Original Article

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A Comparative Study on the Effects of Two Different Positions of Intermittent Cervical Traction in Cervical Radiculopathy

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Abstract

Objective: The study was done to find out the difference between the effects of two different positions of intermittent cervical traction in cervical radiculopathy. *Method:* The study was of an experimental design, with 30 subjects, 14 were female, 16 were male, and all subjects were assigned into two groups, 15 subjects in each, according to criteria (inclusion & exclusion) and carried out at physiotherapy OPD of CSS Hospital and Jai Physiotherapy and Dental Clinic, SF- 06, Ansal Galleria, Meerut. In both groups, disability & pain were assessed by using the NDI & VAS score respectively. The collected data were of men and standard deviation of NDI & VAS score and has been analyzed using SPSS software. Paired T-test was used to find the difference between two groups. *Results:* The results showed that there was significant difference in pain and disability with their NDI and VAS score (p=0.000).

Keywords: CR (Cervical Radiculopathy); NDI (Neck Disability Index) & VAS (Visual Analog Scale).

Introduction

Cervical radiculopathy is a common clinical diagnosis classified as a disorder of nerve root and is a pathologic process which has been defined as pain in the distribution of a specific cervical nerve root [1].

Cervical radiculopathy from degenerative disorders can be defined as pain in a radicular pattern in one or both upper extremities related to compression and/or irritation of one or more cervical nerve roots [2].

Degenerative disorders and natural cervical Radiculopathy are neurological conditions characterized by dysfunction of a cervical spinal nerve, the roots of the nerve or both. It usually presents with pain in the neck and one arm, with a combination of sensory loss, loss of motor function, or reflex changes in the affected nerve-root distribution [3].

The average annual incidence of cervical radiculopathy is 83.2/100,000 persons, while the average prevalence is 3.5/1000 persons. Individuals are most commonly affected in the 5th and 6th decades of life [4].

The most common cause of cervical radiculopathy (in70 to 75 percent of cases) is foraminal encroachment of the spinal nerve due to a combination of factors, including decreased disc height and degenerative changes of the uncovertebral joints anteriorly and zygapophyseal joints posteriorly (i.e., cervical spondylosis) [5].

The most severe injuries and greatest wear and tear occur between C4 and C7. The nerve roots passing through the intervertebral foramina in these areas are C5, C6 and C7. Uncovertebral articulations (also known as joints of Luschka) are present in the C3-7 spinal segments, located on the posterolateral border of the intervertebral disc and in the anteromedial portion of the intervertebral foramen[6]. These articulations are not true synovial joints, but can hypertrophy associated with disc degeneration, and result in narrowing of the intervertebral foramen. This foraminal narrowing is a common cause of cervical radiculopathy [7].

Aims and Objective

To compare the effectiveness of two different positions of intermittent cervical traction t**o** reducing pain and disability in patients with cervical radiculopathy.

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Materials and Method

Visual Analogue Scale

The visual analog scale is one of the most basic pain measurement tools. It consists of a 10 cm line. The clinician can measure the place on the line and convert into it a score between 0 to 10 where 0 is no pain and 10 is bad as it could be [8].

Neck Disability Index

The NDI has become a standard instrument for measuring self-rated disability due to neck pain and is used by clinicians and researchers alike.

Each of the 10 items is scored from 0 - 5. The maximum score is therefore 50. The obtained score can be multiplied by 2 to produce a percentage score. Occasionally, a respondent will not complete one question or another. The average of all other items is then added to the completed items.

The original report provided scoring intervals for interpretation, as follows:

0 - 4 = no disability

5 - 14 = mild

15 - 24 = moderate

25 - 34 = severe

Above 34 = complete.

It is recommended that the NDI be used at baseline and for every 2 weeks thereafter within the treatment program to measure progress. As noted above, at least a 5-point change is required to be clinically meaningful. Patients often do not score the items as zero, once they are in treatment. In other words, it is common to find that patients will continue to score between 5 - 15 despite having made excellent recovery (i.e., they may be back to work). The practitioner should avoid the trap of "treating till zero", as this is not supportable based on current evidence [9].

Hypothesis

Experimental Hypothesis

There is significant difference between two different positions of intermittent cervical traction to reduce pain and disability in patients with Cervical Radiculopathy.

Null Hypothesis

There is no significant difference between two different positions of intermittent cervical traction to reduce pain and disability in patients with Cervical Radiculopathy.

Limitation of study

Small sample size

The duration of study is so small.

Research is done only among a particular age group. It could have taken on large groups.

Only pain and disability recovery was considered.

Variables

Dependent Variables

VAS score and NDI score

This study is an experimental design in nature, a comparative study.

Sample Selection

Convenient sample of 30 subjects, according to the inclusion and exclusion criteria, randomly assigned into two groups include in the study. This study was conducted in physiotherapy OPD of CSS Hospital Subharti University and Jai Physiotherapy and Dental Clinic, SF-06, Ansal Galleria, Meerut.

Inclusion Criteria

1. Age 35-55 year
2. Gender both male and female
3. History of pain less than 2 months
4. Neck disability index more than 10%
5. VAS score for neck pain more than 3.
6. Subjects suffering from Degenerative disorder of cervical spine.
7. Foraminal compression test, Jackson compression test positive.

Exclusion Criteria

1. Age not above 55 year
2. History of any trauma to cervical spine
3. Rheumatoid arthritis
4. Sign of spinal cord compression
5. Vertigo/Dizziness
6. Ankylosing spondylitis
7. Tumors
8. Vertibrobasilar insufficiency symptoms

9. Any pathology around shoulder region such as Periarthritis, Bursitis, Tendinitis.
10. Cervicogenic Headache
11. Congenital and Acquired deformity i.e Torticolis, Scoliosis, Kyphosis
12. Whiplash Injury

Tools Used in Study

1. Couch
2. Towel
3. Consent form
4. Cervical traction machine
5. Stationary (pen, paper & pencil)

Protocol

After getting their informed consent the subjects were randomly assigned into two groups. Both of two groups i.e. group A and group B have 15 patients in each.

Group A: Intermittent cervical traction in supine lying position along with moist heat pack.

Group B: Intermittent cervical traction in sitting position along with moist heat pack.

It was given to the patient with duration of *15 minutes/day for 6 days in a week. Moist heat pack was given to the both group of patient for 10 minutes* (before intermittent cervical traction) to reduce pain and disability and to improve tissue extensibility. The protocol included treatment of total three weeks, with six days per week management. The patients included in both group who were encouraged to complete the home exercise program such as isometric exercise of neck flexors, neck extensors and lateral flexors along with hot water fomentation once a day over a 3 weeks period.

Data Analysis

All analysis was obtained using SPSS version 13.0(For window 7). Demo graphic data of the patients including age and gender were summarized. The dependent variables for the statistical analysis were VAS and NDI. A base line data was taken at the beginning of the study (pre test values) and after the completion of the treatment (post test values) to analyze the difference between the two treatment groups; independent t-test was used. A level of 0.05 was used to determine the statistical significance.

Result

A sample of size 30 (15 in group A & 15 in group B) was studied individually for VAS and NDI score at base line 1st and 21st day respectively. Table 1 presents the Mean & S.D. and standard error of Mean of group A and group B for Pre VAS score and Post VAS score. Table 2 presents the Mean & S.D. and standard error of Mean of group A and group B for Pre NDI score and Post NDI score. Table 3 presents the Mean, Standard Deviation for the difference (1st-21st Day).

The Paired 't' test was applied to find the significant difference between Pre and Post VAS and NDI score in group A and group B respectively, which shows a significant difference in both the groups separately at 5% level of significance (P<.05).

The average difference from 1st to 21st day in VAS and NDI score shown in Table 3, for both groups which shows that group A, (Intermittent Cervical Traction in Supine Lying position) reduce pain and disability higher in comparison to group B (Intermittent Cervical Traction in Sitting position).

Table 1: Mean, standard deviation & S.E.M. for VAS scores in Group A & Group B

S. No.	Time Periods	Group A (Mean±S.D.)	S.E.M.	Group B (Mean±S.D.)	S.E.M.
1	At 1st Day	5.253±1.0141	.2618	5±.9258	.2390
2	At 21st Day	2±.7559	.1951	2.467±.7432	.1918

Table 2: Mean, standard deviation & S.E.M. for N.D.I score in Group A & Group B

S. No.	Time Periods	Group A (Mean±S.D.)	S.E.M.	Group B (Mean±S.D.)	S.E.M.
1	**At 1st Day**	**.26±.0875**	**.0226**	**.256±.0718**	**.0185**
2	**At 21st Day**	**.0827±.0446**	**.0115**	**.076±.0241**	**.0062**

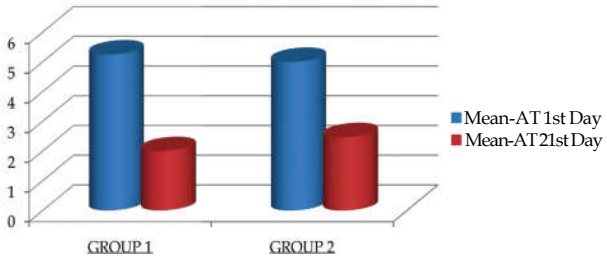
Table 3: Mean, standard deviation for the difference (1st – 21stday) VAS score & N.D.I. score in Group A & Group B

S. No.	Time- Difference	Group A (Mean± S.D.)(Difference)	Group B (Mean± S.D.) (Difference)
1	(1-21)Day VAT Score	3.253±.2582	2.533±.1826
2	(1-21)Day N.D.I. Score	.1773±.0645	.18±.0641

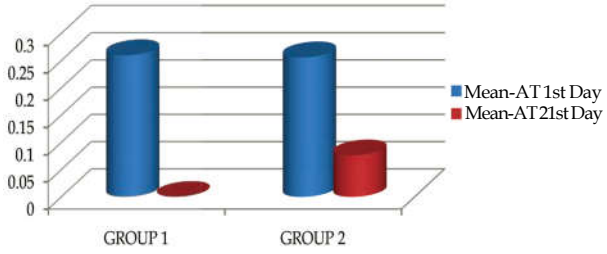
Table 4: Comparasion b/w (1st – 21stdays) in VAS scores & N.D.I. scores (by paired "T" test) in Group A & Group B

S. No.	Type of Scores	Group A	Group B
1	VAT Score	.0000 (P<.05), Significant	.0000 (P<.05) ,Significant
2	N.D.I. Score	.0000 (P<.05), Significant	.0000 (P<.05), Significant

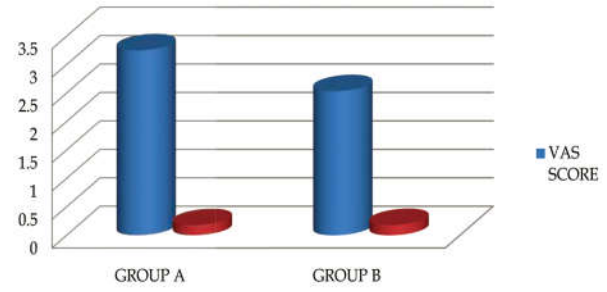
*p<.05 shows a significant difference at α=.05 level of significance



Graph 1: The Bar Chart of average values of VAS scores at 1st & 21st day in two groups



Graph 2: The Bar Chart of average values of NDI scores at 1st & 21st day in two groups



Graph 3: The Bar Chart of average difference b/w (1st-21st day) for VAS score & N.D.I. score in two groups

Discussion

The findings of this study indicated that subjects in both the groups had significant decrease in pain and disability. However, out of the two groups, the group receiving Intermittent cervical traction in supine lying position had shown more improvement in both pain and disability. The data showed that with the use of three weeks protocol there was a significant difference between post treatment values of VAS score (p=0.000) and NDI Score (p=0.000) taken on 21st day between group A and group B but more improvement was seen in the group A. A few researchers have done work where they have attempted to improve pain by giving cervical traction in supine lying position.

An article given by deets D, hand KL and Hopp SS supports the result of my study. In this article, 8 subjects were studied to determine the position which provided the greatest amount of posterior intervertebral separation during cervical traction treatment. Measurement of posterior intervertebral separation taken from lateral roentgenograms of C4-C7 vertebrae revealed greater separation in supine lying position. The result suggested that the supine lying position was more beneficial in treatment of cervical spine with traction [10]. The investigators concluded that the increased separation in supine lying position was related to the patients increased comfort and relaxation.

Fater DC, Kernozek TW did study was performed for the purpose of comparing the magnitude of cervical vertebrae separation during cervical traction in supine and seated positions using home traction units. A repeated measures design with two within-subject factors (type of traction and time) was used. Seventeen asymptomatic volunteers received cervical traction in seated and supine position. Subjects received 5 minutes of static traction in sitting or supine using a force of 13.6 kg while in 15 degrees of neck flexion. A lateral radiograph of the cervical spine was taken before traction force was applied and after five minutes of static traction. Anterior and posterior distances between the inferior border of C2 and the superior border of C7 were measured by a radiologist. After supine traction there were significant increases

(p=0.001) in posterior cervical vertebrae separation compared to any changes after seated traction. There were no significant changes in anterior vertebral separation during either supine or seated traction positions (p=0.769). Supine cervical traction may be more effective for increasing posterior vertebral separation than seated cervical traction [11].

It is likely that patients with CR would be benefitted with intermittent cervical traction along with moist heat pack. This approach reduces pain and disability; improve function which makes it a reasonable therapeutic option for clinicians in treating individuals with CR.

Conclusion

The study shows that the parameters utilized for the technique maneuvers were effective for improving pain and disability. Study supports experimental hypothesis H1.The significant difference was present between two types of therapies for VAS score as well as NDI score.

After seeing the data and graph, group A shows more significant improvement to reduce pain and disability. Therefore, Intermittent Cervical Traction in Supine Lying position may be incorporated into the treatment regimen of the patient undergoing physiotherapy for the pain and disability in cervical region of spine.

Study conclude that the difference from 1st to 21st day in VAS and NDI which is shown in (Table 3) for both groups/therapies which shows that group A i.e. Intermittent Cervical Traction in Supine Lying position reduced pain and disability higher in comparison to Intermittent Cervical Traction in Sitting position.

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