A RANDOMIZED STUDY COMPARING ACTIVE AND POSITIONAL RELEASE TECHNIQUES FOR MYOFASCIAL TRIGGER POINTS IN THE GASTRO-SOLEUS COMPLEX AMONG MALE RECREATIONAL RUNNERS

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ABSTRACT

Background: Repetitive loading during running can lead to tightness and trigger point formation in the gastrosoleus complex. Active Release Technique (ART) and Positional Release Therapy (PRT) are manual therapy techniques used to manage such dysfunctions.

Objective: To compare the effectiveness of ART and PRT in reducing pain and improving ankle dorsiflexion in recreational runners with gastrosoleus trigger points.

Method: Twenty male recreational runners were randomly assigned to Group A (PRT) or Group B (ART). Both groups received interventions targeting the gastrocnemius and soleus muscles. Pain intensity (NPRS) and dorsiflexion ROM (goniometer) were measured pre- and post-intervention.

Results: Both groups showed significant improvement. However, ART demonstrated superior outcomes in reducing pain and increasing ROM compared to PRT.

Conclusion: ART is more effective than PRT in treating gastrosoleus trigger points in recreational runners.

Keywords: Active Release Technique, Positional Release Therapy, Gastrosoleus, Trigger Points, Recreational Runners

INTRODUCTION

Running is one of the most accessible and widely practiced physical activities across the globe, renowned for its multifaceted health benefits including cardiovascular enhancement, musculoskeletal strength, mental well-being, and weight management. Over the past few decades, running has emerged as a preferred mode of exercise due to its minimal financial requirements, ease of implementation, and adaptability across diverse populations. Individuals of varying age groups and fitness levels engage in running to fulfill personal fitness goals, therapeutic needs, and even social interaction. This surge in global interest has also been fueled by increasing public awareness about health and fitness, and the integration of running into preventive healthcare and wellness programs.

Despite its advantages, running is not without its drawbacks. It is often associated with a high incidence of overuse injuries, particularly affecting the lower limbs. Research has indicated that nearly 50% of running-

related injuries involve the knees, ankles, and feet. These injuries are commonly attributed to repetitive microtrauma, faulty biomechanics, inadequate warm-up or cool-down routines, and errors in training load. Injuries often develop gradually, impairing functional performance and leading to pain, reduced range of motion, and decreased participation in physical activity. The most frequently observed injuries among runners include patellofemoral pain syndrome, Achilles tendinopathy, plantar fasciitis, shin splints, and calf strain.

Within the running community, recreational runners—often referred to as "fun runners" or non-elite runners—form a substantial demographic. These individuals engage in running not for professional competition but primarily for the purpose of maintaining fitness, enjoying physical activity, relieving stress, and participating in social or community-based events. Although they may not follow highly regimented training schedules like competitive athletes, recreational runners are still exposed to musculoskeletal stress and are equally susceptible to developing chronic conditions due to overuse, poor running form, or inadequate recovery.

A crucial component of the running mechanism is the triceps surae muscle group, which includes the gastrocnemius and soleus muscles. These muscles are integral to plantarflexion of the ankle, and they contribute significantly to propulsion during the gait cycle. In running, particularly during the push-off phase, these muscles bear substantial loads—sometimes up to 6–8 times the body weight during mid-stance and toe-off. Continuous loading and repetitive stress, especially in the presence of poor flexibility or muscular imbalance, can lead to tightness, fatigue, and the formation of myofascial trigger points (MTrPs).

Myofascial trigger points are defined as localized hyperirritable spots within taut bands of skeletal muscle fibers that are painful on compression and can cause referred pain, motor dysfunction, and autonomic phenomena. First defined by Dr. Janet Travell and Dr. David Simons, these trigger points are recognized as a major source of musculoskeletal pain and dysfunction. They are believed to form due to excessive release of acetylcholine at the neuromuscular junction, leading to sustained sarcomere contraction, reduced blood flow, hypoxia, and subsequent release of pain-inducing biochemicals like bradykinin, histamine, and prostaglandins.

Trigger points are typically categorized into active (painful at rest and on movement), latent (asymptomatic until palpated), central (near the motor endplate), and satellite (caused by another primary trigger point).

In order to address the complications arising from trigger points, various manual therapy techniques have been developed and integrated into clinical practice. Two such techniques, Active Release Technique (ART) and Positional Release Technique (PRT), have been widely utilized for managing soft tissue dysfunctions.

Active Release Technique (ART), introduced by Dr. P. Michael Leahy, is a soft tissue manipulation method aimed at identifying and releasing adhesions or scar tissue that restrict movement and cause pain. It involves the application of precise tension combined with specific movements of the affected tissue to break down fibrotic adhesions, improve tissue elasticity, and restore normal range of motion. ART is particularly useful in cases involving repetitive strain injuries, nerve entrapments, and muscle tightness affecting performance and function. It is a dynamic and movement-oriented approach that requires practitioner expertise and patient cooperation.

On the contrary, Positional Release Technique (PRT), formerly known as “Strain-Counterstrain,” was developed by Dr. Lawrence Jones. This method is based on placing the affected muscle or joint in a position of maximal comfort or ease—usually a shortened position—for a brief period, allowing for relaxation of the muscle spindle and reduction in gamma motor activity. The technique is passive and gentle, aiming to interrupt the pain-spasm-pain cycle, reset abnormal proprioceptive input, and reduce tenderness at the trigger point. PRT is especially beneficial for chronic musculoskeletal conditions where pain and muscle guarding are predominant features.

Given the central role of the gastrosoleus complex in running mechanics and the high prevalence of calf-related injuries among recreational runners, it becomes imperative to identify the most effective therapeutic

strategies for managing trigger points in these muscles. Although both ART and PRT have demonstrated efficacy in relieving pain and improving mobility, direct comparative studies—especially in the context of recreational runners—are limited.

Hence, the current study was undertaken to compare the immediate effects of Active Release Technique and Positional Release Technique on pain reduction and ankle dorsiflexion range of motion in male recreational runners diagnosed with gastrosoleus trigger points. The outcomes of this study aim to provide evidence-based guidance to clinicians and rehabilitation professionals in selecting the most suitable intervention for optimizing muscle performance and minimizing injury risk in this population.

MATERIALS AND METHODLOGY

This study followed a pre and post experimental design to compare the effectiveness of Active Release Technique (ART) and Positional Release Technique (PRT) in treating gastrosoleus trigger points among male recreational runners. The research was carried out over a period of four weeks at the Outpatient Department of Thanthai Roever College of Physiotherapy, Perambalur, under the supervision of the designated institutional authorities.

A total of 20 male participants were selected through purposive sampling based on specific inclusion and exclusion criteria. These participants were randomly allocated into two groups of ten each. Group A received treatment using the Active Release Technique, while Group B was treated using the Positional Release Technique. All participants were between the ages of 20 and 25 and had a consistent history of recreational running—defined as running at least three to four times per week for more than six months. To be eligible, individuals needed to present with a pain intensity of more than 4 on the Numerical Pain Rating Scale (NPRS) and demonstrate restricted ankle dorsiflexion, specifically less than 20 degrees.

Participants were excluded from the study if they had any conditions that could compromise the validity of the results. These included fibromyalgia syndrome, congenital deformities of the foot or ankle, tumors, lower limb fractures, peripheral vascular disorders, or any recent injuries involving the foot or ankle.

The tools and materials used in this study included a universal half-circle goniometer to measure ankle dorsiflexion, ice packs for post-treatment care, a couch to facilitate comfortable positioning during therapy, and standard stationery items like paper and pen for documentation purposes.

Outcome measures were assessed using two reliable and widely accepted tools. The first was the goniometer, which was used to evaluate the range of motion (ROM) in ankle dorsiflexion. A typical ROM for ankle dorsiflexion was considered between 0 and 20 degrees. The second tool was the Numerical Pain Rating Scale (NPRS), which provided a subjective measure of pain intensity. Participants were asked to rate their pain on a scale from 0, indicating no pain, to 10, representing the most severe pain imaginable. Both outcome measures were recorded prior to the intervention and again after the treatment sessions to assess the efficacy of the applied techniques.

PROCEDURE

Group A: Positional Release Technique (PRT)

Participants allocated to Group A received Positional Release Technique targeting the gastrocnemius and soleus muscles. All interventions were performed with the subject in a prone position to facilitate optimal access to the posterior compartment of the lower leg.

For the gastrocnemius muscle, the subject's knee was positioned at 90° flexion with the ankle in plantarflexion. The therapist, positioned in a walk-standing stance beside the treatment couch, identified myofascial trigger points through palpation. Once located, deep manual pressure was applied over the trigger point and

maintained for 90 seconds. This procedure was repeated three times per session, with interventions delivered consistently over a four-week period.

Treatment of the soleus muscle was conducted with the subject's knee extended and ankle maintained in plantarflexion. Deep sustained pressure was applied to the palpated trigger point for 90 seconds and repeated three times per session, identical in protocol to the gastrocnemius intervention. The intervention continued for four consecutive weeks.

Following each treatment session, all participants received adjunctive care comprising the application of ice packs, eccentric exercises targeting the plantarflexors, and static stretching exercises for both the gastrocnemius and soleus muscles.

Group B: Active Release Technique (ART)

Participants in Group B underwent Active Release Technique (ART), targeting the same muscle groups. All procedures were performed with subjects positioned in prone lying.

For the gastrocnemius muscle, the subject's knee was flexed to 90°, and the ankle was positioned in plantarflexion. After palpating the trigger point, the therapist applied deep, sustained pressure over the site. While this pressure was maintained, the subject was instructed to actively extend the knee and dorsiflex the ankle to induce dynamic tension across the muscle. Each repetition was followed by a 10-second relaxation period. A maximum of 15 repetitions were performed per session, administered over a period of four weeks.

For the soleus muscle, the intervention was conducted with the subject lying prone, the knee extended, and the ankle placed in plantarflexion over the edge of the treatment couch. Deep pressure was applied to the trigger point, and the subject actively dorsiflexed the ankle during sustained compression. A 10-second rest interval was allowed between each repetition, with up to 15 repetitions conducted per session throughout the four-week intervention period.

Following each treatment session, all participants received adjunctive care comprising the application of ice packs, eccentric exercises targeting the plantarflexors, and static stretching exercises for both the gastrocnemius and soleus muscles.

DATA ANALYSIS

TABLE 1:- PRE AND POST ASSESSMENT VALUES OF NUMERICAL PAIN RATING SCALE (NPRS) ON POSTIONAL RELEASE TECHINQUE

PATIENT GROUP - A	PRE ASSESSMENT	POST ASSESSMENT (PRT)
1	8	4
2	5	2
3	7	3

4	9	2
5	6	3
6	8	3
7	9	2
8	7	3
9	6	2
10	8	3
Mean	7.3	2.7

GRAPH 1 :- POSITIONAL RELEASE TECHNIQUE ON NUMERICAL PAIN RATING SCALE

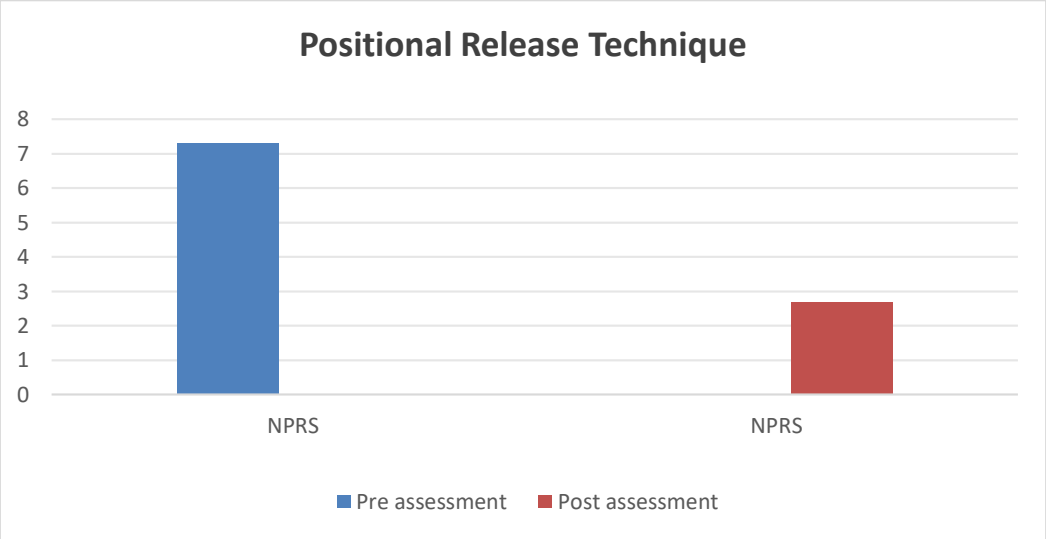

TABLE 2:- PRE AND POST ASSESSMENT VALUES OF ACTIVE RELEASE TECHNIQUE

PATIENT GROUP - B	PRE ASSESSMENT	POST ASSESSMENT(ART)
1	8	6
2	6	5

3	9	7
4	7	7
5	6	5
6	7	5
7	9	6
8	8	6
9	6	5
10	7	5
Mean Value	7.3	5.7

GRAPH 2:- ACTIVE RELEASE TECHNIQUE ON NUMERICAL PAIN RATING SCALE

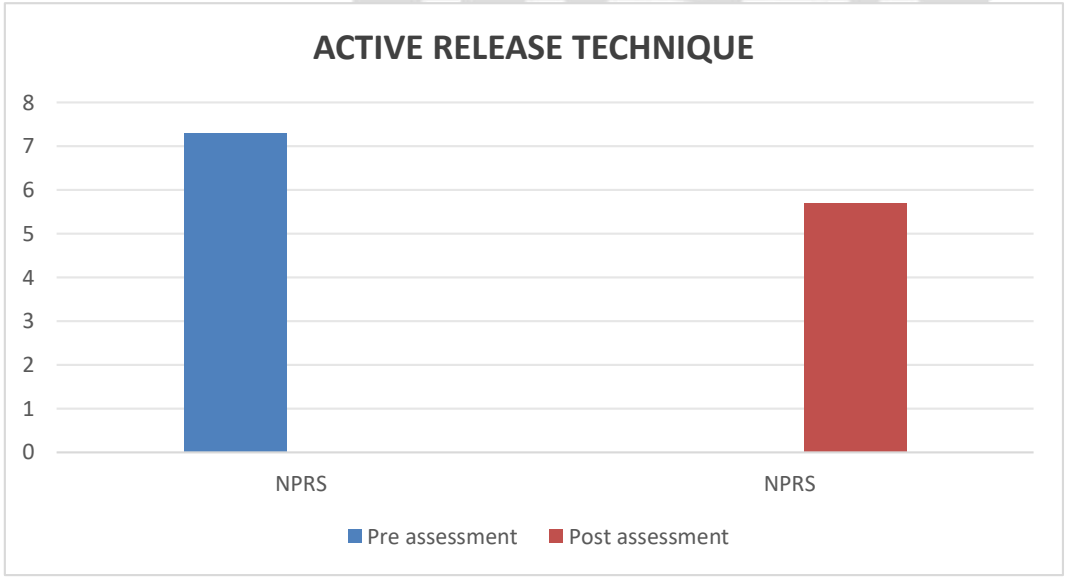

TABLE 3:- PRE AND POST ASSESSMENT RANGE OF MOTION OF POSITIONAL RELEASE TECHNIQUE

PATIENT GROUP-A	PRE ASSESSMENT	POST ASSESSMENT (PRT)
1	12^0	18^0
2	17^0	19^0
3	14^0	18^0
4	10^0	20^0
5	18^0	18^0
6	12^0	18^0
7	10^0	20^0
8	14^0	18^0
9	18^0	19^0
10	12^0	20^0
Mean	13.7	18.8

GRAPH 3 :- POSITIONAL RELEASE TECHNIQUE

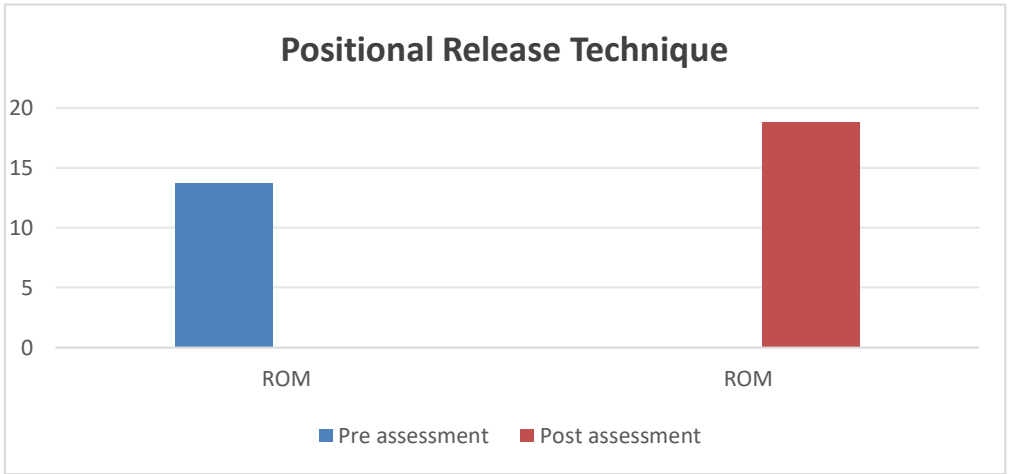

TABLE 4:- PRE AND POST ASSESSMENT OF ACTIVE RELEASE TECHNIQUE

PATIENT GROUP - B	PRE ASSESSMENT	POST ASSESSMENT(ART)
1	12^0	15^0
2	18^0	20^0
3	10^0	18^0
4	14^0	16^0
5	18^0	20^0
6	14^0	16^0
7	10^0	16^0
8	12^0	15^0
9	18^0	20^0
10	14^0	17^0
Mean	14.0	17.3

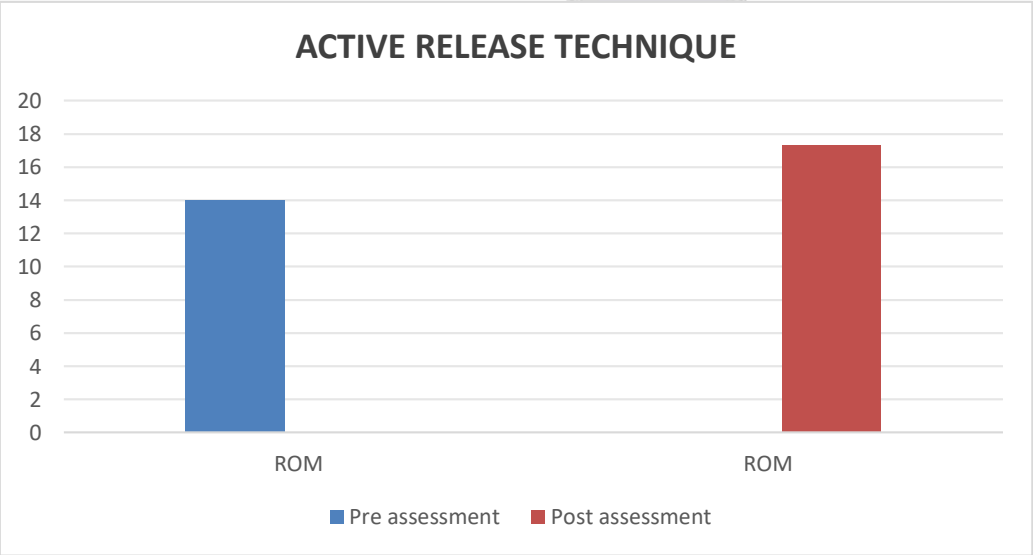

TABLE 4:- PRE AND POST ASSESSMENT OF ACTIVE RELEASE TECHNIQUE

RESULT

The Study revealed a significant improvement in ankle dorsiflexion range of motion and a notable reduction in pain scores following trigger point release in both groups. However, intergroup comparison indicated that Group A, which received Positional Release Therapy, demonstrated a greater enhancement in range of motion and a more substantial decrease in pain levels compared to Group B.

DISCUSSION

In this study, 20 subjects aged between 20 and 25 years, each presenting with at least one hypersensitive tender nodule (trigger point) within a palpable taut band of either the gastrocnemius or soleus muscle, were selected. These individuals were randomly divided into two groups of 10 each. A comparison was made between the effectiveness of Active Release Technique (ART) and Positional Release Therapy (PRT) in releasing gastrosoleus trigger points. The primary outcome measures used for evaluation were ankle dorsiflexion range of motion (ROM) and pain intensity assessed through the Numerical Rating Scale (NRS).

On intergroup comparison, Positional Release Therapy (Group A) demonstrated a greater improvement in ankle dorsiflexion ROM following trigger point release. PRT, by design, works by placing the muscle in a shortened position to facilitate relaxation and improve muscle flexibility. The neurophysiological mechanism underlying PRT involves reducing excessive gamma gain in the muscle spindle system. Hyperactivity of the myotatic reflex arc often a cause of restricted movement can be normalized by maintaining the muscle in a position of ease. This allows the reflex arc to reset, improving muscle length and joint mobility.

Additionally, pain scores on the NRS showed a significant reduction in both groups; however, Group A (PRT) showed a more considerable decrease in pain levels. According to the proprioceptive theory, passive shortening of the dysfunctional agonist muscle reduces the abnormal neuromuscular stimulation caused by continuous activation of the muscle spindles. This normalization helps restore normal function by allowing both agonist and antagonist muscle spindle activity to return to their resting state.

Statistically, the findings of this study support existing literature on the efficacy of both ART and PRT in reducing pain and enhancing ROM following trigger point release. However, this study specifically aimed to compare their immediate effects. The results indicated that PRT is more effective than ART in improving both ankle dorsiflexion and pain levels in the short term. Therefore, PRT can be considered a preferable approach in clinical settings for the management of gastrosoleus trigger points.

Despite the promising results, the study was limited by its small sample size and its focus solely on the immediate effects of the interventions. The study was conducted only in the outpatient department of Thanthai Roever College of Physiotherapy and did not include athletic populations or broader age groups. The participants were limited to the age range of 20 to 25 years, and future research should consider extending the age range beyond 30 years and include participants engaged in recreational sports or athletic activities.

Furthermore, future studies may benefit from exploring long-term outcomes of PRT, comparing male and female responses separately, and integrating various therapeutic approaches such as balance and proprioception training programs to enhance clinical applicability. The present treatment approach in this study was biomechanical; hence, incorporating neuromuscular and functional training methods could offer broader insights into comprehensive trigger point management.

CONCLUSION

The present trial, conducted on 20 male participants diagnosed with trigger points in the gastrosoleus muscle, evaluated the effectiveness of Active Release Technique (ART) and Positional Release Therapy (PRT) in

terms of pain reduction and improvement in ankle dorsiflexion range of motion. Pain intensity was measured using the Numerical Pain Rating Scale (NPRS), and range of motion was assessed using a goniometer. The findings of the study indicate that while both interventions were effective, Positional Release Therapy demonstrated superior outcomes, showing a greater increase in ankle dorsiflexion and a more significant reduction in pain. Therefore, PRT may be considered a more effective clinical intervention for the immediate management of gastrosoleus trigger points.

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