

Comparative clinical study on efficacy of Marma Chikitsa and stimulation of Marma by TENS (Trans Cutaneous Electrical Nerve Stimulation) in the management of Lumbar Spondylosis w.s.r. Gridrasi

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Background: Gridrasi is a Shoolapradhana Snayugata Vaatavyadhi and Marmabhighata is one of the reasons for it, Mardana or Massage is one of the management for Snayugata Vaata. In this study Marma Chikitsa is done by adapting manipulation technique explained in Varmachikitsa of Siddha System of Medicine and Stimulation technique i.e., TENS explained in Chinese System of Medicine over Marma points explained by Acharya Sushruta. **Objectives:** To compare the efficacy of manipulation of Marma points and Electrical Stimulation (TENS) over Marma points in the management of Gridrasi. **Method:** 40 patients suffering with classical signs and symptoms of Gridrasi of either sex were selected from OPD and IPD, MIAMS, Manipal and divided into two groups of 20 each. Group A treated with Marma Chikitsa - manipulation over Marma points and Group B with TENS over Marma points for 7days. Assessment criteria are pain, stiffness, fasciculation, tenderness, muscle power, SLR, VAS, Oswestry disability assessment scale. **Results:** The outcome of treatment after 7 days was statistically significant. **Conclusion:** The study confirms Marma Chikitsa by stimulation of Marma using TENS is effective in the management of Gridrasi and later being the more effective in comparison statistically.

Keywords: Gridrasi, Marma, Varma, TENS

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Introduction

Ayurveda explains many vital points in our body of anatomical and physiological significance which are called as 'Marma'. [1] *Prana* circulates throughout the body and these *Marma* points act as junctions where *Prana* is specially seated. Any injury to the *Marmasthana* results in disturbance in the flow of *Prana* leading to the manifestation of the disease. Injury to *Marmasthana* is of two types *Bahya* 'external' and *Abhyantara* internal'. [2] *Bahya* injury is by direct trauma over these points where as *Abhyantara* is due to vitiated *Doshas*. [3] Injury to these *Marma* points is called as *Marmabhighata*. [4] It is one of the causes for *Vatavyadhi*. [5] Injury to these *Marma* points leads to *Vata Prakopa* and manifests as pain, swelling, numbness, loss of functions and sometimes even death.

First line of management of *Marmabhighata* is to protect or correct the *Marma* and bring the flow of *Prana* to normalcy which is called as *Marma Chikitsa*. This can be done by externally manipulating or stimulating the *Marma* points. *Mardana* and *Bandhana* are told in the management of *Snayu* and *Sandhigatavata*. [6] 'Siddha system of medicine' utilizes *Marma Chikitsa* very effectively. Traditional massage technique gives importance to these points. *Siddha* system of medicine gives detailed description about *Marma Chikitsa* [7] and manipulation techniques. *Marma* points according to *Siddha* are similar to *Marma* points explained in *Ayurveda*. In these study manipulations techniques explained in *Siddha* system of medicine was tried over *Marma* points explained in *Ayurveda* involved in *Ghridhasi*.

"Transcutaneous Electrical Nerve stimulation" (TENS) is used in Physiotherapy and Traditional Chinese medicine for pain management. [8] Manual Manipulation of *Marma* points has limitations like one *Marma* practitioner can do *Marma* therapy for limited number of patients. He also develops body ache if he performs *Marma* therapy on many patients. TENS is a better alternative to stimulate these *Marma* points.

'*Gridrasi*' is *Shoola Pradhana Vatavyadhi* characterized by pain radiating to *Sphik, Kati, Uru, Janu, Jangha, Pada* associated with *Toda, Stambha* and *Spandana*. [9] *Marma* located at low back region and in lower limbs are involved in the *Gridrasi*. Hence this study is aimed to evaluate the effect of *Marma Chikitsa* by manipulation and electrical

Stimulation over the specific *Marma* points in patients of *Gridrasi*.

Aims and Objectives

01. To evaluate the efficacy of *Marma Chikitsa* by manipulation of *Marma* points in the management of *Gridrasi*.
02. To evaluate the efficacy of electrical stimulation over *Marma* points in the management of *Gridrasi*.
03. To compare the efficacy of *Marma Chikitsa* with manipulation and electrical stimulation of *Marma points* in the management of *Gridrasi*.

Materials and Methods

Source of data

Clinical source: 40 patients suffering from *Gridrasi* were randomly selected from OPD and IPD of MIAMS, Manipal, Karnataka for the study with their consent.

Method of collection of data

A detailed clinical history was taken and patients were examined as per case perform prepared for the purpose. They were equally divided into two groups A & B with 20 patients in each group.

Diagnostic Criteria

- Pain in Low back region radiating to right or left limb.
- X- Ray or MRI showing spondylosis changes.

Inclusion criteria

- Patients between the age group of 20 to 70 years of either sex.
- Patients suffering from signs and symptoms of *Gridrasi*
- Patients who are fit for *Marma Chikitsa*.

Exclusion criteria

- Patients with congenital anomalies of spine, Fracture of spine, Neoplastic condition of spine, Tuberculosis of spine, Caudaequina syndrome, Spondylolisthesis and Entrapment neuropathy.
- Patients of uncontrolled DM, HTN.

Interventions

Marma points involved in Low back and lower extremity which are involved In *Gridrasi* were selected and Manipulation or Electrical Stimulation was given. (Table 1 and Table 2)

Table 1: Group A Marma Chikitsa and Group B TENS

Groups	A	B
Sample size	20 patients	20 patients
Procedure	Marma Chikitsa	TENS
Sittings	Seven /daily	Seven /daily
Assessment	1st and 7th day	1st and 7th day
Follow up	14th day	14th day

Procedure on Kshipra Marma[12]

- **Marma** - Kshipra Marma
- **Vermam** - Viruthi Kaalam
- **Location** - In web space between big toe and index finger
- **Manipulation** - By placing the first interphalangeal joint of the thumb on the Kshipramarma point by using ½ Maathirai pressure, press and releasing three times.
- **Stimulation** - A continuous electrical wave of intensity 1-2mA with frequency between 2-4Hz and pulse width of 100 µs for 15min over the Marma point.

Procedure on Talahridaya[13]

- **Marma** - Talahridaya
- **Vermam** - Ullangkaal Vellai
- **Location** - In center of sole facing the root of 3rd toe
- **Manipulation** - By placing the pulp part of the middle finger on Talahridayamarma, by using ½ Maathirai pressure press and release three times.
- **Stimulation** - A continuous electrical wave of intensity 1-2mA with frequency between 2-4Hz and pulse width of 100 µs for 15min over the Marma point.

Procedure on Kurcha[14]

- **Marma** - Kurcha
- **Vermam** - Padangkaal
- **Location** - Center of the foot
- **Manipulation** - By placing the middle part of the middle three fingers on the Kurchamarma using ½ Maathirai pressure, apply three clockwise and three anti clockwise rotations.
- **Stimulation** - A continuous electrical wave of intensity 1-2mA with frequency between 2-4Hz and pulse width of 100 µs for 15min over the Marma point.

Procedure on Kurcha Sira[15]

- **Marma** - Kurcha Sira
- **Vermam** - Kanpugaichal
- **Location** - Lateral side of the ankle joint
- **Manipulation** - By placing the pulp part of the middle three fingers two finger measurement above the outer ankle joint by using ¼ maathirai pressure, starting at two finger measurement above the outer ankle joint, drag along Kurcha till Kurchasira, repeat the same three times on the third action apply 3 clockwise rotations and three anticlockwise rotations on Kurchamarma.
- **Stimulation** - A continuous electrical wave of intensity 1-2mA with frequency between 2-4Hz and pulse width of 100 µs for 15min over the Marma point.

Procedure on Gulfa[16]

- **Marma** - Gulfa
- **Vermam** - Uppukkutri
- **Location** - In medial aspects of the ankle joint.
- **Manipulation** - By placing the pulp part of the thumb and middle finger on both the Gulphamarma point by using ½ Mathirai pressure three times traction by holding the tendocalcaneum downwards towards the heel.
- **Stimulation** - A continuous electrical wave of intensity 1-2mA with frequency between 2-4Hz and pulse width of 100 µs for 15min over the Marma point.

Procedure on Indrabasti[17]

- **Marma** - Indrabasti
- **Vermam** - Kuthikaal
- **Location** - In the posterior compartment of leg
- **Manipulation** - By placing the pulp part of the middle three fingers, in a vertical position on the Indrabasthimarma point using ½ Mathirai pressure, press and release, three times.
- **Stimulation** - A continuous electrical wave of intensity 1-2mA with frequency between 2-4Hz and pulse width of 100 µs for 15min over the Marma point.

Procedure on Urvi[18]

- **Marma** - Urvi
- **Vermam** - Aami Kaalam
- **Location** -

- In the posterior compartment of thigh
- **Manipulation** - By placing the hypothenar part of the palm on the Urvimarma point, using ½ Maathirai pressure apply three outward rotations and three inward rotations simultaneously on both the legs.
- **Stimulation** - A continuous electrical wave of intensity 1-2mA with frequency between 2-4Hz and pulse width of 100 µs for 15min over the Marma point.

Procedure on *Katikataruna*[19]

- **Marma** - Katikataruna
- **Vermam** - Idampuri Valampuri
- **Location** - Sides of the vertebral column in the post aspect of ilium
- **Manipulation** - By placing the hypothenar part of the palm on Katikataruna Marma by using ½ Maathirai pressures apply three inward and outward rotations, and then drag along the sides of the body to end below the gluteus.
- **Stimulation** - A continuous electrical wave of intensity 1-2mA with frequency between 2-4Hz and pulse width of 100 µs for 15min over the Marma point.

Procedure on *Kukkundara*[20]

- **Marma** - Kukkundara
- **Vermam** - Nanganpottu
- **Location** - Sides of the vertebral column over sacro-iliac articulation
- **Manipulation** - By placing the first interphalangeal joint of the left thumb on the Kukkundara Marma points by using ½ Mathirai pressure apply three outward rotations and three inward rotations.
- **Stimulation** - A continuous electrical wave of intensity 1-2mA with frequency between 2-4Hz and pulse width of 100 µs for 15min over the Marma point.

Procedure on *Nitamba*

- **Marma** - Nitamba
- **Vermam** - Nill
- **Location** - On either side of two pelvic bones
- **Manipulation** - Place the hypothenar part of the hand on the Nitambha Marma points using ½ Maathirai pressure. Lift upwards and relax 3 times.

- **Stimulation** - A continuous electrical wave of intensity 1-2mA with frequency between 2-4Hz and pulse width of 100 µs for 15min over the Marma point.

Maathirai Kanakku is the method of touching the *Varmam* points by the Fingers.[21]

Maathirai (Viduthal) - Is the soft pulp portion of the middle finger (from the tip of the middle finger to the 1st bone joint or distal interphalangeal joint - one pulp of finger is divided into 4 stages). (Figure no. 1) (Figure no. 2)

Assessment Criteria

Subjective Parameter

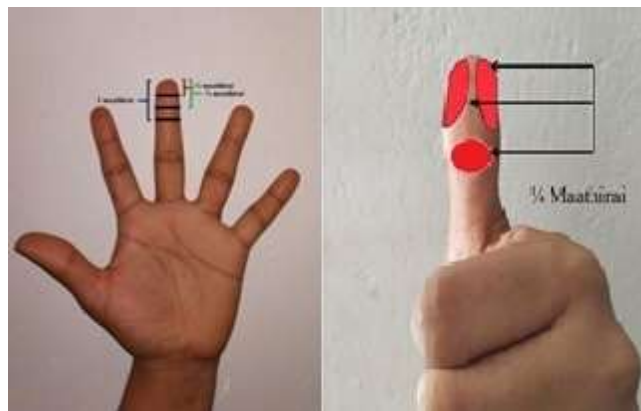
- Pain
- Stiffness
- Fasciculation

Objective Parameter

- Tenderness
- Muscle Power
- Reflexes
- Straight Leg Raise Test
- Visual Analogue Scale
- Oswestry Low Back Disability Assessment

Statistical Analysis

The scores of assessment criteria were analyzed statistically. Wilcoxon Signed-Ranks Test was carried out for within the groups and Mann whitney U test for between the groups using GraphPad InStat and Sigma Stat 4.0. The results were considered Significant or Insignificant depends upon P<0.05 value.



TENS

Figure 1: TENS Apparatus



TENS Machine



TENS Electric Pads with wire

Figure 2: Tens Procedure



Observation and Results

Table 2: Effect of Marma Chikitsa on Gridrasi

Group A	BT Mean	Mean	DIFF	SD	SEM	P	Sig.
Pain	3.9	AT	2.55	1.35	0.68	0.153	<0.001 ES
		AF	2.65	1.25	0.74	0.166	<0.001 ES
Stiffness	1.9	AT	0.75	1.150	0.716	0.160	<0.001 ES
		AF	0.80	1.100	0.833	0.186	<0.001 ES
Fasciculation	0.55	AT	0.15	0.40	0.36	0.819	0.0078 VS
		AF	0.40	0.15	0.60	0.133	0.25 NS
Tenderness	1.55	AT	0.45	1.100	0.51	0.114	<0.001 ES
		AF	0.50	1.05	0.51	0.114	<0.001 ES
Muscle Power	4.3	AT	4.6	0.30	0.68	0.152	0.0547 NS
		AF	4.6	0.30	0.50	0.112	0.0547 NS
Reflex	0.95	AT	0.3	0.65	0.47	0.105	<0.001 ES
		AF	0.6	0.35	0.75	0.168	0.0313 S
SLR	2.80	AT	1.95	0.85	0.68	0.153	<0.001 ES
		AF	1.75	1.05	0.63	0.142	<0.001 ES
ODA	33.6	AT	25.5	8.10	3.15	0.705	<0.001 ES
		AF	17.95	15.6	3.73	0.835	<0.001 ES
VAS	5.45	AT	3.85	1.60	0.98	0.220	<0.001 ES
		AF	2.95	2.50	0.94	0.211	<0.001 ES

Table 3: Effect of TENS on Gridrasi

Group B	BT Mean	Mean	DIFF	SD	SEM	P	Sig.
Pain	3.75	AT	2.55	1.20	0.68	0.153	<0.0001 ES
		AF	2.05	1.70	0.68	0.153	<0.0001 ES
Stiffness	2.1	AT	0.6	1.50	0.820	0.183	<0.001 ES
		AF	0.5	1.60	0.688	0.153	<0.001 ES
Fasciculation	0.35	AT	0.15	0.20	0.36	0.082	0.1250 NS
		AF	0.10	0.25	0.31	0.068	0.0625 S
Tenderness	2.1	AT	0.90	1.2	0.85	0.190	<0.001 ES
		AF	0.55	1.55	0.60	0.135	<0.001 ES
Muscle Power	3.7	AT	4.5	0.80	0.60	0.135	<0.001 ES
		AF	4.65	0.95	0.49	0.109	<0.001 ES
Reflex	0.95	AT	0.55	0.40	0.680	0.153	0.0078 VS
		AF	0.45	0.50	0.604	0.135	0.0039 VS
SLR	2.75	AT	1.45	1.30	0.82	0.184	<0.001 ES
		AF	0.60	2.15	0.50	0.133	<0.001 ES

ODA	31.75	AT	22.5	9.25	3.07	0.686	<0.001	ES
		AF	11.3	20.45	2.25	0.503	<0.001	ES
VAS	5.55	AT	3.35	2.20	0.104	0.232	<0.001	ES
		AF	2.15	3.40	1.089	0.243	<0.001	ES

Discussion

Gridrasi is one among the *Vatavyadhi* mentioned in *Brihatrayis*. It can manifest because of *Marmaabhighata*. Injury to the *Marma* is of two type's external (*Bahya*) and internal (*Abhyantara*). *Bahya* injury is by direct trauma over these points, whereas *Abhyantara* is due to vitiated *Doshas* and *Dushyas*. *Ruk, Stambha, Toda, Spandana* are the features of *Gridrasi*. *Gridrasi* is mentioned under *Snayugata vaata vikaara*. *Acharya Sushruta* mentioned the line of treatment for *Vatavyadhi* affecting *Sandhi, Snayu* and *Asthi* such as *Snehana, Upanaha, Agnikarma, Bandhana* and *Unmardana*.

In contemporary medical science, lumbar spondylosis can be compared to *Gridhrasi* as it has similar feature like inability to walk, numbness over extremities, pain from low back radiating to lower extremities.

Starting from *Kukundara* to *Kshipra Marma* points of lower back and lower limb are involved in *Gridrasi*. Flows of *Prana* in these are affected in *Gridhrasi* resulting in pain. By manipulating these points flow of *Prana* can be corrected and improvement in symptoms can be seen. Study conducted on *Marma Chikitsa* showed that *Marma* therapy has advantage over conservative management by oral medicines in improving the symptoms in *Ghridrasi*.^[22] But manual manipulation over *Marma* points has limitations as *Marma* physician or therapist may get exhausted by doing *Marma* therapy to many patients or doing it for long time. Instead of manual manipulation if any mechanical technique can be used has advantage in the *Marma* management. Physiotherapist uses TENS to stimulate muscles and nerves in pain management. Hence in this study *Marma* manipulation was compared with stimulation of *Marma* points using TENS.

Effect of Therapy on Pain^[23]

The whole study was done centered to pain, which are the main feature of disease. Mean pain score after treatment for group A was 34.61% and in group B was 32%. Pain score after follow up for group A was 32.05% and in group B was 45.33%. Group A individuals showed reduction in the pain after treatment while Group B individual showed reduction in the pain after follow up.

According to pain gate theory, by TENS and *Marma Chikitsa* acute pain is stimulated which blocks the transfer of chronic pain.

Endorphin theory, according to theory proposed by Bruce Pomeranz there is a neurotransmitter which is neuropeptide in nature present in central nervous system called as Endorphins. Endorphins are hormonal in nature and are produced by pituitary gland. For external pain impulse it will be carried by peripheral nerves towards the spinal cord, brainstem, mid brain reaching the sensory cortex. But on the mean pathway the pain impulses stimulates the mid brain. There after the mid brain stimulates pituitary gland to release endorphins. Intensity of pain reduces because endorphins quickly get into the hematological circulation of brain and goes towards the sensory cortex and undergoes competitive inhibition with the pain impulses. In chronic pain patient, from a particular area of the body a similar group of impulses are continuously produced which passes through the mid brain to reach the sensory cortex. Initial days the mid brain stimulates the pituitary to release endorphins. But as the time passes on midbrain gets adapted to this impulse and accepts these impulses as normal, for which there is neither stimulation of pituitary gland nor the release of endorphins. By *Marma Chikitsa* and TENS positive stimulation are generated at *Marma* points which is felt by the body something new for which pituitary gland gets stimulated and pain gets relieved.

Inflammatory theory - Manipulation of *Marma* points generates mild active inflammation over a sight of chronic inflammation in order to subside chronic inflammation.

Effect of therapy on Stiffness

Mean stiffness score after treatment for group A was 60.52% and in group B was 71.42%. Mean stiffness score after follow up for group A was 42.10% and in group B was 76.19%. After treatment and after follow up Group B showed better results. While in Group A individual showed reduction in the stiffness after treatment but was comparatively less after follow up. In both the Group there is reduction in stiffness comparatively better result in Group B this is because by doing both *Marma Chikitsa* and TENS therapy nerves get stimulated and circulation improves which helps to relax spasm of the muscle over that area resulting in improvement of stiffness here TENS gives better result than *Marma Chikitsa* for improving circulation.

Effect of therapy on Tenderness

Mean tenderness score after treatment for group A was 70.96% and in group B was 57.14%. Mean tenderness score after follow up for group A was 67.74 % and in group B was 73.80%. Group A showed better results after treatment while Group B showed better result after follow up. As stated earlier by stimulating *Marmasthanas* it stimulates the nerve which supplies that particular area in turn it relaxes the muscle spasm and there by increases the circulation to that area. Thus increased circulation will helps in relieving local inflammation. By this entire means tenderness over the area reduces.

Effect of therapy on Fasciculation

Mean fasciculation score after treatment for group A was 72.72% and in group B was 57.14%. Mean fasciculation score after follow up for group A was 27.27% and in group B was 71.42%. Group A showed better results after treatment while Group B individuals showed better results after follow up. By doing stimulation over *Marma* points relieves the obstruction of *Vata* which gave relief to the patients.

Effect of therapy on Muscle Power

Mean muscle power score after treatment for group A was 6.97% and in group B was 21.62%. Mean muscle power score after follow up for group A was 6.97% and in group B was 25.67. Group A showed little improvement soon after treatment and after follow up while Group B individuals showed better increase in the Muscle power after treatment and after follow up. By stimulating the *Marma* will improve the circulation to the particular area by which increased nourishment of the muscles in that particular area in turn results in improving its strength and power.

Effect of therapy on Reflex

Mean reflex score after treatment for group A was 68.42% and in group B was 42.10%. Mean reflex score after follow up for group A was 36.84% and in group B was 52.63. Group A showed better results after the treatment while Group B individuals showed better results after the follow up, but it was comparatively less than the effect of Group A shown soon after the treatment. By doing both manipulation and stimulation of *Marma* points results in proper flow of *Prana/Vata* due to which the patients reflexes improved, in *Marma Chikitsa* it gave instant result while in stimulation late effect.

Effect of therapy on SLR

Mean SLR score after treatment for group A was 30.35% and in group B was 47.27%. Mean SLR score after follow up for group A was 37.5% and in group B was 78.18. Group B showed better results after treatment and after follow up. Group A individual showed reduction in the SLR but was comparatively less than Group B. Muscles gets relaxed by stimulating the nerves which passes along the *Marma* points there by helps to get relieved from local inflammation and pain hence we can see the improvement of SLR.

Effect of Therapy on VAS

Mean VAS score after treatment for group A was 29.35% and in group B was 39.63%. Mean VAS score after follow up for group A was 45.87% and in group B was 61.26%. Group B showed better results after treatment and after follow up. Group A individuals showed reduction in the VAS but was comparatively less than Group B. By stimulation of *Marma* points it helps in improving the circulation of that area and there by proper nourishment and it also relieves the local inflammation and thereby reduce in the symptoms like pain stiffness and fasciculation and improvement in movements and muscle power because of all these things patient feels better hence VAS also shows improvement.

Effect of therapy on ODA

Mean ODA score after treatment for group A was 75.89% and in group B was 29.13%. Mean ODA score after follow up for group A was 46.42% and in group B was 64.40%. Group A showed better results after the treatment while Group B individuals showed better results after the follow up, but it was comparatively less than the effect of Group A shown soon after the treatment. By doing both manipulation and stimulation of *Marma* points results in increased circulation and there by proper flow of *Prana/Vata* due to which the patients get relieved from pain stiffness fasciculation and it improves the muscle power hence patients able to do their routine work properly, in *Marma Chikitsa* it gave instant result while in stimulation late effect is observed.

Conclusion

The following conclusions were drawn on the basis of the conceptual study and observation made in the clinical study with TENS and *Marma Chikitsa*.
Marma

And *Varma* are similar; technique of manipulation of *Varma* points explained in *Siddha* System of Medicine can be adopted over *Marma* points of *Ayurveda* system of medicine. TENS is the better way to stimulate the *Marma* points to get better relief from the pain and stiffness. Stimulating the *Marma* points told in *Ayurveda* which are involved in the disease *Gridrasi*, is effective in the control of symptoms. TENS over *Marma* points can be effectively implemented for the management of *Gridrasi*.

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