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Effectiveness of deep ischemic pressure verses positional release therapy on trigger point of upper trapezius in computer users: Randomized control trial

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Abstract
Trapezius muscle is highly susceptible for over use and is the most designated postural muscle. The aim of study was to compare positional release therapy verses deep ischemic compression for trigger point on upper trapezius in computer users for 1 week. Total 60 subjects were taken for the study. Subjects were divided into two groups 30 subjects in each group. Participant were evaluated with pre and post interventions of NDI and VAS score. Treatment session was carried for 1-week with 3 days sessions on alternate days.
Result: Both group A and B shown significant improvement in VAS score and NDI when comparison is made within group.
Conclusion: Deep ischemic compression is better choice of treatment in improving the pain and functional disability for trigger points on upper trapezius for 1 week.

Keywords: trigger points, PRT, DIC, computer users

1. Introduction
The term trigger point is coined in 1942 by Dr Janet travel to describe clinical findings with following characteristics pain related to discrete, irritable point in skeletal muscle or fascia, not caused by acute local trauma, inflammation, degeneration, neoplasm infection [1]. Palpation of the trigger point reproduces the patient's complaint of pain and pain radiates in the distribution typical of the specific muscle harbouring the trigger point [1]. Pain cannot be explained by findings on neurological examination [1]. Work related musculoskeletal disorder of the neck are the most common problem experienced by the people who spend lot of time on computer [2]. The ratio of prevalence in males and females in India is 1:10 and 35% of the population in worldwide [1]. Trapezius muscle is highly susceptible for over use and is the most designated postural muscle [2]. When surrounding muscles and soft tissues are under stress, it tends to receive less amount of oxygen and glucose and therefore it leads to accumulation of high level of metabolic waste. This leads to formation of a trigger point and can cause higher rates of musculoskeletal complaints [2]. The trapezius muscle is designated postural muscle and it is highly susceptible to overuse [2]. For people who work at desk and computers, the upper trapezius becomes very sore and painful [2]. For people spend a great deal of time using computers work-related musculoskeletal disorders (WRMSDs) of neck are a common problem. Prolonged use of computers during daily work activities and recreation is often cited as a cause of neck pain [3]. Clinical features of Myofascial Trigger point are Point tenderness on a taut muscle band, Local twitch response, Referred pain, Reproduction of usual pain, restricted range of motion, weakness without atrophy, autonomic symptoms [4]. Treatment option for trigger points include trigger point injection, dry-needling, stretching exercise; massage therapy, and positional release therapy (PRT) [5]. Lawrence H. Jones invented PRT. This technique involves passive body positioning, which is claimed to elicit immediate and prolong reduction in tenderness at trigger points and to reduce pain and with musculoskeletal conditions. PRT relies on precise positioning of dysfunctional tissues in ways that allow a spontaneous response that releases or reduces excessive tension or spasm [6]. Ischemic compression is one of the least invasive trigger point therapies and has been employed by chiropractors since 1957. Ischemic compression is a mechanical treatment of myofascial trigger points that consist of application of sustained pressure for long enough time to inactivate the trigger points [7]. On performing ischemic compression, tissue attains recovery by reperfusion hereby relieving transient blood flow occlusion [8].

2. Need of study
Upper trapezius muscle is designated as postural muscle and it is highly susceptible to overuse. (2) There is strong association between perceived neck pain intensity and upper trapezius muscle trigger-point in office computer workers. Various treatment protocols are available for treating trigger points of upper trapezius. PRT and DIP are useful in treating trigger points. Sahem A.M. AL Shawabka, *et al*. had written an article on "Positional release therapy verses manual pressure release on upper trapezius muscle in patient with myofascial pain dysfunction syndrome" with immediate effect showed that manual pressure release is more effective than positional release therapy. Thus, there is need for comparison done between these two techniques in long-term effect.

3. Aim and Objectives
3.1 Aim
To compare the effect of deep ischemic pressure verses positional release therapy on trigger point of upper trapezius in computer users.

3.2 Objectives

- To find out the effect of deep ischemic pressure on trigger point of upper trapezius in computer users.
- To find out the effect of positional release therapy on trigger point of upper trapezius in computer users.
- Compare effect of deep ischemic pressure verses positional release therapy on trigger point of upper trapezius in computer users.

4. Hypothesis

4.1 Null hypothesis (h0)

There will not be any significant difference in positional release therapy group and deep ischemic pressure group over the period of 1week with respect to Visual Analogue Scale and Neck Disability Index.

4.2 Alternative hypothesis (h1)

Positional release therapy group will be showing the significant difference than deep ischemic pressure group over the period of 1week with respect to Visual Analogue Scale and Neck Disability Index.

4.3 Alternative hypothesis (h2)

Deep ischemic pressure group will be showing the significant difference than positional release therapy group over the period of 1 week with respect to Visual Analogue Scale and Neck Disability Index.

5. Review of Literature

i) Carlos Alberto, Victor Alexandre, Cesar *et al*. (2012)

In their study on "Trapezius upper portion trigger points treatment purpose in positional release therapy with electromyographic analysis stated that " the analysis of data collected and the electromyography data showed that the positional release therapy (PRT) for the treatment of patients with cervicobrachialgia has proved effective because it reduced the muscle tension in the upper trapezius and decreased the musculoskeletal pain, with consequent improvement of posture and daily life activities.

ii) Yakshi Bhardwaj, Richa Mahaja2015

In her article on "prevalence of neck pain and disability in computer users" stated that incidence of neck pain is very high in students with prolonged computer usage. But the incidence of the disability caused by it is not very high.

iii) Ujawal L Yeole, Neha P Diwakar and Pournima P Pawar 2013

In their article on effects of muscle energy technique and positional release therapy on neck pain in computer users a randomized control stated that positional release therapy was statistically more effective in pain relief, improvement of function and cervical rom than muscle energy technique among computer users with neck pain.

iv) Cagnie B, *et al*. J Manipulative physiol Ther. 2013

In his article on "Effect of ischemic compression on trigger points in the neck and shoulder muscles in officer workers: cohert study" stated that ischemic compression resulted in a significant improvement in general neck and shoulder complaints.

v) Dr. Preeti Gazbare, Dr. Tushar Palrkar 2014

In their article on "comparison of ultrasound and ischemic compression on latent trigger point in upper trapezius" stated that ischemic compression showed reduction in pain sensitivity in comparison to ultrasound.

vi) Kamali F, (2018)

In his article, he states that application of dry needling for active Trigger Points in the Infraspinatus can be as effective as direct Dry Needling of active MTrPs in the Upper Trapezius in improving pain and disability in athletes with shoulder pain, and may be preferred due to greater patient comfort in comparison with direct Upper Trapezius needling.

6. Methodology

Study Design: Experimental study.

Study settings: In and around Pune city.

Target population: computer users

Sample size: 60 (both male and female)

Sampling method: convenient sampling.

Study duration: 1 week

7. Materials used in the study

Paper
Pen, pencil
Plinth
Consent form
Chair

8. Inclusive Criteria

- Participant (both male and female) between the age group of 18-50years.
- Daily use of computer at least 3 hours and more.
- Presence of trigger point on unilateral upper trapezius.
- Neck disability index score more than 10 points on 0-50 scales

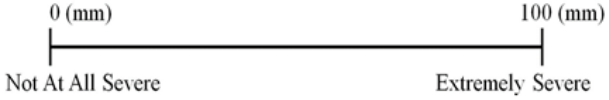
9. Exclusive Criteria

- History of orthopaedic or neurological disorders related to spine, and shoulder joint.
- History of any fractures or recent trauma or injury to upper limb and spine.
- Patients with conditions like malignancy, spondylolisthesis, and radiculopathy and fibromyalgia syndrome.

10. Outcome Measures

Visual Analogue Scale (VAS) (r=0.94)
Sensitivity -95% specificity- 88%

Note how severe you feel your disease state is with a mark (|) on the line below.



Neck Disability Index (r=0.89)
Sensitivity –52% specificity -59%

- This scale is used for functional disability.
- Total score 0-50, higher score corresponds to greater level of disability.
- 5-14-mild
- 15-24-moderate
- 25-38-severe

11. Procedure

The study was done with presentation of synopsis to ethical committee and clearance was obtained from P.E.S Modern College of Physiotherapy. Study was conducted in and around Pune. The subject was explained about the study. Consent was taken from the patient who wished to participate in the study. Subjects was assured that the collected information will not be misused in any form. Group 1 was received positional release therapy and Group 2 was received deep ischemic compression. Each group was having 30 subjects.

11.1 Positional Release Therapy (PRT)

Standardized treatment procedure for PRT was followed. In Group A, Patients was asked to be in supine position with therapist standing at the side of the table to the patients affected side Trigger points was located in the upper trapezius muscle. After identification of trigger point, patient was asked to relax. Pressure was applied over the muscle by pinching it between the thumb and fingers and applying pressure by thumb over the trigger points. Patient head was laterally flexed to the side of trigger point. After lateral flexion of head to the same side therapist grasps patients forearm and abduction of shoulder will be done to about 90 degrees Addition of flexion and extension was done to fine tune. This position of comfort was maintained for about 90 seconds.After this patient's hand and neck was passively taken to neutral position.

11.2 Deep Ischemic Compression (DIP)

This consists of sustained deep pressure with the thumb to the upper trapezius trigger point for 30s-1 min. Pressure will be released when there will be decreased tension in the trigger point has elapsed. Subjects was instructed to inform of the pain felt on the compression site, was reduced by 50% at the beginning of procedure and then the compression pressure was gradually increase, over a period of 90 seconds.Treatment was given 3 days in one week. After one week post treatment VAS and NDI SCORE was taken by each patient.

Fig 1: PRT for Upper Trapezius

Fig 2: Deep Ischemic Pressure for Upper

12. Data Analysis

INSTAT software was used to test significance between variables. Paired t-test was used to calculate the differences between the pre-treatment and post treatment mean values within both the groups' i.e PRT & DIP. Unpaired t-test was used to compare between groups

Intra Group Analysis

Table 1

DIP	NDI	
	PRE	POST
MEAN	56.66	5.62
SD	3.91	2.35
P value	p<0.0001	
t value	96.958	

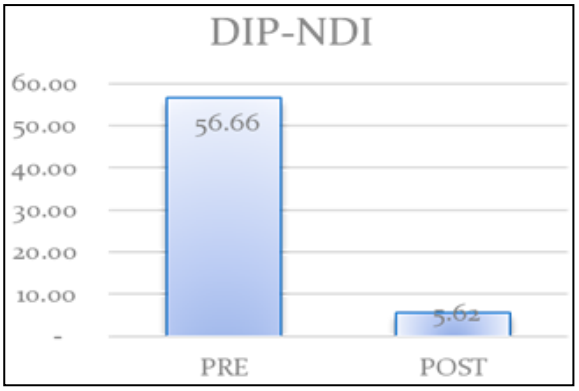


Fig 3

Table 2

PRT	NDI	
	PRE	POST
MEAN	56.03	23.72
SD	3.200	3.229
P value	p<0.0132	
t value	50.499	

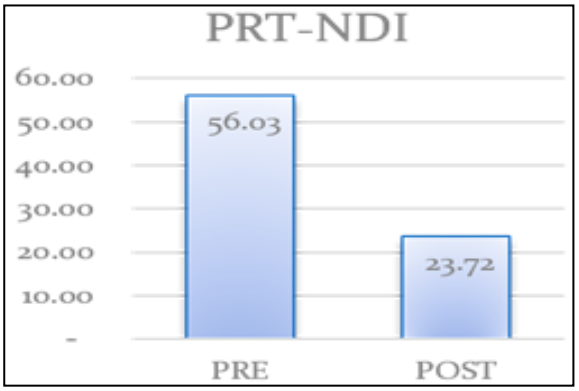


Fig 4

- PRT Group: there were significant difference with P<0.0001 between pre-treatment and post-treatment values in NDI score.
- There were significant difference with P<0.0001 between pre-treatment and post-treatment values in VAS score.

Table 3

DIP	VAS	
	PRE	POST
MEAN	7.76	7.76
SD	0.96	0.96
P value	p<0.0001	
t value	34.449	

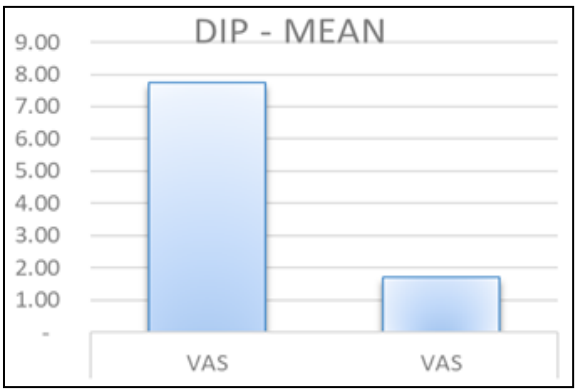


Fig 5

Table 4

PRT	VAS	
	Pre	Post
MEAN	7.85	3.88
SD	0.84	0.86
P value	p<0.0089	
t value	24.996	

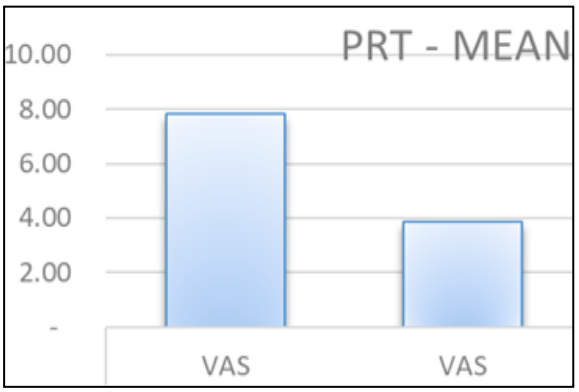


Fig 6

- **DIP Group:** there were significant difference with P<0.0001 between pre-treatment and post-treatment values in NDI score. There were significant difference with P<0.0078 between pre-treatment and post-treatment values in VAS score.

Inter Group Analysis

Table 5

POST	NDI	
	DIP	PRT
MEAN	5.62	23.72
SD	2.65	3.28
P value	p<0.0095 slightly significant	
t value	24.565	

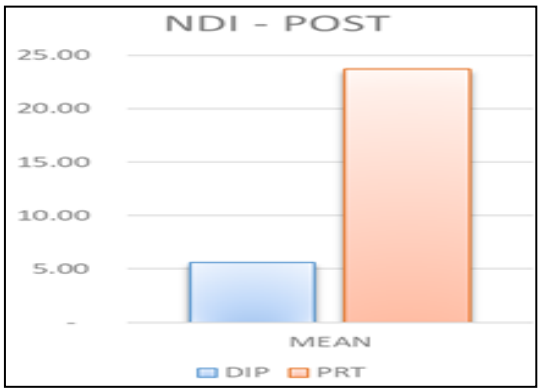


Fig 7

Unpaired t test was used for comparing both the group for parametric data.

- The difference in post-treatment VAS means was not significant.
- With NDI score there was significant difference both groups of post treatment.

Table 6

POST	VAS	
	DIP	PRT
MEAN	1.70	3.88
SD	0.89	0.86
P value	p< 0.9129 is not significant	
t value	9.741	

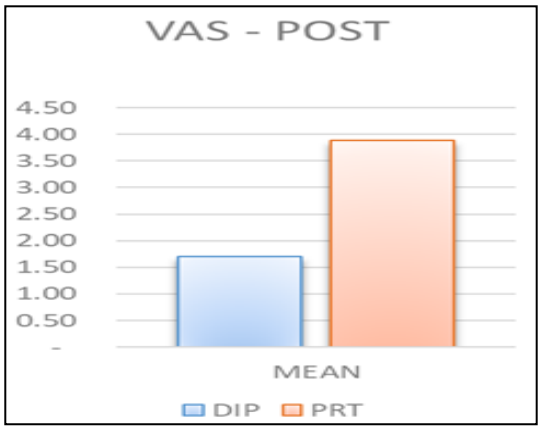


Fig 8

13. Discussion

The presence of trigger points in upper trapezius muscle is one among the classical findings in neck pain. The most typical symptoms include a presence of taut band and hyperirritable tender spots within the muscle. Treatment option for tigger points include tigger point injection, dry-needling, stretching exercise, massage therapy, and positional release therapy (PRT) [5]. Sahem A.M. AL Shawabka, *et al*. had article on "Positional release therapy verses manual pressure release on upper trapezius muscle in patient with myofascial pain dysfunction syndrome", with immediate effect showed that manual pressure release is more effective than positional release therapy. The present experimental study reveals the importance of manual methods, in treating trigger points in upper trapezius muscle for 1 week. This study included 60 subjects in the age group 18-50 including both male and female. In this study, 64% female and 36% male were included. The right side of involvement of the muscle was more common in both groups. The duration of the protocol was for 1 week with treatment session given 3 alternate days a week by therapist. Reduction in pain intensity was significant in both the groups i.e PRT and DIP. Posture correction and ergonomics were also given to the subjects as per their posture requirement. The participants treated within groups showed a statistical significant decrease in NDI score and VAS score in both the groups. In deep compression, force is applied perpendicular to the fibres in an attempt to separate each fibres, mechanically, promotes local hyperaemia, analgesia and reduction in pain, due to counterirritant effect that produced reflex reaction of the involved muscle. Due to trigger the point, the muscle was stressed; thus by compression on that point for 90 seconds gave a recovery by reperfusion hereby relieving transient blood flow occlusion [11]. Upper trapezius trigger points is formed due to sustained sarcomere shortening compromising local circulation, loss of oxygen and nutrient supply in the presence of an increased metabolic demand, thus the energy crisis, this theory was supported by a study done by Larson *et al*. (1990) he measured blood flow in painful upper trapezius and found that myalgia co-related with reduced blood flow [10]. PRT effect gave a shortening of muscle and decrease the tissue tenderness by altering nociceptive activity in the soft tissues. Thus, again, after 90 seconds, the muscle will come under stress and lengthening of sarcomere was occurring as the subject sits for more than three hrs using computer. Mohammadi kojidi *et al*. investigated the effects of PRT verses active soft tissue therapy on pain and ROM in women with latent trigger points the participant received 3 treatment sessions within 1 day intervals similar to present study, NDI score decreased and but the VAS score was statistically insignificant. DIP causes the stimulation of nociceptive endings connected to a delta fibres and mechanoreceptors found in soft tissues that are connected to large diameter a beta fibres thus causing pain relief [12]. When pre and post analysis was done among the two techniques Deep Ischemic Pressure post results showed that it was more effective than positional release technique.

14. Limitations

Sample size was taken small.

15. Future Scope for Study

- Study can be done by using different manual techniques with the use of any modality.
- Study can be done for more than 1 week.

16. Conclusion

Deep ischemic pressure is more effective than positional release therapy in reducing the pain in upper trapezius and improving functional activity for 1-week duration.

17. References

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