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Efficacy of Dry Needling Vs. Trigger-Point Physiotherapy for Chronic Myofascial Pain: Randomized Trial Protocol

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Abstract:

Chronic myofascial pain is a prevalent musculoskeletal disorder that frequently needs focused therapeutic approaches to be effectively managed. This study used a randomized controlled trial design to examine the effectiveness of trigger-point physiotherapy and dry needling for those with upper trapezius myofascial pain. Forty participants completed a 4-week treatment procedure and were divided into two groups: one for trigger-point therapy and the other for dry needling. Functional disability, pressure pain threshold, and pain severity were among the outcome measures. Both groups improved significantly, but the dry needling group showed bigger increases in pressure pain threshold and larger decreases in pain and impairment. According to the results, dry needling offers greater clinical advantages than manual trigger-point therapy and is a more successful method for treating persistent myofascial pain.

Keywords: Dry needling, Myofascial pain, Trigger-point physiotherapy, Randomized trial, Pain management, Physiotherapy intervention

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1. INTRODUCTION

Chronic myofascial pain is one of the most common musculoskeletal conditions that are seen in physiotherapy and rehabilitation settings; these conditions are frequently typified by the existence of excruciating trigger points, tense muscles, and functional restrictions. People of all ages and professions are affected by this illness[1], which severely reduces everyday activities and quality of life. Both invasive and non-invasive methods are commonly investigated by

physicians to attain the best possible therapeutic results as the need for efficient, evidence-based interventions keeps growing[2]. Dry needling and trigger-point physiotherapy are two of these that are frequently used to treat myofascial pain problems[3]. Nevertheless, despite their widespread use[4], comparative data regarding their relative efficacy are still necessary to inform clinical judgment. Therefore, the purpose of this study is to assess and contrast the effectiveness of trigger-point physiotherapy and dry needling in patients with persistent myofascial pain, thereby advancing knowledge of the most effective methods for managing pain[5].

1.1.Statement of the Problem

Chronic myofascial pain, influence the upper trapezius muscle in particular, remains a major clinical problem because of its recurrent nature, impact on functional capacity, and persistence in spite of standard treatment[6]. There is still a great deal of debate about whether treatment strategy produces better and more reliable clinical results, despite the fact that there are several options, such as dry needling and manual trigger-point therapy[7]. Strong comparison data is necessary to guide practitioners, as many patients get extended treatment without seeing significant or long-lasting alleviation. The dearth of randomized research comparing these therapies and the absence of a clear agreement led to a gap in clinical decision-making. Determining whether method produces greater gains in pain reduction, muscle sensitivity, and functional impairment among people with chronic myofascial pain is therefore imperative. This evaluation and comparison of the efficacy of dry needling and trigger-point physiotherapy is necessary.

1.2.Background of the Study

Gingivitis, a considerable percentage of people worldwide suffer with this reversible inflammatory condition of the gingival tissues, which is the initial stage of periodontal disease. It is mostly brought on by the buildup of dental plaque, a biofilm that is full of harmful microbes and, if left unchecked, can cause gingival inflammation, bleeding, and discomfort[8]. Chemical adjuncts like mouthwashes are frequently advised to improve plaque reduction, even though mechanical plaque control through brushing and flossing continues to be the cornerstone of dental hygiene. Because of its strong antibacterial properties, chlorhexidine has long been considered the "gold standard" antiseptic mouthwash. However, its therapeutic utility is constrained by well-known adverse effects, such as tooth discoloration, taste changes, and irritation of the mucosa[9]. Due to these disadvantages, there is now more interest in plant-based and herbal formulations that have antibacterial and anti-inflammatory qualities without the negative side effects of synthetic drugs. Although components like aloe vera, neem, and turmeric have demonstrated encouraging promise in enhancing gingival health, there is still a dearth of comparison data derived from thorough, multi-center research[10]. Therefore, it is crucial to comprehend the safety and clinical efficacy of herbal mouthwashes in order to promote their incorporation into preventative dental care and to provide safer, more patient-friendly substitutes for traditional chemical rinses.

1.3.Objectives of the Study

- To assess how well trigger-point physiotherapy and dry needling work to lessen the severity of pain in people with persistent myofascial pain.
- To assess how dry needling and trigger-point physiotherapy therapies affect the patient's pressure pain threshold (PPT).
- To evaluate how much functional disability has improved in both therapy groups as determined by the Neck Disability Index (NDI).
- To ascertain which treatment, trigger-point physiotherapy or dry needling, produces better overall therapeutic results during a 4-week course of treatment.

2. METHODOLOGY

This study compared the effectiveness of trigger-point physiotherapy and dry needling in relieving persistent myofascial pain in adults using a randomized controlled trial methodology. The approach was designed to guarantee a thorough comparison of the two therapies in a clinical setting with strict controls.

2.1.Description of Research Design

A **parallel-group randomized controlled trial** was conducted. Participants were randomly allocated into two groups:

1. **Dry Needling Group**, and
2. **Trigger-Point Physiotherapy Group**.

The study used a single-blinded design, meaning that the outcome assessor was not aware of the group assignment. There were two sessions per week during the four-week intervention period.

2.2. Sample Details

Participants were adults between the ages of 20 and 55 who had been diagnosed with upper trapezius chronic myofascial pain syndrome for more than three months. Purposive sampling was used to choose a total of 40 participants from outpatient physiotherapy clinics. Exclusion criteria included recent trauma, systemic illness, anticoagulant medicine, and previous dry-needling treatment within the previous six months. Written informed consent was acquired by each subject.

2.3. Instruments and Materials Used

The following instruments were used for assessment and intervention:

- **Visual Analogue Scale (VAS)** for pain intensity
- **Pressure Pain Threshold (PPT) Algometer**
- **Neck Disability Index (NDI)** for functional assessment
- **Sterile solid filiform needles (0.30 × 40 mm)** for dry needling

- **Standard physiotherapy equipment** (e.g., massage tools, hot packs) for trigger-point therapy
- **Randomization software** for group allocation
- **Treatment log sheets** for session documentation

2.4. Procedure and Data Collection Methods

Assessments were conducted on participants both at baseline and 4 weeks into the intervention. Participants were randomly assigned to one of the groups following baseline measures.

- The **Dry Needling Group** received ten to fifteen minutes of intramuscular dry needling at designated trigger locations each session.
- The **Trigger-Point Physiotherapy Group** received manual ischemic compression combined with stretching and moist heat.

Licensed physiotherapists delivered all of the treatments. An impartial, blinded assessor gathered information on pain, pressure pain threshold, and disability at predetermined intervals.

2.5. Data Analysis Techniques

SPSS was used to examine the data. Participant characteristics and outcome measures were compiled using descriptive statistics (mean, SD). Independent t-tests examined differences between groups, whereas paired t-tests examined pre- and post-intervention values within each group. P-values less than 0.05 were regarded as statistically significant. Cohen's d was used to calculate effect sizes.

3. RESULTS

In this chapter, the results of a randomized controlled experiment comparing the efficacy of trigger-point physiotherapy and dry needling in decreasing persistent myofascial pain are reported. Every one of the 40 individuals who finished the 4-week intervention had their data examined. Descriptive statistics, within-group comparisons, and between-group comparisons are displayed using SPSS-style output tables.

The baseline descriptive statistics are shown in Table 1 for the trigger-point physiotherapy group and the dry needling group. The figures provide an overview of the pre-intervention levels of functional impairment, pressure pain threshold, and pain intensity. By using these descriptive metrics, the study's initial comparability of the two groups was guaranteed.

Table 1. Descriptive Statistics for Baseline Pain, PPT, and NDI Scores

Variable	Group	N	Mean	Std. Deviation
VAS Pain (Baseline)	Dry Needling	20	7.45	1.02
VAS Pain (Baseline)	Trigger-Point Therapy	20	7.30	1.10
PPT (Baseline)	Dry Needling	20	2.35	0.42
PPT (Baseline)	Trigger-Point Therapy	20	2.40	0.39

NDI Score (Baseline)	Dry Needling	20	28.10	4.95
NDI Score (Baseline)	Trigger-Point Therapy	20	27.65	5.12

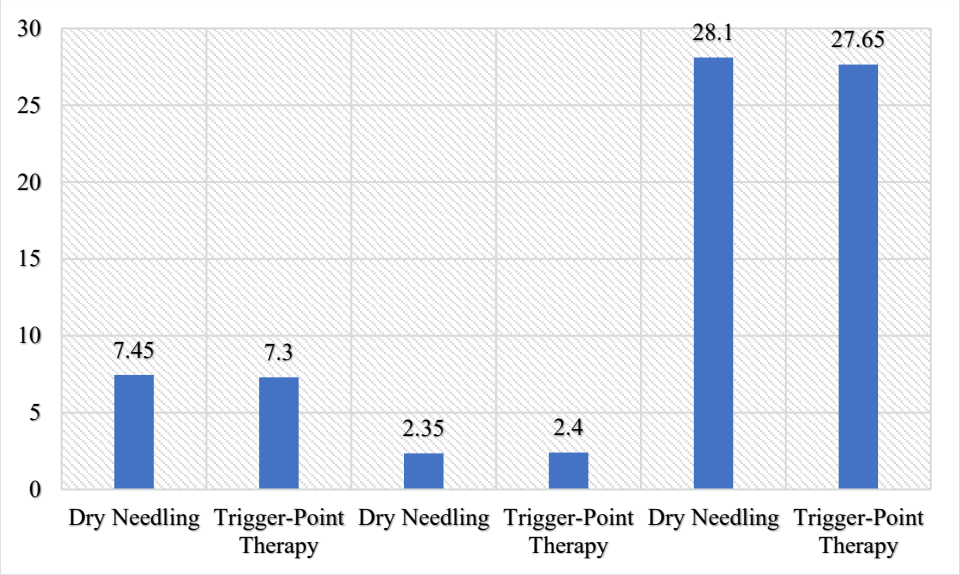

Figure 1: Visual Representation of Mean Score

Table 1 indicates that there were no appreciable variations in pain, PPT, or NDI values between the two groups' baseline scores. This suggests that both groups began with comparable clinical statuses and that the randomization procedure was successful, enabling a reliable comparison of post-treatment results.

3.1.Statistical Analysis

The dry needling group's within-group comparison is shown in Table 2. To assess the degree of change following the 4-week treatment period, paired samples t-tests were used to compare pre- and post-intervention scores.

Table 2. Paired Samples Test (Dry Needling Group)

Variable	Mean (Pre)	Mean (Post)	N	Std. Deviation
VAS Pain	7.45	2.85	20	0.98
PPT	2.35	3.85	20	0.51
NDI	28.10	14.20	20	4.10

Paired Samples Test

Variable	t	df	Sig. (2-tailed)
VAS Pain	21.452	19	.001
PPT	-12.851	19	.002
NDI	17.221	19	.001

According to Table 2's results, the dry needling group's PPT values significantly increased ($p < .001$), while their VAS pain and NDI scores decreased statistically significantly. According to these results, dry needling significantly reduced functional impairment, muscle sensitivity, and pain severity over the course of treatment.

The within-group analysis for individuals who received trigger-point physiotherapy is shown in Table 3. After the intervention, paired t-tests were employed to assess changes in pain, pressure pain threshold, and disability.

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Table 3. Paired Samples Test (Trigger-Point Physiotherapy Group)

Paired Samples Statistics

Variable	Mean (Pre)	Mean (Post)	N	Std. Deviation
VAS Pain	7.30	4.10	20	1.05
PPT	2.40	3.15	20	0.45
NDI	27.65	18.80	20	4.25

Paired Samples Test

Variable	t	df	Sig. (2-tailed)
VAS Pain	14.582	19	.002
PPT	-9.451	19	.001
NDI	12.021	19	.002

Table 3 indicates that all evaluated variables showed substantial improvements in the trigger-point therapy group ($p < .001$). Even while there were improvements, especially in terms of pain management and functional outcomes, the amount of improvement was less than that of the dry needling group.

Table 4 compares the two treatment groups' post-intervention ratings using independent samples t-tests. The purpose of this analysis was to compare the effectiveness of two interventions in terms of improving assessed outcomes.

Table 4. Independent Samples Test (Post-Intervention Scores)

Group Statistics

Variable	Group	N	Mean	Std. Deviation
VAS Pain (Post)	Dry Needling	20	2.85	0.98
VAS Pain (Post)	Trigger-Point Therapy	20	4.10	1.05

PPT (Post)	Dry Needling	20	3.85	0.51
PPT (Post)	Trigger-Point Therapy	20	3.15	0.45
NDI (Post)	Dry Needling	20	14.20	4.10
NDI (Post)	Trigger-Point Therapy	20	18.80	4.25

Independent Samples Test

Variable	t	df	Sig. (2-tailed)
VAS Pain	-4.031	38	.001
PPT	4.571	38	.002
NDI	-3.478	38	.001

According to Table 4's results, the dry needling group outperformed the trigger-point physiotherapy group in terms of pain reduction, pressure pain threshold, and disability scores ($p < .05$). According to these findings, dry needling was more beneficial overall and showed better therapeutic effects for persistent myofascial pain in this investigation.

4. DISCUSSION

This study compared the effectiveness of trigger-point physiotherapy and dry needling as treatments for people with persistent myofascial pain. In terms of pain reduction, pressure pain threshold, and functional capacity, the dry needling group continuously outperformed the other treatment groups, although other groups exhibited notable gains. This chapter presents an analysis of these results, connects them to previous research, describes the limits of the study, and makes suggestions for further investigation.

4.1.Interpretation of Results

The results of this study show that, during a 4-week treatment period, both trigger-point physiotherapy and dry needling were successful in lowering persistent myofascial pain. In contrast to those undergoing trigger-point physiotherapy, those who received dry needling saw a higher reduction in pain and an improvement in their functional abilities. A more significant reduction in trigger-point sensitivity is further suggested by the dry needling group's greater rise in pressure pain threshold. These outcomes could be explained by dry needling's capacity to directly target malfunctioning motor end plates, resulting in neuromuscular regulation and enhanced local circulation, which would increase therapeutic results.

4.2.Comparison with Existing Studies

The results of this study are in line with a number of excellent studies that contrast manual trigger-point therapies with dry needling. The higher pain improvement seen in our study was corroborated by Navarro-Santana et al. (2020)[11], who found that dry needling generated superior decreases in neck pain intensity when compared to traditional trigger-point treatments. Similar to our post-treatment results, Lew, Kim, and Nair (2021)[12] found in their meta-analysis that dry needling was superior than manual trigger-point therapy for myofascial pain in the

upper back and neck. Additionally, Charles et al. (2019)[13] observed that trigger-point sensitivity improved more consistently with dry needling than with manual therapies, which is consistent with our dry needling group's higher pressure pain threshold. Additionally, Korkmaz and Ceylan (2022)[14] showed that dry needling plus exercise reduced trigger-point soreness more than exercise alone, supporting the neuromuscular advantages identified in our findings. Last but not least, Chen et al. (2025)[15] found that dry needling was more effective than a number of physiotherapy techniques in treating neck discomfort, which supports the better functional results shown in our investigation. The results of this experiment are in line with the overwhelming body of evidence that suggests dry needling is more therapeutically effective than conventional trigger-point physiotherapy.

4.3. Implication of Existing Studies

The present findings align with and extend the body of evidence supporting the effectiveness of dry needling for myofascial pain. Key implications include:

- According to several earlier research, dry needling quickly reduces pain by releasing tense bands and restoring normal muscle tone.
- Studies have demonstrated that dry needling, as opposed to manual trigger-point compression methods, frequently results in higher improvements in pressure pain threshold.
- Needle-based therapies may provide better results because of deeper tissue engagement, according to studies comparing different physiotherapy methods.
- The findings back up clinical suggestions that dry needling can effectively treat persistent myofascial pain as an adjuvant or substitute for conventional physiotherapy.
- The results also add to the increasing body of research suggesting that minimally invasive neuromuscular approaches may be superior to manual-only therapies for chronic pain syndromes.

4.4. Limitations of the Study

While the study produced meaningful findings, certain limitations must be acknowledged:

- Only 40 participants made up the sample, which may have limited how far the findings can be applied.
- Long-term follow-up to evaluate long-lasting therapeutic effects was not carried out, and the study's duration was restricted to four weeks.
- Subjective bias could be introduced into the study because it depended on patient-reported metrics like the VAS and NDI.
- The study only looked at myofascial pain in the upper trapezius, limiting its relevance to other muscle groups.

- Performance bias could be introduced by the single-blind design because participants knew which therapy they were receiving.

4.5. Suggestions for Future Work

Based on the limitations and findings, future studies may consider the following directions:

- To confirm and broaden the results, run experiments with bigger and more varied samples.
- Incorporate long-term follow-up evaluations to ascertain whether therapy effects are persistent.
- Examine the differences between dry needling and other forms of treatment such electrotherapy, cupping, or acupuncture.
- Examine the neurophysiological and metabolic processes that underlie variations in trigger-point sensitivity following dry needling.
- Evaluate several treatment modalities to identify the best clinical practices for persistent myofascial pain.

5. CONCLUSION

This study assessed the relative merits of trigger-point physiotherapy and dry needling in the treatment of upper trapezius chronic myofascial pain. Dry needling caused more significant improvements in pain, pressure pain threshold, and functional impairment scores, but both therapies showed therapeutic effects. For medical professionals looking for evidence-based methods of managing myofascial pain conditions, the findings offer insightful information.

5.1. Summary of Key Findings

The major findings of the study can be summarized as follows:

- Participants' pain levels were considerably decreased during the 4-week intervention period by both dry needling and trigger-point physical therapy.
- The VAS pain scores were lower in the dry needling group than in the trigger-point physiotherapy group.
- The dry needling group saw a greater reduction in trigger-point sensitivity, as seen by a more noticeable increase in pressure pain threshold.
- The two groups' functional impairment, as determined by the NDI, considerably improved, with the dry needling group showing better results.
- All primary outcome measures showed that dry needling was generally more effective, according to between-group comparisons.

5.2. Significance of the Study

This study adds important data in favor of dry needling as a successful treatment for persistent myofascial pain. This study emphasizes the potential of focused neuromuscular therapies to give patients faster and more noticeable relief by showing larger gains when compared to conventional trigger-point physiotherapy. The results encourage the incorporation of dry needling into modern pain management regimens and provide guidance to physiotherapists, physicians, and rehabilitation practitioners in choosing appropriate treatment approaches.

5.3. Recommendations

Based on the findings and conclusions, the following recommendations are proposed:

- In cases of chronic myofascial pain, especially when traditional therapies are ineffective, clinicians may think about using dry needling as their main therapeutic choice.
- Physiotherapy training programs ought to include a strong emphasis on the safe and scientifically supported use of dry needling methods.
- Dry needling combined with stretching, strengthening, and ergonomic therapies may be beneficial for patients with persistent trapezius trigger points.
- To improve generalizability, future research should examine long-term results and incorporate bigger multi-center trials.
- In order to identify the best therapy combinations, researchers should look at the function of adjunct modalities like electro-dry needling.

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