

# EFFECT OF MYOFASCIAL RELEASE ALONG WITH CONVENTIONAL THERAPY ON HAMSTRING TIGHTNESS AND FORWARD HEAD POSTURE IN SUBJECTS WITH CHRONIC NON-SPECIFIC NECK PAIN AMONG IT WORKERS

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**Abstract:** **BACKGROUND:** Chronic non-specific neck pain (CNSNP) is commonly associated with forward head posture (FHP), characterized by a reduced craniovertebral angle (CVA). Mechanical connection between hamstring tightness and cervical spine posture through the posterior kinematic chain. Myofascial release (MFR) targeting hamstring tightness may influence cervical alignment and pain perception in individuals with CNSNP and FHP. **OBJECTIVE:** To evaluate the effect of myofascial release along with conventional therapy on hamstring tightness and forward head posture in subjects with chronic non-specific neck pain among IT workers.

**METHODOLOGY:** Pre and post experimental study that includes 30 subjects. The subjects were divided into two groups. Group A received conventional therapy alone and group B received myofascial release along with conventional therapy. The treatment duration was 6 weeks. The outcome measures were numerical pain rating scale that measures the pain, craniovertebral angle that measures the forward head posture and active knee extension test that measures the hamstring tightness.

**RESULT:** Using unpaired 't' comparison of post-test values of group A and group B of the t value in numerical pain rating scale shows 5.48, craniovertebral angle shows 12.21 and active knee extension test shows 2.46.

**CONCLUSION:** This study concluded that there is significant result in myofascial release along with conventional therapy on reduction in pain, hamstring tightness; and forward head posture improvement among subjects with chronic non-specific neck pain.

**Keywords:** Craniovertebral angle, Forward head posture, Hamstring tightness, Flexibility.

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## I. INTRODUCTION

Non-specific neck pain (NSNP) is the fourth most common cause of musculoskeletal disorders worldwide and not only risk factor for developing severe spinal pathologies and functional disability. It is associated with occupational and musculoskeletal factors including prolonged work hours, sedentary lifestyle, high workload, inappropriate computer workstation designs and desk-bound work position. These elements could cause muscle spasms, reduced cervical motion and functional restriction. Acute NSNP lasts less than 4 weeks; subacute NSNP has a duration of 1- 4 months; chronic neck pain persists more than 4 months.<sup>[1]</sup>

The neck muscle contains both flexors and extensors muscles. The deep cervical flexion muscles are; Longus capitis, Longus colli, Longus cervicis (3 portions; - superior oblique, inferior oblique, vertical), Rectus capitis anterior, Rectus capitis lateralis. Superficial cervical muscles are; Sternocleidomastoid, Anterior scalene. Cervical extensors are; Levator scapulae, Upper trapezius, Splenius capitis, Splenius cervicis, Semispinalis capitis, Semispinalis cervicis. Neck flexors such as the longus capitis and longus colli are thought to be crucial for postural adjustment and dynamic stabilization.<sup>[6]</sup>

Chronic nonspecific neck pain is more likely to develop catastrophizing attitudes and functional limitations, which can lead to impairment.<sup>[2]</sup> Incorrect movement, posture of head, neck and upper thorax may predispose to non-specific neck pain, and an occupational posture with the head bent forward may facilitate complaints in the cervical spine.<sup>[3]</sup> Chronic neck pain is one of the main factors for disability and discomfort in office workers.<sup>[4]</sup> Work-related physical, psychological, and personal variables were found to be associated with the prevalence of neck discomfort in both men and women who work in office. It has been highlighted that as compared with working males, employed females were exposed to different risk factors, that is stress related jobs and families. Based on these findings, this study was designed to identify factors categorized under domains such as individual, physical, psychological, work place and social lifestyle factors resulting in neck pain among working women. So far there is paucity of studies that has evaluated the wide-ranging combination of factors among working women at the workplace and at home in relation to the occurrence of non-specific neck pain.<sup>[5]</sup>

According to these studies, 54% of people have neck pain and 37% of people suffer persistent neck discomfort. The prevalence of CNSNP is increasing, especially among young people due to changes in living and working conditions, and one of the important reasons is the change in posture control.<sup>[6]</sup> The number of laptop-related duties is growing daily, especially in the fields of education, business, publishing, banking, and even entertainment. Most of laptops are designed with the screen joined to the keyboard, making it impossible to adjust separately in terms of screen height and distance. This leads to prolonged flexion at cervical spine will consequent forward head posture and trunk flexion adopted as a fixed postural habit.<sup>[11]</sup> The cervical spine is positioned anteriorly in forward head posture. When the head change its position from normal and moves forward from the cervical spine the condition is termed as Forward Head Posture (FHP). It causes the center of gravity to shift forward from the spine. This puts abnormal stress on the cervical musculature causing muscle imbalance.<sup>[7]</sup>

FHP has been shown to be a common postural displacement, with a conservative estimate of 66% of the patient population. studies have found that there is a significant association between neck pain and forward head posture, with higher risks of having neck pain in female and old population.<sup>[8]</sup>

Several studies have used different surface measurement angles such as Craniovertebral Angle, cervical inclination angle, and head tilt angle to measure the FHP, but each of these angles will present only one aspect of the craniocervical posture and it seems that studying different angles together can better identify abnormalities of the craniocervical posture. The craniovertebral angle (CVA) is one of the most common angles for evaluating the FHP.<sup>[9]</sup>

The term "hamstring" refers to the four muscles located in the posterior compartment of the thigh: the semimembranosus, the semitendinosus and the long and short heads of the biceps femoris <sup>[18]</sup>. The hamstring muscle's proximal attachment is the ischial tuberosity, with the exception of the short head of the biceps femoris, which originates from the femur's linea aspera. These muscles are hip extensors and knee flexors and are key muscles for gait and running.<sup>[12]</sup> The most common muscle to become tight is the hamstring muscle.<sup>[14]</sup>

Hamstring tightness is defined as a reduced range of motion with restriction in the posterior thigh. Hamstring tightness results in slight knee flexion throughout activities and inputs relatively high quadriceps forces to counteract the passive resistance of the hamstring.<sup>[13]</sup> The most important of physical fitness is flexibility. A person with normal flexibility can move securely and effortlessly. For normal locomotion flexibility of muscle is important. It will help for normal body function. Normal hamstring flexibility is affected by numerous factors which includes age, gender, race, tissue temperature, strength training, stiffness, awkward posture and reduce warm up period during exercise.<sup>[14]</sup> Extended periods of sitting during work can cause tightness in the hamstring for 90% of the population, and 85.75% of office workers who work for 6-8 hours a day experience hamstring tightness. This can decrease flexibility in the hamstring muscles.

It is important to note that the computer-based workers and smartphone users have a significantly high prevalence of 66% of subjects with FHP. The relationship between FHP and hamstring tightness results from the back fascial line that connects the back muscles of the thigh and leg, the back muscles of the spine, and the suboccipital muscles. Forward head posture can cause the lower cervical area to experience fascial stretching and the upper cervical segment to shorten, leading to tightness in the hamstrings, posterior rotation of the pelvis, flattening of the lumbar curve and limitations in the back fascia at the hamstring.<sup>[10]</sup>

For correcting FHP, strengthening and stretching exercise can be done. This exercise which can address the imbalances of the underlying soft tissues, consists of stretching the cervical extensors and also stretching the pectoral muscles, strengthening the deep cervical flexor and shoulder retractor muscles.<sup>[17]</sup> For the treatment of tightness, myofascial release (MFR) is a "curative" technique. It is a manual therapy technique that aims to increase movement of the muscles and surrounding fascia by applying pressure and stretching to them. MFR technique was considered to have potential in pain reduction, improving flexibility, reducing disability thus enhancing function in the activities of daily living.<sup>[16]</sup>

## II. MATERIALS AND METHODOLOGY

**STUDY DESIGN:** This study design was a pre-test and post-test and experimental design.

**STUDY SETTING:** The study was conducted at K.G physiotherapy and rehabilitation centre, KGISLcampus, saravanampatti, Coimbatore under the supervision of my guide.

**STUDY DURATION:** The study duration was 6 months and the treatment duration was 6 weeks.

**STUDY SAMPLING:** 30 subjects with an age between 23 to 30 were selected by convenient sampling method.

**SELECTION CRITERIA:** the inclusion criteria include Age 23 to 30 years, Gender - female, CVA – less than 49-degree, Chronic non-specific neck pain (> 4 months), System based workers, Working hours for more than 8-12 hours. The exclusion criteria include Moderate or severe scoliosis, Osteoarthritis, Osteoporosis, Progressive neurological deficits, Surgical intervention, Inflammatory disorder – knee, History of lower extremity fracture and surgery with mal union, Subjects with hamstring injury for past 2years.

### PROCEDURE:

A total of 30 subjects with forward head posture and hamstring tightness were taken based on the selection criteria and randomly divided into two groups as group A and group B each consisting of 15 subjects. Group A underwent stretching and strengthening exercises, one session per day on alternative days over a period of 6 weeks. Group B underwent stretching and strengthening for forward head posture and myofascial release for hamstring tightness, one session per day on alternative days over a period of 6 weeks.



Figure 1



Figure 2



Figure 3



Figure 4



Figure 5

### III. DATA ANALYSIS AND INTERPRETATION

Table 1 – demographic data

AGE	MEMBERS	PERCENTAGE
24	5	17%
25	8	27%
26	7	23%
27	6	20%
28	4	13%

Table 2 – post test score for NPRS

S.NO	POST- TEST	NO OF PATIENTS	POST MEAN	STANDARD DEVIATION	Unpaired “T” Value
1	Group A	15	3.67	0.67	5.48
2	Group B	15	2.33		

Table 3 – post test scores for CVA

S.NO	POST- TEST	NO OF PATIENTS	MEAN	STANDARD DEVIATION	Unpaired “T” Value
1	Group-A	15	50.48	0.382	12.21
2	Group - B	15	53.39		

Table 4 – post test scores for AKET

S.NO	POST- TEST	NO OF PATIENTS	MEAN	STANDARD DEVIATION	Unpaired “T” Value
1	Group - A	15	20.33	5.87	2.46
2	Group - B	15	15.06		

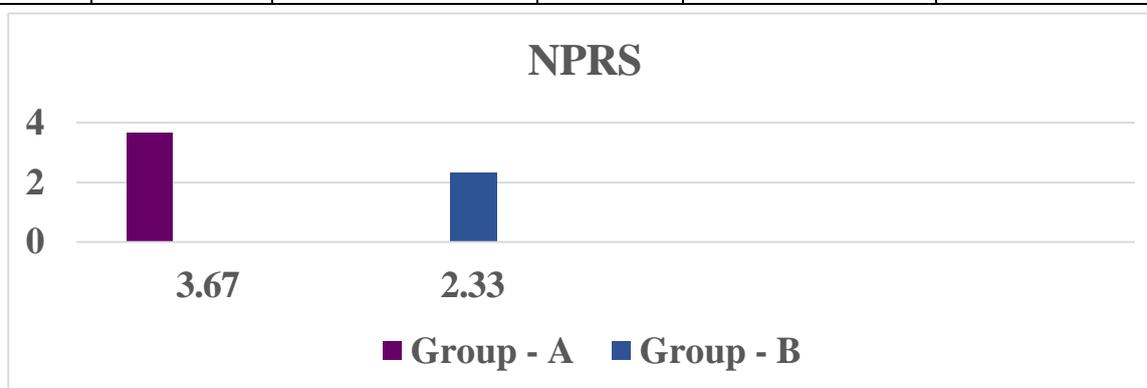


Figure 6 (post-test scores – NPRS)



Figure 7 (post-test scores – CVA )

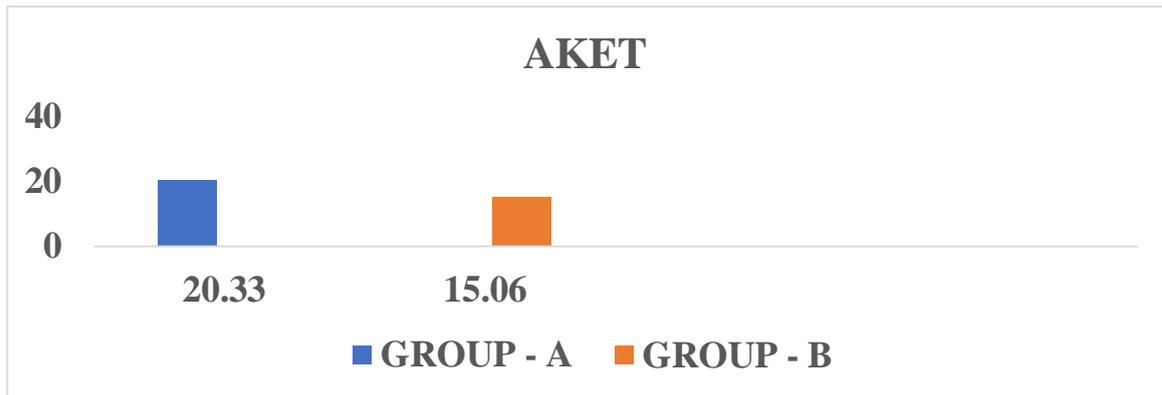


Figure 8 (post-test scores – AKET)

#### IV. DISCUSSION

The incidence rate of chronic non-specific neck pain is increasing. Many young people are affected by frequent and long-term use of electronic products, a sedentary lifestyle and prolonged posture which may be related to the onset and recurrence of neck pain <sup>[6]</sup>.

The purpose of a study is the effect of myofascial release along with conventional therapy on hamstring tightness and forward head posture in subjects with chronic non-specific neck pain among IT workers. In this study 30 subjects were selected according to inclusion and exclusion criteria. The craniovertebral angle is measured by using photographic method is used to find out forward head posture. The cervical spine is positioned anteriorly in forward head posture.

It is a postural problem that is caused by several factors includes extended use of computers, laptops & cell phones. Forward head posture a high percentage of population that can cause significant neck pain, while in this posture; the skull is positioned anterior to the body's center of gravity, resulting in chronic condition that puts increased stress on the postural musculature of the entire spine, particularly the cervical spine. Forward head posture is identified by measuring craniovertebral angle <sup>[11]</sup>.

Craniovertebral angle is a widely used method for FHP measurement. In this study, the mean craniovertebral angle in non-FHP group was 55 degrees, The normal craniovertebral angle range was 53.2–56.8 degrees, reducing the ranges 46.9–49.1 degrees in subjects with moderate-severe FHP and slight FHP. FHP as a craniovertebral angle less than 48–50 degree <sup>[9]</sup>.

The FHP had a reduction in CVA, which also was correlated with a decrease in flexibility of their hamstring muscles. On the other hand, subjects without FHP had an increase in CVA, which was correlated with an increase in flexibility of their hamstring muscles.

The tightness and contraction of the hamstring muscle can lead to neck and shoulder pain. The reason behind that is also the myofascial chain's superficial backline that connects the neck to the lower extremities, as well as the soft tissue in the cervical spine. Tight hamstrings can produce backward pelvic rotation, reducing the lumbar lordotic curve and increasing kyphosis resulting in FHP. It was demonstrated that performing myofascial release for hamstring tightness, significantly improved cervical range of motion <sup>[10]</sup>.

The aim is to correct the FHP misalignment towards an ideal posture. posture correction exercise program that includes two strengthening exercises (deep cervical flexors and shoulder retractors) and two stretching exercises (cervical extensors and pectoral muscles). Clinical settings for the treatment and improvement of FHP in patient populations <sup>[8]</sup>.

Myofascial release is a manual approach to stretch the fascia, according to reports, MFR mostly improves flexibility, range of motion, and quality of life while reducing discomfort. This approach has the advantage that can be carried out safely and efficiently. The flexibility of the hamstrings for improving physical performance.

MFR reduces hamstring pain and improving the range of motion. Fascial release is very effective in the Golgi tendon organ to reduce stress, decrease pain, restore muscle length-tension, and improve function <sup>[20]</sup>. Myofascial release of the hamstrings improves physical performance found that MFR for hamstring not only the improvement in flexibility but also the improvement in physical performance. Therefore, it is important to perform MFR to maintaining physical function and

performance until the restriction of activity is lifted and people are able to actively increase the amount of physical activity [21].

In this study we found that group – B shows significant improvement on symptoms among chronic non-specific neck pain subjects when compare to group – A.

## V. CONCLUSION

The conclusion of this study is that both the groups showed significant improvement but the group which received myofascial release on Hamstring tightness and postural correction on forward head posture showed better improvement when compared to the other group which received postural correction on forward head posture alone, according to the results of the Numerical Pain Rating Scale (NPRS) and Craniovertebral Angle (CVA) and Active Knee Extension Test (AKET). According to the data analysis and interpretation, the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted which states " There is a significant difference between the effects of myofascial release along with conventional therapy on hamstring tightness and forward head posture in subjects with chronic non-specific neck pain among IT workers."

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