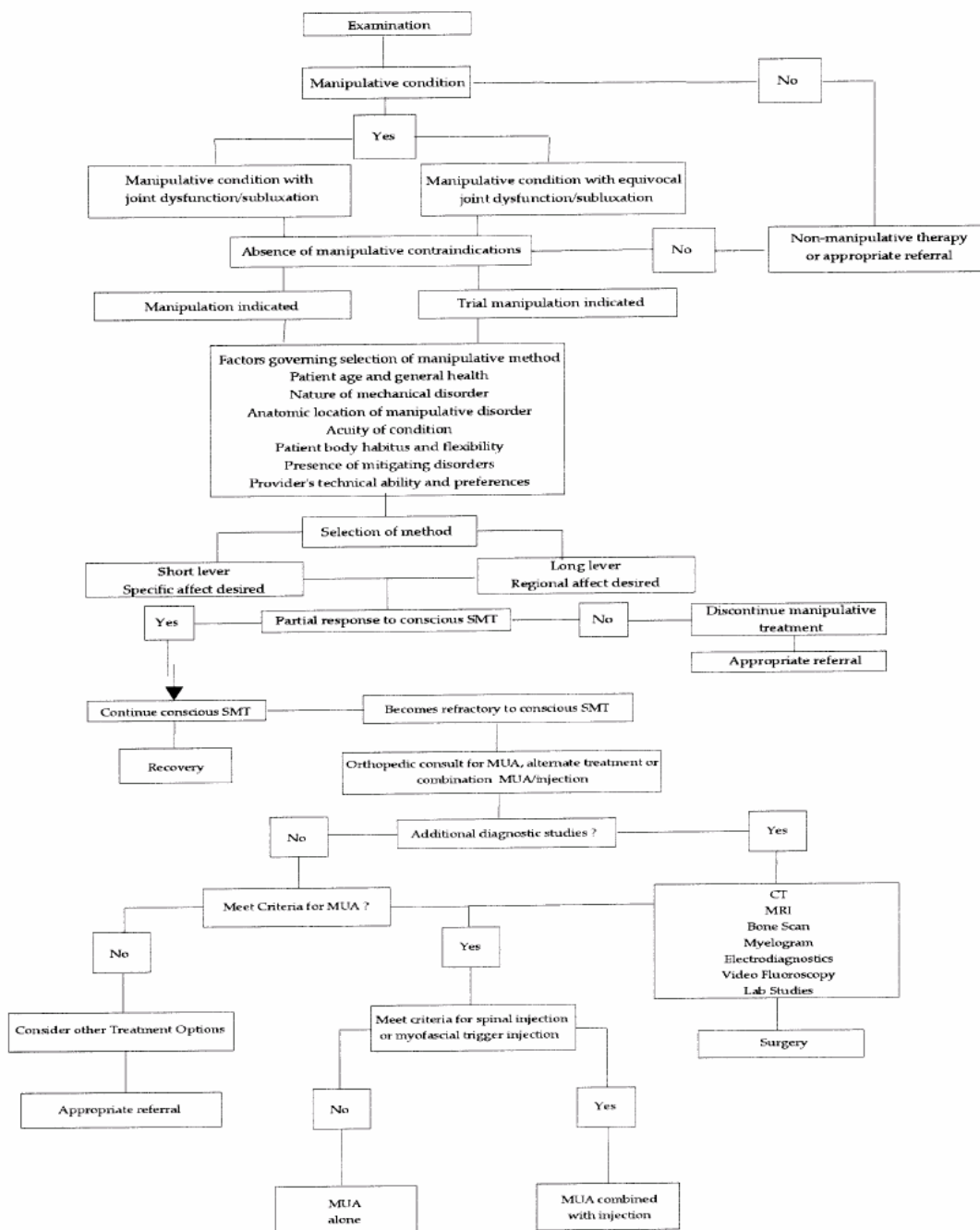


Fig 1. Diagnostic/treatment algorithm.

Specifics of MUA

Some of the more immediate concerns of SMT/MUA are of a more technical nature. One of the greatest problems today with manipulation is the attempt by clinicians to apply these techniques without formal training. Office practitioners will read text, journals, or even attend a weekend seminar in an attempt to take an untrained clinician to the level of a skilled manipulative practitioner. Many of the reported injuries related to manipulation can be attributed to inadequate, crude, or long-lever force techniques³⁵. Consequently, the expected good result and minimization of complications are directly related to the highly developed skills of the practitioner. This factor should not be overlooked due to the physical and technical aspects of the procedure as it does vary from other surgical procedures.

There has been much discussion regarding the use of general anesthesia in the performance of MUA^{7,8}. Issues discussed include: (a) the depth of consciousness associated with general anesthesia; (b) the inability of the patient to give painful feedback or resist an overzealous manipulation; and (c) the intrinsic guarding mechanism of voluntary/involuntary muscle fibers, which protects the elastic barrier in the conscious patient. Examples of potential injury include: (a) inherent risks of general anesthetic agents; (b) deformation of the joint capsule or intervertebral disk; (c) fracture involving the vertebral segment; (d) neurovascular compromise; and (e) tough soft tissue hypermobility.

To address these concerns, the author would make the following points:

1. Only highly skilled, graduate practitioners who have been trained in structural diagnosis and manipulative treatments should be performing these procedures^{10,14}.

2. The advent of newer short-acting, highly titratable, and completely reversible intravenous anesthetics allows for controlled anesthesia depth, preservation of patient pain response, and significantly reduced morbidity and mortality.

The allopathic profession has performed these procedures in an appropriate office-based setting for years. This is clearly for quality of care and for safety reasons. The introduction of anesthesia does pose serious health care risks that should not be ignored. If the delivering health care provider is not in a hospital setting or outpatient setting with admission privileges, the facility or provider should have other health care providers present for admission purposes in emergency situations. This procedure is not to be done in a standard office-based setting.

Post-MUA Follow-up:

The post-procedure care of the MUA patient is obviously important because the restoring function of the osseous bio-mechanics and surrounding tissues is paramount. Once the MUA is complete, the re-healing, remodeling of soft tissue, and re-organization of the tissue begins. In the event that poor post-procedure follow-up has occurred, the treated site will heal poorly and will be as dysfunctional as it was pre-MUA. It is questionable that if the re-organized tissue is not healed properly, it could lead to a greater level of fibrous and disorganization than innately present. This will affect the long-term outcome. This post-procedure window is a very opportunistic time for the post-MUA patient and should be exploited. The exact details, time periods and modalities are easily attainable in the literature and teaching institutions or in the National Academy of Manipulation Under Anesthesia Physicians guidelines.

Summary:

This chapter was written with a different perspective in mind. It is not intended to teach MUA to

a health care provider or to give results of a study. It is a chapter for a multi-disciplinary approach to explain and enlighten a provider on how to use what the author feels is a very safe, efficacious procedure. To be able to identify the potential MUA candidate and make a diagnosis with appropriate patient selection. A successful MUA procedure does require a good team approach comprised of health care providers, i.e., properly trained MUA physicians, allopathic providers, and anesthesiologists. Proper follow-up of the patient in rehabilitation in conjunction with the allopathic provider is imperative.

The chapter was to be focused on getting any health care provider to feel comfortable making a referral for MUA and not be left in wonder on what type of outcome to expect. Or how to select a qualified MUA practitioner. To now be able to ask the proper questions of the MUA physicians and the proper questions of the patient in the history as to identify him or her for this viable treatment option.

The author feels that this multi-disciplinary approach to evaluation and treatment offers to patients benefits above and beyond what can be obtained through the individual efforts alone. This procedure has demonstrated itself to have good and positive results with minimal complications.

If after reading this chapter one health care provider is able to make a patient identification for MUA, then the goals have been achieved.

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