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EVALUATE THE IMPACT OF POSITIONAL RELEASE TECHNIQUE ON PAIN AND SYMPTOM SEVERITY IN RESTLESS LEG SYNDROME PATIENTS

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Abstract: **Restless Legs Syndrome (RLS) is a neurological sensory motor disorder characterized by an uncontrollable urge to move the legs, often accompanied by discomfort such as tingling, burning, or aching. These symptoms primarily manifest during rest or inactivity, particularly in the evening or night. In India, RLS prevalence varies among different populations, with a reported 8.36% occurrence among adolescents and young adults, significantly higher than the 2.1% observed in the general urban population. The purpose of the study was to evaluate the impact of the positional release technique on pain and symptom severity in patients with Restless Legs Syndrome.**

Methodology: A single-group experimental pre-post study was conducted with 15 participants aged 20–50 years, selected based on specific inclusion and exclusion criteria. The intervention was conducted over six months, with treatment sessions lasting 25 minutes per day, three days per week for six weeks. Pain intensity and symptom severity were assessed using the Numeric Pain Rating Scale (NPRS) and the International Restless Legs Syndrome Severity Rating Questionnaire (IRLS), respectively.

Result: The statistical analysis revealed a significant reduction in pain and symptom severity following the intervention. The pre- and post-test comparisons showed a notable improvement in scores on both the IRLS (t = 3.5775) and the NPRS (t = 4.0000), indicating the efficacy of the positional release technique in managing RLS symptoms.

Conclusion: The findings of this study suggest that the positional release technique is an effective therapeutic approach for reducing pain and symptom severity in patients with Restless Legs Syndrome.

Keywords: **Restless Legs Syndrome, Positional Release Technique, International Restless Legs Syndrome Severity Rating Questionnaire, Numeric Pain Rating Scale.**

I. INTRODUCTION

Restless legs syndrome (RLS), also known as Willis-Ekbom disease, is a sensorimotor disorder characterized by an uncomfortable urge to move the legs. The urge to move is usually accompanied by unpleasant sensations in the legs, which worsen in the evening or night and during rest or inactivity, and are relieved by movement.[1] RLS, commonly known as Ekbom syndrome, is named for the neurologist Karl-axen-Ekbom.[2] RLS is a sensory-motor disorder that is characterized by a severe involvement of sensory symptoms and, depending on the severity of the disease, an irresistible desire to move

one or both legs. It typically affects the legs in the first stage. But if the illness worsens, the need to move the legs could spread to the arms or other body parts (such as the head or trunk). Pain can often overshadow the disease and cause it to be mistaken for a chronic pain condition. The patient has the sensory unpleasant sensations both at night and while they are awake, sitting or lying down. The symptoms may be lessened and pain may be somewhat relieved by walking, bending, or extending the legs.[3]

Globally, the prevalence of RLS is reported to be anywhere between 3.9% and 15%, and in an Indian urban population, Restless Legs Syndrome Study have reported it to be 2.1%.[4] The prevalence of RLS is 12.1% (men: 8.5%; women: 15.4%). Despite this, the frequency is high among young people.[5] Research studies have shown that the disease affects 2% to 15% of the general population and that women are at an 11% to 27% higher risk than men.[6] The prevalence of RLS varies from 4% to 29%, according to the International restless leg syndrome study Group.[7] Restless leg syndrome (RLS) is highly affected in females but it also occurs in male.[8] Causes of RLS in females are hormonal disorders.[9][10]

Commonly, RLS is a primary central nervous system disorder.[11] In RLS both primary and secondary forms of the syndrome exist; in primary(idiopathic), the illness is not caused by another condition and frequently has a favourable family history. On the other hand, secondary is found in diseases such rheumatoid arthritis, diabetes, iron deficiency anaemia, pregnancy, renal failure, and neuropathy.[12][13] The pathogenic mechanism in primary RLS is linked to iron insufficiency and dysfunction of the dopaminergic system, while the secondary type mechanism is more closely linked to deficient blood serum calcium and phosphorus.[14] Restless syndrome can be divided into several categories based on its aetiology and age of onset, including primary RLS, secondary RLS, early onset (age -45 years), and late onset (age >45 years). RLS risk factors include iron and calcium deficiencies, stress, exhaustion, end-stage kidney disease, family history, and pregnant women with iron deficit and anaemia. [15]

RLS is a sensorimotor condition that presents with characteristic symptoms that have a unique circadian pattern. Patients frequently report experiencing discomfort deep inside their legs along with a strong, uncontrollable need to move their legs. Movement, such walking or stretching, relieves the desire, which usually starts or gets worse during times of inactivity (such as sitting or lying down). The symptoms occur in the evening or at night and can get worse over the course of the night, but they typically subside away themselves by the morning. RLS symptoms often occur in the calf area, distal to the knee, although they can also occur in the arms and thighs. The majority of patients report feeling pain deep into their legs, however it is less frequently superficial. In most cases, the symptoms affect both the limbs, although they can also alternate between the two sides or, less frequently, be completely unilateral.[16][17]

When comorbidities are present, it can be challenging to determine whether symptoms that resemble RLS are actually caused by comorbidities or by RLS itself. Possible mimics of RLS include Peripheral neuropathies, Radiculopathies, Positional discomfort, Painful legs and moving toes, Nocturnal legs cramps, Vascular claudication, spinal claudication, Peripheral vascular-disease, Varicose veins, Propriospinal myoclonus, Sleep myoclonus, Fasciculations, Akathisia, Attention deficit hyperactivity disorder, Volitional movements, foot tapping, leg rocking.[18]

The exact pathophysiology of RLS is unknown. Restless Legs Syndrome (RLS) is caused by a shortage of iron in the brain, particularly in areas that control movement, such as the substantia nigra, thalamus, and red nucleus. This happens due to problems with iron transport and storage, leading to lower iron levels in nerve cells. Since iron is essential for dopamine production and function, its deficiency results in an imbalance where dopamine levels increase, but dopamine receptors decrease, causing faulty communication between nerve cells. This disruption leads to abnormal brain signaling, triggering the uncomfortable sensations and urge to move seen in RLS. Additionally, iron transport issues in the choroid plexus further limit iron availability in the brain, worsening the condition. These combined changes in iron metabolism and dopamine activity explain the neurological basis of RLS.

The current diagnostic criteria for RLS have been developed by the International Restless Legs Study Group (IRLSSG).

Essential diagnostic criteria for RLS (all must be met) by international restless leg syndrome study group: Unpleasant and uncomfortable sensations may accompany a constant desire to move the lower extremities.

The desire to move the extremities is less intense during the day and gradually increases at night and in the evenings. Additionally, the symptoms occur while at rest or during times of inactivity and sleep.

Walking around or stretching your legs can help reduce the impulse to move your lower extremities. As long as the activity is continuing, the symptoms are either minimal or non-existent.

In the evenings, the impulse to move the lower extremities intensifies, making it impossible to fall asleep. As a consequence, the patient frequently feels exhausted during the day.

These symptoms cannot be misunderstood for other medical or behavioural conditions including myalgia, venous stasis, leg oedema, arthritis, leg cramps, positional discomfort, habitual foot tapping. [19]

Non-pharmacological methods are easy to use, inexpensive, safe, and self-practiced; they may also improve quality of life.

Commonly utilized therapies for RLS care include acupuncture, foot massage, transcutaneous electric nerve stimulation, vibration pads, compression devices, positional release therapy, walking, infrared therapy, stretching exercises, and thermotherapy application. [20]. Physical therapies like stretching exercises, positional release therapy, cardiovascular activities, thermotherapy, cryotherapy, and traction straight leg raise are examples of non-pharmaceutical strategies that have demonstrated potential in reducing RLS symptoms without the negative side effects of medication. Further research is necessary because there is a dearth of information on these nonpharmaceutical methods, especially in the field of physical therapy. [21] Positional Release Technique (PRT) is a manual therapy method that alleviates musculoskeletal pain by placing the body in a position of comfort to reduce neuromuscular tension. In 1981, Jones developed the osteopathic positional release technique (PRT), which involves placing the afflicted tissue in the most comfortable position to restore the dysfunctional related tissue and reduce the irritation of the tender point. Initially referred to as "spontaneous release by positioning," this technique was later renamed "strain and counter strain." The phrase "positional release" eventually became widely used. By placing patients in a comfortable position that makes it easier for the body to eliminate inflammatory mediators that cause sensitization, PRT helps to relax injured tissues, which may be the cause of its soothing effects. The mechanism behind this technique is that the muscular shortening sends a signal to the brain, which in turn lowers the muscle contraction. This technique relieves somatic dysfunctions that are too severe or delicate for conventional methods to treat.[22]

Positional release therapy, also referred to as strain counterstain therapy or manual therapy, improves muscle flexibility by maintaining the muscle in a shortened position to promote further muscle relaxation. PRT keeps the muscle in a comfortable position for ninety seconds while applying constant manual pressure. [23]

The International RLS Study Group [IRLSSG] questionnaire is the source of this instrument. The purpose of the scale was to rate the severity of RLS symptoms. It is composed of ten items rated on a four-point likert scale ranging from mild [1] to very severe [4]. The overall scores were between 10 and 40. The following criteria were used to classify the severity of restless leg symptoms: mild (scores 1–10), moderate (scores 11–20), severe (scores 21–30), and extremely severe (scores 31–40). The reliability of the IRLS had been tested and found to be internally consistent, valid and reliable.

NPRS-The 11-point numerical scale, which ranges from "0" (no pain) to "10" (severe pain), is a unidimensional indicator of the severity of pain experienced by adults. Four pain levels were evaluated using it: 0 denoted no pain, 1–3 mild pain, 4–6 moderate pain, and 7–10 severe pain.[24] Restless leg syndrome (RLS) is a neurological disorder that causes uncomfortable sensations in the legs, leading to pain, discomfort, and disturbed sleep, significantly affecting quality of life. While medications are commonly used to manage symptoms, they may not be effective for all patients and can have side effects. Therefore, alternative nonpharmacological treatments are needed to address this condition.

Positional Release Technique (PRT) is a manual therapy that aims to reduce muscle tension and alleviate pain through body positioning. Though it has shown success in treating musculoskeletal pain, there is limited research on its effects on RLS. Given the muscular and neurological components of RLS, PRT could offer a promising, non-invasive approach to managing symptoms.

This study is necessary to assess whether PRT can effectively reduce pain and the overall severity of RLS symptoms. If successful, it could provide an alternative or adjunctive treatment, offering a new strategy for improving patient outcomes and quality of life for those suffering from RLS.

The aim and objectives of the study was to “Evaluate the Impact of Positional Release Technique on Pain and Symptom Severity in Patients with Restless Legs Syndrome.”

II. MATERIALS & METHODS

STUDY DESIGN:

The study was Pre-test and post-test single group experimental study design.

STUDY SETTING:

This study was conducted in Department of Physiotherapy, KG Hospital, Coimbatore.

STUDY DURATION:

The study was conducted for a period of 6 months.

STUDY SAMPLING:

15 patients who fulfilled the predetermined inclusion criteria were selected and enrolled in a single experimental group for the study.

SELECTION CRITERIA:

The inclusion criteria were, both male and female, Age between 20-50, Positive diagnosis on the IRLS study diagnostic criteria, Suffering from RLS score with mild to moderate (1-20) based on IRLS criteria, Not receiving other physical therapy or alternative treatments for RLS in the past 4 weeks, No cognitive impairments affecting response to treatment. The exclusion criteria were, IRLS score greater than 20, Musculoskeletal deformity, Impaired sensation and other neurological problems, Severe cardiovascular and musculoskeletal disorders, Secondary RLS (Pregnancy, anaemic, diabetes), History of uncontrolled psychiatric disorders, Current use of drugs known to precipitate RLS such as antidepressants, Recent traumatic injury, fracture or musculoskeletal surgery, Tropical changes, Patients who are all not willing to participate.

PROCEDURE:

All patients who reported to Department of Physiotherapy, KG Hospital, Coimbatore with Restless Legs Syndrome were screened based on the inclusion and exclusion criteria. A total of 32 subjects were initially considered, out of which 15 patients who met the inclusion criteria and were willing to participate were selected through a convenient sampling method. Informed consent was obtained, and a clear explanation of the study was provided before participation. Pain levels were assessed using the Numeric Pain Rating Scale (NPRS), and symptom severity was evaluated using the International Restless Legs Syndrome Severity Rating Questionnaire (IRLS). A pre-test evaluation was conducted on the first day before the intervention. The treatment consisted of a 25-minute session per day, three days a week, for six weeks. A post-test evaluation was conducted on the final day of treatment using the outcome measures.

III. DATA ANALYSIS AND INTERPRETATION

TABLE I: AGE GROUP CLASSIFICATION

S.NO	AGE RANGE	MEMBERS	PERCENTAGE
1	20 - 30	7	46.70%
2	31 - 40	3	20%
3	41 - 50	5	33.30%
TOTAL		15	100%

GRAPH – I

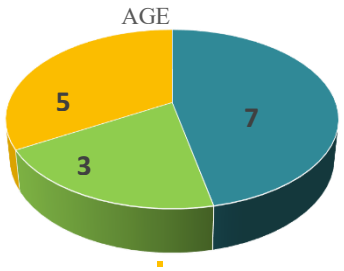


TABLE II: GENDER CLASSIFICATION

S.NO	GENDER	MEMBERS	PERCENTAGE
1	MALE	6	40%
2	FEMALE	9	60%
TOTAL		15	100%

GRAPH – 2

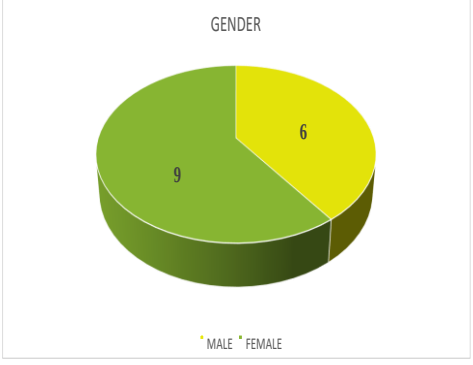
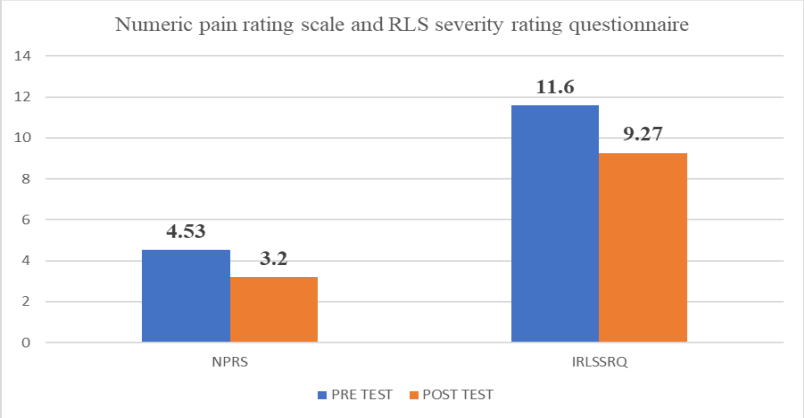


TABLE III: DESCRIPTIVE ANALYSIS OF NUMERIC PAIN RATING SCALE AND INTERNATIONAL RESTLESS LEG SYNDROME SEVERITY RATING QUESTIONNAIRE

Parameter	Test	Mean ± SD	Calculated 't' value	Table 't' value	'P' value
NPRS	Pre-test	4.53± 1.25	4.0000	2.145	0.05
	Post-test	3.20 ± 0.94			
IRLSSRQ	Pre-test	11.60 ± 4.72	3.5775	2.145	0.05
	Post-test	9.27 ± 4.25			

Table III shows that analysis of Numeric pain rating scale and International restless legs syndrome severity rating scale. Using paired 't' test with 14 degrees of freedom and 5% as level of significance, comparison of pre and post-test values of this group showed that calculated 't' value is 4.0000 for NPRS and 3.5775 for IRLSSRQ, which is significantly greater than the tabulated 't' value (2.145). The results shows that there is marked difference between the pre-test and post-test values.

GRAPH-III: PRE AND POST TEST MEAN SCORES OF NUMERIC PAIN RATING SCALE AND INTERNATIONAL RESTLESS LEG SYNDROME SEVERITY RATING QUESTIONNAIRE



Graph III shows the mean value of pre and post-test analysis of Numeric pain rating scale and International restless leg syndrome severity rating questionnaire.

In this study, 15 patients with Restless Legs Syndrome (RLS) were selected to assess the impact of Positional Release Therapy on pain and symptom severity in RLS patients. A total of 15 subjects, aged between 20 to 50 years, were conveniently selected, as presented in Table I. Gender distribution included 6 males and 9 females, as shown in Table II. The paired 't' test analysis for the pre-test and post-test values of the Numeric Pain Rating Scale (NPRS), as presented in Table III, demonstrated a significant reduction in pain levels, with a calculated 't' value of 4.0000. The paired 't' test analysis for the pre-test and post-test values of the International Restless Legs Syndrome Severity Rating Questionnaire (IRLS), as presented in Table III, demonstrated a statistically significant improvement in symptom severity, with a calculated 't' value of 3.5775. The statistical analysis revealed a significant improvement in pain levels, as measured by the Numeric Pain Rating Scale (NPRS), followed by a notable reduction in symptom severity, as assessed using the Restless Legs Syndrome Severity Rating Questionnaire (IRLS).

IV. DISCUSSION

Restless legs syndrome (RLS) affects as many as 4–29% of the general population in developed countries. However, most people who are severely affected are middle-aged or older. In India, the prevalence of Restless Legs Syndrome (RLS) varies across different populations. A study reported an 8.36% prevalence among adolescents and young adults, significantly higher than the 2.1% observed in the general urban population.

Restless Legs Syndrome (RLS) is a neurological disorder causing uncomfortable leg sensations and an urge to move, worsening at rest and night. It can be primary or linked to conditions like iron deficiency, and movement provides temporary relief. Therefore, the positional release technique can be considered as a fundamental factor for reducing the pain and severity in restless legs syndrome patients. Muscle pain often arises from excessive contractions caused by calcium release

from the sarcoplasmic reticulum or a damaged sarcolemma. These prolonged contractions restrict blood flow, leading to waste buildup, muscle fatigue, and activation of pain receptors (nociceptors). This cycle results in increased stiffness, fibrous tissue formation, pain, and sarcomere loss, ultimately impairing movement and function. Improving local blood and lymph circulation can help relax injured tissues and remove inflammatory substances that heighten pain sensitivity. Maintaining a comfortable position supports better fluid perfusion, reducing muscle tension and discomfort.

The proprioceptive theory suggests that neuromuscular dysregulation can cause abnormal activation of agonist and antagonist muscle spindles, worsening pain and dysfunction. The Strain-Counterstrain (SCS) method addresses this by gently shortening affected muscles, restoring normal muscle spindle activity and neuromuscular function. Additionally, SCS enhances blood flow, influenced by the autonomic nervous system, supplying oxygen and nutrients while clearing metabolic waste. It may also affect the neuromuscular-ligament reflex, reducing ligament tension and excessive muscle activation. By restoring musculoskeletal balance, SCS can be an effective approach to pain relief and muscle rehabilitation. (Jency Thangasheela Gnanasigamani et al.)

Positional Release Technique (PRT), originally developed by Lawrence Jones in 1964, is a manual therapy approach that relieves pain and muscular dysfunction by passively positioning the body to minimize tension in affected tissues. The mechanism behind PRT in Restless Legs Syndrome (RLS) is based on its ability to reset dysfunctional proprioceptive reflexes and reduce abnormal neuromuscular activity.

According to MacDonald, Peters, and Leach, et al specific counterstrain points identified by Longden were found to be associated with RLS. These tender points, located in the pelvis and lower extremities, may contribute to hyperactive muscle spindle activity, leading to the characteristic restless leg sensations. PRT works by holding these points in a shortened and relaxed position for approximately 90 seconds, allowing a neurological "reset" of muscle tension and reducing aberrant proprioceptive signaling. This approach is believed to decrease excessive gamma motor neuron activity, which is commonly implicated in RLS-related involuntary leg movements.

Peters et al., demonstrated that treating RLS-specific counterstrain points led to a statistically significant reduction in symptom severity. One proposed mechanism is that PRT influences the autonomic nervous system by decreasing sympathetic nervous system overactivity, which has been linked to RLS pathophysiology. By modulating the parasympathetic response, PRT may help restore neuromuscular balance and reduce the urge to move the legs. Additionally, muscle relaxation through PRT may improve local blood circulation, reducing ischemia-related discomfort that can exacerbate RLS symptoms. Since RLS has been associated with both central and peripheral nervous system dysfunction, PRT may offer relief by addressing both musculoskeletal imbalances and neurological hypersensitivity.

Another key mechanism by which PRT may help RLS patients is through its effects on myofascial restrictions and muscle imbalances. Longstanding muscle tightness and fascial restrictions may contribute to the discomfort experienced in RLS, particularly in the lower extremities. By releasing these restrictions, PRT may enhance tissue mobility, reduce nociceptive input, and improve proprioceptive function. Peters et al. suggested that the activation of mechanoreceptors during PRT may alter the perception of pain and discomfort in RLS patients, leading to a reduction in symptom severity. Additionally, self-treatment techniques based on Longden's method, incorporated in the study, allowed patients to maintain the benefits of therapy between sessions, supporting the idea that sustained neuromuscular retraining is possible with this approach.

In conclusion, Restless Legs Syndrome (RLS) is often marked by painful and uncomfortable sensations in the legs, driven by dopaminergic dysfunction and iron deficiency, which disrupt neural activity and exacerbate muscle tension. Positional Release Technique (PRT) targets these symptoms by addressing specific tender points, which helps reduce muscle tension and reset proprioceptive reflexes. This process alleviates hyperactive muscle spindle activity, a key contributor to the restless leg sensations. By releasing myofascial restrictions and improving blood circulation, PRT helps reduce both pain and discomfort associated with RLS. Additionally, PRT's ability to relax muscles, enhance tissue mobility, and restore neuromuscular balance leads to a noticeable reduction in the frequency and severity of symptoms. This therapeutic approach provides long-term symptom relief, significantly improving the quality of life for RLS patients. According to the above mechanism of action, PRT is frequently used to reduce the tender points on the muscle. By identifying the tender point, fluids are moved out of the inflammatory area, which reflexively relaxes or tones the muscle.

In this study, we provided evidence that incorporating positional release technique for patients with Restless legs syndrome effectively reducing the pain and severity with the outcome measure of IRLS and NPRS. Hence this therapy which incorporates positional release technique can substantially reducing the pain and severity in patients with mild to moderate Restless legs syndrome.

V. CONCLUSION

This study aimed to evaluate the effectiveness of Positional Release Technique in reducing pain and symptom severity in patients with Restless Legs Syndrome (RLS). A total of 15 participants, aged 20 to 50 years, were selected based on specific criteria, and informed consent was obtained before participation. The findings revealed a significant reduction in pain levels, followed by an improvement in symptom severity, as assessed using the Numeric Pain Rating Scale (NPRS) and the International Restless Legs Syndrome Severity Rating Questionnaire (IRLS).

Statistical analysis showed a notable difference between pre-test and post-test scores, confirming the effectiveness of the intervention. As a result, the null hypothesis is rejected, and the alternative hypothesis is accepted. In conclusion, this study demonstrates that Positional Release Therapy is an effective approach for reducing pain and symptom severity in patients with Restless Legs Syndrome.

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