

Short Term Effect of Extracorporeal Shockwave Therapy in Myofascial Pain Syndrome of Erector Spinae in 19-Year-Old Male: A Case Study

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ABSTRACT

Myofascial pain syndrome is a complex condition marked by a range of clinical symptoms including pain, hyperirritable nodules or spot of tenderness, referred pain, muscle spasm triggered by myofascial trigger points. This study investigates the effectiveness of extracorporeal shock wave therapy in a patient with myofascial pain syndrome of erector spinae muscle. A 19-year-old physiotherapy student came to Outpatient department with a complaint of back pain while sitting for long time and driving 2-wheeler. Patient underwent 2 weeks of Extracorporeal Shockwave Therapy, attending 2 sessions/week. After 2 weeks of treatment session pain reduced to 0, patient was able to sit and drive 2-wheeler comfortably. This study concluded that Extracorporeal Shockwave Therapy is effective to reduce pain and improve flexibility in patient with Myofascial Pain Syndrome.

Key words: myofascial pain syndrome, shockwave therapy, pain

1. INTRODUCTION

Myofascial pain syndrome (MPS) is a complex condition marked by a range of clinical symptoms, including: pain, hyperirritable nodules or spots of tenderness,

referred pain, muscle spasms triggered by myofascial trigger points (MTPs)¹. When activated by direct or indirect trauma, MTPs can produce a variety of effects, including: local and referred pain, tenderness, motor dysfunction, autonomic phenomena, hyperexcitability of the central nervous system². Myofascial pain syndrome originates from the muscle manifesting symptoms from sensory, motor and autonomic systems³.

Myofascial pain syndrome is a common disorder seen in 12% of general population. Few studies observed incidence of 30% of MTP, with a prevalence of 54% in women and 46% in men and most common age group of onsets is 27-50².

Although the pathophysiology of myofascial trigger point is not clear, it is assumed that the muscle fibres are shortened and taut bands are made by calcium influx in damaged fibre or acetylcholine secretion in motor end plate¹.

MPS is a great imitator. Neck or back pain of myofascial origin may mimic radiculopathy with pain radiating down upper or lower limb. The pain may be referred from MTrPs over the dermatome of a sensitized spinal segment innervating the taut band. It may also result from neurological entrapment⁵.

Diagnosis of MPS is: regional pain; palpation of a trigger point elicits a stereotypic zone of referred pain specific to that muscle;

identification of a palpable taut band as well as a palpable and exquisitely tender spot along the length of that taut band; and a restricted range of motion of the involved muscle. Other criteria which may further aid in the diagnosis of myofascial pain syndrome: palpation of a trigger point should reproduce the clinical pain complaint; a local twitch response may be obtained by transverse snapping or needling of the trigger point, and the alleviation of pain by trigger point inactivation. The palpable band is considered to be critical to the identification of a trigger point².

Myofascial pain management include conservative and multidisciplinary approach along with Physiotherapy and recently the use of ESWT has advanced as an alternative treatment for MPS². The ESWT come under non-invasive treatment modality¹. It utilizes biphasic acoustic energy to stimulate tissue repair and relief from pain. This safe and effective therapy employs 2 types of shock waves: focused (F-ESWT) 10–100 MPa megapascals–MPa), short duration (0.2–0.5 μ s), short rise times(10-100ns) generated electrically through electrohydraulic, electromagnetic or piezoelectric techniques, and radial (R-ESWT) lower intensity shockwaves (0.1–1 MPa) with longer rise times (0.5–1 ms) and duration (0.2–0.5 ms), generated ballistically and propagating divergently within the tissue. The induced energy converges into a focal or radial area, depending on the equipment settings and tissue properties. This therapy has proven effective in treating myofascial pain syndrome.

It improves capillary blood circulation in ischemic zones and alters pain signal in ischemic tissues caused by calcium influx. It also interrupts the cascade of referred pain by inhibiting peripheral muscle nociceptors³. It is significance since it is a non-invasive and simple treatment, easy to apply at a larger surface, and has fewer side effects with low intensity even if it requires relatively high cost. ESWT could reduce the pain of myofascial pain syndrome by pain signal

alteration, promoting angiogenesis and muscle ischemia¹.

Shock waves effect on soft tissue and musculoskeletal tissue are as the follows:

Increase cell membrane permeability and microscopic circulation of tissues which enhance the metabolism, healing and dissolution of calcification.

Enhance the healing process of connective tissues such as tendon, ligaments, and fascia by stimulation of ESWT has also been shown to stimulate fibroblast⁵.

2. LITERATURE REVIEW

1. Hye MIN Ji et al conducted a study on extra corporeal shock wave therapy in myofascial pain syndrome of upper trapezius. This study concluded that ESWT in myofascial pain syndrome of upper trapezius is effective to relieve pain after four times therapies in two weeks.
2. Silvia Roman et al conducted a study on update on the efficacy of extracorporeal pain syndrome treatment for myofascial pain syndrome and fibromyalgia. This study concluded that muscular pain and especially myofascial pain are new indicators for ESWT and ESWT shows satisfactory results for myofascial pain syndrome.
3. Qing sheng et al conducted a study on efficacy of extracorporeal shockwave therapy on pain and function in myofascial pain syndrome of Trapezius: A systemic review and meta-analysis. This study concluded that ESWT appears to benefit patient with MPS of trapezius by alleviating pain. ESWT may not be an ideal therapeutic method to replace conventional therapies but could serve as an adjunct therapeutic method to those treatment.
4. Areerat Suputtitada conducted a study on update of extracorporeal shockwave therapy myofascial pain syndrome. This study concluded that ESWT plays a role as desensitization. It can be nowadays approved as an effective, safe, non-invasive therapy for many musculoskeletal diseases including MPS.

It is considered as regenerative therapy as well.

5. Mohammad Rahbar et al conducted a study on effectiveness of extracorporeal shock wave therapy versus standard care in the treatment of neck and upper back myofascial pain. This study concluded that extracorporeal shock wave therapy was more effective in controlling of the pain intensity compared to ultrasound one month after treatment.
6. Ali Gur et al conducted a study on comparison of the effectiveness of two different extracorporeal shock wave therapy regimens in the treatment of patients with myofascial pain syndrome. This study concluded that low energy ESWT is a safe and well tolerated therapy for patients with myofascial pain syndrome and can be more efficient when administrated as a three-session treatment regimen.
7. Parisa Taheri et al conducted a study on extracorporeal shock wave therapy versus phonophoresis therapy for neck myofascial pain syndrome. This study concluded that both phonophoresis and ECSWT groups effectively decreased pain and neck disability in patients with MPS, with the superiority of ECSWT with a more lasting effects for a month after the end of the treatment.
8. Jong Hyun Jeon et al conducted a study on the effects of extracorporeal shock wave therapy on myofascial pain syndrome. This study concluded that the ESWT in patient with MPS in trapezius muscles are as effective as TPI and TENS

for the purpose of pain relief and improving cervical range of motion.

9. Dalila Scaturro et al conducted a study on extracorporeal shock wave treatment versus mesotherapy the treatment of myofascial syndromes. This study concluded that use of focal ESWTs can be considered a safe and effective treatment in reducing allergic symptoms and improving short term and long-term quality of life.
10. Chang Han Lee et al conducted a study on usefulness of extracorporeal shockwave therapy on myofascial pain syndrome. This study concluded that the results revealed that the combined treatment of ESWT and integrated neuromuscular inhibition for treating MTrPs in the upper trapezius is more effective than using only one of them.

MATERIALS AND METHOD

Intervention:

Patient was scheduled for shockwave therapy weekly 2 days during the course of study.

Procedural intervention:

Patient attended the treatment session for 2 consecutive weeks. Short term goals were to reduce pain. Treatment plan and care focused primarily on reducing pain and restore flexibility.

Techniques of application:

Before starting the treatment

Patient was made to lie down in prone position examination of taut band on both side of thoracolumbar region.

ESWT was applied to the following muscles

| MUSCLE | SHOCKS |
|-----------------------------------|-------------------------|
| 1. Paravertebral (Erector spinae) | 1000 impulses each side |
| 2. Quadratus lumborum | 750 impulses each side |
| 3. Gluteus | 1500 impulses each side |

Post ESWT – Icing was done on the treatment area.

3. RESULTS

The patient reported an overall improvement in NPRS. The patient physiotherapy session

was done for 2 Consecutive Week and there was indeed a good prognosis in pain and flexibility of patient in 2weeks.

| SCALE | PRE-DATA | POST-DATA |
|----------------------------|-----------|-----------|
| NPRS | 6/10 | 0/10 |
| Toe touch flexibility test | 11 inches | 4 inches |

Post treatment assessment:

Pain:

According to NPRS scale the patient scored 0/10 pain.

Patients pain was improved from moderate (6/10) to nil (0/10).

Toe Touch Flexibility Test:

According to toe touch test pre-test showed that the distance between fingertip to floor was 11 inches.

After the treatment distance between fingertip to floor decreased to 4 inches.

This data shows that there was considerable improvement in flexibility of the patient.



Fig 1: Pre toe touch flexibility test



Fig 2: Post toe touch flexibility test

4. DISCUSSION

The study aimed at assessing short term effect of extracorporeal shock wave therapy in myofascial pain syndrome of erector spinae. The result of the study is based on single case study. The data were collected with the help of NPRS scale and toe touch flexibility test. Experimental study design intended to assess the effect of extracorporeal shockwave therapy in myofascial pain syndrome of erector spinae in 19-year-old male patient.

In this study, numeric pain rating scale was used to assess the myofascial pain and toe touch test was used to check flexibility of lumbar muscle. After assessing the pain, shockwave therapy was applied to quadratus lumborum, erector spinae and gluteus bilaterally of shocks 750, 1000 and 1500

respectively, then again assessed with numeric pain rating scale and toe touch test. Myofascial pain and flexibility of lumbar muscle of the patient was assessed by NPRS and Toe touch Flexibility test. In NPRS result showed that pretest score was 6/10 and post test score was 0/10 and pretest flexibility test was 11 inches and post-test distance from finger to floor was 4 inches. This showed that there was a significant difference between the pre-test and post-test, it implies that there was a significant reduction in intensity of pain and improvement in flexibility after ESWT treatment session.

In this study, extracorporeal shock wave therapy had a positive effect on pain and increasing quality of life in adult male with myofascial pain syndrome. A study was done by Hye MIN Ji et al on extra corporeal shock

wave therapy in myofascial pain syndrome of upper trapezius. This study was performed on 20 patients with myofascial pain syndrome. The results of this study showed that ESWT is effective to relieve pain in myofascial pain syndrome. Therefore, ESWT can be used to treat myofascial pain syndrome. Another study was conducted by Jong Hyun Jeon et al about the effects of extracorporeal shock wave therapy on myofascial pain syndrome. For this study 30 patients were taken who were suffering from myofascial pain syndrome. The result suggested that the ESWT in patient are as effective as TPI and TENS for the purpose of pain relief.

Numeric Pain Rate Scale was used for pain evaluation in this study. This is supported by a study conducted by Yao et al [2020] a study on comparison between the low back pain scales for patients with lumbar disc herniation: validity, reliability, and responsiveness. For this study a total of 353 lumbar disc herniation patients were enrolled. The results says that NPRS, and ODI or RMDQ is recommended in studies related to LDH patients, while if the quality of life also needed to observe, the NPRS and JOABPEQ would be more appropriate rather than SF-36.

Flexibility of the back muscles was assessed using toe touch flexibility test. Vaughan Kippers et al conducted a study on the measure of validity of toe touch test in a sample of 33 young adults. This study indicates that there is significant partially correlation between vertebral flexion and FFD and this finding indicates that when there is no changes in hip flexion range as a resulting treatment, the toe touch test provides indicator of changes in vertebral flexibility.

Limitation of the study:

1. The experiment was conducted on subject with moderate functional discomfort.
2. The study was performed on a single 19-year-old male individual.

3. The duration of the study is limited to 2 weeks.
4. This study aimed to assess the short-term effects of ESWT.

Scope of study:

1. Further research can be conducted in a larger population with longer duration, with different outcome measures for individuals with myofascial pain syndrome
2. Further study can be conducted on subject with severe functional limitations.
3. Further studies can be conducted to assess the long-term effect of ESWT.
4. Comparative study can be conducted by using various other complementary and alternative therapies to find out the effectiveness in reducing myofascial pain.

5. CONCLUSION

The findings of this study concluded that extracorporeal shock wave therapy is effective to relieve pain after 4 times therapy in 2 weeks in reducing pain intensity and improving flexibility in adult males with myofascial pain syndrome in erector spinae. Further studies are required with more patients, a broader age, range and more males.

Declaration by Authors:

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