

Original research article

Comparison Of Two Different Non-Pharmacological Techniques Alone In The Management Of Nonspecific Chronic Neck Pain**Dr. Anil Kumar****Associate Professor, Department of Physical Medicine and Rehabilitation, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India.****Corresponding Author: Dr. Anil Kumar****Abstract**

Objective: The objective of the study was to compare the effectiveness of Isometric neck strengthening exercises with static stretching vs. static stretching alone in the management of nonspecific chronic neck pain.

Methods: This was a randomized controlled trial study conducted in the Department of Physical Medicine and Rehabilitation, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India for 18 Months. Total 120 patients with nonspecific chronic neck pain were randomly assigned through simple random sampling technique, into experimental (group 1) received Isometric training with static stretching and control group (group 2) received Static stretching alone. While aerobic training was initiated in both groups prior to main interventions application. Therapeutic session was 4 days per week for 1 month. Neck pain and Disability was assessed by using outcome measures, numeric pain rating scale (NPRS) and neck disability index (NDI) on initial and final sessions.

Results: Majority of chronic neck pain patients were above 40 years of age group. In experimental group at baseline mean NDI score 35.71 ± 12.21 while after one month follow up after applying the Isometric strengthening exercises with static stretching exercises the total mean score was 22.94 ± 18.16 which was significantly ($p < 0.001$) 12.77 mean point reduced in experimental group. In control group at baseline mean NDI score 31.24 ± 11.12 while at one month follow up after applying static stretching exercises, the total mean score was 28.89 ± 10.69 which was significantly ($p = 0.002$) 2.35 mean point reduced NDI mean score in control group. In experimental group at baseline mean NPRS score 6.23 ± 1.51 while after one month follow up after applying the Isometric strengthening exercises with static stretching exercises the total mean score was 3.11 ± 1.59 which was significantly ($p < 0.001$) 3.13 mean point reduced in experimental group. In control group at baseline mean NPRS score 5.49 ± 1.71 while at one month follow up after applying static stretching exercises, the total mean score was 4.38 ± 1.92 which was significantly ($p = 0.001$) 1.11 mean point reduced in control group. The total mean NDI score was 35.71 ± 12.21 in experimental group and 31.24 ± 11.12 in control group respectively at baseline which was mean statistically insignificant ($p = 0.278$).

Conclusion: We concluded that the Isometric strengthening exercises training with static stretching appears more valuable as compared with static stretching training alone.

Keywords: Chronic nonspecific neck pain; Isometric strengthening; Static stretching

Introduction

Neck pain is one of the common musculoskeletal disorders, it refers to pain along the axis of cervical spine column and it is related to para spinal musculature.¹ Neck pain was more prevalent among women and prevalence of neck pain peaked in middle age. The incidence of neck pain increases with age and is more common among woman. Prevalence is highest in the middle age with the women being affected than the men.^{2,3} The prevalence of the neck pain varies widely between the studies with a mean life time prevalence of neck pain is

48.5%. Global Burden of Disease of study 2010 study neck pain ranked 4th highest in terms of Disability.⁴ Most of the patients who present with neck pain have nonspecific neck pain where the symptoms have a postural or mechanical basis, etiological factors are poorly understood and usually multifactorial including poor posture, anxiety, depression sport or occupational activities. Neck pain after whiplash injury also fits into this category, provides no bone injuries or neurological deficits is present.⁵ The neck moves more than 600 times each hour whether one is in a sleep or awake. The cervical spine is subject to stress and strain with daily activities such as sitting, lying in the supine or prone, speaking, rising, walking, turning, and gesturing.⁶ Most of the episodes of chronic neck pain are due to muscle strain/other tissue sprain. This type of injury can be caused by sudden force (such as an accident) or from strain the neck (such as stiff neck from sleeping in wrong position).⁷ Causes associated with neck pain muscle tightness, muscle strain, ligamentous strain, bad postural habits, disc prolapsed, trauma, tumors, inflammation and the risk factors include flexion of the neck, sitting posture, heavy lifting. In office workers, history of neck complaints, Pain started after duration of employment and, high muscular tension.⁸ Stretching is one way that is often done to reduce discomfort due to pain in the muscles of the neck and shoulders. Stretching provides benefits to strengthen the muscles of the neck and shoulders, increases flexibility and movement of the neck muscles, increases blood flow to the muscles, increases production energy, reduce pain and are relatively easy to do and do not require special time and place. Research conducted by Sowmya et al. in patients with non-specific chronic neck pain showed an isometric stretching technique as effective as dynamic or isotonic stretching to reduce non-specific neck pain.⁹ Various types of exercise therapy have been used in the management of nonspecific chronic neck pain. Such as, Isometric, stretching and aerobic exercises. The objective of the study was to compare the effectiveness of Isometric neck strengthening exercises with static stretching vs. static stretching alone in the management of nonspecific chronic neck pain.

Materials and Methods

This was a randomized controlled trial study conducted in the Department of Physical Medicine and Rehabilitation, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India for 18 months.

Inclusion criteria

- Non-Specific Chronic Neck pain > 3 months.

Exclusion criteria

- History of surgery at cervical spine and shoulder area
- Neck pain due to any specific pathology,
- Any neurological deficits/instability
- Acute neck pain
- Spinal stenosis
- Whiplash diseases
- Osteoporosis

Methodology

Total 120 patients with nonspecific chronic neck pain were randomly assigned through simple random sampling technique, into experimental (group 1) received Isometric training with static stretching and control group (group 2) received Static stretching alone. While aerobic training was initiated in both groups prior to main interventions application. Therapeutic session was 4 days per week for 1 month. Neck pain and Disability was assessed

by using outcome measures, numeric pain rating scale (NPRS) and neck disability index (NDI) on initial and final sessions.

Statistical analysis

The recorded data was compiled entered in a spreadsheet computer program (Microsoft Excel 2010) and then exported to data editor page of SPSS version 20 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics included computation of percentages, means and standard deviations were calculated. Statistical test applied for the analysis was chi-square test and Paired t-test. Level of significance was set at $p \leq 0.05$.

Results

Demographic characteristics of experimental and control groups mention (Table 1). Majority of chronic neck pain patients were above 40 years of age group. In experimental group at baseline mean NDI score 35.71 ± 12.21 while after one month follow up after applying the Isometric strengthening exercises with static stretching exercises the total mean score was 22.94 ± 18.16 which was significantly ($p < 0.001$) 12.77 mean point reduced in experimental group (Table 2). In control group at baseline mean NDI score 31.24 ± 11.12 while at one month follow up after applying static stretching exercises, the total mean score was 28.89 ± 10.69 which was significantly ($p = 0.002$) 2.35 mean point reduced NDI mean score in control group. In experimental group at baseline mean NPRS score 6.23 ± 1.51 while after one month follow up after applying the Isometric strengthening exercises with static stretching exercises the total mean score was 3.11 ± 1.59 which was significantly ($p < 0.001$) 3.13 mean point reduced in experimental group. In control group at baseline mean NPRS score 5.49 ± 1.71 while at one month follow up after applying static stretching exercises, the total mean score was 4.38 ± 1.92 which was significantly ($p = 0.001$) 1.11 mean point reduced in control group.

Table 1: Demographic profile of the experimental and control group

Parameter	Experimental group N=60	%	Control group N=60	%
Gender				
Male	24	40	27	45
Female	36	60	33	55
Age in years				
Below 30	10	16.67	13	21.67
30-40	28	46.67	18	30
Above 40	22	36.66	29	48.33

Comparing both groups findings: The total mean NDI score was 35.71 ± 12.21 in experimental group and 31.24 ± 11.12 in control group respectively at baseline which was mean statistically insignificant ($p = 0.278$). After one month follow up, the total mean NDI score was 22.94 ± 18.16 in experimental group and 28.89 ± 10.69 in control group which was mean 5.95 point significantly lower than control group (0.039). The total mean NPRS score was 6.23 ± 1.51 in experimental group and 5.49 ± 1.71 in control group respectively at baseline which was statistically insignificant ($p = 0.425$). After one month follow up, the total mean NPRS score was 3.11 ± 1.59 in experimental group and 4.38 ± 1.92 in control group which was mean 1.27 point significantly lower than control group ($p = 0.027$).

Table 2: NDI and NPRS pre and post values in experimental and control groups.

	Baseline score	After 1 month follow up	Result	P -value
Experimental group	NDI=35.71 ± 12.21	22.94 ± 18.16	12.77	p<0.00
Control group	NDI=31.24 ± 11.12	28.89 ± 10.69	2.35	p=0.002
Experimental group	NPRS=6.23 ± 1.51	3.11 ± 1.59	3.13	p<0.001
Control group	NPRS=5.49 ± 1.71	4.38 ± 1.92	1.11	p=0.001

Test applied: paired t-test

Discussion

This study demonstrated that there was significant improvement in neck pain, range of motion and functional activities in the experimental group as compared with the control group. The results of this study exposed facts that both of the isometric strengthening exercises with static stretching and static stretching alone were effective in relieving pain and disability in chronic neck pain patients. Present study confirmed the previous information showing the burden of musculoskeletal problems in the community that was 77%, and in other local study neck pain prevalence was 72% which is more consistent to our study.^{10,11} Regarding age factor most participants in our study presented with neck pain were aged below 40 years which showed consistency with the two studies showing peak age of neck pain between 20 and 45 years. Hence their results are consistent with our study and proved that this particular age duration participants with neck pain were due to high work stress and ultimate muscle fatigue. This current study clearly demonstrated significant improvement in pain NPRS and Disability NDI in both groups. Marked improvement in experimental group possibly may be due to rapid hypoalgesia effects of isometric exercises with stretching exercises and is generally consistent with the proposed mechanism of action for Isometric exercises and is used to treat somatic dysfunction that result in cervical pain and restricted full range of motion.¹² Secondly the isometric neck strengthening program was effective because literature suggested that in neck pain patients the neck musculature strength decreases 20%-50%.¹³ Kraut and Anderson found that neck flexors strength values were significantly reduced in women with chronic neck pain. Silverman et al. and Barton and Hayes showed that lower neck extensor muscle performance decreases in patients with chronic neck pain, also weakness of rotator muscles were noted in neck pain; however, it is unclear whether muscle weakness is the cause or result of neck pain. In our study it was observed that stretching has marked effects on major population of our research sample size but younger females patients were noted with discomfort and acute soreness while males with 4th decades showed opposite response to female genders with stretching exercises and it is evident from literature that major cause of neck pain in females population was muscular weakness, further more literature showed that stretching had an individuality response and muscle extensibility is still debated either it is real or apparent in nature and other suggested the effectiveness of stretching exercises for extensibility and decreasing pain and discomfort in individuals without neurological disabilities.¹⁴⁻¹⁶ Some studies showed that stretching causes changes in passive mechanical properties of muscles but this concept is less consistent in view of some researchers. In this research study both groups were also trained with general fitness training (GFT) by using treadmills and stationary leg bicycle before interventional exercises, with aerobic activities muscles were oxygenated and tissue warm up was induced, this phenomenon was supported from literature which stated that heat generation in muscular tissues are more durable and effective as compared to heating tissue with modalities.¹⁷ Our research was also supported from other studies which showed that GFT also decreased pain development during repetitive activities, same study confirmed that 10 weeks interventional general fitness

training improved oxygenation of painful trapezius muscles during repetitive tasks.¹⁸ Aerobic training decreases neck pain but no change in local pain over a prolonged period, aerobic training may be related to the release of B-endorphin, increase in core temperature and increase in trapezius muscle oxygenation for that muscle training is substantial to decrease the pain.¹⁹

Conclusion

We concluded that the Isometric strengthening exercises training with static stretching appears more valuable as compared with static stretching training alone.

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