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Effect of dry cupping vs dry needling therapy on pain and disability in patients with chronic non Specific neck pain–a comperative study

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Abstract
Background and Purpose: Different alternative therapies are commonly used to reduce pain and disability in various musculoskeletal disorders. Previous studies proved the individual effect of dry cupping and dry needling in patients with chronic non-specific neck pain. However few studies compared the effect of both the techniques in this population. The purpose of this study was to compare the effect of dry cupping therapy and dry needling therapy on pain and disability in patients with chronic non-specific neck pain.
Method: 30 subjects with age between 18-35years diagnosed with chronic non-specific neck pain were randomly allocated into two groups. Group A received dry cupping therapy and Group B received dry needling therapy. Both the group received 2 sessions of the respective therapy in 1 week.
Outcome Measures: Visual Analogue Scale (VAS) and Neck Disability Index (NDI) Gujarati version were measured before and after 1 week of intervention.
Result: Wilcoxon Signed Ranks Test was applied for intra-group comparison and post intervention measures showed that there was significant difference in mean of VAS and NDI compared to pre intervention measures in both the groups. Mann Whitney test was applied for inter-group comparison and result showed that both the groups showed no statistical significant difference in mean post-pre difference of VAS and NDI. Confidence interval was kept 95% and the level of significance for all statistical data was set $\alpha = 0.05$.
Conclusion: This study concludes that both the therapies used in the present study i.e. dry cupping and dry needling are equally effective for reducing pain and disability in patients with chronic non-specific neck pain.

Keywords: chronic non-specific neck pain, dry cupping, dry needling, pain, disability

Introduction

Pain is the most common symptom of which the human kind complaints. Pain is defined as chronic when persistent or regularly recurrent with duration of more than 3months.[1] Musculoskeletal pain constitutes mainly back pain, neck pain, shoulder pain, carpal tunnel syndrome, tenosynovitis etc. in order of prevalence rate. Without sex differences, 55% (At 95% confidence interval 52.8-57.6%, men 54.9% and women 55.5%) of the population had perceived persistent pain for 3 months. Among individuals with chronic pain, 90% localized their pain to the musculoskeletal system to a variable extent [1].

Neck pain was defined as pain located between the occiput and the third thoracic vertebra. The growing interest in neck pain is mainly linked to the escalating disability burden and compensation costs associated with neck pain [2]. Neck pain (NP) is a clinical condition, whose associated social and economic costs related to disability and days off work are about to equal those for lumbar pain [3].

The overall frequency of neck pain was 34.4% and was higher in women than in men. Prevalence increased with age for all pain durations taken together as well as for chronic pain. A total of 13.8% of the total study group reported complaints lasting for more than 6 months which are similar value of pain after whiplash injury [4].

Neck pain is considered as chronic neck pain if it has lasted for more than 3 months [5]. Obviously, what is often viewed as a simple clinical problem can rapidly develop into a complex disorder where physical, psychological, compensation, legal and other societal forces all interact to cause disability [2]. The causes may vary from trauma (especially motor vehicle accidents), infections, tumors, congenital disorders and inflammation. In the large majority of cases, however, no specific underlying pathology can be established and the complaints are labeled as non-specific neck pain. Little is known about which (and to what extent) diagnostic procedures and therapeutic interventions are applied to patients, especially in the situation that their complaints do not disappear within a few weeks and thus become chronic [6].

As in younger age group, trauma or severe degenerative conditions are found only in a few cases, excessive physical strain may cause micro trauma in connective tissues, and psychosocial stress may lead to increased muscular tension [7]. Degenerative changes in cervical vertebrae and disks are common and increase with advanced age in asymptomatic people. Thus, Examination using radiographs or magnetic resonance imaging does not elucidate the origin of pain in

most cases [8].

Changes in muscle control, such as increased activity of superficial muscles [9], increased co activation of the superficial muscles of the cervical spine and the upper trapezius muscles during isometric contractions, and delayed feed-forward activation of superficial and deep muscles [10], have been reported in individuals with NP. Although the exact relationship between is unresolved, posture of the cervical spine appears to influence dorsal neck muscle activity at rest and when lifting [11].

Pragmatic reviews have in the past extolled the virtues of a variety of treatments for neck pain. These include education, rest, collars, posture control, exercises, physical modalities, traction, mobilization, massage, analgesics, tricyclic antidepressants, psychological interventions, trigger point injections, occipital nerve blocks, epidural steroid injections, neurectomy, discectomy, fusion, soft tissue technique, muscle energy technique, thrust technique, myofascial release, manipulation under anesthesia and craniosacral manipulation. None of the reviews, however, provided any scientific evidence of efficacy of any of this traditional interventions [12]. In a nutshell, treatment options for chronic non-specific neckpain are limited due to insufficient evidence in most cases [5, 7]; this is also true for complementary and alternative medicine.

Cupping therapy (CT) is a traditional Chinese medical (TCM) treatment which has been practiced for thousands of years. The World Health Organization's (WHO) definition of cupping is a therapeutic method involving the application of suction by creating a vacuum. This is typically done using fire in a cup or jar on the dermis of the affected part of the body [13]. CT is often used to treat pain such as low back pain, fibromyalgia, shoulder pain, chronic non-specific neck pain, cardio-vascular diseases, angina, arthritis and high blood pressure. The clinical evidence of CT is minimal [14].

Dry needling is a technique in which a fine needle is used to penetrate the skin, subcutaneous tissues, and muscle with the intent to mechanically disrupt tissue without the use of an anesthetic [15]. Dry needling is emerging as a treatment modality that is widely used clinically to address a variety of musculoskeletal conditions including neck pain [16] Recent studies of dry needling in mechanical neck pain suggest potential benefits, but do not utilize methods typical to clinical practice and lack long-term follow-up. Therefore, a clinical trial with realistic treatment time frames and methods consistent with clinical practice is needed to examine the effectiveness of dry needling on reducing pain and enhancing function in patients presenting to physical therapy with mechanical neck pain [17].

In literature many studies are done on the effectiveness of dry cupping and dry needling techniques individually on the chronic non-specific neck pain and disability. But there is lack of knowledge about comparison of both the techniques in patients with chronic non-specific neck pain. Hence present study was aimed to compare the effect of dry cupping and dry needling on pain and disability in patients with chronic non-specific neck pain.

Aims and Objectives of the Study

- To know the effect of dry cupping on pain and disability in patients with non-specific neck pain.
- To determine effect of dry needling on pain and disability in patients with non-specific neck pain.
- To compare the efficacy between dry cupping and dry needling on pain and disability in patients with non-specific neck pain.

Hypothesis

Null Hypothesis H0: There is no significant difference between dry cupping and dry needling on pain and disability in patients with non-specific neck pain.

Alternative Hypothesis H1: There is significant difference between dry cupping and dry needling on pain and disability in patients with non-specific neck pain.

Material and Methods

- **Study Design:** Pre-Post experimental design.
- **Population:** patient with non-specific neck pain.
- **Sampling Technique:** purposive sampling
- **Study Duration:** 6 months
- **Sample Size:** 30
- **Study Setting:** SPB Physiotherapy College, Surat.

Inclusion Criteria

1. Subjects having non-specific neck pain.
2. Subjects with age,18-35 years
3. Patients having pain for more than 3 months.
4. Intensity of pain at least 3 points on VAS.
5. Presence of 2triggor points in neck or scapular muscles.

Exclusion Criteria:

1. Traumatic injuries of upper extremity and cervical spine
2. Menstruation.
3. Cervical mylopathy
4. Spondylolysis and spondylolisthesis.
5. Disc bulge and nerve compression.
6. Bleeding disorder.
7. Pregnancy
8. Infection
9. Analgesic injections/medication within 4 hours of preceeding intervention.
10. H/O surgery or malignancy of cervical spine.

Outcome Measures

1. Visual Analogue Scale (VAS) [18]
2. Neck Disability Index - NDI (Gujarati version) [19]

Procedure

An experimental study design was utilized. Sample size was calculated by conducting a pilot study.Power of the study was kept at 80%. It came out to be 15 in each group.Subjectswere preliminary screened based on the inclusion and exclusion criteria. The purpose of the study was explained and a written informed consent and demographic details were obtained from all the subjects. Based on inclusion-exclusion criteria 30 patients were selected for the study from Out-patients department of S.P.B Physiotherapy College, Surat. They were allocated to any of the two groups of equal sizes using random method by tossing a coin.

Group A received dry cupping therapy and group B received dry needling therapy. Pre measurement for pain intensity i.e. VAS and disability i.e. NDI were measured before giving intervention for both the groups

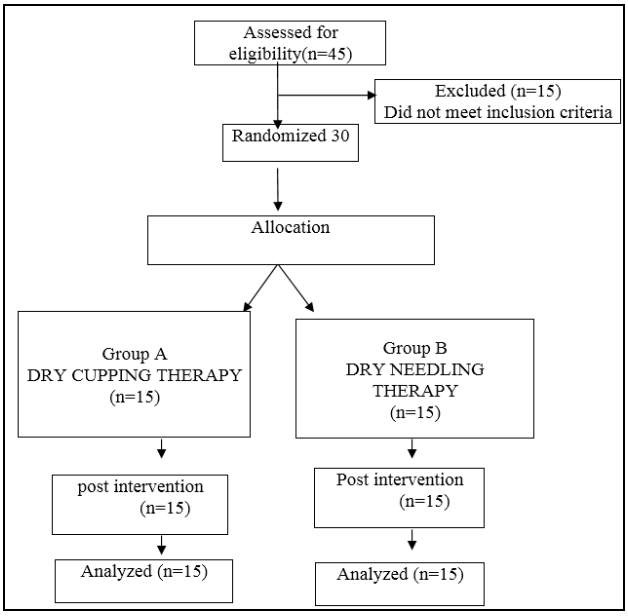


Fig 1: Provides a flow diagram of participant recruitment and retention through the study.

Group A: Dry Cupping

- Patients Position: Sitting with head supported in front on pillow/plinth prone lying.
- Therapists Position: Standing behind the patient.
- Process: A hand operated vacuum pump is attached to the glass cup, and suction applied by manual action.
- Size of the Cup: according to the patient (small to medium size) cup is use.
- Area to be treated: Trapezius & upper back Scapular muscles.
- Exposure of the part to be treated, it should be clean, hair-freesurface.
- Patient should be relaxed and comfortable.
- Palpate for pain and trigger point
- Generally, the cups should be placed on flat sections of the skin (which is usually hair-free, with no bony protuberances, and relatively thick).
- In order to achieve better contact between skin and cup, liberally apply suitable massage oil or gel on the area to be apply.
- Then pressure applied to the cups will vary according to patient. For example, in fatty patient medium to strong suction is use.
- When more than one cup is used simultaneously, the cups should be separated by 1-2 centimeters. For trapezius 2-3 cup at a time is used.
- Then the cupping is applied by hand held pump and procedure is last for 10-15 mins.
- During cupping the patient must remains as still as possible.
- Massage technique is also used for this.
- In which by applying ointment cup is moved on the surface area of trapezius muscle.

After cupping

- Remove cups gently and clean the area with cotton.
- Check for any complication
- After one week post VAS and NDI is to be taken

Group B: Dry Needling

- Patient Position: prone lying / sitting on stool comfortably.
- Therapist Position: standing behind the patient.
- Process:
- Size of the Needles: 25 mm and 30 mm needles is used.
- Area to be treated: trapezius muscles and upper back scapular muscle.
- Exposure of the area. and Clean the area with spirit cotton.
- Palpate for trigger point over the area by wearing gloves.
- Then insert the dry needles with guide tube on the trigger point area.
- Leave the needle over there for 3-5 mins.
- Release the multiple trigger point by applying more than one needle.

After Needling

- Remove needles gently and compress that area with thumb or finger for sometimes to avoid the bleeding.
- Clean the area with cotton and check for any bleeding or complication.
- **Dosages**: 2 sessions of respective treatment were given in 1 week for both the groups
- After one week post intervention VAS and NDI were measured.

Fig 2: Cupping technique on the different trigger points of trapezius muscle.

Fig 3: Dry needling technique on the differrent trigger points on Trapezius muscle

Statistics Analysis

Statistical analysis was done using SPSS version 15 Software. Shapiro wilk test was done to check normality of data, which showed data are not normally distributed on curve. Hence non parametric test was used for intra group and inter groups comparison for this study. Baseline characteristics were compared to check homogeneity between intervention groups. Mann Whitney test was used for all the demographics and outcome measures. Wilcoxon Signed Ranks Test was used to analyze the pre and post intervention differences within each group and Mann Whitney test was used for between groups comparison. Confidence interval was kept 95% and the level of significance for all statistical data was set $\alpha = 0.05$.

Result

Total 45 patients were assessed for eligibility. 30 patients were enrolled in the study and randomized to one of the treatment group (15 in Group A and 15 in Group B).Mean age of participants in Group A was 21.33±1.98, and of Group B was 22.40±3.15. For Group A minimum age was 20 and maximum age was 25 and for Group B minimum age was 19 and maximum age was 30.

Outcome measurements were measured before and after 1 week of intervention. The baseline characteristics were similar between groups. All the parameters showed no significant difference (P>0.01) before intervention. (Table-1).

Intra Group Comparision of Outcome Measures

Wilcoxon signed ranks test was used to compare the Pre-intervention values of outcome measures i.e.VAS and NDI with and post intervention values within the groups. (Table-2)

Inter Group Comparision of Outcome Measure

Mann Whitney test was used to compare the mean values of pre-post difference for both the outcome measures i.e VAS and NDI between groups. (Table – 3)

Table 1: Baseline characteristics of subjects

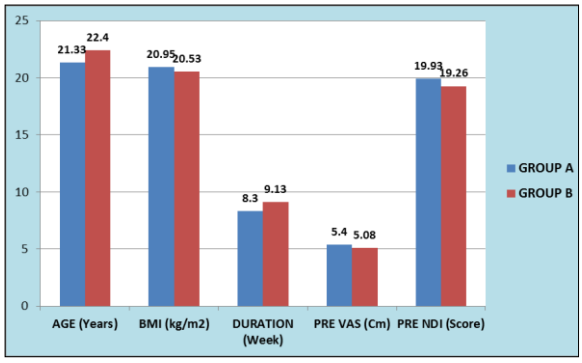
Variable	Group A	Group B	P value
	Mean ±SD	Mean ±SD	
Age (Years)	21.33±1.98	22.40±3.15	0.198
BMI (KG/M^2)	20.95±3.53	20.53±2.19	0.917
Duration (Week)	8.3±5.77	9.13±8.49	0.917
Pre VAS (CM)	5.40±2.03	5.08±1.37	0.708
Pre NDI (Score)	19.93±5.21	19.26±3.12	0.983

Table 2: Intra-Group comparison of mean of VAS and NDI score before and after 1 week intervention using wilcoxon signed ranks test

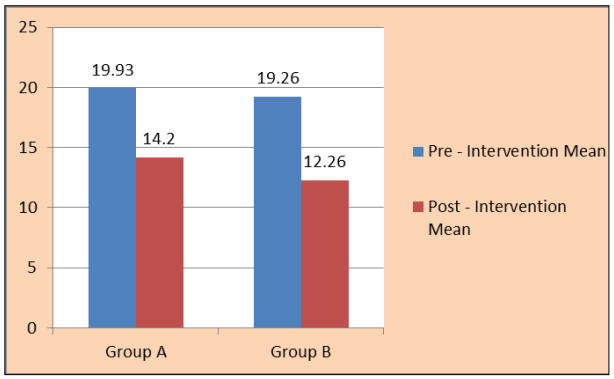
Variable	Group A		P-Value	Group B		P-Value
	Pre - Intervention Mean ±SD	Post - Intervention Mean ±SD		Pre - Intervention Mean ±SD	Post - Intervention Mean ±SD	
VAS	5.40±2.03	1.11±1.37	0.01	5.08±1.37	0.58±0.89	0.01
NDI	19.93±5.21	14.20±3.87	0.01	19.26±3.12	12.26±2.34	0.01

Table 3: Inter group comparison of mean difference value of VAS and NDI of two groups using Maan Whitney test.

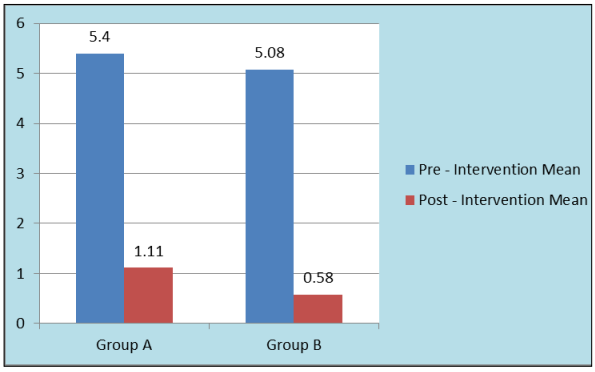
Variable	Group a	Group b	P value
	Pre-Post Diff (Mean ±SD)	Pre-Post Diff (Mean ±SD)	
VAS	4.38±2.06	4.33±1.18	0.983
NDI	1.87±1.35	2.16±1.66	0.803



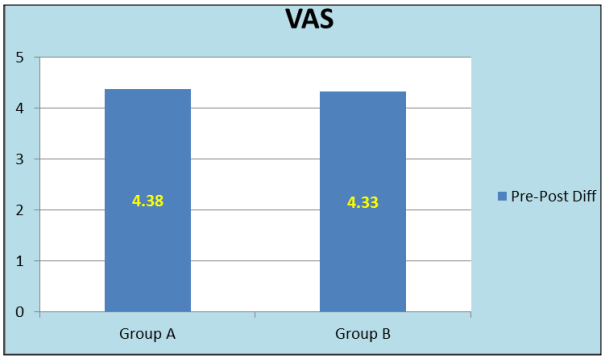
Graph 1: Inter Group comparison of mean of Age, BMI, Duration of Symptoms, VAS and NDI before intervention.



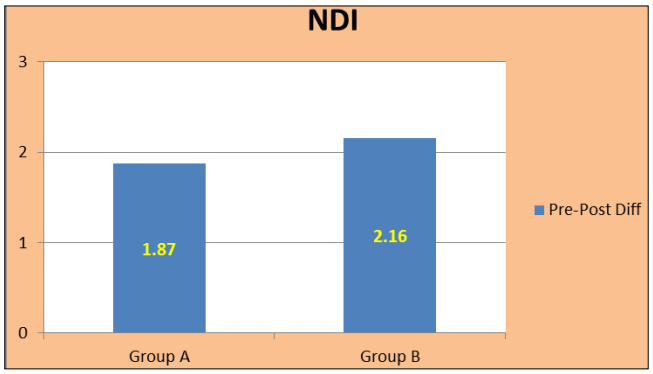
Graph 3: Intra-Group comparison of mean of NDI, before and after 1 week intervention.



Graph 2: Intra-Group comparison of mean of VAS before and after 1 week intervention.



Graph 4: Comparison of mean difference value of VAS during 1 week intervention.



Graph 5: Comparison of mean difference value of NDI during 1 week intervention.

Discussion

Results of present study indicate that both dry cupping and dry needling are effective in reducing pain and improving disability in patients with chronic non specific neck pain, with no significant differences between groups. Pain intensity scores, as measured by VAS and disability as measured by NDI, were lower at the end of 1 week treatment in both the groups.

Possible mechanism for reduction in pain intensity in dry cupping group is that the cupping therapy method can cause vasodilatation and stimulate blood circulation to increase metabolism and accelerate the elimination of waste and toxins from the body. This effect acts to reduce pain and improve physical function [20].

Most of these results are in line with previous studies of cupping for chronic neck pain [21] which found that a single traditional cupping [22], 5 applications of dry fire cupping [23], or pulsatile cupping [21], resulted in significantly better outcomes than those of the respective wait list control groups.

Yuan *et al*. conducted a systematic review and meta-analysis of traditional Chinese medicine for neck pain and low back pain. It was suggested that cupping may be more effective than medications for treatment of chronic neck or lower back pain [24]. Lauche *et al*. targeted 50 participants with nonspecific neck pain and implemented 10 to 15 min of cupping therapy on thelower trapezius muscle. Their results showed that, at rest and during movement, the pain level on the VAS (0–10) decreased by 1.79 and 1.97, after cupping, respectively [25]. Kim *et al*. found that 6 sessions of cupping therapy (wet and dry) on neck pain acupuncture points in 40 patients were more effective than the use of a heating pad [26]. The German study of Lauche *et al*. found that home-based CT was more effective than progressive muscle relaxation in patients with chronic neck pain. The pain reduction effect remained evident at the one week after intervention interval [27].

Huang *et al*. employed cupping therapy around the neck and shoulder regions, combined with acupuncture and massage. This treatment was implemented once a day to comprise one session. A full course of treatment entails five sessions and a total of four courses were conducted for the experiment. Their results illustrated that this regimen could significantly reduce shoulder pain [28]. The current study used ANCOVA to assess the level of NPI and SPI. The baseline was adjusted in both groups to control for the potential bias when using VAS. This allows for a more reliable assessment of the CT effect.

The mechanism for reduction in Pain and disability in dry needling group is explained with physiological sequences i.e. poly-modal type receptors nearby the trigger points that are responsive to mechanical, thermal and chemical stimuli. We also stating that such type of receptors stimulated by dry needling may produce stronger effect on pain modulation and impacted on our studies. Local muscle twitch is an involuntary, localized and temporary contraction in taut band of muscles during needling on the trigger points.

Simons *et al*. [29] hypothesized that the mechanical disruption of the contraction areas forming an MTrP by the needle was the critical therapeutic factor to account for the success of DDN in this condition. The contraction areas are believed to be located in dysfunctional motor endplates [35]. One study showed that multiple insertions of a needle in the endplate zone of the levatorauris longus muscle of mice induce a neuromuscular injury that mechanically affects muscle fibres and motor endplates [30]. It is conceivable that the precise location of the MTrP with the needle, confirmed by LTRs elicitation [30], could contribute to the changes in the dysfunctional nature of the fibers and motor endplates that make up the MTrP, thus accounting for the beneficial results observed with DDN. The effect of DDN could also be attributed to an increase in microcirculation [31] and the lavage of sensitizing substances in the zone [32], which would decrease both peripheral and central sensitization [33], or breaking up of the vicious cycle maintaining the MTrP [34]. However, other factors (eg, patient expectation about DDN) may have had an influence on the outcomes. It is known that the presence of MTrPs is associated with hyperalgesia, weakness, and restricted ROM of the muscles harbouring them [29]. Patients with chronic neck pain typically present with reduced ROM and strength [35]. which are related to disability [36]. Elimination of the MTrPs might explain the increase in PPT, neck ROM, and strength after treatment as seen in previous studies [37], in addition to the improvement in neck disability found in the current study.

The study by Llamas-Ramos *et al*. [38] compared the effect of DDN and manual therapy in participants with chronic mechanical neck pain in the short term. This trial compared 2 different groups of MTrP techniques applied to a single MTrP located in the upper trapezius: DDN technique in one group and 3 different manual therapy applications including pressure release, taut band manual stretch, and passive therapeutic stretch in the other group. Contrary to our study, Llamas-Ramos *et al*. [38] were not able to find clinically relevant within-group differences or significant between-group differences, except in PPT, favouring the DDN group. There are several methodological differences between the studies that could account for this: (1) In the study by Llamas-Ramos *et al*. [38], DDN provoked at least 1 LTR, but there was no indication of whether this was the only elicited LTR or, otherwise, the number of LTRs that occurred. This is an important issue because the efficacy of DDN seems to be correlated with the LTRs. If only 1 LTR was elicited; it may have been clinically insufficient to obtain good results. Recent research shows that the size of the effect of DDN on MTrPs increases with the number of LTRs obtained; (2) In our study we treated as many active MTrPs found bilaterally in 4 relevant muscles, whereas in their study they treated only 1 MTrP located in just 1 muscle, the upper trapezius unilaterally. Prevalence studies of MTrPs in chronic nonspecific neck pain show that muscle involvement is much higher than just one muscle [39], on just one side, and bilateral pain is very common in neck pain [40]. Some other

methodological issues including the concerns about the proper marking of the MTrP so as to be sure that treatments and assessments were done in the same location in consecutive visits, could further explain the differences between studies.

Result of inter group comparison in present study suggest that there is no statistically significant difference between the effect of dry cupping and dry needling in reducing pain and disability in patients with non specific neck pain. Possible explanation for the same improvement in both the groups can be that the physiological mechanism by which the technique reduces pain is almost same for both the techniques. It also may be the reason that small sample size, short duration of intervention and absence of control group contributed in failure of detecting change in the effectiveness of any of the technique over the other.

Hence result of present study confirms our null hypothesis which states that there is no significant difference between the effect of dry cupping and dry needling on pain and disability in patients with chronic non specific neck pain.

Limitations

1. Small sample size
2. Absence of a control group.
3. Only 2 sessions of intervention were given in 1 week in both the groups.
4. Follow up was taken after 1 week of intervention, hence long term effect of intervention is not known.

Future Scope

1. Same study can be done involving large sample size.
2. A future study can be carried out by including control group.
3. Study can be done for longer duration i.e. 2weeks or 4 weeks
4. A future study can be carried out to know the long term benefits of the intervention.

Clinical Significance

Result of present study will add knowledge in treatment of patients with chronic non specific neck pain. Both the dry cupping and the dry needling therapy are equally beneficial in reducing pain and disability in this population. So therapist can use any of this technique according to his/her skill and conveniences.

Conclusion

This study concludes that both the therapies used in the present study i.e. dry cupping and dry needling are equally effective for reducing pain and disability in patients with chronic non specific neck pain.

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