Original Article

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Effect of Core Stability Exercise in Patients with Neckpain

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Abstract

Background: Pain is the most common symptom of which the human kind complaints. Neck pain is the second common condition cause of time off work after low back pain. According to 18% of the responders, the cause of their symptoms was unknown. The most frequently reported causes were ascribed to working conditions (29%), tension: stress (29%) and a poor posture (21%). Sitting at work for more than 95% of the working time seems to be a risk factor for neck pain.

Aims and Objectives: To study the effectiveness of conventional physical therapy in patients with neck pain and to study the additive effect of core stability exercises on conventional physical therapy in patients with neck pain.

Materials and Methods: Study included 30 (Thirty) patients with chronic case of non-specific neck pain between age group of 18-40 years. They were divided into 2 groups: Group A (Conventional therapy + Core stability exercises group) included 15 patients and Group B (Conventional therapy group) included 15 patients by random sampling. The patients were treated for a period of 1 month. Pain was assessed by Visual Analogue Scale, neck function was measured by Neck Disability Index and deep neck flexor strength was measured by craniocervical flexion test.

Results: Results showed that there was significant difference in VAS *(*P< 0.0001), NDI (P=0.002) and deep neck flexor strength (p< 0.0001) between Group A and B.

Conclusion: Core stability exercise along with conventional physiotherapy was found to be more effective in patients with chronic non-specific neck pain. So, these interventions can be applied in clinical setup in combination with conventional treatment for the better and long term improvements.

Keywords: *Non specific neck pain, core stability exercise, neck disability index, craniocervical flexion test.*

Introduction

Pain from musculoskeletal system is very common in modern sedentary society[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 related to automobile collisions and occupational injuries[2]. Overall, 66.7% (95% CI; 63.8-69.5) of the subjects reported that they had experienced neck pain during their lifetime and 22.2% (95% CI; 19.7-24.7) suffered from neck pain on the day of the survey. Overall, 58.8% (95% CI, 54.8-62.7) of women and 47.2 (95% CI, 42.4-51.5) of men had experienced neck pain in the previous 6 months[3]. Many patients come to physiotherapy department with complaint of pain caused by cervical spine dysfunction as neck pain is reportedly affecting 70% of people within their life time[4]. Neck pain is considered as chronic neck pain if it has lasted for more than 3 months[5]. With an increasing sedentary population, especially with reliance on computer technology in the workplace, it is predicted that the prevalence rate of non specific neck pain will continue to rise[6]. Sitting at

work for more than 95% of the working time seems to be a risk factor for neck pain and there is a trend for a positive relation between neck flexion and neck pain[7]. 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. Patients with neck pain had demonstrated greater activation of accessory neck muscles during a repetitive upper limb task compared to asymptomatic controls. Greater activation of the cervical muscles in patients with neck pain may represent an altered pattern of motor control to compensate for reduced activation of painful muscles[8]. Muscles respond to dysfunction in two ways: by becoming inhibited or by weakness[9]. If there is pain for whatever reason, these muscles will become inhibited & there will be selective weakness, a decrease in force production and a decrease in tonic stabilizing capacity or endurance capacity of the muscle. In the cervical spine, segmental stability is provided by the deep neck flexors (DNF) particularly in mid range positions. The DNF muscles demonstrate predominately tonic activity whereas sternocleidomastoid primarily functions in torque production[8]. Commonly used physical therapy modalities for non specific neck pain include application of heat and ice, ultrasound, cervical traction, acupuncture and electrical stimulation and some times Exercises, Manipulation and Mobilization as specific treatment[10]. DNF muscles endurance training is effective in reducing pain by increasing in pressure pain threshold[11]. DNF training in chronic neck pain patients demonstrated an improved ability to maintain a neutral cervical posture during pro longed sitting[12]. DNF muscles endurance training is given using air filled pressure Bio-feedback instrument in incremental stages as muscle function and endurance improves. Till now many researchers have done studies on efficacy of different treatments in neck pain including conventional therapy and stabilization exercises, but very few studies have been done on efficacy of deep cervical muscles training (core stabilization) in neck pain, so need of this study is to find out the effect of core stability exercises along with conventional therapy in patients with neck pain.

Materials and Methods

A total number of 30 patients with chronic non-specific neck pain were selected for study after giving informed written consent with due consideration to inclusion and exclusion criteria. Inclusion criteria for the study are patients with chronic non specific neck pain in age group 18 to 40 years. Both male and females were included. Patients with Vertebra-Basilar Insufficiency (VBI), Radiating pain with weakness, paraesthesia and decreased deep tendon reflex in upper limb, any surgery around neck, ankylosing spondylitis, any structural deformity of spine and any history of recent trauma around neck were excluded from the study. They were divided into 2 groups: Group A (Conventional therapy + Core stability exercises group) included 15 patients and Group B (Conventional therapy group) included 15 patients by random sampling. On the first visit, a complete Orthopedic Assessment was done. Pre-participation evaluation form consisted of VAS, NDI and assessment chart which included Age, sex, chief complain, presence of symptoms in one or both sides of neck etc. study duration is of one year. Outcome measures used were Visual analogoue scale (VAS), Neck Disability Index (NDI) and Deep Neck Flexor Strength. Study participants were requested to continue normal activities and avoid other forms of treatment for the duration of the study, apart from routine physician management. Subjects were not permitted to administer any other forms of electrotherapy during the intervention period of the trial.

Fig.1 Core muscle activation in supine with pessure biofeedback

Fig 2 upper limb loading with core muscle activation

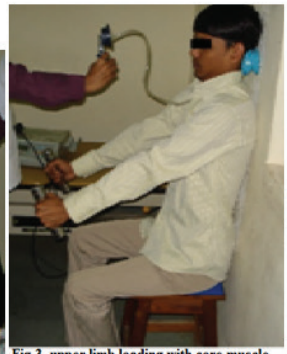

Fig 3. upper limb loading with core muscle activation in sitting position

Fig 4. upper limb loading with core muscle activation in standing position

Results

In this study all the tests were performed manually as well as with the use of demo version of Graph pad software. To analyze the effect on outcome measure VAS before and after treatment in Group A and in group B, non-parametric Wilcoxon matched pair test was used and for VAS between group non-parametric Mann Whitney U test was used. To analyze the effect on outcome measure NDI and DNF strength before and after treatment in Group A and group B, parametric paired t test was used and for between group A and group B, parametric unpaired t test was used. The mean age of Group A patients is 27.60 ± 6.73 years and mean age of Group B patients is 27.93 ± 4.59 years.Table 1 shows means of VAS, pre treatment and post treatment in Group A and Group B. in which Non-parametric Wilcoxon matched pair test was performed for both the Groups.

Table 1: Means of VAS, pre treatment and post treatment in Group A and Group B

Group	Pre treatment Mean± SD	Post treatment Mean± SD	W-value	P-value
Group A	7.33±1.11	0.86±0.83	120	0.0003
Group B	7.26±0.79	3.46±1.50	120	0.0003

For Means of differences in VAS between Group A and Group B Non-parametric Mann Whitney U test was used (Table-2). P< 0.0001 was extremely significant at 5% level of significance.

Table 2: Means of differences in VAS between Group A and Group B

Group	Mean± SD	U-value	P-value
Group A	6.46±0.63	5.0	p < 0.0001
Group B	3.80±1.08	5.0	p < 0.0001

For means of NDI, pre treatment and post treatment in Group A and Group B parametric-paired t test was used (Table 3). In both the groups, P < 0.0001 was extremely significant at 5% level of significance.

Table 3: Means of NDI, pre treatment and post treatment in Group A and Group B

Group	Pre treatment Mean ± SD	Post treatment Mean ± SD	t-value(df)	P-value
Group A	31.08±9.00	11.39±6.51	10.68(14)	p < 0.0001
Group B	33.26±9.79	22.07±8.58	5.37(14)	p < 0.0001

For means of differences in NDI between Group A and Group B, Parametric, Unpaired t test was used (Table 4). P= 0.002 < 0.05 was significant at 5% level of significance.

Table 4: Means of differences in NDI between Group A and Group B

Group	Mean± SD	t-value(df)	P-value
Group A	19.69±7.14	3.05(28)	0.002
Group B	11.19±8.06	3.05(28)	0.002

For means of DNF strength, pre treatment and post treatment in Group A and Group B (Table 5) Parametric-paired t test was used

Table 5: Means of DNF strength, pre treatment and post treatment in Group A and Group B

Group	Pre treatment Mean± SD	Post treatment Mean± SD	t-value(df)	P-value
Group A	20.53±0.91	25.33±1.44	18.33(14)	p < 0.0001
Group B	20.57±0.93	20.93±1.28	1.87(14)	p = 0.08 > 0.05

For means of differences in DNF strength between Group A and Group B (Table 6) Parametric-Unpaired t test was used.

Table 6: Means of differences in DNF strength between Group A and Group B

Group	Mean± SD	t-value(df)	P-value
Group A	4.80±1.01	13.02(28)	P < 0.0001
Group B	0.40±0.82	13.02(28)	P < 0.0001

Discussion

There are evidenced risk factors for the onset and maintenance of non-specific neck pain includes both, individual and work-related psychosocial factors. Management with specific treatment is required for chronic neck pain patients. The study was conducted on thirty subjects with chronic non-specific neck pain. The patients were randomly divided into two groups; Group A (conventional + core stability exercises), Group B (conventional therapy) with mean age (mean ± SD) of 27.60±6.73 and 27.93±4.59 respectively. Several studies have supported the findings of our results. One of the possible reasons for reduction in pain in both the groups might have been the effect of

application of hydrocollator pack which was given for initial10 days of treatment. It has been suggested that such responses might be explained on the basis of the pain gate theory, in that the transmission of thermal sensations may take precedence over nociceptive impulses[13]. In our study, we found that core stability exercises along with conventional physiotherapy were more effective in reducing chronic pain and disability, and also significantly improved performance of crania-cervical flexion test. Lehmann and de Lateur (1990a) described work which demonstrated that heating tissue to therapeutic temperature results in reduction of spasm and stimulation of skin in neck region could result in increased muscle relaxation[14]. Shaun O"leary et al. determined that crania-cervical flexion provided more specific training to activate deep neck flexor muscles[15]. DNF training is effective in reduction of pain and disability in patients with chronic non specific neck pain as suggested by results of our study this can be com pared with the study done by Jari ylinen et al. (2003) and, Falla D (2007). In the present study, we found that DNF training was also effective in improvement in stages of CCFT after 4 weeks of training which is same as described by Jull G et al. (2002)[16]. Comerford & Mottram (2001) suggested that Motor control and recruitment are the main priority and principal of DNF training, not strength and flexibility. The DNF training with low-load is paramount for rehabilitation of motor control deficits. High perceived effort was permissible initially; but as control and functional integration return, low effort activation dominated. The re-training of motor control dysfunction is a cognitive process requiring afferent feedback (Visual feedback in DNF training)[17]. The present study had demonstrated that conventional physiotherapy effective in relieving pain and disability but not effective for improving core muscle strength where as core stability exercise along with conventional physiotherapy was found to be more effective in patients with chronic non-specific neck pain. So, these interventions can be applied in clinical setup in combination with conventional treatment for the better and long term improvements.

CONCLUSION:

An experimental study to find out the effect of core stability exercises with conventional therapy in patients with neck pain was conducted on 30 patients. Significant difference was found between these groups on outcome of pain and neck disability and core muscle strength. So from the study it can be concluded that "Core stability exercises along with conventional therapy are highly efficient in relieving pain and disability and in improving core muscle strength in patients having neck pain."

Limitations: The small sample size of 15 in each group may limit generalization of the results of this study to all the patients with neck pain and long term follow up was not done.

Conflict of Interest: None Declared.

Source of Funding: Nil.

Ethical Clearance: Informed written consents were taken from all volunteer participants of the study.

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