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Stimulating Interest in Medicine Assisted Manipulation (MAM)/Manipulation Under Anesthesia (MUA) as a Complementary Treatment Modality for Chronic Pain and Opioid Use

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Abstract

The objective of this clinical review is to stimulate interest in medicine assisted manipulation (MAM), also known as manipulation under anesthesia (MUA). By providing evidence from published studies regarding the use of MUA, as well as identifying its benefits and limitations, our group hopes to increase awareness of this technique and contribute to its implementation to assist in overall pain reduction and reduce opioid medication dosing. A retrospective literature review was undertaken to investigate the extent of published information on the topic in order to compile evidence-based data and provide the reader with a summary of both the benefits and the flaws of the technique. We intend for this manuscript to serve as a starting point to stimulate readers' interest into further research and discussion on MUA. We see MUA as a means of providing patients with additional treatment options as well as an opportunity to raise awareness of an uncommon, yet effective, manipulative technique.

Introduction

There has been mention of MUA since the 1920s.¹ Manipulation of the spine under anesthesia was fairly common in orthopedic practices from 1940-1965, but gradually fell out of favor because of the increased reliance on advanced surgical techniques.² In 1949, Mensor and his colleagues demonstrated a need for MUA in the treatment of lumbar intervertebral disc pain prior to surgical intervention.³ This study collected data regarding patient pain relief, post-MUA range of motion, and ability to perform straight-leg raises. Results showed that:

- 42% of patients who had MUA fell in the “excellent” category
- 23% of those who had the laminectomy alone were in this category.³

In 1964, a group of allopathic orthopedic surgeons studied MUA in 39 patients ranging in age from 19 to 62 years with severe lumbar disc disease and sciatica. They found that:

- <50% of patients reported significant improvement of their sciatica symptoms within 24 hours
- including diminished leg pain
- improved straight-leg raising capability

This study confirmed Mensor's views that manipulation can play an important role in the conservative therapy of patients with disc syndrome and supported his assertion that rotatory MUA with absolute relaxation “offers optimum results and maximum safety”.⁴

Complications from general anesthesia and aggressive HVLA procedures led to decreased use of early MUA procedures in favor of surgery. Although orthopedic surgeons had largely abandoned MUA, its use by chiropractors and osteopathic physicians renewed interest in the 1990s.⁵ Most notably, a chiropractor, Robert Gordon DC, went on to train many in the technique and published a textbook on the subject, *Manipulation Under Anesthesia: Concepts in Theory and Application*, which ignited a movement that promoted this unique treatment as an option for patients who were resistant to outpatient manual techniques. Gordon describes MUA in 3 steps. First, sedation of the patient via Monitored Anesthesia Care. Second, manipulative procedures during which passive range of motion is determined and treatment is administered with high-velocity, low-amplitude joint mobilization and muscle/fascia stretching with soft tissue/myofascial release techniques. Finally, post MUA follow up therapy to continue muscle/joint engagement.

Since its revival, MUA has been used to provide treatment for musculoskeletal dysfunctions involving the cervical through lumbar spine as well as knee and shoulder joints.⁷ Spinal MUA indications include:

- muscle spasm accompanied with pain,
- loss of joint range of motion, and
- chronic spinal pain which has been minimally responsive to conservative therapy.⁶

Early methods of MUA differ from the modern practice in that, currently, it is typically used in conjunction with operative procedures. While progress has been made in revitalizing MUA as a treatment modality, there is a need for additional evidence-based research d to support it as a potential standard of care and its efficacy on post operative pain management.

Results

In 1968, an article published in the osteopathic medical literature highlighted several conditions for which MUA can be beneficial: chronic myositis, chronic fibrositis, chronic muscle contracture, and restricted ranges of motion due to trauma. It is pointed out several times in the article that the success of MUA is directly proportional to the skill of the physician and the amount of anesthesia needed is inversely proportional to the physician's skill in MUA. Based on his cited research, Rumney believes that there is a definite place for MUA in the medical field; however, a physician's lack of skill may inhibit its usefulness in a specific situation.⁹

MUA is a manual therapy identified as successful in treating patients with intractable injury or dysfunctions refractory to treatment, such as adhesive capsulitis (particularly of the shoulder) and trochanteric bursitis.¹⁰ For example, 37 patients who had been diagnosed with frozen shoulder received treatment with MUA. 94% of the subjects were satisfied with the procedure, and three months after beginning treatment 59% (23 shoulders) of the patients reported having no or only mild disability.¹⁰ Further research is needed to determine the risk to benefit ratio of MUA vs. physical therapy for the correction of movement disorders.

Medical assistance via conscious sedation is a modification of manipulative medicine to provide relief to patients with unresponsive pain. The use of anesthesia is desirable for patients with these conditions due to the severe pain caused by both the condition and treatment technique ⁹. Explicit emphasis has also been placed on the qualifiers for injuries responsive to MUA. This includes acute and recurrent pain that has not responded to office manipulation, for example, a patient with protrusion of a lumbar intervertebral disc.³ The American Academy of Osteopathy defines failure of office treatment as a lack of response to treatment within 3-6 weeks for acute phase pain, 6-12 weeks for post-acute phase pain, and greater than 12 weeks in chronic phase pain.¹¹ Additionally, the injury may be so severe that analgesic medications, anti-inflammatory medications, or muscle relaxant medications are ineffective.

Chronic pain management is not limited to the provision of physical relief. In a cross sectional study using baseline measures collected within a randomized controlled clinical trial of the effectiveness of Osteopathic Manipulative Treatment (OMT) in patients with chronic lower back pain, Licciardone et al found a correlation between self-reported depression, severity of somatic dysfunction (p<.006), and severity (p<.001) and duration (p=.02) of pain levels.¹²

Table I. Clinical Outcomes of Manipulation Under Anesthesia (MUA)|

Reference	Outcome measured	No. of MUAs	Outcomes	Length of follow-up (months)	Complication rate	Complications
Ajwani et al (2018)	ROM of 1st MTP	35	The total range of movement of the joint improved following manipulation by an overall mean of 44.7° (p < 0.0001). At subsequent follow up, the total range of movement of the joint was still improved by 22.2° (p < 0.0001) overall.	3.1	2.85%	Joint arthrodesis (1 patient).
KS Baum et al (2018)	Knee ROM	78	Unchanged knee extension from pre-MUA to post-MUA (3.2 ± 0.8 to 2.9 ± 0.8), but significant improvement in flexion was achieved (80.0 ± 3.8 to 115.4 ± 2.1, P < .001) At 1 year follow-up, 67% patients had ROM data available showing flexion significantly improved compared to pre-MUA (80.0 ± 3.8 vs 101.4 ± 3.8, range 80-130).	12	6.40%	Ongoing stiffness requiring repeat MUA (2 patients). Revision total knee for continued stiffness (2 patients). Thigh hematoma and continued stiffness (1 patient).
Sassoon AJ et al (2015)	Knee ROM	22	The mean pre-manipulation ROM arc was 59.5 ± 25 degrees. The mean intraoperative arc of motion, achieved at the time of the manipulation was 123 ± 14 degrees. At the most recent follow-up, the mean ROM arc was 110 ± 19 degrees.	7	0%	Radiography demonstrated interval healing.
R. Pagoti et al (2017)	Knee flexion	62	Median flexion improved from 60 deg pre-MUA to 84.5 deg post-MUA.	12	4.80%	Readmission for post-MUA pain management (1 patient). Haemarthrosis post MUA (1 patient). Cerebrovascular accident day 2 post MUA (1 patient). All treated via "conservative management".

An article in the journal *Osteopathic Family Physician* features the personal experiences of Abend et al. in the application of MUA for the treatment of chronic pain. Their stance is derived from a combined practice of MAM/MUA on over 5,000 patients. They argue that one important benefit to chronic pain patients is that MUA directly targets the area of the body in need of relief. In contrast, orally administered medications carry the risk of adverse systemic effects or abuse.¹³ More than 40% of older American adults have chronic pain, and the most often prescribed analgesics are opioids.¹⁴ The National Center for Health Statistics has found that the rate of opioid overdose deaths in the US more than doubled between 1999 and 2015. Deaths from drug overdose involving heroin more than tripled from 2010 to 2015, rising from 8% to 25%.¹⁵ In 2014 alone, 61% of the 47,055 drug overdoses in the US involved an opioid.¹⁶ Clearly, these frightening statistics demonstrate a great need to address the opioid crisis.

Alternative treatments resulting in a reduction of chronic pain could reduce the level of opioids prescribed. The recognition of OMT by the Federation of State Medical Boards as an adjunct to chronic opioid analgesic therapy makes the inclusion of MUA in the scope of acceptable treatment options both timely and appropriate.¹⁷ MUA has the potential to become an additional treatment modality for patients with acute or chronic pain, and to minimize or eliminate the use of opioids.

Currently, literature on MUA is largely focused on demonstrating its use in improving range of motion (table 1), but a need for data surrounding the efficacy of MUA in response to the opioid crisis could prove fruitful.

Conclusion

We seek to stimulate interest among practitioners in exploring the benefits and relevance of MUA as well as establish a place for it in the algorithm of formal pain management for both non-surgical and surgical neuromusculoskeletal conditions. Although MUA is still investigational, we wish to demonstrate that MUA deserves serious consideration by all health practitioners as a non-pharmacologic option as indicated by our statistical review. Based on the information presented, we suggest experts in the field should provide education on the necessary skills to successfully perform MUA as a way to improve patient outcomes and quality of life post surgery. Because lack of skill is a major contributor to the doubt surrounding acceptance of MUA, the first step would be to train physicians in the essential techniques and increase the amount of evidence-based research needed to scientifically support this technique.⁹ These techniques may include, but are not limited to, high-velocity, low-amplitude, myofascial release, and soft tissue manipulation. The hope is that this will raise awareness of MUA and spark further research interest that demonstrates its success, ultimately leading to greater acceptance of MUA in clinical practice.

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