

## ORIGINAL ARTICLE

# Impact of Recently Evolved Matrix Therapy on Varied Musculoskeletal Disorders: A Literature Review

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**How to cite this article:**

*Pallavi Bhakaney, Mayura Deshmukh et al.* Impact of Recently Evolved Matrix Therapy on Varied Musculoskeletal Disorders: A Literature Review. Physio. and Occ. Therapy Jr. 2025; 18(1): 27-34.

**ABSTRACT**

**Background:** The Matrix-Rhythm-Therapy (MRT) directly derived from the clinical and fundamental video-microscopic research of Erlangen University (Dr. Randoll) in the 1990's is a device which activates and rebalances certain skeletal muscles and physiological vibrations of the nervous system. Until now very few studies have been published which attempted on application of Matrix Rhythm Therapy on various musculoskeletal disorders.

**Aim and Objective:** This literature review will identify the application of Matrix Rhythm Therapy to a varying range of musculoskeletal disorders.

**Methods:** A literature review was performed on PubMed/MedLine, Cochrane Central Register of Controlled Trials (Central), Embase and Scopus from inception until January 2024.

**Results:** Randomised control trails, quasi experimental studies, comparative studies were included in the review.

**Conclusion:** MRT's effectiveness on various musculoskeletal disorders has been studied and it has been identified that MRT has a potential to be extensively used in treating varied types of musculoskeletal disorders since its effect has proven to be more beneficial than other conventional physiotherapy techniques.

**KEYWORDS**

• MRT • Physiotherapy treatment • MSK disorders

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➤ **Received:** 04-01-2025 ➤ **Revised:** 11-01-2025 ➤ **Accepted:** 20-02-2025



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## INTRODUCTION

The Matrix-Rhythm-Therapy (MRT) directly derived from the clinical and fundamental video-microscopic research of Erlangen University (Dr. Randoll) in the 1990's is a treatment device that activates and rebalances specific physiological vibrations of skeletal muscles and nervous system<sup>(1)</sup>. In simple terms, it works against it and enhances circulation and tissue extensibility. Because of hypoxia or an energy deficit on the cellular level, the muscles fibres become contracted. The contracted muscle fibres are no longer available for active motion. The motion pattern's variety is limited. MRT is believed to improve range of motion, promote relaxation, manage pain, and lessen inflammation and edema in soft tissues<sup>(2)</sup>. The therapeutic efficacy of MRT is believed to be influenced by the device's compatibility with the muscle's natural vibration frequency. According to MRT creators, cramping, discomfort, and restricted range of motion are caused by reduced skeletal muscle circulation. MRT's inherent vibration promotes skeletal muscle circulation, supplies oxygen and adenosine triphosphate (ATP), aids in range of motion, and lessens pain. According to one earlier study, MRT improves blood circulation by 35%<sup>(3)</sup>.

The skeletal muscles' vibratory behavior and distinctive frequency/amplitude spectrum serve as the foundation for Matrix Rhythm Therapy's therapeutic effects. Although the heart muscle does the main work in the overall circulation of blood, down to the smallest capillaries, the action of the heart must be supplemented by additional mechanisms in order to insure an adequate supply of oxygen and nutrients to the cells as well as the removal of metabolic end-products from tissue. In Matrix Rhythm Therapy the therapist acts from outside on the cells and their environment i.e. the extracellular matrix using a specially developed device called the Matrixmobil. An uneven pressure distribution in tissue produced by applying the Matrixmobil to the body stimulates nerve receptors and produces a pumping or suctioning function<sup>(4)</sup>.

It is a relatively recent therapeutic method for a wide range of musculoskeletal issues. The concept behind MaRhyThe<sup>®</sup> is that the body's cells vibrate or oscillate between the frequencies of 8-12 Hertz (Hz). MaRhyThe<sup>®</sup> is applied using the Matrixmobil<sup>®</sup>, a Class IIA

medical device. It uses the neuromuscular system to coordinate the body's natural vibrations in the alpha rhythm (8-12 Hz). It is a basic frequency in all warm-blooded animals. Matrix Rhythm Therapy provides the normal physiologic muscle frequency from the outside. By restoring the proper frequency and amplitude range of the relevant tissue and organs, Matrix Rhythm Therapy seeks to repair errant body rhythm in the event that perturbations to a healthy regulative function of synchronously cooperating oscillations occurs. The "Matrixmobil," a specialized device, creates pulses that combine magnetic and mechanical energy in the 8-12 Hz physiological frequency range. Muscle pulsation frequencies outside the 8-12 Hertz range are positively connected with pains, muscle tension, and other health problems.

MaRhyThe<sup>®</sup> to regularises the extracellular environment to normal so that hindered extracellular and cellular functions can resume. The treatment is systemic, depending on physiological cycles and concentrating extracellular matrix (ECM) to optimize cellular logistics and so restore metabolism. As a result, there will be no negative consequences.

Matrix Rhythm Therapy showcases significant effects on various musculoskeletal disorders with numerous underlying etiologies. Its working mechanism and physiological effects are thought to have similar effects in all musculoskeletal conditions. Identifying its multifaceted outcome in a similar yet different set of disorders is crucial for its further use in future. In recent years of research, limited literature review was studied on the effect of Matrix Rhythm Therapy on musculoskeletal disorders. Until now very few studies have been published which attempted on application of Matrix Rhythm Therapy on various musculoskeletal disorders. Through this literature review we have identified the application of Matrix Rhythm Therapy on a varying range of musculoskeletal disorders.

## METHODOLOGY

A literature review was performed on PubMed/Medline, Cochrane.

Central Register of Controlled Trials (Central), Embase and Scopus from inception until January 2024. The following key terms

were used in our search: “Matrix Rhythm Therapy” “Musculoskeletal disorders” “Physiotherapy” “Physical Rehabilitation”

Only articles written in English language were reviewed for the study. Randomised control trails, quasi experimental studies, comparative studies were included in the review.

Author	Study Type	Study Sample	Intervention	Outcome	Intervention Period	Result
Varun Chandrakant Naik <i>et al.</i>	Quasi Experimental Study	30 subjects with hamstring tightness	Matrix Mobil was used in a longitudinal stroking manner, with the probe of the device being pushed into the muscles of the hamstring	Active Knee Extension test and ultrasonographic assessment	one session of 60 minutes on both legs (30 minutes on each leg)	MaRhyThe for 60 minutes (30 minutes each leg) produces beneficial effects on subjects with asymptomatic hamstring tightness.
Ozcan <i>et al.</i>	Randomized clinical trial	32 subjects with chronic low back pain	Each participant was treated with ten sessions a combined physiotherapy program, Intervention group received six sessions of MRT.	McGill Pain Questionnaire, Oswestry Disability level, Short Form- 36	6 sessions of Matrix Rhythm Therapy for intervention group and ten sessions of combined physiotherapy program for control group which included electrical modalities and HEP.	Significant improvement was found in total pain and disability level and all subdimensions of SF-36 except emotional role
Derya <i>et al.</i>	Randomised Controlled Trial	43 patients with frozen shoulder	MRT was given for total 18 sessions, Stretching exercises for 20 minutes and HEP twice a day.	Passive ROM of shoulder, Turkish version of constant score, DASH-T	18 sessions of matrix rhythm therapy along with stretching exercises and HEP	Significant improvement was noted in PCS and constant score.
Samson <i>et al.</i>	Experimental study	30 females with hamstring tightness	3 week, three sessions of matrix or passive stretching on alternate days.	Active knee extension test	3 weeks, 3 sessions of MRT or stretching, 30 minutes of MRT	Intervention group showed significant improvement in ROM in Matrix group than in stretching group
Surya, Pankaj kumar malik <i>et al.</i>	Experimental Study	36 patients diagnosed with frozen shoulder	Conventional group received stretching and strengthening exercises and experimental group received MRT thrice a week	Numeric pain rating scale and SPADI (shoulder pain and disability index.	Thrice a week for 2 weeks stretching, MRT for 60-75 minutes, thrice a week	MRT is more effective than other conventional therapy to improve pain and disability
Tushar <i>et al.</i>	Randomised Control Trial	30 participants diagnosed with supraspinatus tendinitis	Matrixmobil used for supraspinatus, trapezius, deltoid and infraspinatus muscles. Passive ROM of shoulder in pain free range.	Visual Analogue Scale, SPADI, Shoulder ROM for flexion, abduction and internal rotation	30 minutes of MRT, Conventional exercises for 5 days a week for four weeks	MRT showed significant improvement in VAS (pain level), SPADI and Shoulder ROM.
Varun Naik <i>et al.</i>	Randomised Control Trial	30 subjects with forward neck posture	Matrixmobil probe used on neck and upper trapezius area, Dynamic exercise program using theraband-control group	eCVA (craniovertebral angle), CCFE, Pain pressure threshold, SF-36	6 days with 45-60 minutes of MRT, Neck exercises using theraband	MRT with conventional physiotherapy is found to be superior in reducing pain, improving RoM, Strength and QOL in subjects with forward neck posture

Author	Study Type	Study Sample	Intervention	Outcome	Intervention Period	Result
Ketan Kirtikumar Bhatikar <i>et al.</i>	randomised clinical trial	30 participants with heel pain since 1 month	matrix rhythm therapy v/s ICT and LASER therapy	VAS for pain and stiffness and Planter Fasciitis Pain/Disability Scale and revised Foot Function Index (FFI).	Intervention for both the groups was given alternatively for 15 sessions	matrix rhythm therapy was more significant than IFT and Laser therapy.
T. Murthy <i>et al.</i> (2019)	Experimental Study	21 with upper trapezius myofascial trigger points	MRT was applied for sixty minutes along the course of muscle fibers of upper trapezius	Constant Murley shoulder outcome score	3 sessions per week of MRT for three weeks. Total 9 sessions of MRT	MRT showed reduced pain and restored normal muscle function
Divya Gohil (2023)	Comparative study	50 patients diagnosed with chronic low back pain	Group A was given MRT.. MRT was given over the painful area of the lower back and the flanks. Group B was given pilates which included stretches, core exercises and cool down stretches.	Numerical Pain Rating Scale for pain, Modified-schober's test for lumbar flexibility, pelvic inclination using an inclinometer, and Oswestry Low Back Disability Questionnaire	Both groups received treatment thrice a week for two weeks. Duration of 45 min.	MRT showed significant results in improving pain, lumbar flexibility, functional impairments, and pelvic inclination than pilates in patients with chronic low back pain. Both the treatments have their own benefits when tailor-made for patients with chronic low back pain.
Tanna, Rushil Deepak (2023)	Comparative study	30 participants diagnosed with radiation induced trismus	MFR technique was given in circular motion by the therapist, with three finger contact and longitudinal tissue stretch to the tight palpated muscles of mastication. The longitudinal stroking method was used with the handheld Matrix Mobil® device.	Visual Analogue Scale (VAS), Vernier Caliper reading for maximum mouth opening, GTQ, TDI, FIGS and Functional Assessment of Cancer TherapyHead and Neck (FACTHN)	MFR: 2 days per week for 3 weeks for 15 minutes. MRT: 45-60 minutes/session	MFR and MRT both are equally effective in treatment of radiation induced Trismus. MRT was found to be clinically significant in terms of patient satisfaction.

## RESULT

A study on the effects of matrix rhythm therapy on subjects with asymptomatic hamstring tightness was conducted by V Chandrakant Naik *et al.* because hamstring tightness affects posture and results in musculoskeletal pain. The purpose of this research was to use an active knee extension test and ultrasound to ascertain the immediate impact of Matrix Rhythm Therapy (MaRhyThe®) on a patient with asymptomatic hamstring tightness in the 18–25 age range. For a single session lasting 60 minutes on both legs (30 minutes on each leg),

MaRhyThe® was administered. By comparing the active knee extension test results of both legs and doing the ultrasonography evaluation after the session, the immediate impact of the treatment was observed. According to the study's findings, people with asymptomatic hamstring tightness who use MaRhyThe® for 60 minutes (30 minutes per leg) experience positive outcomes like enhanced tissue flexibility, increased blood microcirculation, and decreased tissue thickness<sup>(5)</sup>.

Ozcan *et al.* investigated the impact of matrix rhythm therapy on chronic low back pain

patients' pain, degree of disability, and quality of life. A total of 32 individuals were randomly assigned to one of two groups: the intervention group or the control group. Ten sessions of a combined physiotherapy program, consisting of hot packs, transcutaneous electrical nerve stimulation, therapeutic ultrasound, at-home exercises, and patient education, were given to each participant. The intervention group also received six MRT sessions. Measures of quality of life (Short Form-36), disability level (Oswestry Disability Index), and pain (McGill Pain Questionnaire) were taken both before and after the treatment. According to the study, patients with persistent low back pain benefit from the combined physiotherapy program and the MRT application in addition to the combined physiotherapy program in terms of pain, disability level, and quality of life<sup>(6)</sup>.

A randomized clinical trial was conducted by Ketan Kirtikumar Bhatikar *et al.* on evaluation and compares the effect of matrix rhythm therapy with strengthening exercises v/s interferential current therapy with laser therapy and strengthening exercise. 30 participants with the age group 30 to 50 years old, experienced heel pain at least of one-month duration were randomly assigned to receive matrix rhythm therapy v/s ICT and LASER therapy. Strengthening exercises for plantar fascia were the same for both the groups. ICT for 15 sessions, the intervention was administered alternately to both groups. The updated Foot Function Index, the Plantar Fasciitis discomfort/Disability Scale, and the Visual Analogue Scale for early morning first-step discomfort and stiffness. According to the study's findings, both treatments had positive impacts. But matrix rhythm therapy was more important than laser therapy and IFT<sup>(7)</sup>.

Tushar *et al.* conducted a study based on the fundamental inclusion and exclusion criteria, a total of 30 participants who had been diagnosed with supraspinatus tendinitis were recruited for the study. The participants were divided into two groups: Group B received therapeutic exercise and icing, whereas Group A received matrix rhythm treatment, therapeutic exercise, and icing. After the six sessions of matrix rhythm therapy over the course of four weeks, there were therapeutic exercises and icing. Utilizing VAS, SPADI, and shoulder ROM, the individuals were evaluated both before and after treatment.

The study found that both the groups were statistically significant. The MRT showed more efficacy on the VAS (visual analogue scale), SPADI (shoulder pain and disability index), and shoulder ROM (range of motion) when compared to the control group, according to the study. The current investigation came to the conclusion that both matrix rhythm therapy and therapeutic activities combined with icing have favourable efficacy. Matrix rhythm therapy has been demonstrated to be more effective than therapeutic exercise alone in lowering pain, enhancing range of motion, and reducing disability in individuals with supraspinatus tendinitis<sup>(8)</sup>.

Derya *et al.* conducted a randomized controlled experiment in which 43 patients with frozen shoulder were randomly allocated to one of two treatment groups in order to examine the short-term efficacy of stretching exercises and matrix rhythm therapy: Stretching exercises and Matrix Rhythm Therapy group. For six weeks, all groups underwent the same at-home workout regimen. A traditional goniometer was used to measure the range of motion. The Disabilities of the Arm, Shoulder, and Hand score and the Constant score were employed for the functional evaluation. General health status and satisfaction of the patients were evaluated by Short Form Health Survey-36 and Global Rating of Change score, respectively. For six weeks, all groups underwent the same at-home workout regimen. A traditional goniometer was used to measure the range of motion. The result came up that both groups had significant improvement in all outcome measurements. Although the patients showed improvement with all therapy approaches, stretching exercises were found to be more beneficial for patients' function, physical health, and satisfaction than Matrix Rhythm Therapy<sup>(9)</sup>.

A randomised controlled study was conducted by Varun Naik *et al.* to determine and compare the effects of the Dynamic Exercise Program (DEP) and matrix rhythm therapy (MaRhyThe<sup>®</sup>) along with conventional physiotherapy in asymptomatic subjects with forward head posture (FHP) on a craniovertebral angle (CVA), strength, pain, and quality of life (QoL) using CVA, pressure biofeedback unit, pain algometer, and short form (SF 36), respectively. Sixty five

people were screened for the study, of which 30 were included who participated in the study. The study participants were randomly allocated to Group A (DEP) or Group B (MaRhyThe®). It was found that when paired with traditional physiotherapy, deep exercise regimens and MaRhyThe® are both beneficial for treating FHP. However, it was discovered that MaRhyThe® combined with traditional physiotherapy was more effective at lowering pain and enhancing strength, range of motion, and quality of life<sup>(10)</sup>.

A study comparing the acute effects of matrix rhythm therapy with passive stretching on female hamstring flexibility was carried out by Akhil Sansom *et al.* Hamstring extensibility is of functional significance in prevention of locomotion related injuries. In this study, the acute effects of matrix rhythm therapy and passive stretching on hamstring flexibility in healthy, normal females were compared. In these experimental study 30 female subjects aged 18-25 were recruited. Subjects fitting the study design were divided into 2 groups of 15 each who received either matrix therapy (Group A) or passive stretching (Group B) for 3 times each within 3 weeks. Greater improvement in flexibility was seen in group A (matrix rhythm) when compared to group B (passive stretching). The results showed that matrix therapy was more effective than passive stretching at increasing hamstring flexibility. Matrix rhythm therapy can be used in the early rehabilitation of individuals with hamstring tightness.

An experimental investigation on the effectiveness of matrix rhythm therapy on pain and impairment in patients with adhesive capsulitis of the shoulder was carried out by Surya, Pankaj Kumar Malik, *et al.* 36 participants of age group between 40-60 years old were assessed Group A received conventional therapy, while Group B received conventional therapy in addition to matrix rhythm therapy. These two groups were created based on the intervention. The Shoulder Pain and Disability Index (SPADI) and the Numeric Pain Rating Scale (NPRS) were used as outcome measures. The results showed significant statistical improvement in pain and disability reduction among subjects in group B. In terms of reducing pain and disability in patients with frozen shoulder, it was determined that the MRT shows better and faster outcomes than

other traditional therapies and modalities in recovering the damaged shoulder joint<sup>(11)</sup>.

## DISCUSSION

V Chandrakant Naik *et al.* performed a study on effect of Matrix Rhythm Therapy on Subjects with Asymptomatic Hamstring Tightness. The aim of this study was to determine the immediate effect of Matrix Rhythm Therapy (MaRhyThe®) on an individual with asymptomatic hamstring tightness. The study concluded that MaRhyThe® produces beneficial effects such as improved tissue extensibility, increased blood microcirculation, and decreased tissue thickness in subjects with asymptomatic hamstring tightness.

Ozcan *et al.* studied matrix rhythm therapy to determine its effect on pain, level of disability, and quality of life in chronic low back pain. In patients with persistent low back pain, the study found that the combined physiotherapy program and the MRT application along with the combined physiotherapy program improved pain, disability level, and quality of life. Matrix-Rhythm-Therapy stimulates the natural muscles quivering in the synchronizing frequency range of 8 - 12 Hz. This resets the body's cells and allowing them to function normally, resulting in improved lymphatic drainage and metabolism, accompanied by accelerated healing process and pain relief.

A randomized clinical trial was conducted by Ketan Kirtikumar Bhatikar *et al.* on evaluation and compares the effect of matrix rhythm therapy with strengthening exercises v/s interferential current therapy with laser therapy and strengthening exercise. The study came up with the conclusion that both the therapies showed the beneficial effects. However, matrix rhythm therapy was more significant than IFT and Laser therapy.

Tushar *et al.* conducted a study based on the application of matrix rhythm therapy. MRT showed more efficacy on the VAS, SPADI, and shoulder ROM when compared to the control group, according to the study. The current investigation came to the conclusion that both matrix rhythm therapy and therapeutic activities combined with icing have favourable efficacy. Matrix rhythm therapy has been demonstrated to be more effective than therapeutic exercise alone in lowering pain, enhancing range of motion, and reducing

disability in individuals with supraspinatus tendinitis.

A study by Tanna *et al.* compared the effects of MaRhyThe® and Myofacial release technique on functional intraoral Glasgow scale (Figs), TMJ disability index (TDI), mouth opening, pain, and quality of life in individuals with radiation-induced trismus. They concluded that MFR and MRT both are equally effective in treatment of radiation induced Trismus. MRT was found to be clinically significant in terms of patient satisfaction.

In order to compare the effects of MRT and Pilates exercises on lumbar flexibility, functional deficits, pelvic inclination, and chronic low back pain, Gohil, Divya M. *et al.* The results demonstrate that in patients with persistent low back pain, matrix rhythm therapy significantly improves pelvic inclination, lumbar flexibility, discomfort, and functional deficits. In order to improve the supply of oxygenated blood and nutrition through the extracellular matrix and to eliminate waste products, acids, and gases, the study found that MRT helps restore the vibrations of the extracellular matrix by gently and harmoniously pulsing, causing the cells to accept their own analogue oscillations again. Surya, Pankaj kumar malik *et al.* in their experimental study, studied the effect of MRT v/s stretching and strengthening amongst population suffering from frozen shoulder. The study analysed that MRT is more effective than other conventional therapy to improve pain and disability.

## CONCLUSION

The effect of MRT on various musculoskeletal disorders has been studied and it has been identified that MRT has a potential to be extensively used in treating varied types of musculoskeletal disorders since its effect has proven to be more beneficial than other conventional physiotherapy techniques.

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