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Effectiveness of dynamic neck exercises along with interferential therapy in patients with chronic mechanical neck pain

Kamalakannan M[1*], Kalyani[2]
[1] Assistant Professor, Saveetha College of Physiotherapy, Chennai, Tamil Nadu, India
[2] Final year student, Saveetha College of Physiotherapy, Chennai, Tamil Nadu, India

Abstract
Aim: To find the effectiveness of dynamic neck exercises in patients with chronic mechanical neck pain.
Objective: To determine the effectiveness of interferential therapy with dynamic neck exercises on pain and functional ability in patients with chronic mechanical neck pain.
Methodology: A total of 30 patients were selected based of inclusion criteria they were randomized in to two groups 15 in each group A and group B.
Outcome Measures: numerical pain rating scale and neck disability index used as outcome measures.
Statistical Analysis: The collected data was tabulated and analyzed using inferential statistics to assess all the parameters mean and standard deviation was used. To find out significant changes within the group of pre and post-test by unpaired t-test was used.
Results: Statistical Analysis of post-test, Numerical Pain Rating Scale (NPRS) and Neck Disablity Index (NDI) revealed that there is high statically significant difference seen between Group A and Group B.
Conclusion: From the result, it has been concluded that Dynamic neck exercise with Interferential therapy (Group B) is more effective than Interferential therapy (Group A) in decreasing pain and improving the functional ability.

Keywords: dynamic neck exercises, mechanical neck pain, NPRS

Introduction

Prevalance of musculoskeletal pain in men and women were 32.7% and 53.7% respectively. Organisation (WHO) globally, has been estimated 1 in 5 adults suffer from pain and another 1 in 10 adults are diagonised with chronic pin each year. Only 1.7% are reported neck pain with predominance in women (2.1%) than men (0.7%). A higher prevalance of neck pain (6.8%) was found in rural population of India [6].

Neck pain arises from numerous different conditions and sometimes referred to as cervical pain. Chronic neck pain it last for several weeks or longer time (3 months). Poor posture, injury or the wear and tear of age can all lead to chronic neck pain.

The term ”mechanical neck pain” is used because it gets worse when we use our neck more and seems to be coming from the parts of the cervical spine - the mechanical parts that allow us to move our head around and up and down. This type of pain does not come from pinched or irritated nerves. The pain seems to come from the inflammed facet joins and from the degenerated disc. As the disc and facet join become more inflammed when we use to move our neck, the muscles around the cervical spine begin to get spasm and cause pain. This spasm is a protective spasm to prevent movements of neck.

The international association for the study of pain (IASP) in its classification of chronic pain defines cervical spinal pain as pain percieved anywhere in the posterior region of the cervical spine, from the superior nuchal line of the first thoracic spinous process. Neck pain is the sensation of discomfort in the neck area it can result from disorders of any of the structures in the neck, including the cervical vertebrae and intervertebral discs, nerves, muscles. A common cause of neck pain is muscle strain or tension [3, 4, 5].

Another type of classification proposed by IASP [7] is based on the duration of neck pain. Acute neck pain usually lasts less than 7 days, sub-acute neck pain lasts more than 7 days but less than 3 months, and chronic neck pain has a duration of 3 months or more. The same time frames but with different terminology are proposed by the Neck Pain Task Force [8]; they propose the term transitory neck pain instead of acute, short-duration for sub-acute, and long-duration for chronic neck pain.

Although dynamic exercises has advantages that, there is increased movement of joint resulting in capsular, ligament and muscular flexibility and increased cartilage nutrition. Muscle strengthening occurs in all joint ranges achieved during exercise and results in functionally more efficient muscle joint complex [9].

Active neck muscle training in the treatment of chronic neck pain concluded that dynamic neck exercises were effective methods for decreasing the pain and disability in with chronic non specific neck pain [10].

Among the recent advancements in the field of exercise therapy, active neck muscle training is also an effective mode of exercise regime developed to improve the functional status of the patients with neck pain. IFT currents are created by the 'interference' effects of two alternating medium frequency currents, which mean they are not impeded by skin resistance.

When two differing currents are applied simultaneously to the tissues through interrelated electrodes, an oscillation is generated endogenously where they augment to create a new low frequency current deep within the targeted tissues. The use of IFT in most cases, controls pain and improves functional ability of individual, it aims at pain reduction. The physiological effects of interferential therapy depends upon magnitude of current, rhythmic and constant types of mode, the frequency range used, accuracy of electrodes and effects are relief in pain, motor stimulation, absorption of exudates.

Background and Purpose

Poor posture can lead to neck pain, which causes excessive and prolonged muscle activity for a period of months as it can lead chronic neck pain. Hence this study will be attempted to find the effectiveness of dynamic neck exercises in the treatment of chronic neck pain.

Objective

- To determine the effectiveness of interferential therapy on pain and functional ability in patients with chronic mechanical neck pain.
- To determine the effectiveness of interferential therapy with dynamic neck exercises on pain and functional ability in patients with chronic mechanical neck pain.

Hypothesis

Null hypothesis

There will be no beneficial effect of dynamic neck exercises and IFT and in patients with Chronic mechanical neck pain.

Alternate hypothesis

There will be beneficial effect of dynamic neck exercises and IFT and in patients with Chronic mechanical neck pain.

Clinical significance

There was lack of synthesized evidence regarding the efficacy of dynamic neck exercises and IFT in the treatment of chronic mechanical neck pain. Hence the study was undertaken with an attempt to determine the effectiveness of dynamic neck exercises and IFT in the treatment of chronic mechanical neck pain.

Methodology

Study Design: Experimental study Design
Study Setting: Saveetha Medical College & Hospitals Physiotherapy Outpatient Department,
Saveetha University, Thandalam, Chennai-602105.
Sampling Method: simple random sampling technique
Sample Size: 30

Inclusion Criteria

- Age 35-60 years
- Both genders
- Patients persisting with chronic neck pain more than 3 months
- NPRS score not more than 7

Exclusion criteria

1. Neurological problem
   - Spinal cord stenosis
   - Intervertebral disc prolapse with nerve root compression
2. Spinal conditions such as
   - Infection
   - Tumors
   - Osteoporosis
   - Spinal fracture
3. History of spinal surgery

Procedure

Patients willing to participate in this study were screened for inclusion and exclusion criteria. They were explained about safety and simplicity of procedure and information consent was obtained and the study was approved by scientific review board and ethical comittee of saveetha University.
A total of 30 patients were selected based of inclusion criteria they were randomized in to two groups 15 in each group. numerical pain rating scale and neck disability index used as outcome measures.

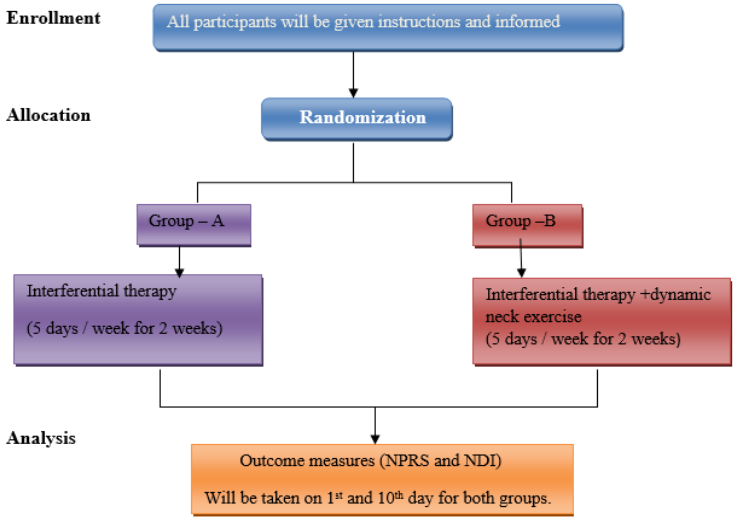


Fig 1

Group A (Control group)
Patients were given interferential therapy for 5 days /2 weeks. Patient was positioned in forward lean sitting with pillow support. IFT treatment protocol in (Table 1)

Group B: (Experimental group)
Dynamic neck exercise
Dynamic neck exercises will include

- Lifting head up with the chin tucked in from supine lying for neck flexion,
- Lifting head backwards in prone lying for neck extension,
- Lifting head sideways from pillow in side lying position for neck side flexion which is also repeated for the other side.
- Lifting head off from the bed and rotating to one side for neck rotation, repeating both ways.
- For dynamic neck exercise treatment protocol is tabulated in (Tab2)

Table 1: Treatment Protocol for Interferential Therapy

Frequency	80-100Hz
Intensity	mild sensory perception
Duration	15 min/day for 10 days
Placement of electrode	Quadripolar method
Type of electrodes	carbonized rubber electrodes

Treatment will be given for 10 days (5days/week for two weeks)

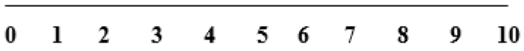
Table 2: Treatment protocol for dynamic neck exercises

Duration of each session	15min
Sessions	One
Repetitions	8 reps
Hold time	5 seconds
Frequency	5 days /week for 2 weeks
Duration	10 days

Treatment will be given for 10 days (5days/week for two weeks)

Outcome Measure
Neck Disability Index [12]
The functional index comprising of 10 items with 7 items related to activities of daily living, 2 items related to pain and 1 related to concentration. Each item is scored 0 to 5 and the total score is expressed as a percentage, with higher score corresponding to greater disability [11, 7].

Numerical pain rating scale
The NPRS is a 10 point scale consisting of numbers 0 to 10, it helps to find the pain threshold of the patient subjectively, in which 0 refers to no pain and 10 refers to worst imaginable pain.



0 indicates no pain
1-3 indicates mild pain
4-6 indicates moderate pain
7-10 indicates severe pain

Statistical Analysis
The collected data was tabulated & analyzed using descriptive & inferential statistics. To all parameters mean & standard deviation (SD) were used. Paired t-test was used to analyze significant changes between pre-test & post-test measurements.

Table 3: Pre test-Post test values of group - A

Group A		Mean	Standard deviation	t value	p value
Numerical Pain Rating Scale (NPRS)	Pre test	6.20	0.68	8.6963	<0.001
	Post test	2.53	1.25		
Neck Disability Index (NDI)	Pre test	31	1.51	15.8160	<0.001
	Post test	22	1.56		

The data from the above table shows the pre-test and post-test values of Numerical Pain Rating Scale (NPRS) and Neck Disablity Index (NDI) in Group-A subjects.
The pre-test mean value of NPRS is 6.20 (SD 0.68) and post-test mean value is 2.53(SD 1.25) this shows that NPRS scores are gradually decreasing with the P value (0.001) statistically significant.
The pre-test mean values of NDI is 31 (SD 1.51) and the post -test mean value is 22 (SD 1.56) this shows that NDI scores are gradually decreasing with the P value (0.001) statistically significant

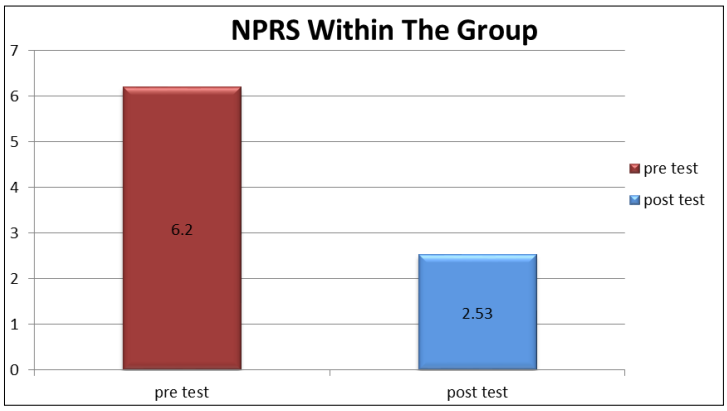


Fig 1

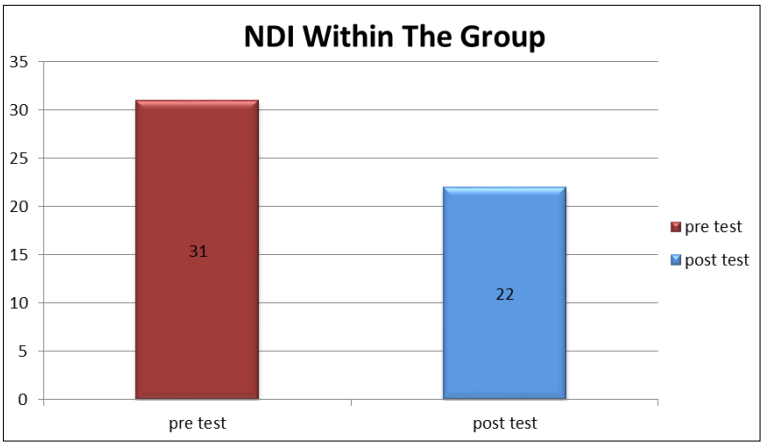


Fig 2

Table 4: Pre test –Post test values of group - B

Group B		Mean	Standard deviation	t value	p value
Numerical Pain Rating Scale (NPRS)	Pre test	6.27	0.70	28.3855	<0.001
	Post test	0.87	0.74		
Neck Disability Index (NDI)	Pre test	30.87	1.46	36.0288	<0.001
	Post test	13.33	1.29		

The data from the above table shows the pre-test and post-test values of Numerical Pain Rating Scale (NPRS) and Neck Disablity Index (NDI) in Group-B subjects.

The pre-test mean value of NPRS is 6.27 (SD 0.70) and post-test mean value is 0.87(SD 0.74) this shows that NPRS scores are gradually decreasing with the P value (0.001) statistically significant.

The pre-test mean values of NDI is 30.87 (SD 1.46) and the post -test mean value is 13.33 (SD 1.29) this shows that NDI scores are gradually decreasing with the P value (0.001) statistically significant

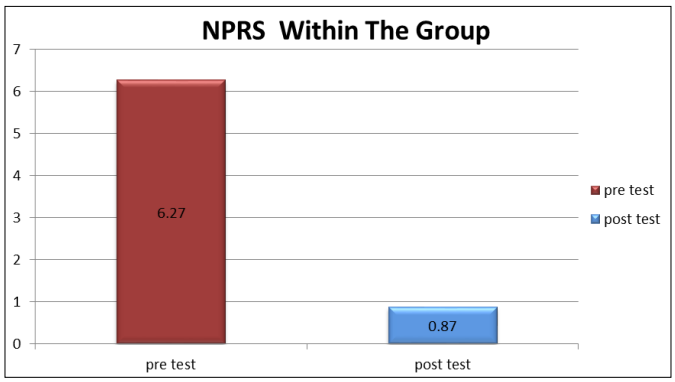


Fig 3

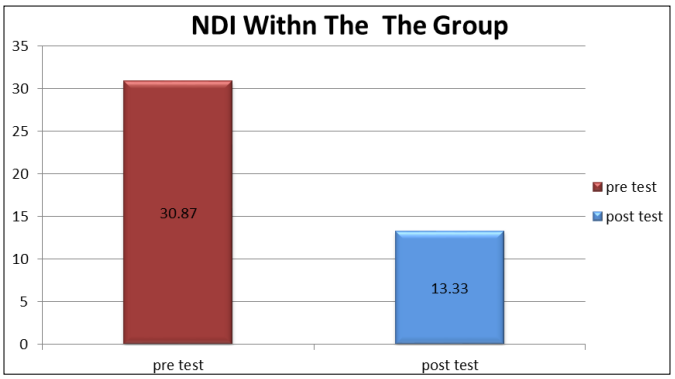


Fig 4

Table 5: Comparison between the post-test values group A& B.

Parameter	Post Test Values				't' test	Significance
	Group A		Group B			
	Mean	Standard deviation	Mean	Standard deviation		
Numerical Pain Rating Scale (NPRS)	2.53	1.25	0.87	0.74	4.4493	<0.001
Neck Disability Index (NDI)	22.00	1.56	13.33	1.29	16.5866	<0.001

The data from above table shows the post-test values of Numerical Pain Rating Scale (NPRS) and Neck Disability Index (NDI) in Group-A and Group-B.

The post-test mean value of NPRS in Group-A is 2.53(SD 1.25) and post-test mean value of NPRS in Group-B is 0.87 (SD 0.74), this shows that Group-A is greater than Group-B with the P value (0.001)

The post-test mean value of NDI in Group-A 22.00 (SD 1.56) and post-test mean value of NDI in Group-B is 13.33 (SD 1.29), this shows that Group-A is greater than Group-B with the P value (0.001)

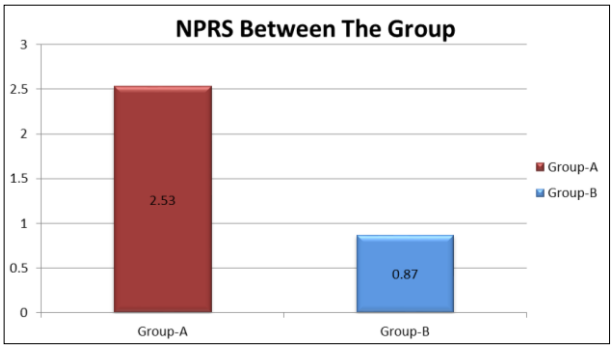


Fig 5

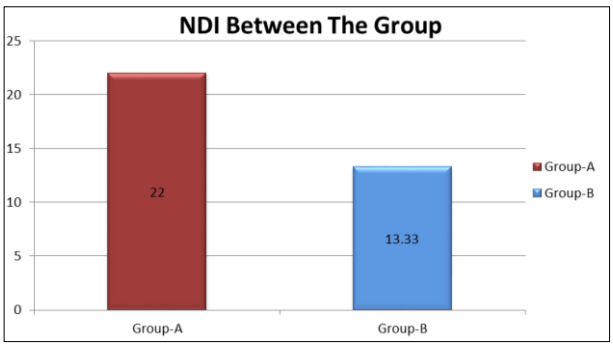


Fig 6

Results

From the statistical analysis made with the quantitative data revealed statistically significant difference between the Group A and Group B, and also within the group.

The post-test mean value of NPRS in Group-A 2.53 is (SD 1.25) and post-test mean value of NPRS in Group-B is 0.87 (SD 0.74), this shows that Group-A is greater than Group-B with the P value (0.001)

The post-test mean value of NDI in Group-B is 22.00 (SD 1.56) and post-test mean value of NDI in Group-B is 13.33 (SD 1.29), this shows that Group-A is greater than Group-B with the P value (0.001)

Statistical Analysis of post-test, Numerical Pain Rating Scale (NPRS) and Neck Disablity Index (NDI) revealed that there is high statically significant difference seen between Group A and Group B.

Discussion

This study shows that, participation in two week neck strengthening program led to a considerable reduction in the average neck pain, disability and improvement of neck muscle power in the group of patients who performed dynamic neck exercises.

Although dynamic exercises has advantages that, there is increased movement of joint resulting in capsular, ligament and muscular flexibility and increased cartilage nutrition. muscle strengthening occurs in all joint ranges achieved during exercise and results in functionally more efficient muscle joint complex [9].

Active neck muscle training in the treatment of chronic neck pain concluded that dynamic neck exercises were effective methods for decreasing the pain and disability in with chronic non specific neck pain [10].

In review (Gross 1996), results were inconclusive, and there was no ability to look at subgroups of exercise due to the small number of trials and their low power. Since then, 15 randomised clinical trials have been added to the current review. In general, these new trials utilize larger sample sizes

and more consistent outcomes.

- **Strong evidence:** There is strong evidence of benefit favouring a multimodal care approach of exercise combined with mobilisations or manipulations for subacute and chronic MND (mechanical neck disorder) with or without headache in the short and long term.
- **Moderate evidence:** When the stretching and strengthening program focuses on the cervical or cervical and shoulder/thoracic region, there is moderate evidence of benefit on pain in chronic MND in the short and long term. A program of eyefixation/proprioception exercises imbedded in a more complete program shows moderate evidence of benefit for pain, function, and global perceived effect for chronic MND (mechanical neck disorder) in short term and on pain and function for acute and subacute with or without headache in the long term.
- **Limited evidence:** The point to limited evidence of benefit that AROM may reduce pain in acute pain in the short term. There is evidence of benefit that neck strengthening exercises will reduce pain, improve function and global perceived effect for chronic neck disorder in the short and long term.

The aim of this study was determine the effectiveness of dynamic neck exercises in treatment of patients with chronic mechanical neck pain. 30 subjects fulfilling the inclusion criteria were assigned to this study by randomization technique. The subjects were divided into 15 subjects each. Informed consent was taken from the subjects and the procedure was explained. Group A (n=15) were receiving interferential therapy over a period of 2weeks, 5 days/week. Group B (n=15) were receiving dynamic neck exercises and interferential therapy over a period of 2weeks, 5 days/week. Neck Disability index and Numerical pain rating scale was used to as the tools for analysis. The Outcome measures were been taken at the end of 2nd week.

In the present study, the subjects were chosen from age group 35-60 years. The data obtained from the study was statistically analyzed using paired and unpaired t-test. The result of the study revealed that there was decrease in pain and an improvement in the functional ability. Decrease in pain measured by NPRS in both groups, A and B after the respective protocol.

Hence, the result of this study proves that, there will be beneficial effect of dynamic exercises in treatment of patients with chronic mechanical neck pain.

Conclusion

From the result, it has been concluded that Dynamic neck exercise with Interferential therapy (Group B) is more effective than Interferential therapy (Group A) in decreasing pain and improving the functional ability

Limitations

1. Small sample size.
2. Equal attention to all the patients could not be given as the procedure was done by single therapist

Future recommendations

1. A study with large sample size is recommended.

References

1. Mantyselka PT, patient pain in general practice ed 6, Kuopio Finland Kuopio university publication, 1998.
2. Rekola k, Health Services Utilization for Musculoskeletal Disorders in Finnish primary health care, Avta Univ, Pul Rehablitaion,1993:D259:53-59
3. KaschH, Bach FW, Stengaard - Pedersen, Jensen TS, Development in pain and neurological complaints after whiplash: a 1 year prospective study neurology, BMJ, 2003, 60:743-749.
4. Phero JC, Pharmacological Management of Head and Neck Pain- Otolaryngology clin North Am, BMJ, 2003; 36(6):1171-1185.
5. Devereuax MW, Neck pain, Prim care 2004; 31(1): 19-31
6. Joshi VL, Chopra A. Is there an urban-rural divide? Population surveys of rheumatic musculoskeletal disorders in Pune region of India using the Copcord Bhigwan model. J Rheumatol 2009; 36:614-22.
7. International Association for the study of Pain (IAPS) IAPS ask Force for Taxonomy. Pain Terminology. Seattle: IAPS; 2004.
8. Berglund A, Alferedsson L Classidy JD, *et al*. The association between exposure to rear end collision and future neck pain: a cohorot study. J Clin Epidemology 2000; 53:1089.
9. Carrie M Hall, Lori Thein Brody-Therapeutic Exercise Moving towards Function, 2nd edition, United kingdom, Zeefarm ltd,1980.
10. Jari Ylinen MD, Esa-pekka Jakala MD, DMed Sc, Matti Nykanen MD, DMed Sc, Arja Hakkinen Phd; Esko Malkia Phd, Timo Pohjolainen MD, DMed Sc, Sirkka-lissa Karppi, MSc, Hannu Kautiainen, BA,Olavi Airaksinen MD, DMed Sc,Active Neck Muscle Training in Treatment of Chronic Neck Pain in Women-A Randomized Controlled Tria., JAMA, 2003; 289(19).
11. Exercises for mechanical neck disorders (Review) Kay TM, Gross A, Goldsmith CH, Hoving JL, Brønfort G
12. Thomas TW, Chiui PhD, Tai-Hing Lam; MD, Anthony J. Hedly MD. A Randomized Controlled Trial on the Efficacy of Exercise for Patients with Chronic Neck Pain, Spine journal, Lippincott and Wilkins. Inc. 2004; 30(1):E1-E7.
13. Sarig H Bahat, Evidence for Exercise Therapy in Mechanical Neck Disorders, Manual Therap, 2003; 8(1):10-20.
14. Gross AR, Aker PD, Goldsmith CH. Peloso P, Conservative management of mechanical neck disorders; A systematic Overview and Meta-analysis, Online Journal Curr Clin Trials, 1996; July 30:Doc no: 200-201.
15. Howard Vernon, DC, the Neck Disability Index (NDI). An informal blurb from the author, Medline, 1991; 45:32-35.