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EFFICACY OF CRANIOCERVICAL FLEXOR TRAINING ON SITTING NECK POSTURE IN PATIENTS WITH CHRONIC NON SPECIFIC NECK PAIN AMONG ATHLETES-SINGLE GROUP EXPERIMENTAL STUDY

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Abstract:-

Background & introduction

Poor sitting posture has been implicated in the development and perpetuation of chronic nonspecific neck pain symptoms. The Cervical spine is surrounded by a complex arrangement of muscles that contribute to control of the head & neck. The deep cervical short flexor muscle group(longus colli, longus capitis,rectus capitis anterior & lateralis) is considered to be an important stabilizer of head on neck posture.The present study, which consist of twenty subjects with chronic, nonspecific chronic nonspecific neck pain were enrolled in this study. Single group experimental which received craniocervical flexion exercise. The outcomes of chronic nonspecific neck pain and disability were measured through Numerical Rating Scale (NRS) and Neck Disability Index (NDI). The forward head posture was measured from the Digital Photograph method. The study consisted of treatment sessions of five weeks with five times in a week.The Results shows that the single experimental groups, (CCF training), the Mean ± SD values were calculated. Groups were compared Using ANOVA (Analysis of variance).The results of the study suggest that F - values for Craniovertebral angle for experimental Group 14.54(P<0.001) , (P<0.001)respectively. The F- values for NDI for experimental Group, 63.90(P<0.001). In last the F- values for NRS for experimental Group 145.524(P<0.001), respectively .The result further suggests that experimental Group significantly more effective. The present study, which concludes that the tailored intervention of specific craniocervical flexion exercise improves forward head posture and reduce chronic nonspecific neck pain and disability significantly for the management chronic nonspecific chronic nonspecific neck pain. Clinicians should consider deficits, functional limitations, irritability level, and the sport's cervical spine stress profile when selecting exercises for athletes with chronic nonspecific neck pain.

Key words: *CCF, Chronic nonspecific neck pain, NRS, NDI and FHP*

INTRODUCTION:-

Chronic nonspecific chronic nonspecific neck pain which is more common in athletes and is usually the result of minor sprains, strains, or contusions. Athletes with chronic nonspecific muscle recruitment, strength and endurance, repositioning acuity, postural stability, and chronic nonspecific neck pain may have deficits in cervical and/or upper thoracic mobility, oculomotor control. High-level athletes and weekend warriors alike are affected by chronic nonspecific neck pain. In most instances, athletic chronic nonspecific neck pain is the result of minor injuries, such as ligament, sprains, muscle strains, or soft tissue contusions (Zmurko et.al 2003).60 Data on the prevalence of benign chronic nonspecific neck pain in athletes are lacking, presumably because surveillance efforts in this population have focused on serious cervical spine injuries (eg, fractures). Cycling athletes, for instance, suffer from chronic nonspecific neck pain at a relatively high rate, yet cyclists are often absent from reports of athletic chronic nonspecific neck pain (Weiss BD.,1985).Cervical spine is surrounded by a complex arrangement of muscles that contribute to control of the head & neck. The deep cervical short flexor muscle group (the longuscolli, longus capitis, rectus capitis anterior & lateralis) is considered to be an important stabilizer of head on neck posture (Williams et.al., 1980 and Basmajian 1979).

Self-stretching exercises may reduce chronic nonspecific neck pain, at least in the short term (Ylinen et al 2007). Ylinen et al 59). Evidence based reported that stretching 5 times per week was as effective in reducing chronic chronic nonspecific neck pain as twice-weekly manual therapy. Stretching exercises for the scalenes, upper trapezius, levator scapulae, pectoralis minor, and pectoralis major may be helpful (Childs et al 2008).7 Athletes with chronic nonspecific neck pain associated with an increased thoracic kyphosis may benefit from thoracic extension self-mobilization using a foam roller. Deep cervical flexor muscles act over anterior aspect of upper & middle section of cervical spine (Jands et.al., 1988). Deep cervical flexor muscles are small stabilizing muscles located on anterior & anterior-lateral surface of cervical spine & are deep to the sternocleidomastoid muscle.Rectus capitis anterior & lateralis course from the atlas to the basilar & jugular part of occiput respectively.Longus capitis attaches below to the transverse process of 3rd to 6th cervical vertebra & above to the basilar part of occiput (Mauoux Benhamou.et.al.,1994). Longus capitis attaches below to the transverse process of 3rd to 6th cervical vertebra & above to the basilar part of the occiput (Williams & Warwick et.al 1980).

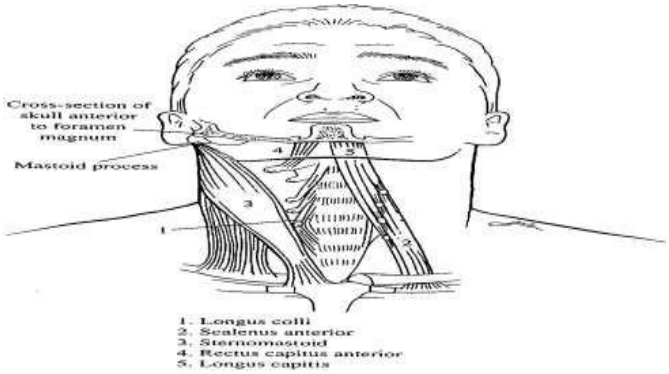

Fig1: Upper and Deep Neck Flexor

Chronic nonspecific neck pain is extremely common (Peter and Aber,Anita et al. 1996) and has been described by osteopaths since old times. Restoration of supporting capacity of upper & deep neck flexor muscles parallels a reduction in chronic nonspecific neck pain & headache. (Rosemary Grant and Jull et al., 1997) chronic nonspecific neck pain is common & costly problem in the community affecting approximately 70% of people at some point in life (Roni Evans et al.2002)

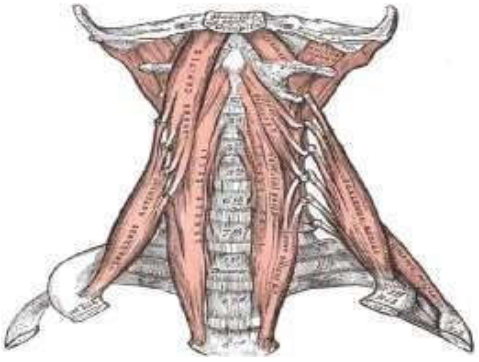

Fig 2: The deep anterior muscles of the cervical spine.

Randomized controlled trials comparing different exercises or exercise protocols with various athletic populations are lacking. Consequently, the discussion of therapeutic exercise that follows is impairment based and not sport specific. Nonetheless, the clinician should give consideration to the cervical spine stress profile of the athlete's sport prior to formulating an exercise program.

Athletes with chronic nonspecific neck pain associated with an increased thoracic kyphosis may benefit from thoracic extension self-mobilization using a foam roller. Pectoralis minor stretching may also decrease the thoracic kyphosis. Corner self-stretching with the shoulder in 90° of abduction can effectively lengthen the pectoralis minor. The evidence based a specific craniocervical flexion exercise (CCFEx) protocol in the supine position. This program initially involves retraining a static holding contraction of the target muscles at a submaximal level to improve their tonic postural function. The type of training employed is based on the nature of the dysfunction presenting in these muscles), as well as their normal functional role). These exercises constituted the conventional exercises of our study. Increased forward neck flexion may result in increased tension in posture, stabilizing muscles as well as increasing compression forces in the articulation of the cervical spine, resulting in a higher risk of work related muscular disorders. The craniocervical flexion test (CCFT) regime appears to be an ideal strategy for specifically activating DCFs and reducing augmented activity of the SCM muscle.

Need of study:

The present study, which is able to find the individual effect of craniocervical flexor training & cervical flexor training on forward head posture, and to find the combine effect of both craniocervical flexor exercise & cervical flexor exercise on forward head posture & chronic chronic nonspecific neck pain.

Aims and Objectives of the study:

To find the effectiveness of cranio cervical flexion exercise for the treatment chronic nonspecific neck pain among athletes.

Fig 3: Cranio Cervical Training

Fig 4: Materials

Fig 5: Sphygmomanometer

Methodology:-

Research Approach

Experimental approach, but comparative in nature is chosen for conducting the present study.

Study Design

Single group experimental study

Inclusion Criteria

1) Age: 20-30years on field athletes.
2) Forward head posture
3) History of chronic nonspecific neck pain more than 3 months old
4) Athletes who have mild chronic nonspecific neck pain & disability scoring 5-15 on Neck Disability Index
5) Poor performance (unable to achieve 24 mm hg) on clinical test of craniocervical flexion.

Exclusion Criteria

1) Athletes with more severe chronic nonspecific neck pain (disability scoring more than15 on Neck Disability Index).
2) History of fracture or trauma around cervical spine
3) History of surgery around cervical spine
4) Athletes suffering from vertigo and dizziness
5) Athletes having congenital disorders cervical rib, torticollis, thoracic outlet syndrome
6) Any neurological disorder

Dependent variable

1) Forward head posture
2) Chronic nonspecific neck pain

Indepenent variable

1) Cranio cervical flexor exercise

Procedure

The subjects were randomized into single experimental groups. Twenty athletes (10 females and 10 males- aged group) participated in the study those who have on field experience. Before starting the study, the researcher which he explained about the nature of the research protocols to athletes and trainer. Once the confirmation and consent clearance certificate which is obtained through IRB, then the study which was carried out.

Experimental Group: Craniocervical flexor training intervention.

Postural analysis was performed before the intervention, Again the measurement which was carried out after 2 weeks of intervention and after 5-week intervention which is performed through in single experimental groups. The exercise tailored

made protocols were conducted over a 5-week period, 5 times in a week and total duration exercise sessions were approximately 30 minutes. The exercises were performed without any provocation of chronic nonspecific neck pain.

Experimental group

The exercise was performed in the supine position. The sphygmomanometer was used for exercise, the cuff of it placed sub-occipitally to monitor the flattening of cervical lordosis that occurs with longus colli's contraction. Subjects were guided by feedback to sequentially reach 5 pressure target in 2 mm Hg increments from a baseline of 20mm Hg to the final level of 30mm Hg. Subjects were instructed to gently nod their head as though they were saying 'yes'. The therapist identified the target level that the subject could hold steady for 10 sec. For each target level, the contraction duration was increased to 10 sec & subject trained to perform 10 repetitions. At this stage, the exercise was progressed to train at the next target level. The exercise is a low-load exercise in nature to more specifically train the deep cervical flexors, rather than the neck flexors as a whole, which occurs with a head, lift exercise.

Result

The present study which deals with the results obtained after the statistical analysis. Statistics were performed by using a software package SPSS 17. The Results were calculated using 0.05 level of significance (P<0.05).For ANOVA results were concluded using 0.01 of significance (P<0.01). The study consists of single experimental groups with Twenty (20) athletes. They were instructed undergo Craniocervical flexor training, therapeutic intervention.

Table 1: Mean and SD Participant age

DEMOGRAPHIC	**Single experimental group**
	Mean±SD
AGE	21.05O±3.236

Table 2: Mean and SD of Craniovertebral angles Before intervention, after 2 weeks and after 5 weeks of Single experimental group

Session	**Single experimental group**	
	Mean	SD
Before Rx	46.75	4.43
After 2 weeks	49.5	2.83
After 5 weeks	52.85	2.84

Table 3: Comparison of mean values of carniovertebral angle of Single experimental group at intervals Pre- 2 week, 2 week-5week, Pre- 5 week

Carnivertebral angle	**Single experimental group**	
	t-value	**p-value**
Pre- 2 week	9.28	<0.05
2 weeks-5week	10.63	<0.05
Pre- 5 week	18.16	<0.05

Table 4: Mean and SD of NRS before intervention, after 2 weeks and after 5 weeks of intervention of Single experimental group

Session	**Single experimental group**	
	Mean	SD
Before Treatment	3.75	0.44
After 2 weeks	2.3	0.57
After 5 weeks	0.55	0.605

Table 5: Comparison of mean values of NRS of Single experimental group at intervals Pre- 2 week, 2 weeks-5weeks, Pre- 5 week

NRI	**Single experimental group**	
	t-value	**p-value**
Pre- 2 week	12.70	<0.05
2 week-5week	16.05	<0.05
Pre- 5 week	29.0	<0.05

Table 6: Mean and SD of NDI before intervention, after 2 weeks and after 5 weeks for the subjects of Single experimental group

Session	**Single experimental group**	
	Mean	SD
Before Treatment	6.9	2.4
After 2 weeks	4.05	1.05
After 5 weeks	1.45	0.826

Table 7: Comparison of mean values of NDI of Single experimental group at intervals Pre- 2 week, 2 week-5week, Pre- 5 week

NDI	Group A	
	t-value	p-value
Pre- 2 week	8.14	<0.05
2 week-5week	17.08	<0.05
Pre- 5 week	18.16	<0.05

Table 8: Comparison of F-value for craniovertebral angele, NRS, NDI between Single experimental group

Variable	Experimental Group	
	F-value	P value
Craniovertebral angle	14.546	0.0067
NRS	145.524	0.0053
NDI	63.903	0.0081

The above analysis defines that there is a significant improvement of forward head posture, NRS and NDI in all groups. But there is highly significant improvement with Group C in which subjects performed both craniocervical flexion exercise and cervical flexion exercise.

Discussion

The present study, which was carried out 20 subjects with age group between 20-40 years to know the individual effectiveness of craniocervical flexion exercise, on forward head posture, pain and disability in subjects with chronic nonspecific neck pain. Subjects were divided into single groups with 20subjects in each group. Subjects with experimental Group were treated with Craniocervical flexion exercise. Results showed that combination of both craniocervical flexion exercises is highly effective in improving forward head posture,pain and disability in physical education students with chronic nonspecific neck pain with respective F-values 11.073(P=0.0064). Group A which underwent CCFE also showed highly significant improvement in FHP, decrease pain and decrease disability than Group B which undergone CFE with F value of craniovertebral angle of Group 14.546(P=0.0053), F value of NRS of Group 14.524(P=0.0081) and F value of NDI 63.90 respectively. This experimental Group subject underwent both CCF training, in which CCF training which concentrated on both deep and superficial neck muscles and CCF training concentrate on DCF muscles (O'Leary et.al.2007). In this study, CCF exercise was done by using a sphygmomanometer as feedback for retraining the DCF muscles and it showed significant improvement in the performance of the DCF muscle, thus this study is supported by the above researches for the use of CCF action for retraining the DCF muscles (Heikkila and Astrom. 1996). Experimental Group showed significant improvement in FHP.F values for craniovertebral angle of 14.546, respectively. This showed that subjects in the experimental group who underwent CCF exercise showed significant improvement in FHP. Patients with chronic chronic nonspecific neck pain may tend to develop an increased cervical lordotic posture associated with a forward head posture, 90 and had less cervical backward bending.80A sustained forward flexion posture of the spine has been associated with increased cervical compressive loading and creep response in the connective tissue (Revel. 1991). The poor isometric performance of the cervical short flexor muscle has been observed in females with chronic cervical origin headache and forward resting head posture. In this study CCF training, CFT exercise and a combination of both CCF exercise and CF exercise are used as the intervention. Previous research proved that CCF exercise and CF exercise individually effective in reducing chronic chronic nonspecific neck pain by improving performance of DNF muscles. Previous studies showed that anterior head weight bearing reduces the forward head posture, which is shown in this study also in experimental Group. CCF exercise is effective in reducing myoelectrical manifestation of superficial cervical flexor muscle fatigue as well as increasing cervical flexion strength in a group of athletes with chronic nonspecific neck pain. In this study, we also found that CCF training is significant to improve forward head posture and to reduce chronic nonspecific neck pain and disability. A Retrospective study showed the effect of CCF training found CCF training better for the treatment to reduce chronic nonspecific neck pain and disability. But none of the study has been shown this specific effect of CCF training on chronic nonspecific neck pain and forward head posture. This study used the CCF showed that this specific training is more effective to reduce chronic nonspecific neck pain and disability. Combination of both CCF trainings strengthens the DCF mainly and also superficial neck flexors, improved the endurance of DCF, retrained the DCF.CCF training mainly strengthen the DCF muscles and improve the endurance of deep and superficial neck muscles. Due to this reason combination of both exercise showed the highest significant improvement in FHP and chronic nonspecific neck pain and disability.

According to the result of this study if the combination of both CCF trainings is used in chronic nonspecific chronic nonspecific neck pain patient then it will be so beneficial to improve FHP and reduce chronic nonspecific neck pain and disability.

Conclusion

The present study which concludes that the tailored made intervention strategy, this specific craniocervical flexion exercise improves forward head posture .The cranio cervical flexion training which significantly reduces chronic nonspecific neck pain and disability for the management chronic nonspecific neck pain. Athletes with chronic nonspecific neck pain may have deficits in mobility, muscle recruitment, strength and endurance, repositioning acuity, postural stability, or oculomotor control. The treatment of athletic chronic nonspecific neck pain should thoroughly address these deficits. The resultant exercise program should adequately prepare the athlete for the demands of their sport and a safe return to full participation.

Source of funding- self or other source

This study was conducted through self-sources. The retrospective study does not influence any other resources.

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