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## Commentary

## An evaluation of the experimental and investigational status and clinical validity of manipulation of patients under anesthesia: A contemporary opinion

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For more than 60 years, manipulation of patients under anesthesia (MUA) has been performed by osteopathic physicians, orthopedic surgeons, and, in the past 10 years, by chiropractic physicians. More than 40 articles and publications have been written on this subject in the peer-reviewed literature and clinically documented patient-outcome reviews. Part of the attraction of performing MUA is that since it was first used in the osteopathic profession,<sup>1</sup> results have been remarkable for properly selected cases.<sup>2</sup> These results have been duplicated over the years and have continuously improved. The results achieved today are similar to those achieved by Siehl,<sup>3</sup> Morey,<sup>4</sup> Clyborne,<sup>5</sup> and Krumhansl<sup>6</sup> who performed MUA in the earlier part of the 20th century. If anything has changed, it is in the enhancement of techniques that were used by the early MUA practitioners. As modern manual therapists began to investigate MUA and add to these earlier techniques,<sup>7-10</sup> they found that modifying and changing some parts of the procedures made an already good technique even better.

However, within the past 4 years, as the procedure has become more widely used, debate has been waged over the efficacy of MUA; those who question the validity of MUA have drawn on outdated literature<sup>5,11</sup> to create doubt about the clinical validity and the therapeutic value of MUA.

I believe there are several concerns that need to be addressed to justify the use of MUA:

1. Has MUA been practiced enough and with enough reliability to be evaluated as a form of therapy that achieves similar results when used with recommended types of conditions that have been shown historically to respond favorably to MUA?
2. Is MUA an experimental procedure? Does the definition for "an experimental procedure" apply to this procedure?
3. How safe and effective is MUA, and has MUA historically been shown to be safe and effective?
4. What is the current relationship between acute and chronic neuromusculoskeletal spinal pain and results obtained with MUA?
5. Is a controlled or double-blind study possible with the MUA technique as it is being done throughout the United States? If not, are the outcomes being achieved today any less significant?

**Has MUA been practiced enough and with enough reliability to be evaluated as a form of therapy that achieves similar results when used with recommended types of conditions that have been shown over the years to respond favorably to MUA?**

Because MUA has its own Current Procedural Terminology (CPT) code in the American Medical Association (AMA) CPT code book of reimbursable procedures,<sup>12</sup> it must have been proven over the years to have both reliability and clinical validity. The CPT codebook, written by a medical committee that researches procedures for reimbursement by third party payors, does not recommend unproven procedures. The CPT code book for 2000 specifically states, "Inclusion of a descriptor and its associated specific 5-digit identifying code number in CPT is generally based upon the procedure being consistent with contemporary medical practice and being performed by many physicians in clinical practice in multiple locations."<sup>12</sup>

In the AMA's Current Procedural Terminology,<sup>12</sup> the following statement is also made regarding the panel and the process for accepting a code: "The CPT Editorial Panel is responsible for maintaining CPT. This panel is authorized to revise, update, or modify CPT. The panel is made up of 16 physicians, 11 nominated by the AMA and one each from the Blue Cross and Blue Shield Hospital Association, and the co-chairman of the HCPAC (Health Care Professional Advisory Committee). AMA's Board of Trustees appoints the Panel members." In addition to the Advisory Committee opinions, current medical periodicals and textbooks are used to provide up-to-date information about the procedure or service. Further data are also obtained about the efficacy and clinical utility of procedures from other sources, such as the AMA's Diagnostic and Therapeutic Technology Assessment program and various other technology assessment panels.

The CPT code book is used by third party payors as a reliable source for recognition of reputable procedures recognized by the AMA. Because spinal MUA has its own CPT code (22505), it is recognized by the AMA as a valid procedure. The CPT code book recognizes CPT code 22505 as "spinal manipulation under anesthesia of any area."<sup>12</sup> MUA has met the requirements for inclusion in the CPT code of reimbursable procedures because it is practiced by clinicians of varying specialty throughout the country who achieve same or similar results by using the same or similar techniques.

Patient-informed consent, as referenced in the AHCPR Guidelines,<sup>13</sup> requires that a physician or doctor inform his or her patient about the procedure that is being recommended and give information about all alternative treatments available. This would include MUA because the literature supports this procedure as safe and effective for certain selected neuromusculoskeletal conditions when performed by certified MUA practitioners, and it supports the use of MUA as an alternative to prolonged conservative manual therapy or surgical intervention when contraindications are not present.<sup>7,9,10</sup>

***Is MUA an experimental procedure? Does the definition for "an experimental procedure" apply to this procedure?***

From a ruling by Hunter Patrick,<sup>14</sup> District Judge of the Fifth Judicial District of the State of Wyoming, the following is stipulated with reference to a procedure being experimental:

*Expensive, uncommon, controversial, developing and exploring are not synonyms of experimental. Basically, an experiment is a trial or a test, and something that is experimental is something that is in the trial or testing stage. MUA is far beyond the trial or testing stage. It is controversial. It is uncommon in certain parts of the country and common in other parts of the country. It is developing, which is characteristic of virtually any medical or chiropractic procedure. The fact that it is relatively new to one profession does not mean that it is experimental either, and it is not necessarily true that this procedure is as new as it is made out to be.*

Because the debate over MUA revolves around the combination of 2 distinct procedures, it seems relevant to determine whether either of the 2 procedures is in itself experimental and whether combining these 2 procedures in any way relegates the combination to the status of *experimental*.

In a proof entitled *Qualification and Use of Chiropractor in Use of Expert Witness*,<sup>15</sup> Sullivan and McCann give the following information on the history of manipulative therapy:

Scientists have been able to establish that manipulative therapy predates medical therapy. As far back as the aurignacian (17,500 BC), extensive prehistoric cave paintings depict spinal manipulations being delivered. There is evidence that the Chinese used spinal manipulative therapy (2700 BC), as did the Greeks (1500 BC). In fact, there does not seem to be a single origin of manipulative therapy; it was practiced by the Japanese, ancient Egyptians, Syrians, Babylonians, Hindus, and Tibetans. Even American Indian hieroglyphics reveal familiarity with the therapy by such diverse groups as the Sioux, Aztecs, Winnebago, and Mayan Indians.

The other component of the MUA technique is anesthesia. The use of anesthesia or medicinal pain relief was documented as early as the time of Hippocrates. Anesthesia has been around for so long that there is little question about its experimental nature. Because of the advancement of new medications and the use of conscious sedation, the anesthesia element of MUA

makes the procedure one of the most easily adaptable neuromusculoskeletal treatment modalities that manual practitioners have at their disposal for chronic and certain acute neuromusculoskeletal problems.

Combining the use of manipulative therapy and anesthesia is not new. As described previously, the CPT code book of reimbursable procedures recognizes the use of manipulation and anesthesia. In fact, the CPT code book lists 10 reference codes for the use of manipulation and anesthesia in such areas as the wrist, elbow, knee, shoulder, ankle, and spine.<sup>12</sup>

MUA is far from being the only medical or chiropractic procedure that involves risks. That it is controversial does not make it experimental; there is nothing new or unique about anesthesia relaxing the muscles, joints, and joint capsules. Because conscious sedation is the anesthesia of choice when performing MUA and because MUA involves qualifying selected patients for the procedure according to the Council on Chiropractic Education-accredited institutional courses and national standards and protocols,<sup>2</sup> there is a precedent set for how the combination of the 2 procedures are performed. Both anesthesiologists and manual practitioners know about these procedural precedents and therefore use sound clinical justification for methods when performing MUA. If a procedure is experimental, it has not been sufficiently tested, it has not been performed by clinicians throughout the United States or abroad with same or similar results, and it has no valid standards of care. Such is not the case with MUA of the spine and extremities. Documentation suggests that there has been clinical investigation, and multiple cases throughout the United States and abroad have documented that this procedure has been performed thousands of times with the same or similar results.

The idea that uniqueness, uncommonness, novelty, controversy, and expense make something experimental is a false notion. When we actually look the terms up in a dictionary, we find that none of these factors have anything at all to do with whether MUA is experimental or not.<sup>14</sup>

Black's Law Dictionary<sup>17</sup> defines experiment as "a trial or special test or observation made to confirm or disprove something doubtful. The process of testing." Tabor's Cyclopedic Medical Dictionary<sup>18</sup> defines experiment as "the scientific procedure used to test the validity of a hypothesis, to gain further evidence or knowledge, or to test the usefulness of a drug or type of therapy that has not been tried previously." The term *experimental* is a word that can be expanded to fill and define as many situations as one may wish; on the other hand, it may also be restricted to the extent that one may desire.

We could easily get carried away and characterize virtually anything medical or chiropractic as *experimental* because there will always be something better tomorrow, and there will also be controversies about what the best procedure is today. For any procedure it is true that the more that is known, the better the procedure. Does continuous evolutionary investigation and improvement in technique mean that a procedure is still investigational or experimental, or does it mean that a procedure is getting better with time and more understanding?

"Courts often remark that the burdens of production and persuasion on an issue rest with the party that pleads the affirmative on the issue."<sup>14</sup> When the term *experimental* is used by one party to deny a claim by another party, it is incumbent on the first party to justify the use of the term *experimental* by proving that the denial of a procedure is actually because it is *experimental* (true meaning) rather than because it is *controversial*. In other words, you cannot deny a viable procedure that has been shown to be reliable just because you do not like it, or because a company has a policy against reimbursing certain doctors for that procedure.

The reference to MUA being experimental is primarily directed toward the chiropractic physician performing this procedure, in spite of the fact that MUA is not a chiropractic procedure but a multidisciplinary technique. Because most of this argument is based on a reference to MUA within the Mercy Guidelines,<sup>11</sup> we need to discuss this document and the authors' interpretation of it.

The Mercy Guidelines were written in 1993 to give direction to the various procedures used in the chiropractic profession and also to give evolutionary guidance to treatment plans for various conditions. The problem with these guidelines is that they left little room for the evolutionary changes in treatments that were discovered over the years. As with any procedure, treatment modalities improve as more research is done and more clinical outcomes are documented. This is historically a reasonable assumption with any clinical therapeutic modality.

For example, the Mercy Guidelines list MUA as an "equivocal" procedure. According to the guidelines, an "equivocal" listing means "more investigation needed."<sup>11</sup> The word "equivocal" can be referenced in several ways, which is why these guidelines can be so dangerous. If the authors of the Mercy Guidelines wanted to see more research completed to make MUA more understood and improved as a modality for the chiropractic profession rather than being considered more controversial, then their concerns and comments should have been made more concise and pertinent as part of the listing.

As it is, there have been different interpretations by those who seek to deny reimbursement for MUA by claiming it is "experimental" based on the Mercy Guidelines listing. Although the authors of the Mercy Guidelines may have had good intentions, this interpretation of the word "equivocal" has been used against the practitioners who choose to use this modality.

If MUA is broken down into its component parts, particularly those components that a chiropractic physician is responsible for, the procedure is a combination of passive stretch (70%) and articular manipulation (30%). Because both of these procedure are listed as "established" in the Mercy Guidelines, one can only assume that the guidelines are addressing anesthesia as an

equivocal part of MUA. Anesthesia is not a chiropractic procedure and never has been; a chiropractic guideline should not have any part in evaluating or interpreting anesthesia. The MUA technique is an intensive manipulative therapeutic modality that takes additional postgraduate training to perform. The technique is only enhanced by adding conscious sedation to the equation. The procedure is a multidisciplinary approach to manipulative therapy that has parts administered by different team members. The anesthesia for conscious sedation is administered by an anesthesiologist. The manipulation portion of the procedure, which involves stretching, mobilization, and manipulation, is performed by an MUA-certified doctor, whether that be a chiropractor, osteopathic, or allopath. The patient's safety, movement, and monitoring for MUA is performed by the operating and recovery room nursing staff. Because this is the generally accepted team approach to MUA,<sup>7,9,16,19-21</sup> a chiropractic guideline should only address the chiropractic portion of the procedure. Additional reference to the anesthesia portion of the procedure should be listed as "with the addition of anesthesia provided by American Society of Anesthesiology standards of care for conscious sedation." Neither established or equivocal procedures make reference to the word "experimental;" therefore, these guidelines are misrepresented if used as a reference for the denial of MUA.

### ***How safe and effective is MUA, and has MUA historically been shown to be safe and effective?***

Manipulation under anesthesia has been used as an alternative to prolonged conservative manual therapy and surgical intervention since the late 1930s and has been completed on well over 20,000 patients since that time (number of procedures is based on literature review and clinician interview throughout the United States and the United Kingdom). Because the procedure has been used with regularity on the same types of conditions with similar results over that same period, it falls within the parameters of being both a safe and effective procedure.

Literature reviews, which have been completed on numerous occasions by many authors, indicate that a considerable body of material has been written on the subject of MUA, including references in manual therapy texts. It is important to mention some of the more prominent writers who have supported the use of MUA over the years. Their comments about MUA directly relate to the safety and effectiveness of this procedure and support the findings of others who have indicated that MUA has been used successfully for many years.

Clybourne<sup>5</sup> states, "I have had the opportunity to use manipulation under anesthesia on a sufficiently large number of cases to realize its scope and limitations." Siehl and Bradford<sup>1</sup> wrote a review of 100 MUA procedures on 87 cases and indicated that "the method was first used on those cases which were not responding or were responding very slowly to usual manipulative management." Interestingly enough, Siehl and Bradford also refer to a study on 1038 by Piersol's International Medical Clinic, in which 200 MUAs were performed with a 94% to 97% recovery from nonspecific low back pain.<sup>1</sup> This shows that the 1948 article by Clybourne, although more clinically documented, was not the first article written about this procedure.

In 1963 Donald Siehl wrote, "A conservative regime which includes manipulative treatment of the lower lumbar intervertebral disc syndrome under anesthesia eventuates in a significantly high percentage of satisfactory results to warrant its use as an essential part of conservative therapy."<sup>3</sup> Dr Siehl presented an 11-year study of 723 cases treated with MUA at the annual meeting of the American Osteopathic Academy of Orthopedics, Bal Harbour, Florida, October 31, 1962.

Lindemann and Rossak<sup>23</sup> concluded that "... it is not permissible to regard the reposition under anesthesia without further ado as technical blunders. It deserves its place in the scale of the orthopedic therapeutic measures for the treatment of the protrusion and the dorso-lateral prolapse in the lumbar region."

In an early presentation at the 39th Annual Session of The American Congress of Physical Medicine and Rehabilitation in 1962, Barber<sup>24</sup> expressed the essence of the controversy surrounding the use of MUAs when he wrote:

Manipulation is a word used to mean passive movement, forced movement, mobilization, or stretching. Manipulation carried out while the patient is anesthetized, as done by orthopedic surgeons is reputable, but manipulation done on a conscious patient is disreputable in the eyes of the medical profession, because this is the method used by osteopaths and chiropractors.

Because this concept of the right professional providing the right procedure is still used today by many insurance carriers, MUA has not been given the proper chance to prove its efficacy with the frequency that it should have, given the data from clinical outcomes that are being seen throughout the country.<sup>19</sup> Documentation of the safe and effective use of MUA was evident early when Soden<sup>25</sup> described the reason for the use of anesthesia during manipulative therapy by stating, "The answer to the question of 'why anesthesia' lies not only in the successful clinical results, but also in the physiology of anesthesia." This theory has been the foundation of the MUA technique for many years; however, with the advancement and use of new medicines, anesthesiologists are now able to place the patients in conscious sedation. When performed properly, this allows the joint to be mobilized without putting the patient under general anesthesia, which also allows for end range appreciation in joints, joint capsules, and aponeuroses. In fact, I am aware of only a very few facilities in the country that are still using general anesthesia for this procedure. The use of conscious sedation has become the gold standard for MUA now, which makes for a much safer physiological environment for the procedure to be completed.

Krumhansl and Nowacek<sup>26</sup> make the following comment regarding the efficacy of using MUA:

The importance of fascial lengthening, tendon stretching and ligamentous mobilization are as important as the realignment of joints. Patients with long-standing, intense pain resulting from motor vehicle accidents, industrial accidents and severe falls gradually compensate. Eventually even the 'normal' joints of the spine and proximal extremities become involved. Most frequently there develops a zigzag pattern of muscle tightness and locked facets, either in individual segments or in groups. Manipulation under anesthesia is a final step in a long sequence of medical and physical treatments for patients who have endured prolonged and intractable pain and who have not responded to the more conventional methods of treatment. It is neither new nor revolutionary. Orthopedic surgeons in the United Kingdom have practiced it for many years. Osteopaths in the United States have relied on its efficacy. A few American orthopedists have incorporated this approach into their treatment regimes.

For this last statement they refer to Stoddard,<sup>27</sup> Fisher<sup>28</sup> and Mennell.<sup>29</sup>

Rumney stated that manipulative therapy to the musculoskeletal system under anesthesia has a definite place as an elective modality.<sup>30</sup> "Manipulation of the joints of the spine and the appendages under anesthesia has been carried out by orthopedic surgeons for many years, in both the osteopathic and allopathic professions."

Beckett and Francis<sup>20</sup> reported on a controlled study on MUA completed by Chrisman et al<sup>31</sup> that included 39 patients, all of whom had low back pain, sciatica, and positive findings on at least one sciatic nerve stretch test, with at least one reflex, motor, or sensory deficit finding. By using guidelines from an earlier study by Mensor,<sup>32</sup> 27 of the 39 patients had positive myelograms for disk herniation. The average duration of the symptoms was 6 years, with a range of 10 days to 25 years. For their last attack of back pain, these patients had received conservative management including heat, analgesics, muscle relaxants, bracing, flexion exercises, and rest. These patients then received MUA. A similar group of 22 patients received the same conservative care but no MUA. Chrisman et al<sup>31</sup> reported that "the effects of the MUA were frequently dramatic and more than one half of the patients reported their sciatic symptoms lessened within 24 hours." According to Mensor's criteria,<sup>32</sup> Chrisman et al<sup>31</sup> reported that 21 of the MUA patients had excellent or good outcomes at 5 to 10 months follow-up, 4 patients had fair outcomes, and 14 patients had unsatisfactory results. Overall, they reported that 51% of the patients with an unequivocal picture of ruptured intervertebral disk unrelieved by conservative care had good or excellent results after MUA.<sup>32</sup> The 22 patients who did not have MUA did poorly (no mention of specific results or testing methods), and 16 eventually required surgery. The findings of Chrisman et al were consistent with the findings of Mensor in the earlier study.<sup>31,32</sup> Their findings are also consistent with clinical reasoning that if a procedure has a record of positive patient outcomes and includes similar techniques and procedures from earlier studies, it is hard to argue against its effectiveness, safety, and reliability.

In the article, "Issues Concerning Chiropractic Standards of Practice," Gilkey<sup>34</sup> stated the following:

Manipulation under anesthesia as a procedure appears to be well within the province of chiropractic. Traditionally, chiropractic's goal has been to restore and maintain the welfare of the human body. In my opinion, MUA fits within that goal since 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 (currently limited) scientific basis.<sup>33</sup>

In a 1992 article in the *Journal of the American Osteopathic Association*, Greenman<sup>7</sup> wrote that MUA "is an old widely recognized procedure in musculoskeletal medicine" that has been used for many years to treat musculoskeletal conditions that have been unresponsive to other conservative therapies. In researching the validity of the chiropractor as a prominent provider for this procedure, we learned that Shekelle et al,<sup>35</sup> in a report from a RAND study, found that 94% of the manipulative therapy performed in the United States is by chiropractors. "As part of the chiropractic education there are over 600 hours of basic instruction for manipulative therapy with an additional 8 months of internship with additional training in proctoring requirements to perform manipulation under anesthesia."<sup>9,35</sup> This statement is true, relative to all chiropractic colleges and most states with regard to application by professionals who perform manipulative therapy. To perform MUA, additional postgraduate training is required. This would indicate that the chiropractic physician has specialized skills that may represent higher training skills than other manual practitioners with regard to MUA.

In my articles for the *Florida Chiropractic Association Journal* in 1993 and 1995, I indicated that with the introduction of MUA, certified manual practitioners have another avenue to try if the patient falls into the properly selected categories for MUA.<sup>10,37</sup>

"The basic concept behind mobilization, manipulation, and adjusting procedures while the patient is under a sedative/hypnotic is to increase articular, ligamentous, tendonous, and muscular flexibility that has not been achieved in the office therapeutic routine. Standard manipulative techniques are used, but the physiologic state of the patient is changed, and the procedure is done in a different environment. When used on properly selected patients, it is more cost effective and more productive to the patient's return to normal lifestyle than prolonged conservative care or possible surgical intervention."<sup>19</sup>

West et al,<sup>19</sup> commenting on the use of MUA wrote:

The addition of anesthetic allows for the benefits of manipulation to be shared with those patients who cannot tolerate manual techniques because of pain response, spasm, muscle contractures, and guarding.... There has been much discussion regarding the use of general anesthetic in the performance of MUA. Issues discussed include the depth of consciousness associated with general anesthesia, the inability of the patient to give pain feedback or resist over zealous manipulation, and the intrinsic guarding mechanism of voluntary/involuntary muscle fibers, which protect the elastic barrier in the conscious patient.

To address these concerns, Dr West makes the following points:

First, only highly skilled graduate practitioners who have trained in structural diagnosis and manipulative treatments should perform these procedures. And secondly, the advent of newer, short-acting, highly titratable, and completely reversible intravenous anesthetics allow for controlled anesthesia depths, preservation of patient pain response, as well as significantly reduce morbidity and mortality rates.

Several references in the previously mentioned literature have related to the use of general anesthetics with MUA. The newer concept of conscious sedation, which has been briefly alluded to by Dr West, is important in the discussion of safety and effectiveness of MUA because most of MUAs done in the United States today are being done by using conscious sedation. The anesthetics that are being used are short acting and can be titrated to allow for patient response, yet allow for a protective level that permits doctors to complete what they are trying to accomplish with the manipulative technique without allowing tissue damage to occur.

All of the articles I have reviewed and quoted show that MUA has not only been performed for a number of years but has also been investigated both clinically and scientifically. Today, with the advent of newer medications for anesthesia and the formation of the National Academy of MUA Physicians<sup>2</sup> (NAMUAP) in October of 1995, MUA is being recognized as a real alternative to prolonged conservative care or surgical intervention. The NAMUAP has established standards and protocols for the primary practitioner performing MUA (a chiropractic physician in most instances) and has established standards for anesthesia for nursing and for the facilities where MUA is completed. These standards and protocols have begun to be endorsed throughout the United States, primarily by state boards that are interested in addressing the MUA procedure. Most of the state boards of chiropractic have adhered to the provision in their state laws that asserts that procedures that are taught by chiropractic colleges accredited by the Council on Chiropractic Education fall within the scope of practice of a chiropractic physician. Some states have adopted a policy relative to MUA directing specific language in their scope of practice. As an example, in August 1994, the North Carolina Board of Chiropractic stated:

Manipulation of a patient under anesthesia by an MUA trained chiropractor 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 procedures.<sup>21</sup>

When addressing the safety and effectiveness of any procedure, it is necessary to address any complications as well. Phil Greenman<sup>7</sup> states:

Temporary flare-ups of symptoms after the procedure have been reported by several patients. This flare-up is attributed to stretching of the adhesion and mobilization of inflamed soft tissue joints. It is easily controlled with appropriate postoperative care. Serious complications have been rare.

He quotes Poppen,<sup>38</sup> who reported the following in 1945:

[There were] two cases of paralysis after manipulation by competent orthopedic surgeons with the patient under anesthesia. This complication occurred in a population of 400 cases of intervertebral disc disease. It appears that serious complications can be avoided by appropriate patient selection, suitable operative technique by a competent practitioner, and consideration for the contraindications and potential complications.

This demonstrates that the proper selection of cases, as prescribed by accredited certification courses on MUA and the National Standards and Protocols,<sup>2</sup> establishes a precedent for those who perform this procedure. By adhering to these standards for patient care, safety and effectiveness are prominent factors in positive patient outcomes. Many others also believe that the proper approach to any manipulative procedure is the selection of appropriate patients through an examination process, which eliminates potential problems. And it is those manual practitioners with extensive training, such as chiropractic physicians, who make any manipulative treatment less likely to cause harm to the patients.<sup>39</sup>

Another concern within the field of MUA is manipulation of the cervical spine and contraindications for its use in this area. The procedure of MUA in the cervical spine is completed with low-velocity, high-amplitude thrusting procedures that put very little torsion into the cervical spine.<sup>16,39a</sup> The primary focus of MUA in the cervical spine is axial and lateral tractioning and oblique tractioning, with articular cavitation occurring generally during the stretching maneuvers.<sup>16,40</sup> Today, with the use of conscious sedation rather than general anesthesia, the patient is able to discern pain even though neuroperception is slowed down, but end range of muscles and joints are not lost. This allows for full stretching maneuvers and articular cavitation without the inherent risk of vertebrovascular accident, tissue rupture, or joint dislocation. Patients have also undergone prerequisite conservative care for an average of 4 to 6 weeks before the MUA. Because the office form of manipulation is high-velocity, low-amplitude, any damage to the spinal segments or tissues would certainly occur during the office manipulative therapy program. Again, this is why a regimen of conservative manipulative therapy is recommended before considering MUA and why there are very few recorded instances of tissue damage, injury, or even death from MUA. As with any technique that uses forms of anesthesia, there are inherent risks. However, historically there have been very few reports of damage from MUA, and most were from medication reaction or the result of the procedure being performed by uncertified, unskilled practitioners.

The safety and effectiveness of spinal MUA has been widely proven by clinical documentation. The information previously cited relates to the educational standards necessary to perform this procedure,<sup>36</sup> proper patient selection for the procedure, and proper follow-up care once the procedure has been completed. It also relates to the physician being trained to provide proper diagnostic and examination procedures before performing MUA. If all of these standards are followed properly, MUA is safe to perform. It has been performed more than several thousand times, and the effectiveness has greatly outweighed any minimal risks from the types of anesthesia used. All of the malpractice insurance carriers for the chiropractic, osteopathic, and medical professions cover those types of physicians for MUA, which would certainly not be the case if there were any question regarding the safety and effectiveness of this procedure.

#### ***What is the current relationship between acute and chronic neuromusculoskeletal spinal pain and the results obtained with MUA?***

The current practical status of MUA is the same as it was some 60 years ago except that techniques have been improved. The resistance now taking place is between third party payors and doctors who currently perform MUAs. In 1995, the NAMUAP was formed to help establish Standards and Protocols for the MUA and manipulation under joint anesthesia procedures.<sup>2</sup>

Because these standards and protocols were established by using clinical documentation from earlier studies and present-day clinical outcomes, and because the NAMUAP is now affiliated with the American Academy of Pain Management, it is hoped that although evolutionary improvements are inevitable as more is learned about the MUA technique, the procedure will move into a more scientifically recognized posture of mainstream therapeutics. Because of this standardization of technique, MUA remains scientifically valid based on the concept that any procedure that has proven historic reliability with consistent procedural use must be considered clinically valid. These are established parameters for inclusion in the CPT code book of reimbursable procedures as stated previously.

MUA has been used historically for both acute and chronic conditions. The concept of acute care, however, takes on a different meaning when we speak of MUA. Acute refers to severity and not time as it pertains to MUA; that is, there are many conditions that have recurrent acute exacerbations over the course of the treatment period. This is determined by the patient's perception of pain and is measured subjectively by the doctor with a Visual Analogue Scale and patient questionnaire instruments. Measurement in improvement in many facilities is also objectively obtained by using magnetic resonance imaging, electrodiagnostics, functional capacity testing, and video fluoroscopy. The use of MUA is in itself traumatic on a microtrauma scale. The stretching and articular manipulations that are used during MUA would tend to increase the inflammatory response; thus, MUA is not normally used on acute traumatic cases. There are instances, however, when the

patient has unrelenting pain that is interfering with activities of daily living. In these instances, the MUA team might evaluate whether the patient could be brought into the MUA program to gently stretch out the areas and provide relief through increased circulation from passive stretching and medications for pain. The National Academy of MUA Physicians<sup>2</sup> has established parameters for the use of MUA in acute traumatic care. They consider it as having merit in situations in which conservative care that includes forms of manipulative treatment and medical pharmacologic intervention has been tried for a period of 2 weeks and has produced minimal change and progressive deterioration. This treatment varies from the normal MUA and involves coordination with the medical team member to combine pain management with manipulative therapeutics. It has been established that once this acute traumatic care stage has been reached, it usually only takes 1 MUA to bring the patient back to the conservative office program.<sup>16</sup> These cases represent only a fraction of the types of conditions that are normally seen by MUA practitioners.

Historically, the majority of MUA candidates have been those patients with chronic joint restriction from fixation caused by disuse after trauma. This syndrome sets up a vicious cycle that Michael Alter<sup>41</sup> calls the "self-perpetuating cycle of muscle spasm." In this cycle, the patient undergoes trauma, which may be caused by direct contact or through repetitive incremental injuries. These injuries set up pain stimuli, inflammation, emotional tension, sometimes infection, temperature variations, and eventual immobilization from disuse. The cycle then sets up reflex muscle contraction, which if left untreated progresses to muscle contracture. Contracture, in turn, progresses to restricted movement and fixation in the joints, which have a direct effect on what Wyke<sup>42</sup> calls *dysfunctional postural kinesthetics*. Wyke refers to a disturbance in postural kinesthetics as resulting in altered mechanoreceptor response. Typically, Type I, II, and IV mechanoreceptors are concurrently involved, which sets up a cycle of trauma-induced altered posture-affecting movement, which then stimulates nociceptive response. With the MUA technique, stretching maneuvers and mobilization techniques are coupled with specific adjustive techniques to help alter adhesion accumulation that has been laid down by the body as connective tissue to prevent further damage to the areas involved. New medications allow us to perform this technique while the patient is in conscious sedation; thus, we are able to provide progressive linear forces to these areas and alter these adhesions without tearing tissue in the process. Because these medications allow the patient to relax and not respond with immediate muscle contraction when pain is perceived, these maneuvers can be performed so that end range is not lost, the natural protective mechanisms are present but slowed down temporarily, and pain is perceived at a lowered threshold but not remembered.<sup>16,19,43</sup> The anesthesiologist, as a very valuable member of the MUA team, provides just the right medications to allow this physiologic change from the normal office manipulative therapy program. As a result, the certified MUA doctor is able to accomplish considerably more than could be accomplished if the patient were to undergo these procedures in the office setting without conscious sedation. The most important concept here is that if the patient were able to recover in the office setting without the use of conscious sedation, the patient would not have been a candidate for MUA in the first place.

***Is a controlled or double-blind study possible with the MUA technique as it is performed throughout the United States? If not, are the documented clinical outcomes being achieved today any less significant?***

With the advent of newer medications and more site-specific manipulative techniques being used to perform the MUA technique, the doctor certified to perform MUA today has a considerable advantage in technique. In the 1940s and 1950s, when this procedure was used with regularity by the osteopathic profession, MUA was originally used as an adjunct to orthopedic or osteopathic manipulation techniques that were not working in the office setting. The orthopedic and osteopathic doctors had access to the hospital setting; thus, if a more intensified form of manipulative procedure was warranted in the course of treatment, the doctor could take the patient into the hospital and use anesthesia to complete the manipulations that were deemed necessary to achieve the desired result.

Today, the chiropractic profession has taken up where the osteopaths and orthopedists have left off. With the specific adjustive and manipulative techniques that are taught in chiropractic colleges, the MUA technique is enhanced almost 10-fold<sup>16,44</sup> from the standard office manipulative technique.

Palmer<sup>45</sup> discusses the difficulty of studying the MUA technique in his masters thesis presented at the 6th Annual National Academy of MUA Physicians conference in New Jersey, May 2001. This was a designed study of MUA and states the following regarding data collection and obtained results:

Patient selection is difficult because there have not been studies designed to specifically determine that one particular condition is better treated with MUA than with other therapeutic modalities. Although there have been numerous clinical papers written about the technique and the results that have been obtained, specific studies to prove that one condition does better therapeutically than others has not been determined. Documentation concerning MUA however, does show significant outcomes when used with chronic conditions that over the years have shown to be very responsive to this procedure.<sup>45</sup>

There are multiple procedures performed as part of the MUA technique. The procedure involves passive stretch, myofascial release, specific articular adjustive procedures, postural change enhancement (postural kinesthesis), and anesthesia to change the physiologic response so that MUA produces the desired outcome. It is the combination of these techniques,

however, that allows MUA to achieve the results that it does.

Clinicians who perform this procedure use different types of manipulative techniques, and one clinician's hands are different from another's. This does not negate the benefit of the hands-on technique but makes it difficult to determine specifically what was done and to duplicate it exactly with another patient.

There are usually multiple areas of the spine or extremities involved in the technique, such as the cervical, thoracic, or lumbar spine. However, the treatment may also involve the cervicothoracic, thoracolumbar, or lumbosacral, or any combination of these areas. If the shoulder is involved, the cervical spine, thoracic spine, and shoulder may be involved. Although these techniques are taught in chiropractic colleges and specific technique courses, the exact duplication of any specific technique for the MUA procedure is not always possible with each condition. In fact, MUA is designed to be condition specific,<sup>16</sup> and the technique is modified according to the specific condition for which it is being used.

Questionnaire instruments for pain evaluation and patient response vary and are not always reliable for every study. A standard subjective pain questionnaire should be universally recognized for a particular study because some questionnaires are designed specifically for patient pain assessment but are not always accurate for neuromusculoskeletal outcome response.

Chronic pain, even with acute exacerbation, is difficult to study because there are so many variables, especially when psychologic considerations are factored in.

There are very legitimate concerns about the safety of patients and the effectiveness of procedures being used to treat them. Controlled studies or double-blind studies are certainly useful in determining the scientific validity of a procedure. Although manual therapy has been around for centuries, the concern has been to prove its scientific validity the way other scientific studies have been done. The problem is that there are too many human factors involved. Does manipulative therapy in its various forms work? The results of thousands of cases that have been performed by all types of physicians say that it does. There may not as of yet be a clear-cut reason why we get the results we get, but there is no denying that we get these results. The MUA technique is no different. It is considered a form of intensified manual therapy that has been documented by clinicians to be both safe and very effective for certain conditions that have had historically significant responses to the technique. Does the lack of controlled study mean that the MUA technique is any less effective today because we have not been able to "scientifically" document controlled studies? Because MUA is controversial does that make it "experimental," unsafe, or an ineffective procedure? The answers to those questions clearly lie in the patient response and remarkable results that have been achieved with this technique. There are thousands of workers who have returned to work after having MUA when other forms of therapy failed, and thousands of patients who have returned to normal daily living because MUA was used before surgical intervention became necessary. The real "study" is the patient population's response to the MUA technique over the years. This can be determined by the countless articles written about MUA, which are documented in this article, and by the large numbers of MUA candidates that have come and gone with better outcomes because of the MUA technique. The significance of MUA is that it has been found to be very safe and effective and has achieved remarkable results for more than 60 years. A technique that has been used by multiple practitioners for a long time with similar results and outcomes and that is listed in a reputable manual of reimbursable expenses cannot be addressed as an investigational or an experimental procedure. It is time for a re-evaluation of MUA, one that is based on patient appreciation and clinical outcome. The MUA technique is not harming the public but, rather, helping thousands to return to more healthy lifestyles, in many cases far earlier than with other more traditional types of conservative therapy. Why are we debating a procedure that has so much to offer with very little hazard? Why is there so much controversy over who performs the procedure when those who are certified to perform this procedure are producing remarkable results that are less expensive than prolonged conservative care or possible surgical intervention? Are we basing decisions for this therapeutic modality on results or rhetoric? Are we still concerned with patient response or who provides the service? I would hope the answers to these questions are obvious.

TOP

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