Case study

Myofascial Pain Syndrome: looked through the lens of 11 cases managed by myofascial trigger point massage therapy, Riyadh, Saudi Arabia

Running title: Myofascial Pain Syndrome

ABSTRACT

Background: Myofascial pain syndrome is a common pain condition characterized by a key symptoms and signs, determined by multiple etiologies, comorbid with a variety of systemic diseases and regional pain syndromes and managed by diverse therapies with variable outcomes. **Objective:** This study aims to concisely report 11 cases of myofascial pain syndrome managed by myofascial trigger point therapy. **Methods:** The relevant information about 11 cases was collected prospectively using a semistructured proforma. **Results:** Most of the patients with variable age and profession presented in emergency room with acute pain, limited motion, weakness, referred pain of specific pattern and associated autonomic signs and symptoms. All patients were diagnosed mainly by detailed history and gold standard palpation method that helps identify taut muscles, tender myofascial trigger points, local twitch response and autonomic manifestations. Myofascial trigger point therapy alone with a timeline of about 15-60 minutes of 1-3sessions brought about good results in all 11 patients who remained stable at two to three months followup. **Conclusion:** Myofascial pain syndrome linked with latent or active myofascial trigger points developed due to repeated strains and injuries needs to be diagnosed by history and palpation method, systemic evaluation and laboratory investigations. Though several interventions are used in myofascial pain syndrome, myofascial trigger point massage therapy alone is found to be reasonably effective with excellent results. This clinical case series calls globally for rigor interventional comparative research with a large number of patients with MPS in future.

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Keywords: Myofascial pain syndrome, myofascial trigger points, taut muscle, myofascial massage therapy, comorbidities, regional pain syndromes.

INTRODUCTION

Myofascial pain syndrome (MPS) is a dysfunction of muscle and the surrounding fascia, and characterized by key features arising from hard and tender myofascial trigger points (MTrPs) located within the taut muscle [1-3]. Referred pain from tender MTrPs contributes to regional pain syndromes (RPS), which in addition to several systemic diseases comorbids with MPS [2,4,5]. MPS classified as a primary idiopathic disorder with sensory and motor abnormalities and secondary disorder caused by neurogenic or mechanical forcesand co-occur with diverse systemic conditions [1-3,6-10]. Chronic MPS tends to generalize, becomes refractory and reflects poor prognosis and outcome. Evidently, MPS does not transform into fibromyalgia and both distinctively differ from each other [11]. Patients with MPS are reported to successfully respond to a variety of interventions including myofascial massage or MTrP massage therapy, holistic integrated treatments including dry or wet needling with anesthetic agents, herbal medicines, medical acupuncture and biofeedback [1,2,12-16]. For better understanding MPS, MTrPs and myofascial massage therapy and their theories, we defined key terms used in MPS (Table 1). The aim of this clinical case series is to concisely describe 11 patients with MPS managed by manual MTrP massage therapy or myofascial massage therapy or deep therapeutic massage therapy. We will use the term 'MTrP massage therapy' in subsequent sections.

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Table.1.Definition of key terms-MPS, MTrP and MTrP massagetherapy [1,5,17,18]

Key Terms	Definition
MPS	A complex syndrome of sensory, motor and autonomic symptoms, caused by myofascial trigger points
Myofascial massage therapy	A type of bodywork that focuses on the myofascial unit, including muscle, connective tissue (CT) and the neuromuscular junction involving MTrPs situated in skeletal taut muscles
MTrP	Knots of exquisite tenderness and hyperirritability in muscles or their fascia, localized in taut bands, which mediate a local twitch response of muscle fibers under a specific type of palpation – called snapping – and, if sufficiently hyperirritable, give rise to pain, tenderness and autonomic phenomena as well as dysfunction in areas usually remote from their site, called targets. Latent

	and active types, the former tender but no spontaneous pain and the latter is with tenderness and spontaneous pain
Simons' theory	The production of MTrP basically requires muscle overload and overuse, derived from working with a rabbit model later supported by human studies.
Non-tender nodules	Some MTrPs are not tender on palpation and found proximal to or remote from site of pain
Soft tissue pain	Here palpable nodule is not tender or no nodule is palpable: not explained by radiculopathy and muscle strain.
Cinderella Hypothesis	MS disorder symptoms are reported to arise from muscle recruitment patterns during sub-maximal level exertions with moderate or low physical load often applied by office workers, musicians and dentists having myalgia and MTrPs.
Henneman's size principle	Smaller type 1 muscle fibers are recruited first and de-recruited last during static muscle exertions, and consequently these "Cinderella " fibers are continuously stimulated and metabolically overloaded compared to larger motor muscle fibers which do not work hard and spent less time being activated, making "Cinderella" fibers more susceptible to muscle damage and calcium perturbation-key factors in MTrP development

METHODS

All 11 cases were seen in the emergency room of a 50-bed hospital in Riyadh city in year 2017/18. The relevant data including socio-demographic variables, clinical and diagnostic details, followup progress, MTrP massage therapy sessions and their duration were prospectively collected on a semistructured proforma. All the cases were evaluated and managed by one of the co-authors. All patients gave oral consent provided their personal identities were kept confidential. Consequently, their personal data was anonymized. Concerning two kids, we seek oral consent from their parents. We also seek the permission from the director of the hospital to publish this important case series of patients diagnosed with MPS. The following are the clinical details of individual patient and we used MTrP massage therapy in our case series as described here [1,2,18].

Case Vignettes

Case 1

A 55-year-old male patient with essential hypertension on antihypertensive medications with no history of allergic diseases came to the emergency services and complained of severe right low back pain radiating to the RT thigh since one week.The patient did not consult any doctor prior to visiting our outpatient clinic, and was neither on prescribed medications nor self-medicated for pain. The patient gave no recent history of injury. On physical examination, his vital signs were within normal range except two tender

myofascial trigger points (MTrPs) were found on palpation within the taut muscles, iliocostalis and quadratus lumborum, and the surrounding area was affected by pain (referred pain). Furthermore, the pressure on TrPs more than eight seconds showed muscle twig response and piloerection reaction along with numbness in right thigh. Systemic examination ruled out any systemic or local diseases.The relevant laboratory investigations were unremarkable. The patient was diagnosed with myofascial pain syndrome possibly attributed to overuse of backbone. This patient was treated with complementary treatment, i.e., MTrP massage therapy, one session of 30 minutes. Within this timeline, the stagnated muscles were released and the local and referred pain was improved completely. On visual analogue scale (Figure 1, VAS, 0-10), pre- and post-treatment evaluation of pain was 6/10 and 0/10, respectively. The patient remained stable at 3-and 6-month followup.

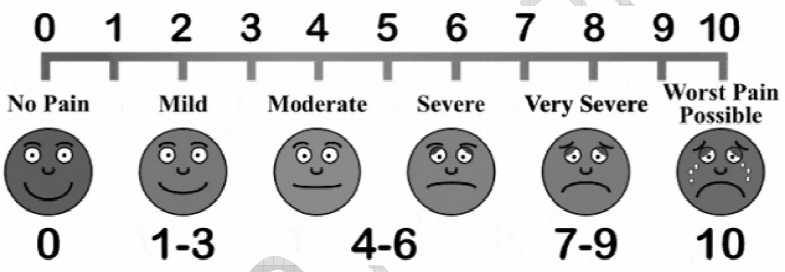

Figure. 1. Visual analogue scale

Case 2

A 30-year male soldier patient not suffered from any systemic disease in the past presented to the emergency services with complain of very severe upper and lower back pain two months duration, and on VAS he scored 8 out of 10, very severe pain. For the same pain, the patient consulted three physicians in different hospitals, and was unsuccessfully prescribed a number of analgesics. On examination, patient's vitals were stable, and systemic evaluation and laboratory investigations neither find any disease nor any abnormal results, respectively. However, the examination of tender area by palpation found a number of myofascial stagnated knots (three MTrPs) from upper to lower back region along with restricted muscle motion and erythema. Palpation of TrP showed muscle twitch response and referred pain in the right shoulder region. A diagnosis of

myofacial pain syndrome was made together with multiple MTrPs identified within upper teres major muscle, infraspinatus muscle, rhomboid major muscle and lower iliocostalis lumborum muscle, and possibly caused by prolonged standing. In addition to diclofenac, 75mg intramuscular once prior to MTrP massage therapy to reduce high intensity of pain, the patient was then given treatment by means of deep myofascial massage therapy, three sessions each one of 30 minutes with an interval of 10 minutes in a day. As a corollary, the stagnated muscles including MTrPs were relieved, and the pain diminished considerably. At the end of the last session, the patient evaluation by VAS was 2 out of 10, mild degree. The patient improved completely at one week and remained stable at two months followup.

Case 3

A 35-year old male Egyptian patient by occupation car driver came to the emergency services with complains of difficulty in sleeping and severe pain in left shoulder radiating to the left arm along with tingling sensation in the left hand of three weeks duration. On VAS, the pain score was 8 indicating severe pain. Physical and systemic evaluations were within normal limits and so were the laboratory investigations. The patient visited various physicians who prescribed analgesics. With given medications, he did not improve at all and the pain persisted and caused difficulty in driving. On palpation of the affected left shoulder and surrounding tender posterior area (referred pain), there were three taut muscles including rhomboid, trapezius and teres minor muscles and three MTrPs situated within these muscles were actively tender. The diagnosis of MPS was entertained and, accordingly, the patient was managed by MTrP massage therapy, one session of 25 minutes and consequently stagnated muscles or trigger points were released. The patient was discharged with a sense of very much improved. VAS was 3. After one week, the patient showed himself in outpatient clinic with a smile on his face and expressed; there is now no more pain.

Case 4

This 19-year young male patient came to the emergency services with complaints of left sided chest pain of very severe intensity increasing with right and left turning movement of chest for the past one week. On VAS the pain score was 7. The patient received pain

medications such as paracetamol in the immediate past but without any improvement.Vital signs of the patient were stable, and systemic evaluation along with full investigation including ECG revealed no remarkable findings and results were within normal limits. The palpation of affected tender zone revealed tender taut knots situated in frontal, lateral and posterior intercostal concerning serratus anterior, teres minor muscles, and posterior rhomboid major muscles, respectively. Within these muscles, two MTrPs were palpated, one each at frontal intercostals and left upper back regions. Simultaneously, muscle twitch responses and referred pain, numbness and erythema in the left neck were observed. The patient was diagnosed with MPS and was treated with MTrP massage therapy, one session of 30 minutes. As a result, his restricted muscles at both places were released. The patient was discharged with pain score of 2 and at 2-week follow up, the patient completely improved including referred pain in the neck.

Case 5

This 24-year male weight lifter with no known allergies came to the emergency services with complain of acute severe pain localized to left upper back thoracic region since one week. In addition, the patient also complained of difficulty in raising his left arm. The estimated pain score using VAS was 6. Both the vital signs and systemic examination were within normal limits and so were the full laboratory investigations. The physical examination of pain area revealed tender taut muscles, referred pain and two active TrPs within the muscles, i.e., rhomboid minor and major muscles and these signs confirmed the diagnosis of acute myofascial pain syndrome. The patient was first given injection diclofenac 75mg IM, followed by one 30-minute session of MTrP massage therapy. Within this timeline the stagnated muscles (TrPs) were released. The patient was discharged with pain score of 1 out of 10. The patient recovered completely as was evidenced at 2-month followup.

Case 6

This-32-year old male patient engineer by occupation presented to the emergency services with complains of right upper back pain for the past two weeks and pain score estimated using VAS was 6. No past history of using pain drugs. This patient was medical free as evidenced by unremarkable physical and systemic examination and

laboratory test results were within normal limits. Examination of pain area found stagnated taut muscle at upper posterior thoracic region and within which 3 tender MTrPs were palpated, and the involved muscles were rhomboid major and minor. The patient was treated with MTrP massage therapy until the MTrPs were released and consequently taut muscles were released along with reduction in pain intensity. The patient received one session of trigger point massage therapy that lasted 30 minutes and then he was discharged with pain score of 1. The patient was pain free at 2-week followup.

Table. 2. Socioclinical information of 11 cases

Case#	Age#	Sex	Duration	Presentation	Muscles involved	Therapy	Followup	Recovery
1.*	55	M	1-week	Right low back pain, two tender TrPs, taut muscle, referred pain, twig response and goose bumps	Iliocostalis and quadratus lumborum	MTrP massage onesession of 30m	3/6 month	Stable with no pain
2.	30	M	8-week	Pain, upper and lower back, three active TrPs, taut muscles, limited muscle motion, erythema, twitch response with referred pain	Upper teres major, infraspinatus, rhomboid major and lower iliocostalis lumborum	Inj. diclofenac 75 mg IMI& three sessions each one of 30 m with an interval of 10m	1-week, 3-month	Stable without pain
3.	35	M	3-week	Severe pain left shoulder, arm and hand, insomnia, referred pain and 3 active MTrPs	Rhomboid, trapezius & teres minor muscles	Deep therapeutic massage, one session 35m	1-week	Completer ecovery
4.	19	M	1-week	Chest pain left sided, referred pain in neck, two MTrPs	Frontal, lateral and posterior intercostal concerning serratus anterior, teres minor, and posterior rhomboid major	one session 30m	2weeks followup	Fully improved
5.	24	M	1-week	Acute pain left upper back thoracic region, difficulty raising left arm, taut muscles, referred pain and 2 tender active TrPs	Rhomboid minor and major	Inj. diclofenac 75 mg IMI & one session of 30m	Two months	Recovered fully
6.	32	M	2-week	Right upper back pain,stagnated taut band, tender 3 latent tender MTrPs	Rhomboid major/minor	One session of 30m	2-weeks	Recovered fully
7.	38	M	>6months	Lower back pain, 3 MTrPs,	Iliocostalis lumborum	One session of 30m	2-week	Stable with no pain
8.	7-month	Boy	48-hour	Pain right shoulder, cryingspells day and night, taut muscles, three tender MTrPs, and referred pain	Rhomboid major	One session of 50m	3-month	Complete recovery
9.	21	M	2-3-hours	Pain right upper back, taut muscle two myofascial knots& twitch response	longissimus thoracis	30-m one session	2-week	Stable with no pain
10.	23	M	>5-month	chronic lower and upper back pain, tenderness, two MTrPs	Upper rhomboid major and iliocostalis thoracic and lower longissimus thoracis	30m one session	3-month	Free from pain
11.	5-month	Girl	48 hours	Pain in the left hand, crying and insomnia, tenderness posterior thoracic region, taut muscles, twitch response 4 MTrPs	Rhomboid major and longissimus thoracis	Three sessions, each of 20m given at an interval of 10 minutes	1-month	Full recovery

*Hypertensive on antihypertensive medications;# in years;

Case 7

This 38-year old x-ray technician came to the emergency services with very severe pain localizing to lower back. The pain score on VAS was 8. The patient gave past history of chronic backache, more than six months and used some analgesics including paracetamol, diclofenac and pain relieving ointments with no cure. The patient reported no systemic disease. His vitals were normal and so were physical and systemic evaluation along with no positive results concerning laboratory investigations. The palpation of affected tender area revealed three knots (MTrPs) within the iliocostalis lumborum muscleand was diagnosed with myofascial pain syndrome (MPS). The patient was treated with MTrP massage therapy, one session of 30-minute and the stagnated muscles and MTrPs were released. The patient was discharged with pain score of 3, and no analgesic was prescribed. The patient was asymptomatic at two-week followup.

Case 8

This is a 7-month boy brought by his father to the emergency services in a distressed and uncomfortable pain condition. According to his father, the child was pulled up by his hands with a stroke by one of his family member two days ago. Subsequently, baby started crying more at bed time than day time. The child was treated at home by using pain killer cream (Vicks VapoRub for babies) without any substantial improvement. Physical and systemic examination found nothing wrong with the patient and he was fully conscious with stable vitals. The palpation of right and left shoulders and surrounding areas found to have taut muscles and three MTrPs at right shoulder involving rhomboid major muscle and referred pain adjacent posterior thoracic region. Acute myofacial pain syndrome was considered in this boy. During palpation, the child expression of pain guided expert physician to score pain on VAS, 8/10. The child was treated with MTrP massage therapy using fingers tips that lasted one session of 50minutes. Ultimately, the taut muscles with MTrPs were released and the kid was completely improved and discharged with VAS score of 0/10. At three months followup the child was stable.

Case 9

This is a 21-year old male patient who attended the emergency serviceswith complaints of severe pain at right upper back/thoracic region for the past few hours, and evaluation of pain intensity revealed a score of 7.The patient took some analgesics with temporary little relief. A quick physical examination and systemic evaluation revealed no remarkable findings. Palpation of right posterior thoracic region found taut muscle, twitch response and two myofascial knots within the tender longissimus thoracis muscle suggestive of myofacial pain syndrome. The patient was treated with trigger points massage therapy or called myofascial massage therapy of 30-mnute one session. Consequently, the stagnated muscles and MTrPs were released and the patient was discharged with VAS score of 1. At 2-week followup, the patient was free of pain without use of analgesics.

Case 10

This is a 25-year male patient employed in healthcare organization came to the emergency services with complaints of chronic lower and upper back pain, more than 5-month. The pain score on VAS was 7. On examination, the vitals of patient were normal, and so were physical and systemic evaluations. After examination of tender regions, the patient was found to have stagnated taut muscle along with two MTrPs at the right and left upper (thoracic) and lower (lumber) back muscles, which were identified as upper rhomboid major and iliocostalis thoracic and lower longissimus thoracis. The patient was diagnosed with MPS and treated with MTrP massage therapy, one session of 30 minutes. The stagnated muscles together with MTrPs were released and the patient was discharged with pain score of 2. The patient was completely free from pain at 3 months followup.

Case 11

This is a 5-month baby girl brought by her father to the emergency services, and the child was screaming and rolling all over with pain in her left hand. She could not sleep due to pain for two days. According to VAS, the pain score was 9. The father informed that her brother forcefully pulled her up by her left hand when she was resting on the bed. Thereafter, she started crying. The patient's vitals were stable, and laboratory basic investigations were within normal limits. Nothing abnormal was found on x-ray. On palpation, the patient was found to have severely tender muscle at left upper back area

(posterior thoracic region) along with a number of MTrPs within rhomboid major and longissimus thoracis muscle. The patient was diagnosed with MPS and treated with deep trigger point massage therapy until the stagnated muscle and MTrPs were relieved after three sessions, each of 20 minutes given at an interval of 10 minutes. The pain score was 3 out of 10 at discharge. The baby improved completely at one-month followup.

Discussion

This study describes a case series of eleven patients with myofascial pain syndrome managed by manual MTrP massage therapy. Majority of patients (82%) with MPS presented with acute pain with variable severity to emergency services and most commonly affected age was between 20 to 55 years (73%). These sociodemographic findings (Table 2) are consistent with other studies; the prevalence of chronic MPS was reported 20% *(acute 80%)*, people with age 27 to 50 years were commonly affected by MPS and women (M=65% versus F=37%) were more liable to suffer from MPS [3,8,9]. Conversely, only one patient was a female baby (9%) in this case series may be because females are chronic rather than acute pain complainers [19]. With special reference to infants and children who are often not recognized having MPS and MTrPs, we found to two such cases that developed taut muscles along with tender MTrPs possibly developed due to strong forceful pulling of their hands impacting front and back aspects of shoulders treated successfully with MTrP massage therapy. Evidently MPS had been reported in children managed effectively by vapocoolant therapy, muscle stretching and moist heat application [20,21]. Conversely, MTrP are not reported in infants less than one year; however, MTrPs may develop in later age [22], and, therefore, further research are needed in infants in future.

A typical case of MPS requires a comprehensive plan: a pertinent history, physical examination (palpation), and systemic evaluation, a battery of laboratory investigation, advanced neuroimaging techniques, ultrasound, and histopathological studies [1-3,16,23-28]. However, in our case series the diagnosis of MPS was based on myofascial pain and tenderness of muscle, recognition of taut muscle, palpation of MTrPs, local twitch

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response, referred pain symptoms such as goose-bumps and numbness, referred pain to other specific regions such as shoulder, neck and back, chest, hands and limitation of motion, and repeated injuries including forceful trauma and muscle strains as described by Gerwin and other researchers [1-4,7-9,11,18,29,30]. Evidently, like in our case series most patients with MPS tend to present with local muscle pain, tenderness, and specific pattern-referred pain along a nerve distribution. As found in the present case series, MPS developed following repeated muscle injuries or overuse activities related to sports but it may develop without identified precipitating and perpetuating factors [1-3,30]. Currently, many advanced investigation methods including laboratory, imaging and histological are used in the diagnosis of primary and secondary MPS but these facilities are often not available in small hospitals [1-3,6-10, 30-36]. Surprisingly, none of the patient except one had comorbid systemic disease and this epidemiological trend possibly is attributed to young age of all patients in the present case series. Overall, the best cost-effective method of diagnosing MPS and MTrPs is by gold standard palpation method; however, objective means of diagnosing MPS and MTrPs are relatively expensive, time-consuming and not available in all healthcare settings [16].

Table 3 Etiologies and management of MPS [1-3,16,23-28,30,37,38]

Etiological Factors	**Treatment intervention**
Repeated strain, forceful pulling arms, mechanical injuries and trauma; poor ergonomics-overuse & abnormal postures, emotional stress (precipitating factors+),	#Education and home programs, management and avoidance of contributory factors in chronic MPS
Structural factors- spondylosis, scoliosis, osteoarthritis, and age related degeneration of bones/joints	#Stretching, exercises and ergonomic modifications, MTrP release and contract relax technique.
Metabolic, infectious, psychological, MS, and visceral disorders (perpetuating factors)	NSAIDs) and muscle relaxants*, and various first & second generation antidepressants
Other systemic diseases, deficiency of vitamin D, 12 &iron, anemia, and Lyme disease (perpetuating factors).	Physical and manual modalities- ESWT and low power laser therapy.
Tendinopathy, arthritis , bursitis, nerve entrapment (perpetuating factors)	TENS** & therapeutic ultrasound*, Hijamah (cupping therapy) and acupuncture.
Cubital tunnel syndrome, insomnia and depression.	Dry with normal saline/wet (with anesthetic agents) needling and local anaesthesia injection into MTrPs***. Lidocaine is better than dry needling, ozone therapy
Radiculopathy or RPS as shoulder or hip, parasitic and Candida infections.	Botulinum toxin VS methylprednisolone combined with physiotherapy & Lidocaine injection vs BTX-A vs dry needling

+Some factors areboth precipitating and perpetuating; #first option of interventions; *Evidence is inconclusive;**short-term effect on pain; ***relatively invasive therapies but more effective in pain reduction; MS=musculoskeletal disorders

The goals of treatment concerning primary and secondary MPS are pain relief and correction of precipitating perpetuating factors (Table 3) [1-3,23,30] and the concerned conservative, herbal preparations, complementary and alternative medicines and invasive interventions are discussed in details elsewhere [13,14,16-18,23,38-40]. Like in our case series, majority of patients with MPS (7/11,68%) were prescribed nonsteroidal anti-inflammatory drugs and other analgesics (ibuprofen, diclofenac, aspirin, paracetamol, etc) but no patients was given muscle relaxants for reducing pain and relaxing contracted muscles [1-4,9,17,23]. These medications must be either avoided because of their unwanted adverse effects or used for short-time prior to MTrP massage therapy. Although we use none of these interventions, anesthetists use ultrasound guided phonophoresis with dry needling (or with normal saline) or wet needling (with anesthetic agents such as, procaine, lidocaine, bupivacaine, prilocaine) in the treatment of MPS [39,41]. However, topical anesthetics may cause muscle necrosis, fatal anaphylactic shock and dose-related toxic effects and, hence, low doses of anesthetics are advised for the safety of patient with precautionary measures [42]. Currently, medical acupuncture needles associated with minimal pain and tissue injury are frequently used effectively in patients MPS [24,39].

In our case series, the prognosis of patients with MPS was excellent following TrPs massage therapy [1-2,18], and might be attributed to acute onset, early seeking of consultation, short symptom duration and no comorbid diseases. The present case series has some limitations including descriptive design. Secondly, placebo effect of about 30% tends to explain the outcome results in rigor studies and even then 70% of improvement in our case series might be attributed to MTrP massage therapy. A mere clinical diagnosis of our patients in the absence of a battery of objective investigations may be challenged but we used specific criteria and standard palpation method to correctly diagnose all 11 cases. The strengths of this case series is that we described 11 cases in detail meeting "5-10" patients criterion of case series as proposed by Abu-Zidan and colleagues [43]. Furthermore, we used effectively MTrP massage therapy with excellent results without any adverse effect. Based on this, we hypothesize that MTrP massage therapy or myofascial massage therapy or deep therapeutic massage therapy would be an ideal

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alternative effective therapy in MPS population, and concerned comparative clinical trials are globally needed in future.

SUMMARY

Myofascial pain syndrome a multifactorial musculoskeletal pain disorder is characterized by acute or chronic pain, muscle tenderness, restricted motion, weakness, and a constellation of autonomic symptoms concerning referred pain. MPS is diagnosed by means of major and minor diagnostic criteria including pain, taut muscle, latent or active MTrPs, local twitch response and other signs-symptoms of autonomic system such as numbness and goose-bumps. Comprehensive history and physical examination (palpation) are the best methods for diagnosing MTrPs and MPS; however, various advanced imaging techniques and laboratory investigations exclude diverse co-occurring systemic diseases, nutritional deficiencies, and regional pain syndromes. Despite availability of larger therapeutic armamentarium, first line definitive treatment for MPS is yet to be reported in the literature. Each patient with MPS is unique in its presentation with ill-defined pathophysiology, therefore, the treatment intervention directed towards MPS needs to be personalized and holistic in order to achieve better outcome with good quality of life, as found in our case series. Evidently, myofascial massage, dry needling and local anesthetic injection into MTrP, and medical acupuncture along with stretching exercises are the most effective complementary and integrative therapies in the management of MPS.

CONCLUSION

Myofascial pain syndrome, an idiopathic disorder of muscle and surrounding fascia and triggered and perpetuated by repeated strain and traumas, is characterized by salient features and has relatively specific diagnostic criteria. MTrP massage therapy tends to produce amazing results among patients with acute MPS with good quality outcome. This case series calls for conducting rigor comparative randomized clinical trials in order to provide robust evidence-based data concerning MPS. Based on review of relevant literature, patients with chronic or refractory MPS may require integrative therapies

including MTrP massage therapy combined with dry or wet needling or medical acupuncture for extended period.

REFERENCES

1. Shah JP, Thaker N, Heimur J, Aredo JV, Sikdar S, Gerber L. Myofascial trigger points then and now: a historical and scientific perspective. PM&R.2015; 7(7):746-761.
2. Gerwin RD. Diagnosis of myofascial pain syndrome. Phys Med Rehabil Clin N Am.2014; 25:341-355.
3. Tantanatip A, Chang KV. Pain, Myofascial Syndrome. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2018. Available from: https://www.ncbi.nlm.nih.gov/books/NBK499882/.
4. Do TP, Heldarskard GF, Kolding LT, Hvedstrup J, Schytz HW. Myofascial trigger points in migraine and tension-type headache. J Headache Pain.2018; 19(1):84.
5. Gerwin RD. Classification, epidemiology, and natural history of myofascial pain syndrome. Current Pain Headache Reports.2001; 5:412-420.
6. Giamberardino MA, Affaitati G, Fabrizio A, Costantini R. Myofascial pain syndromes and their evaluation. Best practice & research Clinical rheumatology.2011; 25(2):185-98.
7. Staud R. Future perspectives: pathogenesis of chronic muscle pain. Best Practice & Research Clinical Rheumatology.2007; 21:581-96.
8. Drewes AM, Jennum P. Epidemiology of myofascial pain, low back pain, morning stiffness and sleep-related complaints in the general population. Journal of Musculoskeletal Pain 1995; 3(1):121.
9. Podichetty VK, Mazanec DJ, Biscup RS. Chronic non-malignant musculoskeletal pain in older adults: clinical issues and opioid intervention. Postgraduate Medical Journal.2003; 79:627-633.
10. Fernández-de-las-Peñas C, Simons DG, Cuadrado ML, Pareja JA. The role of myofascial triggers points in musculoskeletal pain syndromes of the head and neck. Current Pain Headache Reports.2007; 11(5):365-372.
11. Bourgaize S, Newton G, Kumbhare D, Srbely J. A comparison of the clinical manifestation and pathophysiology of myofascial pain syndrome and fibromyalgia: implications for differential diagnosis and management. Journal Canadian Chiropractic Association.2018; 62(1):26.
12. Raeissadat SA, Rayegani SM, Sadeghi F, Rahimi-Dehgolan S. Comparison of ozone and lidocaine injection efficacy vs dry needling in myofascial pain syndrome patients. J Pain Res.2018; 11:1273-1279.
13. Alotaibi M, Ayoub A, King T, Uddin S. The Effect of Kinesio Taping in Reducing Myofascial Pain Syndrome on the Upper Trapezius Muscle: A Systematic Review and Meta-Analysis. European Scientific Journal.2018; 28;14(6).

14. Khan AA, Srivastava A, Passi D, Devi M, Chandra L, Atri M. Management of myofascial pain dysfunction syndrome with meditation and yoga: Healing through natural therapy. Natl J Maxillofac Surg.2018; 9(2):155-159.
15. Hong CZ. Myofascial trigger points: pathophysiology and correlation with acupuncture points. Acupuncture in Medicine.2000; 18(1):41-47.
16. Qureshi NA, Alsubaie HA, Ali GI. Myofascial Pain Syndrome: A Concise Update on Clinical, Diagnostic and Integrative and Alternative Therapeutic Perspectives. International Neuropsychiatric Disease Journal.2019: 13(1): 1-14.
17. Simons DG. Muscular pain syndromes. Advances Pain Research Therapy.1990; 17:1-41.
18. Dixon MW. Myofascial Massage. Lippincott Williams & Wilkins, 1st Edition. 2006; pp240: Philadelphia, USA.
19. Bartley EJ, Fillingim RB. Sex differences in pain: a brief review of clinical and experimental findings. British Journal Anaesthesia.2013;111(1):52-58.
20. Aftimos S. Myofascial pain in children. The New Zealand Medical Journal.1989; 102(874):440-441.
21. Fine PG. Myofascial trigger point pain in children. Journal Pediatric.1987; 111:547-548.
22. Kao MJ, Han TI, Kuan TS, Hsieh YL, Su BH, Hong CZ. Myofascial trigger points in early life. Archives Physical Medicine Rehabilitation.2007; 88(2):251-254.
23. Hong CZ. Treatment of myofascial pain syndrome. Current pain and headache reports.2006; 10(5):345-349.
24. Gazi MC, Issy AM, Avila IP, Sakata RK. Comparisons of acupuncture to injection for myofascial trigger Point Pain. Pain Practice.2010.Doi: 10.1111/j.1533-2500.2010.00396.
25. Zhou JY, Wang D. An update on Botulinum toxin A injections of trigger points for myofascial pain. Current pain and headache reports.2014; 18(1):386.
26. Kim DY, Kim JM. Safety and Efficacy of Prabotulinumtoxin A (Nabota®) Injection for Cervical and Shoulder Girdle Myofascial Pain Syndrome: A Pilot Study. Toxins (Basel).2018; 10(9):355.Doi:10.3390/toxins10090355.
27.Kamanli A, Kaya A, Ardicoglu O, Ozgocmen S, Zengin FO, Bayık Y. Comparison of lidocaine injection, Botulinum toxin injection, and dry needling to trigger points in myofascial pain syndrome. Rheumatology international.2005; 25(8): 604-611.
28. Porta M. A comparative trial of botulinum toxin type A and methylprednisolone for the treatment of myofascial pain syndrome and pain from chronic muscle spasm. Pain.2000; 85(1-2):101-5
29. Harden RN, Bruehl SP, Gass S, Niemiec C, Barbick B. Signs and symptoms of the myofascial pain syndrome: a national survey of pain management providers. The clinical journal of pain.2000; 16(1):64-72.

30. Zhuang X, Tan S, Huang Q. Understanding of myofascial trigger points. Chin Med J.2014; 127(24):4271-4277.
31. Turo D, Otto P, Shah JP, et al. Ultrasonic characterizations of the upper trapezius muscle in patients with chronic neck pain. Ultrason Imaging.2013; 35:173–187.
32. Barbero M, Cescon C, Tettamanti A, Leggero V, Macmillan F, Coutts F, et al. Myofascial trigger points and innervations zone location in upper trapezius muscles. BMC Musculoskeletal disorders.2013; 14(1): 179.
33. Hubbard DR, Berkoff GM. Myofascial trigger points show spontaneous needle EMG activity. Spine.1993; 18(13):1803-1807.
34. Ballyns JJ, Turo D, Otto P, et al. Office-based elastographic technique for quantifying mechanical properties of skeletal muscle. J Ultrasound Medicine.2012; 31(8): 1209-1219.
35. Celik D, Mutlu E. Clinical implication of latent myofascial trigger points. Curr Pain Headache Rep.2013; 17(8): 353.
36. Xin-chang Zhang, Hao Chen, Wen-tao Xu, Yang-yang Song, Ya-hui Gu, Guang-xia Ni. Acupuncture therapy for fibromyalgia: a systematic review and meta-analysis of randomized controlled trials. Journal Pain Research .2019:12:527-542.
37. Gam A, Warming S, Larsen LH, Jensen B, Hoydalsmo O, Allon I et al. Treatment of myofascial trigger points with ultrasound combined with massage and exercise-a randomized controlled trial. Pain.1998; 77:73-79.
38. Borg-Stein J, Iaccarino MA. Myofascial pain syndrome treatments. Phys Med Rehabil Clin N Am.2014; 25(2):357-374.
39. Koca I, Boyaci A. A new insight into the management of myofascial pain syndrome. Gaziantep Med J. 2014; 20(2):107-127.
40. Fiori G, Galluccio F, Braschi F, Amanzi L, Miniati I, Conforti ML, Del Rosso A, Generini S, Candelieri A, Magonio A, Goretti R. Vitamin E gel reduces time of healing of digital ulcers in systemic sclerosis. Clinical & Experimental Rheumatology.2009; 27(3):S51.
41. Takla MK, Rezk-Allah SS. Immediate effects of Simultaneous Application of Transcutaneous Electrical Nerve Stimulation and Ultrasound Phonophoresis on Active Myofascial Trigger Points: A Randomized Controlled Trial. American Journal Physical Medicine & Rehabilitation.2018; 97(5):332-338.
42. Travell JG, Simons DG. Myofascial pain and dysfunction: the trigger point manual. Williams & Wilkins; Baltimore: 1983.
43.Abu-Zidan FM, Abbas AK, Hefny AF. Clinical "case series": a concept analysis. African Health Scciences.2012; 12(4);557-562.

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