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Effectiveness of reflex release technique as an adjunct to neurodynamic mobilization technique in sciatica

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Abstract
There is a paucity of effective treatment in improving functional activity, remand decrease pain in sciatica. Although a variety of rehabilitative approaches have been shown to improve function, rom, and to decrease pain, present study suggested that using nds and rrt as an adjunct to nds had superior effects in improving functional activity, rom, and to decrease pain.
30 patients diagnosed with sciatica were included in this study. Patients were randomly allocated into two groups of 15 each. Group a received nds with 3 sets for each session, 1 set with 10 repetitions, and each repetition is held for 10 seconds, rest between each set is 3-5 minutes, for 20-30 minutes, 6times a week for 6 weeks. Group b received rrt as an adjunct to nds 3 sets for each session, 1 set with 12 repetitions, each repetition is held for 12 seconds for 20 minutes 6 times a week for 6 weeks. Pain intensity was measured using visual analogous scale (vas), rom was measured using slr (inclinometer), functional activity was measured using (odi) before and after the intervention. The data was collected at the baseline and post 6 weeks intervention through vas, slr (inclinometer) and odi and the results were analysed. The post-test mean values for group – a on vas is 1.00 and that for group – b is 0.53. The post-test mean values for group – a on odi is 23.73 and that for group – b is 10.40. The post-test mean value for group a on slr is 76.67 and that for group – b is 83.33. This study found equal improvement in both the groups on vas ($p>0.05$) but there were superior effects of nds+rrt therapy on odi & slr (inclinometer) ($p<0.05$).the statistical analysis helps in concluding that both nds and rrt as an adjunct to nds are equally effective in improving functional activity, rom, and decrease pain but rrt as an adjunct to nds has superior effects in improving functional activity. Hence, nds and rrt as an adjunct to nds therapy can be used alternatively in improving functional activity, rom, decrease pain but functional balance can be improved more by rrt as an adjunct to nds therapy.

Keywords: Sciatica, neurodynamic mobilization technique (NDS), Reflex Release Technique (RRT), Visual Analogous Scale (VAS), Oswestry Disability Index (ODI) Scale, Slr (Inclinometer).

Introduction

Sciatica refers to a set of symptoms including pain numbness, muscular weakness, and movement limitations due to compression and irritation of the sciatic nerve. Pain is usually felt in the lower back, buttocks, and several dermatomes of affected thigh, leg, and foot. It affects many people and its related disabilities disturbs their lives. Sciatica may be caused by disc bulge or herniation, lumbar canal stenosis, spondylolisthesis, trauma, piriformis syndrome, and spinal tumours. Neurodynamic mobilization plays a great role in restoring the neural tissue ability to withstand the stress or tension via inducing reconstruction of normal physiological functions, reduction of pain, and improvement of function. Primal Reflex Release Technique (PRRT) is a treatment paradigm that falls under the regional interdependent approach to patient care and involves down-regulating an overstimulated autonomic nervous system in order to reduce patterns of pain. The paradigm is designed to address the neural system by resetting (recalibrating) hyper-aroused primal reflexes within the body. Sensitized areas are located using bilateral palpation during a one-minute nociceptive evaluation.

These reflex stimulations are generally performed lightly (as to not initiate a pain response) with several repetitions. A potential explanatory theory is that these repetitive reflex stimulations send many impulses to the spinal cord, which may cause the spinal cord and brain to temporarily overload and reset. When this happens, the brain may evaluate the situation and determine the current circumstances. If there was no actual current pathology or illness, rather only a faulty neurological circuit, the brain will clear the faulty pattern. This mechanism is similar to what may be happening in the gate theory of pain control.

After injury, the autonomic nervous system (ANS) may remain in a heightened state of sensitivity in order to protect from further injury. This state may be referred to as up-regulated and can be associated with pain, muscle spasm, muscle guarding, and altered motor behaviour. RRT utilizes reflexive stimulation to downregulate the protective response of the ANS to treat both pain in the musculoskeletal system and address possible upregulation or protective muscle contractions. As there are no studies on RRT in sciatica

Methodology

Study Design: A comparative study done in Susruta Institute of Physical Medicine and Rehabilitation with 30 subjects for 1 year.

Study groups

1. Group A received Neurodynamic mobilizations for 20-30min, 6 times a week for 6 weeks.
2. Group B received primal reflex release technique as an adjunt to NDS for 30min, 6times a week for 6weeks.

Inclusion criteria
- Age- 21-50 years
- Both genders – Male and female
- Patients with diagnosed sciatica of minimum VAS scale <_5
- Patients with sciatica pain minimum of 4weeks
- Patients with positive slump test with reproduction of neurological symptoms,
- Patients with functional disabilities in certain daily tasks as in lifting or walking.

Exclusion Criteria
- Patients were excluded if they had sciatica due to other pathologies (e.g., lumbar canal stenosis, piriformis syndrome). s
- Patients had any prior spinal surgery (e.g., unilateral hemilaminectomy or micro discectomy)
- Patients had a negative slump test, had progressive neurological symptoms (e.g., hyperirritable and unstable symptoms)
- Patients with history of vertebral fracture or trauma, had systemic disorders (e.g., diabetes mellitus), or were pregnant.
- Patients attending another therapy to decrease pain, to improve ROM, Functional ability

Methods
1. Neurodynamic mobilizations
2. Reflex release technique as an adjunct to NDS

Outcome Measures
1. Pain intensity was measured using visual analogue scale (VAS).
2. Rom of SLR was measured using hand held inclinometer.
3. Functional disability was measured using Modified oswestry disability index (ODI).

Procedure

30 patients with sciatica were included in this study. The patients were randomly allocated into two groups of 15 each. Group A received Neurodynamic mobilization technique with 3 sets for each session, 1 set with 10 repetitions, each repetition is held for 5-10 seconds on patient's pain tolerance level, rest between each set is 3-5minutes, for 20-30minutes 6times a week for 6weeks.Group B received RRT as an adjunct to NDS with 3 sets for each session, 1 set with 12 repetitions, each repetition is held for 12 seconds for 20minutes 6times a week for 6weeks Pain intensity was measured using visual analogue scale, ROM of SLR is measured using inclinometer, functional disability was measured using Oswestry disability index (ODI). The data was collected at baseline and post 6weeks of intervention and results were analysed.

The straight leg raising (SLR) test performed in sitting position combined with spinal flexion that induces more neural tension. Patient is in sitting position on the edge of a plinth, asked to flex thoracic and lumbar spine first, then asked to flex his neck to get his chin on his chest. The examiner's hand is placed on the top of the patient's head and his elbow on the patient's thoracic spine maintaining this position. The patient is asked to actively extend his knee and dorsiflex his ankle until reproduction of his pain/symptoms or until his end range is reached. Finally, as a structural differentiation manoeuvre, the examiner removed his hand from the head of the patient and asked him to look up. Both techniques (slider and tensioner) were provided three sets in every session; the first: 10 repetitions, while the second: 15 repetitions, and the third: 20 repetitions. The repetitions were gradually increased to assure patients' tolerance during the techniques. The end position was hold for 5 seconds and the rest between sets was 1-2 minutes.

PRRT

Plantar reflex (primal), SI/Lumbar and L1 release, hamstring release, gastrocnemius release and eversion release as recommended in the PRRT guidelines. This cluster protocol of five PRRT techniques were chosen to focus on downregulating musculature of the posterior chain and targeting the specific release of the sciatic nerve. Each technique was applied for 12 seconds except for the planar reflex which was held for one minute. All patients were treated following the same protocol.

1. The plantar reflex is used to treat lower quarter pain conditions from the lumbar area down to the foot. The patient, was positioned supine with the foot over the edge of the plint. And was asked to hold a pencil between his toes while maintaining full plantar flexion and the motion of inversion to eversion for one minute.
2. The SI/Lumbar and was used to address an upregulation of the ANS specific to the coccyx, SI, Lumbar areas. The patient was positioned supine on the plinth. The patient was asked to bend their affected-side knee to 90 degrees and move the knee over the unaffected-side leg. The clinician stood on the unaffected side and provided static resistance as the patient contracted hip abductors. The patient was then asked to hold isometric abduction and external rotation against the clinician with the affected side while hiking the opposite hip upward. The patient slowly exhaled while performing the technique for 12 seconds for one application.
3. The hamstring release was used to address an upregulation of the ANS for the hamstring area. The patient was positioned in supine, and the involved hip was flexed to 45 degrees. The knee was flexed to 20 degrees. The Simulate technique was then applied for 12 seconds: The clinician tapped (i.e., stimulate deep tendon reflex) on two separate areas at the same time. In this case, the Simultap was used for the mid-belly of the hamstring (involved) and the patellar tendon.
4. The gastrocnemius release was applied as a fourth PRRT™ component to treat lower quarter pain. The patient was positioned in supine, and the hip and knee were flexed (45 degrees and 90 degrees respectively) with the ankles in 90 degrees of dorsiflexion. A Simultap was used on the ankle dorsiflexors and the patellar tendon.

NOTE = following the PRRT™ treatment the clinician began passive stretching of the patient's hamstring. The clinician completed three repetitions of 30-second holds at the patient's point of comfort.

5. Eversion release

The patients was positioned in supine, ankle is placed outside the edge of bed while patient actively holds ankle in eversion while stimulation is applied along the distal peroneal tendons.

6. Adductor release

The patient was positioned in supine, kness flexed, therapist stands along the side of bed on the affected side, holds the patient kness from posterior aspect ask the patient to abduct hip, kness while therapist resist it.

Results

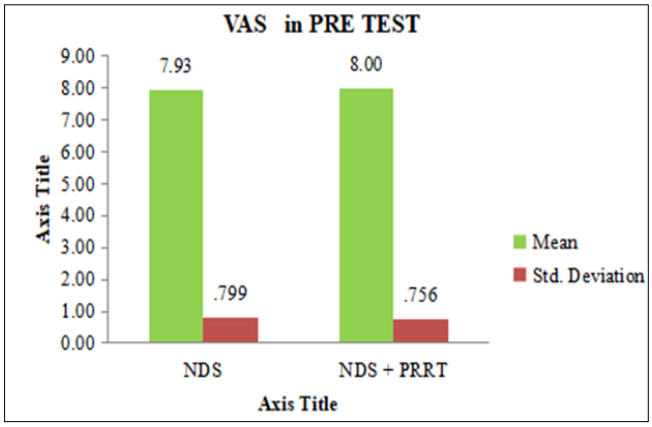

Fig 1

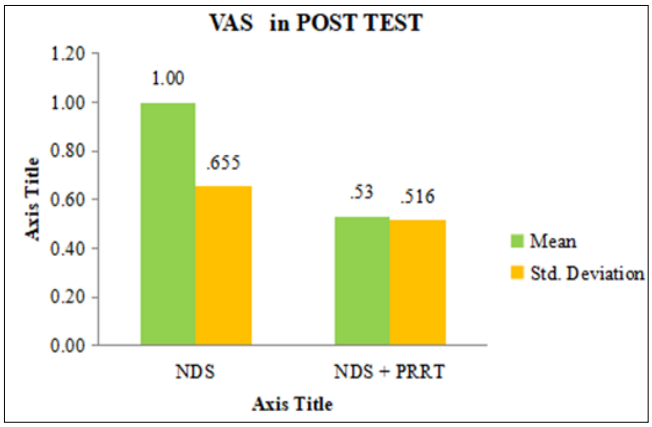

Fig 2

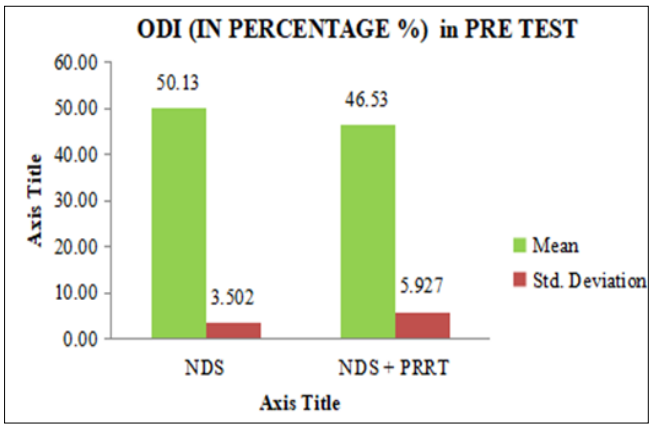

Fig 3

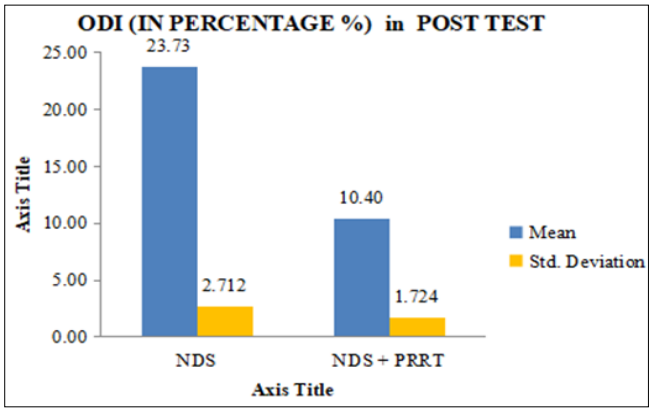

Fig 4

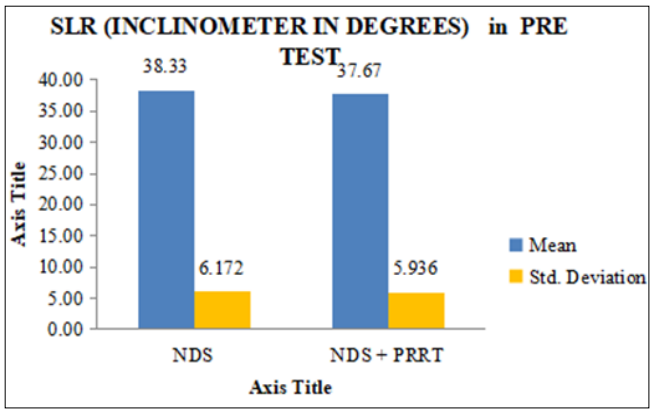

Fig 5

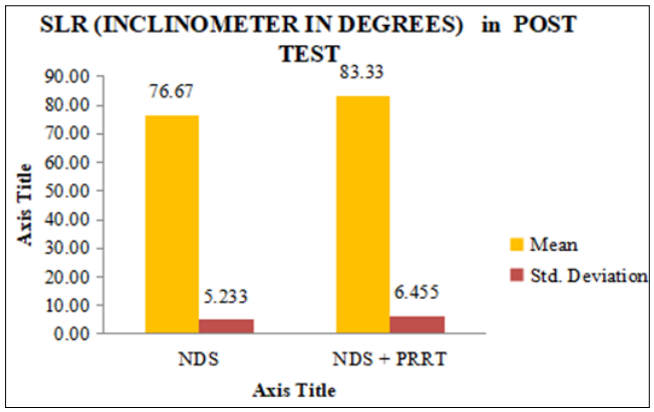

Fig 6

Discussion

The primary objective of this study was to compare the effectiveness of Neurodynamic mobilization techniques and RRT as an adjunct to NDS therapy in improving functional activity, rom and to decrease pain. This study included 30 sciatica patients who met with the inclusion criteria. They were randomly divided into two groups of 15 each. Group – A received neurodynamic mobilisation therapy whereas group – B received RRT as an adjunct to NDS therapy for 6 times a week for 6weeks each.

Neurodynamic Mobilization Technique

NDS is a form of physical therapy that, besides being extremely motivational has several advantages when compared to other techniques of pt intervention.

It can be used in any place, clinic or at home, it is independent from weather

Conditions. Neurodynamic mobilization plays a great role in restoring the neural tissue ability to stress or tension via inducing reconstruction of normal physiological functions, pain reductions, and improvement of ROM.

Refelex Release Technique + Nds

RRT is an pt intervention that utilizes reflexive stimulation to downregulate the protective response of the ANS to treat both pain in the musculoskeletal system and address possible upregulation or protective muscle contractions which helps in reduction of pain, improvement of functional activity, ROM.

Visual analogue scale

In this current study it was seen that there was reduction in pain in both groups. Which was due to neural tension

produced along the nerve course in both groups and to that of activation of ANS in addition to group B.

Current study states that there is significant decrease in pain in both groups. The mean values for pre and post-test values on VAS for GROUP A & GROUP B are (PRE) GROUP =A is 7.93, GROUP =B is 8.00 whereas that of (POST) GROUP=A is 1.00, GROUP=B is .53.

Oswestry Disability Index Scale

There was also improvement in functional activity in both the groups, but group B has more improvement in functional activity. Current study states that there is significant improvement in functional activity in both groups. The mean values for pre and post test values on ODI% for GROUP A & GROUP B are (PRE-TEST) GROUP =A is 50.13%, GROUP =B is 46.53% whereas that of (POST TEST) GROUP=A is 23.73%, GROUP=B is 10.40%, indicating that group B has more significant improvement in improving functional activity in patients with sciatica.

Slr (Inclinometer)

There was also improvement in ROM in both the groups, but group B has more significant improvement in improving ROM. Current study states that there is significant improvement in SLR in both groups. The mean values for pre and post-test values on SLR(INCLINOMETER) for GROUP A & GROUP B are (PRE-TEST) GROUP =A is 38.33, GROUP =B is 37.67 whereas that of (POST TEST) GROUP=A is 76.67, GROUP=B is 83.33, indicating that group B has more significant improvement in ROM in patients with sciatica.

Although there were significant improvements in both the groups on three scales, it was observed that NDS and RRT as an adjunct to NDS were equally effective in decreasing pain, measured by VAS ($p>0.05$) but there were superior effects of RRT as an adjunct to NDS therapy in improving functional activity**,** ROM measured byODI%, SLR(INCLINOMETER) ($p<0.05$). The means of post-test for VAS are group – A (1.00) and group – B (.53) whereas that for ODI% are group – A (23.73%) and group – B (10.40%), whereas that for SLR (INCLINOMETER) are group – A (76.67) and group – B (83.33).

These values interpret that NDS and RRT+NDS therapy are equally effective in decreasing pain and RRT+NDS therapy is more effective in improving functional balance, ROM. The patients in each group showed improvements in different components of ODI%, SLR (INCLINOMETER) mentioned as earlier. But both the groups showed similar improvements in components of VAS. This could be due to the concept of mechanical and physiological continuity between the CNS and Peripheral Nervous System (PNS), which is applicable in RRT which was lacking in patients when NDS alone is given.

Conclusion

This study was conducted to compare the effectiveness of neurodynamic mobilization techniques and reflex release technique as an adjunct to NDS in improving functional activity, ROM, and to decrease pain. The results of the study conclude that both the groups had a significant improvement in functional activity, ROM, and in decreasing pain.

The result from outcome measures provides absolute evidence by which we can conclude that neurodynamic mobilization techniques and RRT as an adjunct to NDS therapy are equally effective in decreasing pain, but RRT as an adjunct to NDS therapy had superior effects in improving functional activity, ROM in patients with sciatica.

The outcome measures of this study are VAS and ODI which are very valid and reliable measures for assessing balance and trunk & SLR (INCLINOMETER) in patients with sciatica.

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