



COMPARATIVE STUDY BETWEEN THE EFFECTS OF ULTRASOUND AND PHONOPHORESIS IN PATIENTS WITH TRAPEZITIS

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ABSTRACT

Aim: To compare the effects of ultrasound and phonophoresis on pain and ROM in trapezitis patients.

Background: Trapezitis is an inflammation of trapezius muscle which results from the overloading and injury of muscle tissue, leading to involuntary shortening of localized fibres. Ultrasound is used for the treatment of soft tissue injuries; primarily used to deliver heat to deep musculoskeletal tissues which produces therapeutic effects of increased soft tissue extensibility and decreased pain and muscle spasm. Phonophoresis is therapeutic ultrasound used to introduce pharmacologic agents, usually anti-inflammatory or analgesic drugs, through intact skin into the subcutaneous tissues.

Methodology: Experimental study was conducted in physiotherapy OPD considering randomized controlled trial sampling. 60 samples were selected and VAS and ROM was assessed. They were divided into 2 groups that is 30 samples each receiving treatment with ultrasound and phonophoresis. Treatment was given for 5 consecutive days along with isometrics for cervical spine. VAS and ROM was assessed and compared.

Results: Significant pain reduction ($p < 0.0001$) was seen in both groups but ROM significantly improved in phonophoresis group ($p < 0.0001$).

Conclusion: Ultrasound and Phonophoresis both are beneficial in reducing pain, whereas, there is significant improvement in ROM using Phonophoresis than compared to Ultrasound.

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INTRODUCTION

Trapezitis

Trapezitis is an inflammation of trapezius muscle. Trapezius is triangular and flat muscle it takes origin from medial one third of superior nuchal line of occipital bone, ligamentum nuchae, spinous process and from supraspinous ligament of all twelve thoracic vertebrae. Upper fibres are inserted into posterior border of lateral one-third of clavicle. Trapezitis results from the overloading and injury of muscle tissue, leading to involuntary shortening of localized fibres. The upper trapezius muscle is designated as postural muscle and it is highly susceptible to overuse. The percentage of population to be affected with neck pain depends on the work environment and posture that is acquired all day long. Professionals working at desks and computers, or individuals who drive for a long period of time are more prone for this condition as the upper trapezius muscle becomes painful and spasmodic. Limitation of range of motion along with neck pain and a feeling of stiffness may be experienced by the person who is precipitated or aggravated by neck movement. The pain is present even during rest and is aggravated by activity.

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Passive range of motion may be painful and restricted due to pain and protective spasm in antagonist groups of muscles².

Ultrasound

Ultrasound is a physical modality used for the treatment of soft tissue injuries such as tendinitis, tenosynovitis, epicondylitis, bursitis and osteoarthritis. It is primarily used to deliver heat to deep musculoskeletal tissues which produces therapeutic effects like increased soft tissue extensibility and decreased pain and muscle spasm. Ultrasound transmission when a high frequency potential field (1-3MHz) is applied to US head or transducer which then vibrates to produce a high frequency acoustic wave. These acoustic waves travel readily through liquids and solids that are dense but less well through air. Thus a conductive medium such as cream or gel is required to fill the space between the transducer and the body's surface. When these high frequency vibrations pass into the body, both thermal and non thermal effects occur. The tissue response to these effects may be important in the promotion of wound healing.

Phonophoresis

Phonophoresis is a technique by which therapeutic ultrasound is used to introduce pharmacologic agents, usually anti-inflammatory or analgesic drugs, through intact skin into the

subcutaneous tissues. Theoretically, phonophoresis can provide a safe and painless alternative to injections for treatment of common inflammatory conditions such as bursitis, sprains, strains, and tendinitis. Phonophoresis has been studied in vivo with several anti-inflammatory drugs, including hydrocortisone, dexamethasone and salicylates, and with anesthetics, such as lidocaine, with variable results.

Conditions treated by phonophoresis have included epicondylitis, tendinitis, tenosynovitis, bursitis and osteoarthritis. Increases in cell permeability and local vasodilatation accompanied by acoustic pressure wave may result in increased diffusion of topical agent.

Commonly Used Drugs

- Dexamethasone-phosphate(DEX-P)
- Sodium diclofenac
- Acetic acid
- Hydrocortisone
- Salicylates
- Lidocaine

The drug to be used - Dexamethasone phosphate (DEX-P)

Because of comparatively :

- lesser adverse effects
- better results
- cost effective

MATERIALS AND METHODOLOGY

Study design

- Type of Study: Experimental Study.
- Duration of Study: 1 year.
- Place of Study: Physiotherapy OPD.

Sample design

- Sample Size: 60.
- Sample Population: Patients with trapezititis.
- Sampling: Randomized controlled trial.

Inclusion criteria

- Age 15-25 years, with a palpable tender spot in the upper trapezius muscle.
- Jump sign characterized by patient vocalization and withdrawal.
- Pain of minimum 5/10 on a visual analog scale (VAS).

Exclusion criteria

- Neck and back deformities like torticollis, scoliosis.
- History of recent surgery or open wounds in neck region.
- Malignancies of upper trapezius.
- Neurological deficit.
- Congenital anomalies.
- Generalized inflammatory disease.
- Skin allergic conditions.

Materials used

- Ultrasound machine.
- Dexamethasone-Phosphate ions.
- Ultrasonic gel.

- Cotton.
- Visual analogue scale (VAS).
- Goniometer.

Procedure

A written informed consent was taken in the language understood by them. A detailed idea of the treatment procedure was given to the patient. Subjects were selected according to the inclusion and exclusion criteria and demographic data of the patients was collected. Their pain was assessed using VAS. 30 patients each according to the groups were divided.-_Group A-treatment with ultrasound. - Group B-treatment with phonophoresis.

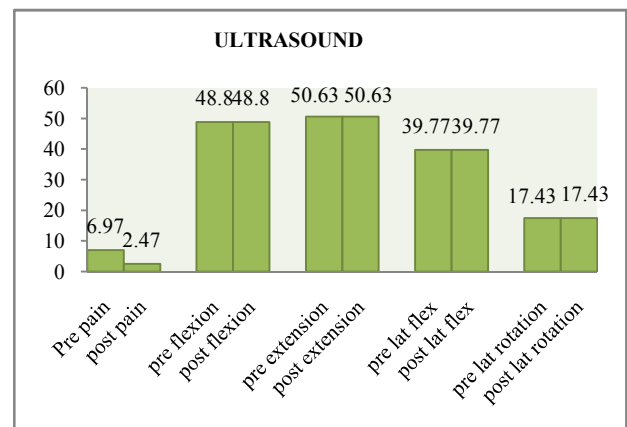
Isometrics for cervical flexion, extension and right and left side flexion was given. 10 second hold and for 10 repetitions. Treatment was given as a whole for 5 consecutive days. VAS and ROM of the patients after treatment protocol is taken and is compared with the other group.

Application: The treatment head was moved over the trapezius muscle of affected side.



application of ultrasound	application of phonophoresis
Patient position: sitting.	Patient position: sitting.
Mode: continuous.	Mode: continuous.
Intensity: 1.5W/cm2.	Intensity: 1.5W/cm2.
Duration=8mins.	Duration: 8mins.
	Drug used: DEX-P ions.(0.4%).

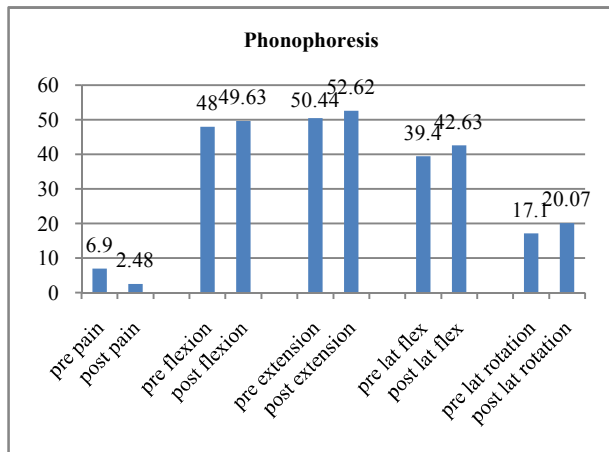
RESULTS



Graph I Comparison between pre and post readings of ULTRASOUND:

	Pre		Post	
	Mean	Sd	Mean	Sd
Pain	6.97	1.40	2.47	0.73
Flexion	48.80	1.32	48.80	1.32
Extension	50.63	1.90	50.63	1.90
Lateral flexion	39.77	0.35	39.77	0.35
Lateral rotation	17.43	1.63	17.43	1.63

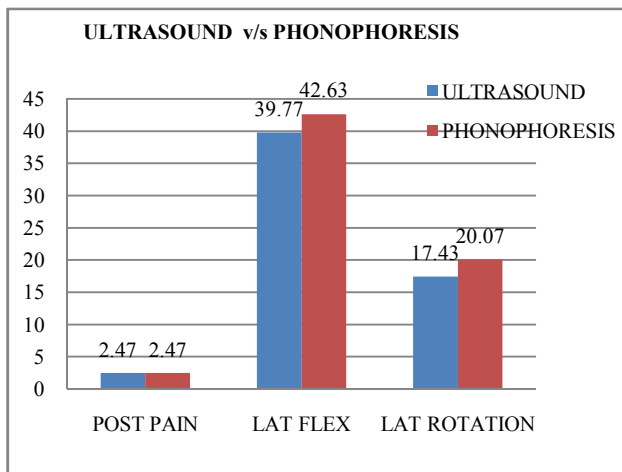
Inference: The above data states that there was significant difference between pre and post readings of pain on VAS, whereas there was no significant improvement in Range of motion of cervical spine.



Graph II Comparison between pre and post readings of PHONOPHORESIS

	Pre		Post	
	Mean	Sd	Mean	Sd
Pain	6.9	1.30	2.48	0.87
Flexion	48.00	1.58	49.63	1.50
Extension	50.44	1.63	52.62	1.66
Lateral flexion	39.40	1.52	42.63	1.22
Lateral rotation	17.1	1.16	20.07	0.91

Inference: The above data states that there was significant difference between pre and post readings of pain on VAS, whereas there was significant improvement in Range of motion of cervical spine.



Graph III Comparison between post readings of ULTRASOUND and PHONOPHORESIS

	Ultrasound		Phonophoresis	
	Mean	Sd	Mean	Sd
Post Pain	2.47	0.73	2.47	0.86
Lateral flexion	39.77	1.94	42.63	1.22
Lateral rotation	17.43	1.63	20.07	0.91

Inference: The above data states that there was no significant difference between post readings of pain on VAS, whereas there was significant improvement in Range of motion of cervical spine.

DISCUSSION

The purpose of the study was to compare the effects of ultrasound and phonophoresis on pain and ROM in patients with trapezitis. The study was done among the sample size of 60 trapezitis patients. The age group was ranging from 15-25 years. The pain was measured using Visual Analog Scale and ROM was measured using goniometer before the treatment. The treatment was continued for 5 consecutive days. Phonophoresis and ultrasound was done along with isometrics for cervical flexion, extension and right and left lateral flexion. The result of the study indicates that there is significant decrease in pain for both ultrasound and phonophoresis using Visual Analog Scale. The average level of pain post treatment was 2.47 for both groups. The study also states that there is no significant improvement in ROM using ultrasound but there is significant improvement in lateral flexion and lateral rotation using phonophoresis. The average of lateral flexion and lateral rotation for phonophoresis are 42.63 and 20.07 respectively. The probable reason for reduction of pain using ultrasound is thermal and mechanical effects that caused tissue response to promote healing. For phonophoresis, the probable reason is the usage of DEX-P ions. The clinical features of the drug used are anti-inflammatory and analgesic which caused the reduction of pain. The probable reason for improvement in the ROM using phonophoresis is the use of DEX-P ions as it is anti-spasmodic. This causes the extensibility of the tissue and thus, this increased the ROM. Thus, our study concluded that Ultrasound and Phonophoresis both are beneficial for reducing pain but Phonophoresis with DEX-P is considered to be more effective than Ultrasound in patients with trapezitis in improving the ROM.

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References

1. B D Chaurasia's Human Anatomy. 2004. Regional and Applied. *Dissection and Clinical*. Vol 1. 5(62) Table 5.2.
2. Bakhtiary AH. *et al.*, 2013 Apr 1. Phonophoresis of dexamethasone sodium phosphate may manage pain and symptoms of patients with carpal tunnel syndrome. *The Clinical journal of pain*. 29(4):348-53.
3. Binder A. *et al.*, 1985 Feb 16. Is therapeutic ultrasound effective in treating soft tissue lesions? *Br Med J (Clin Res Ed)*. 290(6467):512-4.
4. Breivik EK. *et al.*, 2000 Mar 1. A comparison of pain rating scales by sampling from clinical trial data. *The Clinical journal of pain*. 16(1):22-8.
5. Carolyn Kisner and Lynn Allen Colby. 2012. Therapeutic Exercise. Foundations and Techniques. (14)419t.
6. Cynthia C. Norkin and D. Joyce White. 2009. Measurement of Joint Motion. A Guide To Goniometry. 319-361.
7. David J. Magee. 2015. Orthopaedic Physical Assessment. (1)7 Fig. 1-4.
8. Forster and Palastanga. 2006. Clayton's Electrotherapy. *Theory and Practice*. (5)165-179.

9. Gupta C. *et al.*, 2013 Jan 1. Phonophoresis in Continuous Mode Ultrasound has significant effect in the Reliving Pain in Upper Trapezius Tender Point. *Indian Journal of Physiotherapy and occupational therapy*. 7(1):26.
10. Klaiman MD. *et al.*, 1998 Sep. Phonophoresis versus ultrasound in the treatment of common musculoskeletal conditions. *Medicine and science in sports and exercise*. 30(9):1349-55.
11. Metgud S. and Kapila RH. 2015. Comparative effect of therapeutic ultrasound using extract of *ilex paraguariensis* and diclofenac sodium gel in acute trapezitis: a randomized clinical trial. *International Journal of Therapies and Rehabilitation Research*. 4(4):137-41.
12. Naik V. *et al.*, 2015 Jan 1. 5 Days Comparative Study To Evaluate The Effectiveness Of Therapeutic Ultrasound And Elastic Resistance Band Exercises Versus Therapeutic Ultrasound And Conventional Exercises In Acute Trapezitis: A Randomized Clinical Trial. *International Journal of Therapies and Rehabilitation Research*. 4 (3):1.
13. Nirschl RP. *et al.*, 2003 Mar 1. Iontophoretic Administration of Dexamethasone Sodium Phosphate for Acute Epicondylitis A Randomized, Double-Blinded, Placebo-Controlled Study. *The American journal of sports medicine*. 31(2):189-95.
14. Peeyoosha Nitsure and Neha Kothari. December 2015. The effectiveness of bowen technique as an adjunct to conventional physiotherapy on pain and functional outcomes in subject with acute trapezitis – a pilot study. Vol. 21/ nr 36.
15. Pellecchia GL and Bohannon RW. 1998 Sep. Active lateral neck flexion range of motion measurements obtained with a modified goniometer: reliability and estimates of normal. *Journal of manipulative and physiological therapeutics*. 21(7):443-7.
16. Price DD. *et al.*, 1994 Feb 28. A comparison of pain measurement characteristics of mechanical visual analogue and simple numerical rating scales. *Pain*. 56(2):217-26.
17. Rajalakshmi A. *et al.*, 2013. *International Journal of Physiotherapy and Research, Int J Physiother Res*. Vol1 (5):205-7. ISSN 2321-1822.
18. Saliba S. *et al.*, 2007 Jul. Phonophoresis and the absorption of dexamethasone in the presence of an occlusive dressing. *Journal of athletic training*. 42(3):349.
19. Tousignant M. *et al.*, 2000 Feb 1. Criterion validity of the cervical range of motion (CROM) goniometer for cervical flexion and extension. *Spine*. 25(3):324-30.
20. John Low and Ann Reed. 2012. *Electrotherapy Explained*. (9)251-297.

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