ISSN: 2754-4745

Journal of Physical Medicine Rehabilitation Studies & Reports

SCIENTIFIC Research and Community

Case Report

Open Access

Effect of Matrix Rhythm Therapy Along With Conventional Physiotherapy Management in Quadriplegic Patient: A Case Study

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ABSTRACT

A 26-year old Yemeni girl with a gunshot injury with cervical spine fracture at C6-C7 Level injury in June 2018 with complete loss of sensation in all the limbs, motor loss below C3 level with loss of saddle sensation and anal tone. The patient sustained spinal cord injury at C6-7 levels and edema extending upto C3 level, resulting in quadriplesgia.She was airlifted in medevac from yemen to Sultan Qaboos Hospital Salalah Oman in 28th June 2018.The patient underwent extensive Neuro surgical procedures for cervical fracture and spinal decompression.Additionally, the patient received education and counseling, nursing and nutritional intervention, and comprehensive physical therapy treatment including Matrix Rhythm therapy and other conventional Physiotherapy management.We conclude that Physiotherapy management with other medical disciplines are crucial in recovary of the patient and to improve quality of life.

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Received: February 11, 2021; **Accepted:** February 17, 2021; **Published:** February 20, 2021

Introduction

Quadriplegia refers to paralysis from the neck down, including the trunk, legs and arms. The condition is typically caused by an injury to the spinal cord that contains the nerves that transmit messages of movement and sensation from the brain to parts of the body.

In 1996 the concept of matrix rhythm therapy was introduced and gained scientific recognition. This concept expressed the fact that every intervention on a cell- whether preventive, curative, regenerative or destructive-works primarily via the cell's environment, that is via extracellular matrix. That is where the therapeutic action has its primary effect, which then leads in turn to effects on the cell.

In Matrix Rhythm Therapy, the external signal is applied using a device called the Matrixmobil©. Developed by the author for this purpose, the Matrixmobil© is a rod with a spiral-shaped vibration head which vibrates in the physiological region of 8-12 Hz. In the hands of the therapist, this device generates a vibratory space-time pattern to which the body tissues can orient themselves, in returning to their healthy coherent vibratory mode. The device is specially designed in order to be able to propagate vibrations deep into the body, utilizing the natural resonance properties of tissue. For this purpose the device generates a combination of mechanical vibrations together with an oscillating electromagnetic field induced by permanent magnets mounted in the vibration.

The is the most effective target domain for Matrix Rhythm Therapy not only because of its large share of the total body weight, but above all due to its decisive function as a "milking organ" for the microcirculation of the muscle tissue itself. The skeletal muscles constitute the single largest organ in the body, making up about 45% of total body weight and thereby constituting the largest collection of cells of a single type. The skeletal musculature has developed in the course of evolution into the biggest "propulsion organ" of the human body, and it plays the decisive role in fluid transport in the body, especially for the micro-circulation in and around the individual cells. It was thus natural to orient the therapy especially to the vibrational behaviour of the skeletal musculature, to its amplitude range and to its frequency range of 8-12 Hz. The importance of the sympathetic trunkfor the therapy of many chronic illnesses is well established, including especially conditions related to stress. For reduction of load on the sympathetic nervous system, Matrix Rhythm Therapy is initiated paravertebral along the sympathetic trunk, and then further along the major nerve plexus.

Objective

To evaluate the effects of matrix rhythm therapy along with other physiotherapeutic approaches in a quadriplegic patient.

Setting

Sultan Qaboos Hospital, Salalah, Oman.

Case

Patient Description

A 26 years old Yemeni girl with quadriplegia having gunshot injury with cervical spine fracture at C6 C7 with the oedema extending upto c3 level.She had complete loss of sensation and motor power below level of C3 with loss of saddle sensation and anal tone.Patient was airlifted in Air Medevac from Yemen to Salalah Oman and was admitted in Sultan Qaboos hospital where she underwent extensive neurosurgical procedures for C6-C7 fracture and for spinal decompression and was later referred to Physical Therapy management.

Case History
Patient was bedridden with no movements in both upper and lower limbs.
Only neck movements were present.
Pain in neck and bilateral shoulders.

Physical Examination Results
Upper Extremity Evaluation (Right Side)

Passive	Range of Motion	Pain	Muscle Power
Shoulder	Restricted	√	1
Elbow	Restricted	√	1
Wrist	Restricted	√	0
Fingers	Restricted	√	0

Comment: Pain in right shoulder.

Lower Extremity Evaluation (Right Side)

Passive	Range of Motion	Pain	Muscle Power
Hip	Full	no	0
Knee	Full	no	0
Ankle	Full	no	0

Comment: No Muscle power and no sensation.

Upper Extremity Evaluation (Left Side)

Passive	Range of Motion	Pain	Muscle Power
Shoulder	Restricted	√	1
Elbow	Restricted	√	1
Wrist	Restricted	√	0
Fingers	Restricted	√	0

Comment: Pain in left shoulder, left shoulder was internally rotated because of positioning.

Lower Extremity Evaluation (left Side)

Passive	Range of Motion	Pain	Muscle Power
Hip	Full	no	0
Knee	Full	no	0
Ankle	Full	no	0

Comment: No Muscle power and no sensation.

Treatment plan
Positioning of the all four limbs to prevent contracture.
Matrix Rhythm Therapy application on bilateral upper limbs and lower limbs, spinal and Para spinal muscles, stimulation of sympathetic and parasympathetic nerves, intercostal muscles for improving breathing and abdominal area.

Duration of Matrix Rhythm Therapy: 20 to 30 min on each area on alternate days.

Passive movements with verbally encouraging the patient to perform the movements.
As a part of activation.

Stretching: To maintain the length of the muscle
Electric Muscle Stimulator given on bilateral upper and lower limbs.

Turning Exercises for preventing pressure sores and initiating turning.
Chest Physiotherapy for removing of secretions.

Proprioceptive neuromuscular facilitation: facilitation of combined purposeful oriented movements.

Bridging exercises for core strengthening was done passively with patient's attention involvement.

Few Motor imagery exercises.
The patient also recieved health education,counselling,nursing and nutritional intervention.

Result
The result given in this study was for two months because the patient was going to India for further treatment.

Patient was still confined to bed.

No pain in the neck region and bilateral upper limbs.

Patient is freely moving her right upper limb and can do some of her activities of daily living.

Left upper limb is having movements with slight restrictions owing to internally rotated shoulder (left)

Patient is feeling warm sensation in bilateral lower limbs with increased fasciculation on deep stimulation.

There is sensation from C3 to T8.

Discussion
After reviewing the outcome measures for pain taken before and after

The visual analog scale (VAS) is a validated, subjective measure for acute and chronic pain score has decreased after the treatment protocol.

Before the treatment
The Vas score for right upper limb was 9 out of 10
The vas score for left upper limb was 9 out of 10

Post treatment
After 2 months
It has reduced from score of 10 to 0 for right upper limb except finger flexion which is score 1.

It has reduced from score of 10 to 0 for left upper limb except finger flexion and extension which is score 1.

Sensation test before treatment
The sensation test was carried before with soft and sharp object over the cervical and thoracic region where the patient was unable to feel the soft and sharp touch below C3 region.

Sensation test after treatment
After 2 months
The sensation test was carried with soft and sharp object over the cervical and thoracic region where the patient was able to feel the soft and sharp touch below C3 region up to T8.

This case study shows us the effect of matrix rhythm therapy along with other physiotherapeutic approaches can play a pivotal role in quadriplegic rehabilitation with significant results.

The study shows the following effect on the quadriplegic patient:
Upper Extremity Evaluation (Right Side)
Active Range of Motion Pain Muscle Power
Shoulder flexion 0-70° pain free 3
Abduction 0-90° pain free 4

Elbow flexion full range pain free 4
Extension full range pain free 3+

Wrist flexion full range pain free 4
Extension full range pain free 3+

Fingers flexion restricted painful 2+
Extension able to fully extend pain free 2+
Comment: patient is able to move the right arm on command independently.
Reaching out with this arm is possible.

Upper Extremity Evaluation (left Side)
Active Range of Motion Pain Muscle Power
Shoulder flexion 0-70° pain free 1+
Abduction 0-60° pain free 3+

Elbow flexion full range pain free 3+
Extension full range pain free 1+
with assistance

Wrist flexion full range pain free 2+
Extension full range pain free 2+

Fingers flexion restricted painful 1
Extension restricted painful 1
Comment: patient is able to move the left arm on command independently with end range restricted (internally rotated)

The study shows the following effect on the quadriplegic patient:
Upper Extremity Evaluation (Right Side)

Active	Range of Motion	Pain	Muscle Power
Shoulder	flexion 0-70°	pain free	3
	Abduction 0-90°	pain free	4
Elbow	flexion full range	pain free	4
	Extension full range	pain free	3+
Wrist	flexion full range	pain free	4
	Extension full range	pain free	3+
Fingers	flexion		2+
	Extension able to fully extend	pain free	2+

Comment: patient is able to move the right arm on command independently.
Reaching out with this arm is possible.

Upper Extremity Evaluation (left Side)

Active	Range of Motion	Pain	Muscle Power
Shoulder	flexion 0-70°	pain free	1+
	Abduction 0-60°	pain free	3+
Elbow	flexion full range	pain free	3+
	Extension full range with assistance	pain free	1+
Wrist	flexion full range	pain free	2+
	Extension full range	pain free	2+
Fingers	flexion restricted	painful	1
	Extension restricted	painful	1

Comment: patient is able to move the left arm on command independently with end range restricted (internally rotated)

Conclusion

This study observed that the application of matrix rhythm therapy and other physiotherapeutic approaches has an excellent outcome measure in case of quadriplegic patient.

The matrix rhythm therapy application was more effective in bringing back the lost sensation from C3 to T8 by activation of sympathetic and parasympathetic nerves along with spinal and Para spinal muscles.

Study was done for two months as our patient left for further rehabilitation program to India from Oman.

Despite of discontinuing the sessions the current outcome of the study is clear with the fact that matrix rhythm therapy along with other physiotherapeutic approaches can be selected for the rehabilitation of quadriplegic patients.

The main aim of this study was to introduce a new way of multispecialty and updated approach in rehabilitation of quadriplegic patients.

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