Optimizing Care for Myofascial Pain Syndrome: Head-to-Head Comparison of Dry Needling with Myofascial Release versus Trigger Point Therapy with Stretching; A Randomized Controlled Trial

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Abstract

Background: Myofascial Pain Syndrome (MPS) is a prevalent musculoskeletal disorder associated with trigger points, pain, and reduced quality of life. Although different physiotherapy techniques are used and studied but comparison of combined treatment regimens remains scarce.

Objective: To compare the effectiveness of Dry Needling combined with Myofascial Release versus Trigger Point Therapy combined with Stretching on pain intensity, craniovertebral angle (CVA), and health-related quality of life (SF-36) in MPS.

Methods: A three-arm randomized controlled trial was conducted at National Hospital Bahawalpur, Pakistan. Seventy-five participants (aged 20–40 years) with clinically diagnosed

MPS were randomly allocated into three groups. Interventions were delivered twice weekly for four weeks (8 sessions). Outcomes included pain intensity (NPRS), CVA (digital photography with MicroDicom), and SF-36 domains, assessed at baseline, mid-intervention, and post-intervention. Data were analyzed using SPSS-26 with mixed-design ANOVA.

Results: At baseline, groups were comparable ($p > .05$). A significant Group × Time interaction was found for NPRS, CVA, and all SF-36 domains ($p < .001$). DN with MFR achieved the greatest improvements: NPRS scores improved from 8.4 to 0.5, CVA improved from 40.4° to 48.0°), and SF-36 scores approaching normative values (85–95). TrPT with Stretching showed moderate benefits, while Control demonstrated minimal improvements.

Conclusion: DN with MFR is superior to TrPT with Stretching and Control in reducing pain, correcting postural alignment, and enhancing quality of life in MPS.

Trial Registration: The study clinical trial has been registered at PRS clinical trial registry USA (ID: NCT07098754).

Keywords: Myofascial Pain Syndrome, Dry Needling, Myofascial Release, Trigger Point Therapy, Stretching, Craniovertebral Angle, Quality of Life, Randomized Controlled Trial.

Introduction

Myofascial Pain Syndrome (MPS) is a musculoskeletal disorder which is very prevalent characterized by the presence of hyperirritable spots within taut bands of skeletal muscle, known as myofascial trigger points (MTrPs). These trigger points produce local and referred pain, restricted range of motion, and functional limitations that significantly impair quality of life (Dua A, 2025; Dommerholt and Gerwin, 2022). 30% to 93% of patients seeking care for musculoskeletal pain are found to suffer from Myofascial pain syndrome. Although MPS is typically diagnosed in people aged from 27years to 50years of age, it can also affect high-risk

and older populations, e.g. those with athletes, sedentary lifestyles, or workers who have jobs which demand high level of physical activity. The most affected areas include the shoulders, neck, and back. (Dua, 2025). Clinical trials have expressed that activated myofascial trigger points account for at least 40.0% of skeletal muscle pain syndrome in painful muscles (Partanen et al, 2010) The most affected sites in MPS are the shoulders, neck, and back. Literature has cited that activated trigger points are accounting for an increasing frequency of chronic skeletal pains. Myofascial Pain Syndrome (MPS) presents with regional pain, stiffness, limited range of motion, dysautonomia, proprioceptive disturbances, depression, and poor sleep**,** often aggravated by cold, fatigue, or overload. Clinical signs include restricted muscle stretch, palpable taut bands, tender nodules/trigger points with referred pain, localized tenderness, and characteristic local twitch responses (Coe et al, 2021).

Despite its burden, effective management of MPS remains clinically challenging due to its multifactorial etiology involving neuromuscular, biomechanical, and psychosocial components. Conventional treatments range from pharmacologic therapy to physical interventions such as stretching, manual therapy, and electrotherapy. However, no single strategy has emerged as universally effective, highlighting the need for comparative trials that directly evaluate different therapeutic combinations (Peñas, 2019).

Two frequently used multimodal approaches are Dry Needling combined with Myofascial Release (DN+MFR) and Trigger Point Therapy with Stretching (TrPT with Stretch). DN is thought to disrupt dysfunctional motor endplates, reduce spontaneous electrical activity, and normalize local biochemical milieu, thereby alleviating trigger point irritability and pain (Kietrys et al, 2013; Cagnie et al, 2013).

Myofascial Release complements DN by targeting fascial stiffness and adhesions, aiming to restore tissue extensibility and optimize load transfer across the musculoskeletal system. On the other hand, TrPT with stretching focuses on mechanical desensitization of MTrPs, restoration of muscle length, and improvement of flexibility, thereby reducing nociceptive drive and improving function (Guzmán-Pavón et al, 2024). While both interventions are widely used in clinical practice, robust evidence comparing their effectiveness within a single trial framework remains scarce.

Outcome measurement in MPS research has traditionally focused on pain intensity, often quantified by the Numeric Pain Rating Scale (NPRS). However, pain alone provides an incomplete picture of treatment efficacy. Given MPS's profound effect on health status, global patient-reported measures such as the Short Form-36 Health Survey (SF-36) are crucial for capturing health-related quality of life (HRQoL). Additionally, postural deviations, including reduced craniovertebral angle (CVA), have been observed in patients with MPS due to compensatory muscular imbalances (Nejati et al, 2019). Recent advances in digital photogrammetry using platforms such as MicroDicom allow for reliable, non-invasive assessment of CVA, offering objective postural metrics to complement subjective outcomes (Bhutto et al, 2021). Integrating these outcomes strengthens external validity and reflects both structural and functional recovery.

Although DN, MFR, TrPT, and stretching are individually supported by moderate evidence for pain reduction in MPS, few studies have compared integrated multimodal protocols. Evidence gaps remain regarding whether neuromyofascial release strategies (DN+MFR) outperform mechanical/manual desensitization approaches (TrPT+Stretching) in improving not only pain but also postural alignment (CVA) and quality of life. Furthermore, there is limited randomized

controlled evidence from South Asian populations, where MPS is prevalent and healthcare systems often rely on low-cost, pragmatic interventions.

This randomized controlled trial is the first of its kind to directly compare the effects of Dry Needling combined with Myofascial Release (DN+MFR), Trigger Point Therapy with Stretching (TrPT+Stretching) and control group or conventional physiotherapy in patients with Myofascial Pain Syndrome (MPS). Importantly, the study employs MicroDicom-based digital photogrammetry as a standardized, non-invasive method for CVA assessment, a novel approach within this clinical population. Furthermore, it contributes high-quality evidence from Southern Punjab, Pakistan, a region underrepresented in musculoskeletal RCTs, thereby addressing both a methodological and geographical research gap.

Methodology

Study Design and Setting

This study was designed as a single-center, three-arm randomized controlled trial (RCT) conducted at the National Hospital, Bahawalpur, Pakistan. The study commenced from 15th June 2025 and was completed on 20th August, 2025. The study protocol was approved by the ethical review committee of NOGH, and written informed consent was obtained from all participants before enrollment. The trial followed the CONSORT 2010 guidelines for reporting randomized clinical trials.

Sample Size

A total of 75 participants were recruited using consecutive non-probability sampling techniques, with 25 participants allocated to each of the three groups (Group A, Group B, Group C). Sample size was calculated using G Power software version 3.1. A medium effect size (f) of 0.25, power

(1-β) of 80%, correlation (r) of 0.5, a non-sphericity correlation (€) of 1 and alpha level of 0.05, two groups.

Participants selection

Inclusion Criteria

Participants were considered eligible for inclusion if they were between 20 and 40 years of age, regardless of gender, and had a confirmed clinical diagnosis of Myofascial Pain Syndrome (MPS) established by a qualified healthcare professional using standardized diagnostic criteria, supported by clinical examination with or without imaging studies. Eligible participants presented with altered cervical posture characterized by a reduced craniovertebral angle, restricted cervical range of motion resulting from muscular spasm, and cervical or upper extremity pain, with or without associated radiculopathy. Only individuals with moderate symptom severity, as determined through clinical assessment, were enrolled. Additionally, participants were required to demonstrate a willingness to participate in the study and provide informed consent.

Exclusion Criteria

Participants were excluded from the study if they had systemic comorbidities such as uncontrolled diabetes or cardiovascular disease, were pregnant or lactating, or presented with contraindications to dry needling or manual therapy, including bleeding disorders, active infection, or the use of anticoagulant medications. Individuals with a history of cervical trauma, congenital anomalies, or malignancy were also excluded, as were those who had undergone previous surgical interventions in the cervical region.

Randomization and Allocation

Eligible participants were randomly assigned to one of the three intervention groups using a systematic allocation method. Patients were enrolled sequentially, and allocation was performed in a systematic way by choosing first three participants through lottery method to any of the three groups, and it happened that first participant went to Group B, second participant went to Group A and third to Group C. From fourth participant onwards, the participants were allocated systematically to these groups in the same sequence as set by the lottery method.

Interventions

Group A: Dry Needling with Myofascial Release (DN+MFR)

Dry Needling (DN):

Participants were placed in the prone position. Sterile acupuncture needles (0.25 × 25 mm) were inserted into palpated trigger points at a 30° angle into taut bands. A deep dry needling (DDN) technique was applied: needles were left in situ for 20 minutes total, rotated clockwise at the 10th minute, and withdrawn after 20 minutes. Pain reproduction or a local twitch response confirmed proper placement (Tasoglu et al, 2017; Tekin et al, 2013).

Myofascial Release (MFR):

MFR was applied in a sequence from superficial to deeper fascial layers. Initial skin rolling (2–3 minutes) was followed by cross-hand stretching of deep fascia at the symptomatic site. Pressure was progressively increased according to tolerance. Sessions concluded with 2–3 minutes of superficial stroke massage for relaxation.

Group B: Trigger Point Therapy with Stretching (TrPT+Stretching)

Trigger Point Therapy (TrPT):

With participants seated, trigger points in the upper trapezius region were palpated and marked. Sustained digital pressure was applied gradually until pain was reproduced (acknowledged verbally by the participant). The pressure was held for 5 seconds and released. Each point was treated for 5–6 repetitions.

Stretching:

Passive static stretches were performed in supine position, targeting key cervical muscles. Upper trapezius was stretched by passive contralateral side flexion for both sides, sclanes were stretched by ipsilateral side flexion with rotation, extensors were stretched by passive cervical flexion and flexors by passive cervical extension. Each stretch was held for 30 seconds**,** repeated 4–5 times, with 10–15 second rest intervals. Additionally, chin tuck exercises (to stretch sub-occipitals) were held for 3–5 seconds and repeated 4–5 times. (Häkkinen et al, 2007).

Group C: Control Group (Conventional Physical Therapy)

Participants received electrotherapy consisting of TENS (Transcutaneous Electrical Nerve Stimulation), Ultrasound therapy, Stretching and Cervical Range of Motion (ROM) exercises. This regimen followed standard physiotherapy practice guidelines for MPS.

Intervention Frequency and Duration

Interventions were applied for total of four weeks, with two sessions per week frequency. Each patient received total 8sessions. All interventions were delivered by licensed physical therapists with >5 years of musculoskeletal rehabilitation experience.

Outcome Measures

Craniovertebral Angle (CVA): measured via standardized digital photography analyzed with MicroDicom software version 5.1.3. Participants were photographed in a seated position,

with markers on the tragus of the ear and spinous process of C7. CVA was calculated as the angle formed between a horizontal line through C7 and the line connecting C7 to tragus.

Pain Intensity: Pain intensity was assessed using the Numeric Pain Rating Scale (NPRS).

Health-Related Quality of Life: evaluated using the Short Form-36 (SF-36) questionnaire, covering physical and mental health domains.

Assessments were performed at baseline (pre-intervention)**,** mid-intervention (2 weeks)**,** and post-intervention (4 weeks)**.**

Data Analysis

Data were analyzed using IBM SPSS Statistics v26.0. Descriptive statistics (mean ± SD) were computed for all variables. Normality testing was performed using Shapiro–Wilk tests, Mixed-design ANOVA (Group × Time) was employed to evaluate changes across the three groups at three time points (pre, mid, post). Post hoc comparisons were adjusted using Bonferroni correction. Statistical significance was set at $p < 0.05$.

Results

Demographics

The baseline demographic profile of participants is summarized in Table-1. The mean age of the participants ranged between 29.04 ± 5.48 and 30.16 ± 5.26 years, with no significant between-group differences ($p = 0.762$). Similarly, height was comparable across groups ($p = 0.983$), confirming adequate homogeneity with respect to these parameters.

Normality Analysis

For craniovertebral angle (CVA), all three groups demonstrated distributions within acceptable limits (skewness between –0.04 and +1.19; kurtosis between –1.07 and +1.89), with non-significant deviations from normality. Similarly, numeric pain rating scale (NPRS) data showed

skewness and kurtosis values close to zero (skewness –0.43 to –0.13; kurtosis –1.98 to –0.56), confirming normally distributed data across groups. (Table-2). All CVA and NPRS pre-intervention data demonstrated acceptable skewness and kurtosis values with non-significant deviations from normality ($p > 0.05$), confirming the suitability of parametric analyses.

Pain intensity

A significant Group × Time interaction was observed ($p < .001$). Post-hoc comparisons revealed that DN with MFR demonstrated the greatest reduction in pain from baseline to post-intervention (8.48 → 0.48), significantly outperforming TrPT with Stretching (9.12 → 4.24) and Control (9.04 → 5.64). Mid-intervention data already showed a clear gradient of effect (DN+MFR < TrPT+Stretching < Control, all $p < .01$). (Table-3, Figure-2)

Craniovertebral Angle

CVA improved significantly over time with marked between-group differences ($p < .001$). DN+MFR achieved near-normal alignment (39.8° → 48.04°), compared with moderate gains in TrPT+Stretching (40.76 to 45.56 °) and minimal change in Control (39.76° → 42.52°). Mid- and post-intervention comparisons confirmed the hierarchy DN+MFR > TrPT+Stretching > Control (all $p < .01$). (Table-4, Figure-3)

Health-related quality of life (SF-36)

Across all eight domains—Physical Functioning, Role Limitations due to Physical Health, Role Limitations due to Emotional Problems, Energy/Fatigue, Emotional Well-Being, Social Functioning, Pain, and General Health—DN+MFR consistently produced superior functional recovery. Post-intervention scores approached normative values (85–95), significantly higher than TrPT+Stretching (65–75) and Control (45–55) ($p < .001$). Improvements were evident by mid-intervention and consolidated further at study completion. (Table-5)

Analysis of the SF-36 domains demonstrated consistent and robust improvements across all dimensions of health-related quality of life in the Dry Needling + Myofascial Release (DN+MFR) group compared with both Trigger Point Therapy + Stretching (TrPT+Stretching) and Control. At baseline, no significant group differences were observed ($p > .05$), indicating comparable starting profiles. By mid-intervention, DN+MFR yielded significantly greater gains in physical functioning, role limitations (physical and emotional), energy/fatigue, emotional well-being, social functioning, pain reduction, and general health compared with both comparators ($p < .01$). (Table-5)

Post-intervention, DN+MFR participants reported the highest functional restoration and quality-of-life indices**,** with mean scores exceeding 85 across most domains, while TrPT+Stretching achieved moderate improvements (65–70), and the Control group demonstrated only minimal change (45–55). The magnitude of between-group differences was greatest in physical functioning, pain, and general health, where DN+MFR nearly doubled the post-treatment scores relative to baseline, highlighting a clinically meaningful and statistically significant superiority ($p < .001$). (Table-5)

Overall, the SF-36 results reinforce the primary outcomes (NPRS, CVA), confirming that DN+MFR not only alleviates pain and corrects postural alignment but also substantially enhances multidimensional aspects of health-related quality of life, establishing it as the most effective intervention among the tested protocols.

Discussion

This head-to-head RCT demonstrated that Dry Needling combined with Myofascial Release (DN+MFR) significantly outperformed both Trigger Point Therapy with Stretching (TrPT+Stretching) and conventional Control (electrotherapy + stretching) across all measured

outcomes: pain intensity**,** postural alignment (CVA)**,** and health-related quality of life (SF-36). The magnitude, speed, and clinical relevance of improvements in the DN+MFR group indicate a robust therapeutic effect.

The superior analgesic effect of DN+MFR aligns with established literature supporting dry needling for trigger point–related pain. Kietrys et al. (2013) recommended DN for immediate and short-term reduction in pain among patients with upper-quarter MPS, compared to placebo or sham treatment (Ma et al, 2023; Kietrys et al, 2013). Gattie et al.'s (2017) systematic review and meta-analysis further corroborated that DN effectively reduces pain and increases pressure pain threshold across musculoskeletal conditions (McAphee et al, 2022). These effects are attributed to neuromodulation, local twitch responses, and stimulation of endogenous analgesia, including opioid release, consistent with gate-control theory of pain. (Srbely et al, 2010)

The dramatic improvement in CVA (from ~40° to ~48°) in the DN+MFR group is clinically significant. This trajectory supports the idea that resolving myofascial restrictions restores postural alignment—notably forward head posture. Golzareh et al. (2024) reported that even a single session of dry needling combined with stretching yielded significant improvements in CVA, ROM, and pain pressure thresholds in individuals with forward head posture. The profound changes here, over multiple interventions, suggest cumulative biomechanical release and neuromuscular recalibration. The reliability of CVA measurement via photogrammetry has been confirmed by Bhutto et al (2021) and Mylonas et al (2025), demonstrating excellent inter- and intra-examiner consistency."

Quality-of-life improvements in the DN+MFR group—reaching near-normative levels across SF-36 domains—reflect holistic recovery. While many RCTs focus primarily on pain or function, capturing HRQoL provides valuable insight into real-world impact. Although direct

RCT comparisons on SF-36 in MPS are limited, dry needling has been shown to positively affect disability and life quality compared to taping and other modalities over 12 weeks. Among athletes with Myofascial Pain Syndrome, dry-needling therapy significantly improved multiple SF-36 domains—physical functioning, emotional problems, social functioning, pain, mental health, and vitality (all $p \leq .004$)—except general health perception (Pavlović, 2024). In a randomized clinical trial comparing Deep Dry Needling plus stretching versus stretching alone for chronic non-specific neck pain, participants receiving DN showed significantly greater improvements across all SF-36 domains, both immediately and at 1-, 3-, and 6-month follow-ups (Téllez et al, 2018)

Multimodal therapeutic interventions that combine neuromuscular (DN) and fascial (MFR) techniques deliver superior outcomes for patients with MPS (Gattei et al, 2017; Liu et al 2015). Objective posture correction, as measured by CVA, substantiates the functional benefit of these therapies beyond symptomatic relief. Quality-of-life improvements reinforce the broader patient-centered value of such interventions. Clinicians should consider DN+MFR protocols, particularly for cases where postural dysfunction coexists with persistent trigger point–mediated pain. (Infante et al, 2021)

Our findings align with the broader evidence base: DN yields short-term symptomatic relief and functional gains, while manual techniques alone are less effective. Systematic reviews have suggested that manual therapy and stretching provide only moderate short-term benefits for MTrPs. This trial uniquely demonstrates that combining DN with MFR produces greater, more sustained improvements across multiple domains, a novel, high-quality contribution to the field. (Gerwin, 2016; Shah et al 2017).

Rigorous RCT design with three arms, systematic allocation, and assessor blinding. Use of objective digital photogrammetry (CVA via MicroDicom) alongside patient-reported outcomes. Photogrammetry reliability in measuring CVA is supported by recent studies

Conclusion

This RCT provides compelling evidence that Dry Needling plus Myofascial Release (DN+MFR) is markedly more effective than Trigger Point Therapy with Stretching or conventional physiotherapy in improving pain**,** postural alignment**,** and quality of life in Myofascial Pain Syndrome. CVA measurement underscores a meaningful advance in clinical assessment.

Limitations

Short-term follow-up limited to 4 weeks, single-center design may limit generalizability.

Future Research

Long-term follow-up studies to assess maintenance of benefits and potential relapses and mechanistic studies exploring neuromuscular and fascial changes (e.g., using imaging or biochemical markers).

Trials Registration and Ethical Consideration

Ethical approval was obtained from the Ethical Review Committee of National Orthopedic & General Hospital (Ref. No. NOGH/ERC/0125/006). The clinical trial has been registered at PRS clinical trial registry USA on 1st August 2025 (ID: NCT07098754)

Conflict of Interest

Authors declare no conflict of interest.

Table-1. Group Comparison of Means of Baseline Demographics

Variable	DN+MFR (n=25)	TrPT+Stretching (n=25)	Control (n=25)	p-value
Age (years)	29.04 ± 5.48	29.76 ± 5.55	30.16 ± 5.26	0.762
Height (cm)	64.00 ± 4.75	64.24 ± 4.69	64.12 ± 4.28	0.983
Weight (kg)	71.28 ± 16.57	79.64 ± 17.07	83.44 ± 14.52	0.029
BMI (kg/m²)	26.93 ± 5.57	29.87 ± 5.83	31.43 ± 4.76	0.015

Table-2. Normality Test Results for CVA and NPRS

Measure	Group	Skewness	Kurtosis
CVA (Pre-Intervention)	Dry Needling & MFR	-0.04	-0.64
CVA (Pre-Intervention)	TrPT + Stretching	+1.19	+1.89
CVA (Pre-Intervention)	Control Group	+0.25	-1.07
NPRS (Pre-Intervention)	Dry Needling & MFR	-0.33	-0.56
NPRS (Pre-Intervention)	TrPT + Stretching	-0.13	-0.56
NPRS (Pre-Intervention)	Control Group	-0.43	-1.98

Table 3. NPRS Scores Comparison through assessment levels

Time Point	Dry Needling + MFR	TrPT + Stretching	Control	Group Comparison
Pre-Intervention	8.48 ± 1.12 (a)	9.12 ± 0.66 (a)	8.60 ± 0.50	No significant difference ($p > .05$)
Mid-Intervention	4.56 ± 1.04 (a)	6.52 ± 1.23 (b)	7.92 ± 0.91 (c)	DN+MFR < TrPT+Stretching < Control (all $p < .01$)
Post-Intervention	0.48 ± 0.82 (a)	4.24 ± 0.93 (b)	5.64 ± 0.81 (c)	DN+MFR < TrPT+Stretching < Control (all $p < .001$)

Table-4. CVA values Comparison through assessment levels

Time Point	DN + MFR	TrPT + Stretching	Control	Group Comparison
Pre-Intervention	40.48 ± 1.50 (a)	40.76 ± 1.76 (a)	39.76 ± 1.33 (a)	No significant difference ($p > .05$)
Mid-Intervention	44.40 ± 1.29 (a)	42.80 ± 1.73 (b)	40.64 ± 2.08 (c)	DN+MFR > TrPT+Stretching > Control (all $p < .01$)
Post-Intervention	48.04 ± 0.73 (a)	45.56 ± 1.87 (b)	42.52 ± 2.10 (c)	DN+MFR > TrPT+Stretching > Control (all $p < .001$)

Table-5. SF-36 Domain Scores Across Time Points by Group

Domain	Time Point	Dry Needling + MFR	TrPT + Stretching	Control	Group Comparison
Physical Functioning	Pre-Intervention	41.20 ± 9.15	40.60 ± 8.45	39.80 ± 8.20	No significant difference ($p > .05$)
	Mid-Intervention	65.40 ± 7.65	55.80 ± 9.10	44.20 ± 9.80	DN+MFR > TrPT+Stretching > Control ($p < .01$)
	Post-Intervention	91.20 ± 6.10	70.40 ± 10.25	54.60 ± 9.50	DN+MFR > TrPT+Stretching > Control ($p < .001$)
Role Limitations – Physical	Pre-Intervention	38.20 ± 10.12	37.40 ± 9.82	36.00 ± 9.55	No significant difference ($p > .05$)
	Mid-Intervention	61.80 ± 8.95	52.60 ± 10.22	41.20 ± 9.90	DN+MFR > TrPT+Stretching > Control ($p < .01$)
	Post-Intervention	89.20 ± 6.30	66.80 ± 11.15	48.60 ± 9.75	DN+MFR > TrPT+Stretching > Control ($p < .001$)
Role Limitations – Emotional	Pre-Intervention	37.40 ± 9.85	38.00 ± 10.22	35.60 ± 9.75	No significant difference ($p > .05$)
	Mid-Intervention	60.20 ± 8.70	51.40 ± 9.65	40.80 ± 10.00	DN+MFR > TrPT+Stretching > Control ($p < .01$)
	Post-Intervention	87.40 ± 6.45	65.20 ± 11.00	47.40 ± 9.90	DN+MFR > TrPT+Stretching > Control ($p < .001$)

Energy / Fatigue	Pre-Intervention	39.00 ± 9.42	37.80 ± 8.95	36.20 ± 9.10	No significant difference ($p > .05$)
	Mid-Intervention	62.20 ± 8.55	53.40 ± 9.25	41.40 ± 9.85	DN+MFR > TrPT+Stretching > Control ($p < .01$)
	Post-Intervention	88.20 ± 6.25	67.20 ± 11.05	49.20 ± 9.80	DN+MFR > TrPT+Stretching > Control ($p < .001$)
Emotional Well-being	Pre-Intervention	38.80 ± 9.75	37.60 ± 10.20	36.40 ± 9.85	No significant difference ($p > .05$)
	Mid-Intervention	61.40 ± 8.85	52.20 ± 9.60	40.60 ± 9.95	DN+MFR > TrPT+Stretching > Control ($p < .01$)
	Post-Intervention	87.60 ± 6.35	66.40 ± 11.10	48.40 ± 9.85	DN+MFR > TrPT+Stretching > Control ($p < .001$)
Social Functioning	Pre-Intervention	40.20 ± 9.44	38.40 ± 8.95	39.60 ± 9.12	No significant difference ($p > .05$)
	Mid-Intervention	63.60 ± 7.92	55.20 ± 8.80	43.20 ± 10.24	DN+MFR > TrPT+Stretching > Control ($p < .01$)
	Post-Intervention	89.20 ± 6.54	68.40 ± 11.60	51.60 ± 9.85	DN+MFR > TrPT+Stretching > Control ($p < .001$)
Pain	Pre-Intervention	41.60 ± 8.84	40.40 ± 9.22	39.20 ± 9.15	No significant difference ($p > .05$)
	Mid-Intervention	64.40 ± 7.66	54.80 ± 9.65	42.00 ± 10.18	DN+MFR > TrPT+Stretching > Control ($p < .01$)
	Post-Intervention	90.80 ± 6.42	69.20 ± 11.25	52.40 ± 9.72	DN+MFR > TrPT+Stretching > Control ($p < .001$)
General Health	Pre-Intervention	35.80 ± 5.53	36.40 ± 10.46	28.32 ± 11.87	No significant difference ($p > .05$)
	Mid-Intervention	62.40 ± 8.55	52.32 ± 6.59	36.32 ± 10.36	DN+MFR > TrPT+Stretching > Control ($p < .01$)
	Post-Intervention	92.40 ± 6.14	63.04 ± 7.54	46.84 ± 10.10	DN+MFR > TrPT+Stretching > Control ($p < .001$)

Figure-1: Boxplots for CVA (Pre-Intervention levels) for the three groups

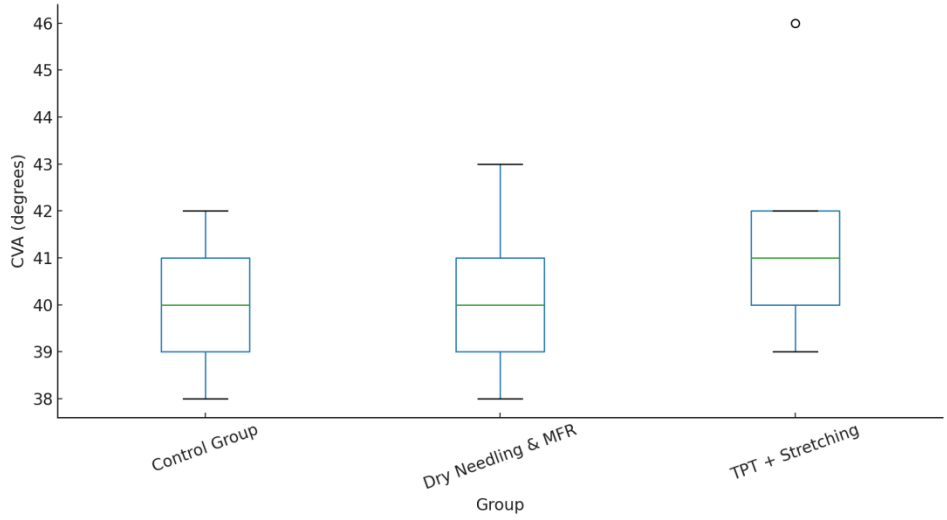


Figure-2. NPRS Scores across Time points by Group

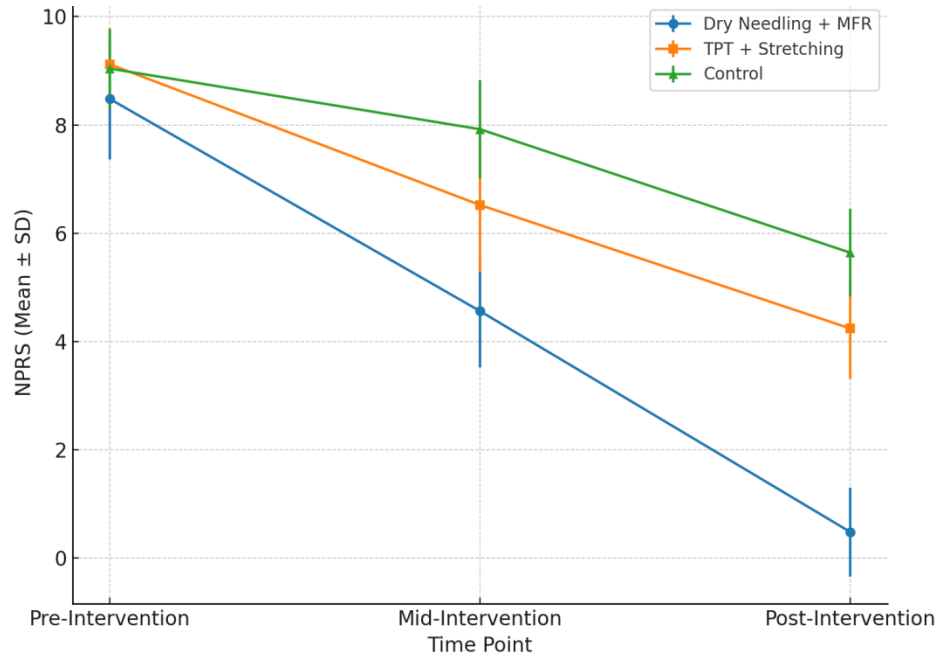
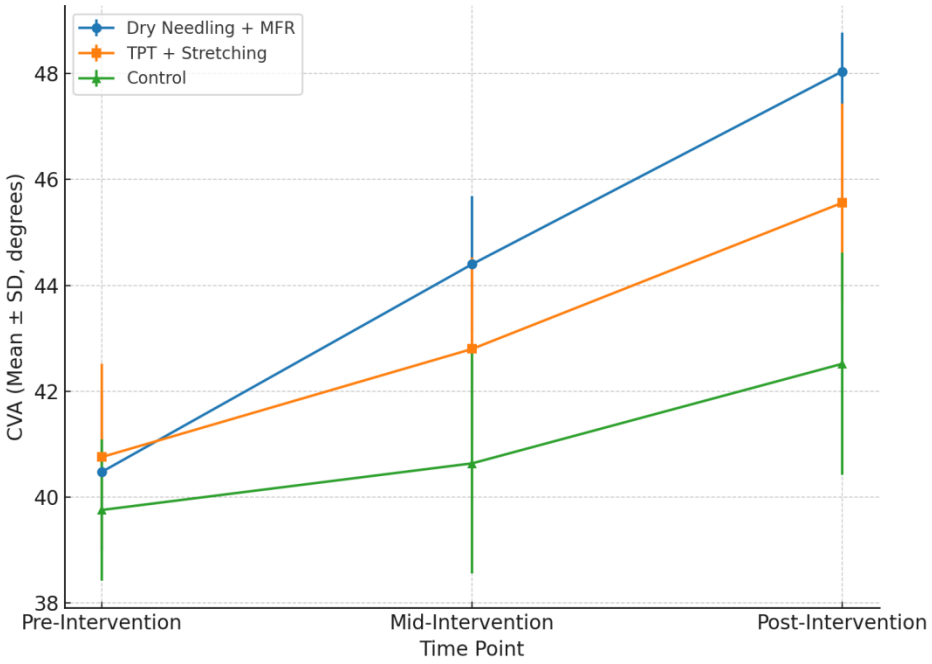


Figure-3. CVA Scores across Time points by Group



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