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EFFECT OF ELECTROTHERAPY IN TRAPEZITIS- AN EVIDENCE BASED STUDY

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ABSTRACT

Background: Trapezitis, characterized by pain, tenderness, and stiffness of the upper trapezius muscle, is a common musculoskeletal condition affecting daily function and quality of life. Electrotherapy modalities, including transcutaneous electrical nerve stimulation , therapeutic ultrasound, surge faradic currents, and interferencial therapy and theragun are frequently used in clinical practice; however, the evidence regarding their efficacy is varied. This study aimed to systematically review , meta-analysis and analyze randomized controlled trials (RCTs) to assess the effectiveness of electrotherapy in reducing pain and improving functional outcomes in patients with trapezitis.

Methodology: A total of five RCTs were included and critically appraised using the PEDro scale to evaluate methodological quality. The studies investigated various electrotherapy interventions, alone or in combination with manual therapy and exercise, measuring outcomes such as pain intensity (VAS/NPRS), pressure pain threshold (PPT), range of motion (ROM), and functional disability (NDI). Data were analyzed to identify patterns in treatment effectiveness and methodological rigor.

Result: PEDro scores of the included trials ranged from 4/10 to 8/10, indicating moderate to high methodological quality overall. the highest quality trials indicating strong methodological rigor with proper randomization, assessor blinding, adequate follow- up, and intention-to- treat analysis.

Conclusion: Conclusion of this study is indicate the electrotherapy is effective in reducing pain , improving in pressure pain threshold and enhancing functional outcomes in patients with trapezitis and myofacial trigger point of the upper trapezius.when electrotherapy is combined with therapeutic exercise indicate that improvement in function , anxiety , proprioception and quality of life.

Keywords: Trapezitis , Trapezius spasm , neck pain , cervical pain

INTRODUCTION

Trapezitis is a common musculoskeletal condition that affects the shoulder and cervical regions, especially in people who are subjected to extended static postures and repeated tasks. It is generally described as myofascial irritation, inflammation, or overuse injury of the trapezius muscle, usually affecting the upper fibres. Localised discomfort, stiffness, tenderness, and restricted neck movements are the clinical manifestations of trapezitis, which are frequently accompanied by palpable myofascial trigger points.[1] The incidence of trapezitis has significantly increased in recent years, primarily due to changes in professional demands and lifestyle. The

cervical and shoulder muscles are subjected to excessive and prolonged strain in modern work situations, particularly those that involve extended computer use, desk-based jobs, smartphone dependence, and insufficient ergonomic awareness.[2] mechanical neck pain syndromes, trapezitis has a unique pathophysiology because of its main myofascial origin.The trapezius muscle is essential for preserving posture, sustaining cervical stability, and enabling scapular motions. Pain and muscular dysfunction are caused by decreased microcirculation, the buildup of metabolic waste products, and localised ischaemia brought on by persistent muscle overload or prolonged contraction. Trapezitis can develop into chronic myofascial pain syndrome if treatment is not received, which can lead to long-term discomfort, functional limits, decreased productivity at work, and a lower quality of life.[3,4] Trapezitis has a complex aetiology that includes both psychological and physical elements. One of the most frequently mentioned causes is prolonged static postures, such as rounded shoulders and forward head posture. Increased intramuscular pressure from prolonged contraction of the upper trapezius muscle lowers blood flow and oxygen delivery to the tissues.

Pain and tenderness are caused by this ischaemic milieu, which also encourages the release of inflammatory mediators and nociceptor sensitisation.Muscle strain is made worse by recurrent micro-trauma, which is frequently observed in jobs demanding lengthy overhead labour or repetitive arm motions. The mechanical burden on the trapezius muscle is greatly increased by poor ergonomic configurations, such as incorrect chair height, monitor positioning, and a lack of lumbar or cervical support.[5,6] myofascial trigger points, are thought to be a defining characteristic of trapezitis. Located within taut bands of skeletal muscle fibres, these hyper-irritable nodules are linked to referred pain patterns and localised soreness. Secondary consequences such cervicogenic headaches, thoracic spine stiffness, altered scapulothoracic rhythm, and decreased upper limb efficiency can result from chronic trapezitis.[7,8] The main goals of conservative trapezitis treatment are to reduce pain, restore normal muscular function, and treat underlying causes. Rest, activity moderation, pharmaceutical therapies such NSAIDs, and ergonomic adjustments are examples of conventional therapy strategies. Through a combination of therapeutic exercises, stretching, strengthening, manual treatment, and postural re-education, physiotherapy plays a crucial role in the management of trapezitis.In physiotherapy practice, electrotherapy has become widely accepted as a non- invasive, economical, and scientifically validated treatment option for musculoskeletal conditions. By using controlled electrical or electromagnetic stimulation, electrotherapy seeks to alleviate muscle spasm, enhance circulation, modulate pain, and speed tissue recovery.[9,10] myofascial trigger points, inflammatory mediators, and local ischaemia are the main causes of pain in trapezitis. Electrotherapy techniques use a variety of physiological channels to target these systems.

Melzack and Wall's Gate Control Theory of Pain serves as the foundation for TENS, one of the most widely utilised analgesic techniques. TENS reduces pain perception by blocking nociceptive signal transmission at the spinal cord level by activating large-diameter afferent fibres. Numerous studies have shown how well TENS work to improve patient comfort, increase functional mobility, and lessen both acute and chronic neck pain.[11,12] low-frequency therapeutic effects, interferential therapy (IFT) uses medium-frequency alternating currents that intersect within the tissues. Compared to traditional TENS, IFT permits deeper penetration into muscle tissues because of its reduced skin resistance. IFT is thought to improve local circulation and metabolic activity while lowering discomfort, oedema, and muscular spasms. After applying IFT to patients with neck and shoulder diseases, clinical trials have shown improvements in pain intensity, cervical range of motion, and muscle relaxation.[13,14] electrotherapy technique for the treatment of myofascial diseases is therapeutic ultrasonography. Depending on the mode and parameters, ultrasound can have both thermal and non-thermal effects. Deep heating produced by continuous ultrasound increases blood flow, muscle relaxation, and tissue flexibility. In contrast, the main non-thermal effects of pulsed ultrasound are cavitation and sonic microstreaming, which increase cellular activity and encourage tissue healing.

Research indicates that patients with upper trapezius myofascial pain may benefit from ultrasound therapy by experiencing less pain and stiffness in their muscles.Trapezitis symptoms are largely influenced by myofascial trigger points. It has been demonstrated that electrotherapy techniques including TENS, IFT, and ultrasound can lessen trigger point sensitivity by modifying muscle spindle activity, enhancing local circulation, and lowering nociceptor excitability.[15,16,17] electrotherapy and manual trigger point release approaches are combined, the results are better than when each intervention is used alone.[18] Highfrequency electromagnetic

waves are used in ShortWave Diathermy (SWD) to generate deep tissue heating.SWD's heat actions improve tissue flexibility, decrease muscle guarding, and increase blood flow.Research has shown how well it works to treat chronic myofascial p ain and musculoskeletal inflammation.SWD may lessen pain and stiffness in trapezitis by inc reasing metabolic recovery and reducing local ischaemia.[19,20] Although electrotherapy modalities such as TENS , IFT ,US and SWD are widely used in physiotherapy practice , the evidence supporting their effectiveness for trapezitis remains limited.So the need of the study is to find the evidence regarding effect of electrotherapy im trapezitis. The aim of this study is to investigate the effect of electrotherapy in trapezitis through an evidence base approach. The objective of this study is to systematic investigated the effect of electrotherapy in trapezitis.

METHODOLOGY

Study Design: This is an Evidence based Study, which was conducted according to PRISMA (Preferred Reposting Item for Systematic Reviews and Meta Analysis) guidelines.

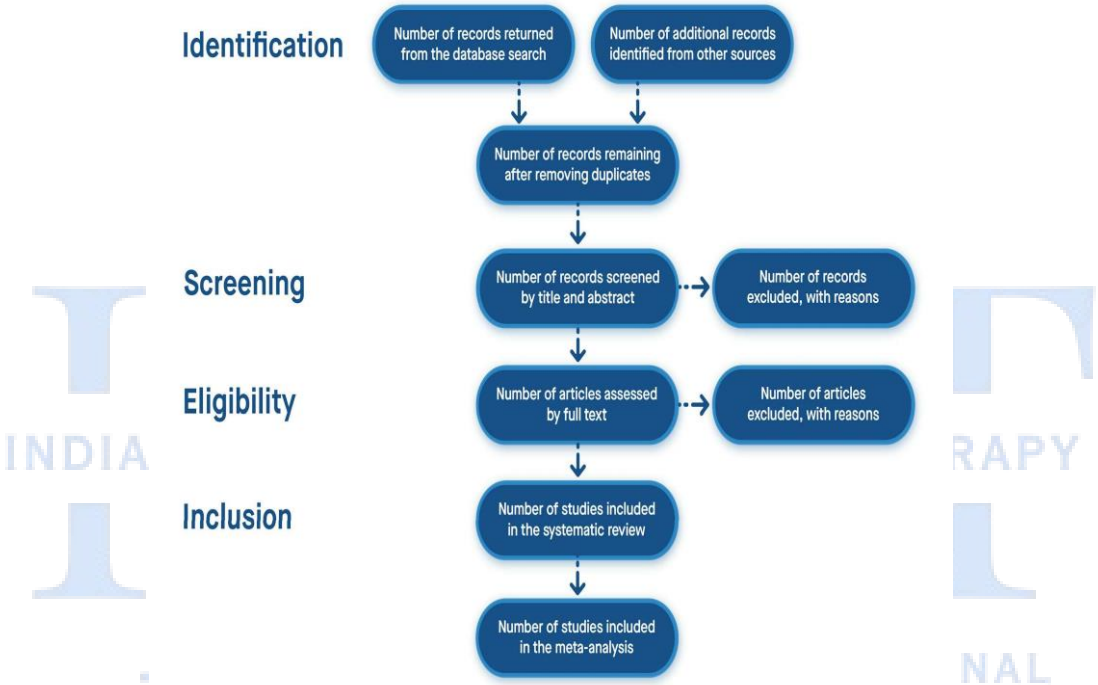

Image: 1 Prisma Guidelines

Literature Search: A specific literature search was performed from 2019 to 2025 (Last 5 Years).Key words –"Trapezitis" , "Trapezius spasm" ,"Neck pain" ,"Cervical pain." Literature was searched using following search engines: Google Scholar , PEDro , PubMed , Science Direct , Research Gate.Method of Selection of Articles for Eligibility Criteria ;

Inclusion Criteria

- Studies involving 2019 to 2025 (last 5 years)
- Articles on Electrotherapy effects on Trapezitis having study design of systemic reviews, Meta-analysis and randomized controlled trials.
- Articles published in English in full text. Studies done on human participants

Exclusion Criteria

- Articles having study design of Case Control , Cohort and Cash reports.
- Studies done on animals

- Studies published in languages other than English

ASSESMENT OF METHODOLOGICAL QUALITY:

o Data was assessed using 2 parameters:

1. Centre for Evidence- Based Medicines (CEBM's) Levels of Evidence25
2. PEDro Scale24

LEVEL OF EVIDENCE 25

Level 1	SR[a] of a number of RCTs[b] of studies (meta –analysis) that Substantially agree (do not have significant)
Level 2	Individual RCT with narrow confidence window (size of Treatment effect precisely defined) observational study with Dramatic effect[c]
Level 3	Nonrandomised controlled cohort study[d]
Level 4	Case-control,[e] case-series,[f] or historically controlled studies
Level 5	Mechanism-based reasoning (expert opinion)

Image: 2 Levels of Evidence Scale

AUTHOR (YEAR)	TITLE OF THE STUDY	INTERVENTION	OUTCOME MEASURES	PRIMARY CONCLUSION	LEVEL OF STUDY / PEDRO SCORE
Musa Çankaya, Pariya PourİYaman h et al. (2025)	Investigation of the effectiveness of interactive telerehabilitation and transcutaneous electrical nerve stimulation on pain, functionality, disability and quality of life in patients with nonspecific chronic neck pain: a randomised controlled trial	Total 48 patient included (female 45, male 3) ; patients with CNNP (chronic nonspecific neck pain) were randomized into TENS, TR or control groups.	VAS , NBQ , NDI ,CNFDS	VAS and NBQ in the TENS; and NDI, CNFS, WHOQOL-Bref in the TR group were more effective after treatment than before treatment in patients with chronic nonspecific neck pain.	**1b – 5/10**
Pablo Mlezivaa, Eric Glenn Johnsona et al.(2024)	Effects of Electrotherapy on Pain, Anxiety, Mobility, and	Twenty-two participants were recruited between the ages of 20-40	VAS , NDI, AROM , JPE , STAI	Reduction in anxiety and disability with TENS treatment	**1b – 6/10**

	Proprioception in Young Adults with Mild Neck Pain: A Randomized Controlled Trial	years old and randomized into control and intervention groups ; Participants had chronic mild neck pain and not receiving pain treatment or medication, and did not have electrotherapy contraindications ; The intervention group received a 30- minute TENS intervention and were instructed in a 2-week daily home- based TENS intervention.		suggests that TENS may be beneficial in reducing pain, anxiety, and improving neck proprioception in young adults with mild neck pain.	
Mohamed Salaheldien Mohmed Alayat, Kadrya Hosney Battecha et al. (2022)	Effectiveness of Photobiomodulation Therapyin the Treatment of Myofascial Pain Syndrome of the Upper Trapezius Muscle: A Systematic Review and Meta-Analysis	A total of 17 studies (944 patients) were included; data regarding participants, intervention parameters, outcome measures, time of measurement, and follow-up were extracted; A meta-analysis was performed on 16 studies, and standardized mean difference (SMD), Corre- sponding 95% confidence interval (CI), and overall effect size (ES) were calculated.	PEDRO scale	Assessment revealed 12 high-quality , 3 fair quality, and 2 low- quality studies ; the GRADE system revealed a low to moderate quality of evidence with little Confidence in the effect estimate, which supports the performance of further high-quality trials aimed at standardizing treatment protocols and irradiation parameters.	**1a**
Yash Seju , Dr. Vidhya Rajput et al.(2021)	Efficacy of Theragun and Surge Faradic Stimulation in Subjects with Trapezitis: A Randomized Controlled Trial	45 subjects into 3 groups; Group A-15 subjects in apply to Theragun , Group B-15 subjects in apply to Surged Faradic Current , Group C-15 subjects in apply to Control Group	VAS , ROM	The group A had most Improvement in the ROM of the side flexion of neck than group B And group C showed no improvement.	**1b – 4/10**

		in all groups into 2 weeks (3 sessions/week) treatment approach on the upper trapezius muscle.			
Teresa Paolucci , Francesco Agostini et al. (2021)	Efficacy of TENS in Cervical Pain Syndromes: An Umbrella Review of Systematic Reviews	Total 11 study was included in which difference type of TENS were use with the frequency is 2-100 Hz /0.5-160 Hz , pulse duration is 40 µs - 250 µs / 40 µs - 150 ms , treatment duration is 15-60 min and some article 10-30 min for given and type of the TENS (conventional TENS , ENAR TENS , sham TENS , H-TENS , L-TENS , BURST TENS) for 1 day to 3 months till 6 months treatment was given and follow up has been taken upto 6 months for efficacy of TENS in cervical pain syndromes.	PICO model , AMSTAR model	TENS seems to have an effect in reducing the intensity of acute and chronic cervical pain, especially in the short term;However, it was no possible to provide precise recommendation s in this regard ; Based on our result, it is desirable to carry out further studies that support the effectiveness of using TENS in patients suffering from acute and chronic neck pain.	**1a**
Wanyi Qing , Xian Shi et al. (2021)	Effect of Therapeutic Ultrasound for Neck Pain: A Systematic Review and Meta-Analysis	A total of 12 studies (705) were included ; 7 studies(449 patients) compared therapeutic ultrasound plus other treatments vs the other treatments alone; Five studies compared therapeutic ultrasound with sham or no treatment (256 patients).	VAS , NRH, NDI, NRS	Therapeutic ultrasound may reduce the intensity of pain more than sham or no treatment, and it is a safe treatment ; Whether therapeutic ultrasound in combination with other conventional treatments produced additional benefits on pain intensity, disability, or quality of life is not clear. The randomized trials included in this	**1a**

				review had different levels of quality and high heterogeneity.	
MANUEL ALBORNOZ CABELLO, et al.(2021)	Immediate clinical benefits of combining therapeutic exercise and interferential therapy in adults with chronic neck pain: a randomized controlled trial.	Participants with neck pain (grades I or II) lasting for more than 12 weeks were allocated to a therapeutic exercise plus interferential currents group (n = 25) or to a therapeutic exercise only group (n = 24). All individuals underwent treatment 5 times a week for 2 weeks.	NPRS , NDI , CROM	Interferential therapy to therapeutic exercise is clinically more effective than therapeutic exercise alone to immediately improve neck pain and disability, but not active cervical range-of-movement, in adults with persistent neck pain.	**1b – 8/10**
M.H.El-Gendy, Y.Lasheen et al. (2019)	Multimodal approach of electrotherapy versus myofascial release in patients with chronic mechanical neck pain: a randomized controlled trial	60 patient were randomly assigned into 3 groups ; in group A 20 patients received multimodal approach of electrotherapy (lASER, IFT, US, and non-guideline approach in the form of stretch and strength) , in group B 20 patients received myofascial release therapy and non-guideline approach in the form of stretch and strength, in group c 20 patients received traditional therapeutic exercise in the form of stretch and strength in all groups into 3 times a week for 4 weeks treatment approach on upper trapezius muscle.	VAS , NDI , CROM	Both multimodal approach of electrotherapy and myofascial release therapy are effective in treating patients with chronic mechanical neck pain ; Significant decrease in VAS for pain and NDI and CROM of functional restriction in group A and group B.	**1b - 6/10**

RESULT

A total of 5 randomized controlled trials were reviewed for methodological quality and evidence strength. The studies were evaluated using the PEDro scale, with scores ranging from 4/10 to 8/10. indicating moderate to high methodological quality across the studies. The highest quality trial was conducted by Manuel Albornz Cabello, Cristo Jesús Barrios-Quinta et al. (2021), which achieved a score of 8/10, reflecting strong methodological rigor with concealed allocation, assessor blinding, intention-to-treat analysis, and comprehensive statistical reporting. Three studies—Musa Çankaya et al. (2025), Pablo Mlezivaa and Eric Glenn Johnson et al. (2024), and M.H. El-Gendy and Y. Lasheen et al. (2019)—demonstrated moderate methodological quality, with PEDro scores of 5/10, 6/10, and 6/10, respectively. These trials adequately fulfilled key criteria such as random allocation, baseline comparability, sufficient follow-up, and between-group comparisons but lacked allocation concealment, participant and therapist blinding, and intention-to-treat analysis. The lowest PEDro score (4/10) was observed in the study by Yash Seju and Dr. Vidhya Rajput et al. (2021), primarily due to the absence of blinding, intention-to-treat analysis, and incomplete reporting of point estimates and variability. Overall, while the included studies generally met essential methodological standards, the consistent lack of subject and therapist blinding and limited use of allocation concealment may affect internal validity, and therefore the results should be interpreted with moderate confidence.

DISCUSSION

The review of five randomized controlled trials evaluates the methodological quality and clinical efficacy of various electrotherapy modalities, including TENS, therapeutic ultrasound, IFT, theragun, and surge faradic stimulation, for treating trapezitis and myofascial trigger points in the upper trapezius. The trials, assessed using the PEDro scale, varied in quality, with high-quality studies demonstrating improvements in pain reduction, pressure pain threshold (PPT), range of motion (ROM), and functional outcomes. Despite some limitations in blinding, the effectiveness of electrotherapy using standardized protocols is emphasized. Moderate-quality trials also showed potential benefits but faced issues such as inadequate follow-up and minimal blinding, affecting their internal validity. Overall, these studies suggest that electrotherapy can be an effective treatment for myofascial pain syndrome.

The analysis reveals a significant improvement in the methodological quality of RCTs examining electrotherapy for trapezitis over the past decade, attributed to better randomization, blinding, and standardized outcomes. This enhances the credibility of interventions like TENS, which have shown consistent pain reduction and functional improvements. However, variability in treatment parameters and outcome measures complicates comparisons and optimal protocol definitions. Multimodal treatment approaches combining electrotherapy with manual therapy and exercise have proven more effective, acknowledging trapezitis's multifactorial nature. Nonetheless, some studies show limited added benefits from combinations. Gaps exist in long-term follow-up and sample sizes, with practical challenges in therapist blinding potentially introducing bias.

Baseline comparability was well addressed in all trials, indicating equivalence in key prognostic factors, which is crucial for attributing post-intervention outcomes accurately. This reflects improved awareness of reporting standards. All five trials had adequate follow- up, with over 85% participant retention, enhancing the reliability of the results and minimizing attrition bias. However, despite the robust randomization and follow-up, issues with blinding and allocation concealment persist, warranting careful interpretation of treatment effect magnitudes.Future randomized controlled trials (RCTs) should focus on enhancing methodological rigor by using concealed allocation, assessor blinding, and intention-to-treat analysis. Adhering to CONSORT and PEDro guidelines for transparent reporting will improve study quality and aid evidence synthesis.

CONCLUSION

The evidence from the reviewed randomized controlled trials indicates that electrotherapy, including TENS, therapeutic ultrasound, interferential therapy, theragun and surge faradic stimulation are effective in reducing pain, improving pressure pain threshold, and enhancing functional outcomes in patients with trapezitis and myofascial trigger points of the upper trapezius. High-quality recent trials demonstrate that when applied with standardized protocols, proper randomization, assessor blinding, and adequate follow-up, these interventions provide clinically significant benefits. Moderate-quality studies support these findings, although limitations in blinding and allocation concealment may influence the strength of the evidence. Overall, the integration of electrotherapy into multimodal treatment approaches, such as combining with exercise or manual therapy, appears promising for optimal patient outcomes.

Conclusion of this study is indicate improvements in function, anxiety, proprioception, and quality of life, especially when electrotherapy is combined with therapeutic exercise. However, the strength of evidence varies due to heterogeneity in treatment parameters, study quality, and outcome measures. While short-term benefits are consistently reported, there remains insufficient high-quality evidence to establish standardized protocols or confirm long- term effectiveness. Therefore, electrotherapy can be considered a useful adjunct in neck pain management, but further well-designed, high-quality trials are required to optimize treatment guidelines and strengthen clinical recommendations.

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