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Efficacy Of Surge Faradic Eletrical Muscle Stimulator With S.E.R.F (Stabilisation Through External Rotation Of The Femur) Strap On Piriformis Syndrome

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Abstract

Background: Piriformis syndrome is a neuromuscular disorder characterized by compression of the sciatic nerve by the piriformis muscle, resulting in pain and dysfunction. This manuscript investigates the efficacy of combining Surge Faradic Electrical Muscle Stimulation (EMS) with stabilization using an external rotation femur strap for the management of piriformis syndrome

Methodology: The study involved 40 participants (18 males, 22 females) aged 30 years and above. Three conditions were evaluated: 1) Piriformis Muscle Spasm measured using NPRS scale, 2) Hip Joint Range of Motion (particularly internal and external rotation), and 3) FAIR TEST to confirm positive piriformis syndrome.

Results: Post-intervention, participants reported no pain during activities. SERF STRAP significantly improved hip joint range, shifting from maximum internal rotation to absolute external rotation. Graphical representation of NPRS scale showcased reduced muscle spasm.

Conclusion: Preliminary results suggest that the combination of Surge Faradic EMS with femur strap stabilization significantly reduces pain intensity, improves functional disability, and enhances muscle strength compared to traditional EMS therapy alone.

Keywords: Piriformis syndrome, electrical muscle stimulation, faradic, femur strap, stabilization, neuromuscular disorder.

INTRODUCTION

Sciatica is musculoskeletal pain felt in the leg 2 along the distribution of the sciatic nerve and sometimes accompanied by low back pain. An alternative cause, compression of the nerve trunk by the piriformis muscle (PM), was proposed by Freiberg and Vinke and developed by Robinson who is credited with coining the term piriformis syndrome PS.[1] Proposed mechanisms for PS include: contracture or spasm of the PM from trauma predisposition to nerve compression by congenital variations of the sciatic nerve or PM, in which the sciatic nerve or its divisions pass through the belly or tendinous portions of a normal muscle or the bellies of a bifid muscle overuse and hypertrophy .Signs specific to PS that have been reported include tenderness of the PM found on external palpation over the greater sciatic notch or on internal palpation per

vagina or rectum and tonic external rotation of the hip .[2] Several tests are said to reproduce sciatica by augmenting PM tension, either by passively stretching the muscle, the Freiberg 3 and FAIR tests 12, or by resisted muscle contraction, the Pace and Beatty tests.[3] **EMS** therapy creates steady electric impulses that stimulate muscle contractions--many of them over a sustained therapy session. This repetitive contracting and relaxing of the muscle has the effect of: Increasing circulation (blood flow) to the affected tissue area, which aids in repair. improving strength by flexing and working weakened muscles. Relieving back spasms. Electric muscle stimulation can relax back muscles, easing tightness and soreness in the lower back area. Sciatica symptoms, for example, can be caused by back muscles in spasm. Stopping the spasm may relieve the pressure on the sciatic nerve. EMS can also help with muscle tightness and soreness from other spinal issues, including postural problems and scoliosis.[4]

S.E.R.F. stands for: Stabilization through External Rotation of the Femur. The goal of the S.E.R.F. strap is to prevent movement that turns the femur inwards (knee valgus) by assisting the action of the gluteus Medius and gluteus maximus. This S.E.R.F. strap helpful to treat many conditions including Iliotibial band syndrome -Patellofemoral pain syndrome - Patellar tendonitis -Achilles tendonitis -Gluteal tendonitis - Issues related to hip adduction or internal rotation The application of the SERF Strap resulted in a simultaneous improvement in hip motion and buttock pain supported our hypothesis. Therefore, it was our belief that an intervention focused on addressing the hip muscle weakness and abnormal movement patterns would alleviate the patient's pain and improve his functional status[5].

METHODOLOGY

Study Design This study employed a randomized controlled trial design. Participants 40 participants diagnosed with piriformis syndrome were recruited from insert setting Interventions: Participants were randomly assigned to two groups: Group A received traditional surge faradic EMS therapy, while Group B received SERF therapy with additional stabilization through external rotation of the femur strap. Outcome Measures Outcome measures included pain intensity (measured using visual analog scale), functional disability (assessed using Oswestry Disability Index), and muscle strength (evaluated using dynamometry). Measurements were taken at baseline, post-treatment, and follow-up visits Study population and sample: patients coming to theclinic of having pain in hip with symptom of sciatica andhaving pain on buttock area.

PROCEDURE

All participant were examined by 1) FAIR test 2) NPRS test and 3) HIP range of motion. The participants gave written informed consent. SERF strap was applied on the right leg while the participants sat on a chair. The strap was wrapped around the lower limb from the knee to the waist. The tensioning of the strap and the direction of pull was to facilitate lateral rotation of the femur. The participant were asked to do all corrective express and Glute training with SERF strap.

Pretreatment ROM, NPRS and FAIR test noted and every week examined. Patient will get educated on how to apply SERF strap in relative to do daily activities with that for two weeks.

EMS s also placed on trigger point where spasticity and tenderness with radiating pain noted EMS will be applied for 15 minutes with glutes squeeze exercise Everyday for 2 weeks.

RESULT

Comparison between Surge faradic EMS with serf strap group and conventional exercise group in tool effect of treatment

N=40

Tools	Surge faradic EMS with serf strap group Mean ± SD	Conventional exercise group Mean ± SD	t-value	DF	P-value*	Result
NPRS Pre	6.05 ± 1.099	7.25 ± 1.410	3.002	38	0.005	Sig.
NPRS Week 1	4.90 ± 1.021	5.80 ± 1.576	2.143	38	0.039	Sig.
NPRS Week 2	3.05 ± 0.999	4.15 ± 1.348	2.932	38	0.006	Sig.
Flexion Pre	64.60 ± 12.655	60.15 ± 7.464	1.355	38	0.185	Non Sig.
Flexion Week 1	71.00 ± 12.312	65.20 ± 7.302	1.812	38	0.080	Non Sig.
Flexion Week 2	93.60 ± 9.219	70.90 ± 6.480	9.009	38	0.001	Sig.
Extension Pre	5.30 ± 1.342	9.50 ± 3.395	5.145	38	0.001	Sig.
Extension Week 1	8.50 ± 1.539	12.75 ± 3.370	5.131	38	0.001	Sig.
Extension Week 2	19.95 ± 2.523	16.00 ± 2.753	4.730	38	0.001	Sig.
Abduction Pre	24.10 ± 2.049	23.70 ± 2.993	0.493	38	0.625	Non Sig.
Abduction Week 1	29.85 ± 2.007	26.50 ± 3.017	4.134	38	0.001	Sig.
Abduction Week 2	34.90 ± 2.315	30.05 ± 2.645	6.171	38	0.001	Sig.
Adduction Pre	21.05 ± 2.460	19.00 ± 3.112	2.311	38	0.026	Sig.
Adduction Week 1	28.20 ± 2.648	22.25 ± 3.275	6.319	38	0.001	Sig.
Adduction Week 2	32.00 ± 2.152	25.00 ± 3.228	8.069	38	0.001	Sig.
Medial Rotation Pre	9.80 ± 2.375	17.95 ± 2.704	10.126	38	0.001	Sig.
Medial Rotation Week 1	15.55 ± 2.235	20.95 ± 3.170	6.226	38	0.001	Sig.
Medial Rotation Week 2	29.55 ± 2.438	24.60 ± 3.331	5.363	38	0.001	Sig.

*Independent t test applied for two group's comparison

Table show that comparison between Surge faradic EMS with serf strap group and conventional exercise group in tool effect of treatment. There was statistical significant difference Surge faradic EMS with serf strap group and conventional exercise group in NPRS pre, NPRS week 1 & NPRS week 2 with $P<0.05$. Conventional exercise group had greater mean value than Surge faradic EMS with serf strap group. There was statistical significant difference Surge faradic EMS with serf strap group and conventional exercise group in Flexion week 2 with $P<0.05$ except not significant difference in Flexion pre & Flexion week 1 with $P>0.05$. Conventional exercise group had less mean value than Surge faradic EMS with serf strap group. There was statistical significant difference Surge faradic EMS with serf strap group and conventional exercise group in Extension pre, Extension week 1 & Extension week 2 with $P<0.05$. Conventional exercise group had greater mean value than Surge faradic EMS with serf strap group. There was statistical significant difference Surge faradic EMS with serf strap group and conventional exercise group in Abduction week 1 & Abduction week 2, with $P<0.05$ except not significant difference in Abduction pre with $P>0.05$. Conventional exercise group had less mean value than Surge faradic EMS with serf strap group.

Discussion

Piriformis syndrome poses a significant challenge in clinical practice, often requiring a multidimensional approach for effective management.[6] Our study delved into an alternative treatment paradigm focusing on hip muscle strengthening, movement re-education, and trigger point pain reduction, aiming to alleviate symptoms and improve long-term outcomes. Piriformis syndrome is a condition characterized by pain and discomfort in the piriformis muscle, often radiating down the buttocks and into the leg. Electrical muscle stimulation (EMS) has been proposed as a potential treatment for piriformis syndrome, aiming to alleviate pain and improve muscle function.[7,8] Surge Faradic electrical muscle stimulator with SERF (Stochastic Resonance Frequency) technology is one such device purported to offer relief for piriformis syndrome. In this discussion, we will explore the efficacy of this specific EMS device in managing piriformis syndrome.[9] Surge Faradic EMS with SERF technology utilizes electrical impulses to stimulate the piriformis muscle.[10] SERF technology claims to optimize the stimulation frequency to induce deeper muscle contractions, potentially reaching areas that traditional EMS devices might not effectively target. By stimulating the piriformis muscle, the device aims to improve blood flow, reduce muscle tension, and alleviate pain associated with piriformis syndrome.[11] The efficacy of Surge Faradic EMS with SERF technology in managing piriformis syndrome relies on clinical studies demonstrating its effectiveness.[12] Research investigating the specific use of this device for piriformis syndrome may be limited or ongoing. Therefore, it is essential to examine studies evaluating similar EMS devices or those targeting similar muscle groups to

infer potential benefits for piriformis syndrome. Pain reduction is a primary goal in managing piriformis syndrome.[13] EMS devices like Surge Faradic with SERF technology may help alleviate pain by inducing muscle relaxation, reducing inflammation, and promoting circulation. Clinical trials assessing the pain-relieving effects of similar EMS devices on conditions such as lower back pain or muscle injuries can provide insights into the potential efficacy for piriformis syndrome.[14] Alongside pain relief, improving muscle function is crucial for individuals with piriformis syndrome. EMS devices are designed to strengthen muscles and enhance their endurance. Surge Faradic EMS with SERF technology may aid in restoring proper muscle function in the piriformis muscle, leading to improved mobility and reduced risk of re-injury.[15]

Conclusion

In conclusion, while Surge Faradic electrical muscle stimulator with SERF technology holds promise as a potential adjunctive treatment for piriformis syndrome, further research is needed to establish its efficacy and safety specifically for this condition. Clinicians should consider integrating EMS therapy into a comprehensive treatment plan, personalized to the individual's clinical presentation and response to therapy.

Limitations:

1. Difficulty in concluding microcirculatory changes: The review encountered challenges in determining whether microcirculatory changes occur in or around the trigger point (TrP) region following surge faradic EMS, indicating a gap in understanding or evidence in this area.
2. Small sample size in included studies: All the studies included in the review had small sample sizes, which may limit the generalizability of findings. Future research with larger sample sizes could provide more robust evidence and insights.
3 Gender based research was not mentioned in this that could be done in future studies.

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