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RESEARCH ARTICLE

THE EFFECT OF IMPROVED SLEEPING POSTURE WITH RESPECT TO CERVICAL SPINE AS AN INTERVENTION IN PATIENTS OF CERVICAL PINE

***Tejal Rajandekar, Pragati Ferwani and Dr. Umanjali Damke**

Physiotherapy School and Centre, Government Medical College, Nagpur, India

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ABSTRACT

Background: Specifically, poor cervical posture during sleep, which is believed to increase biomechanical stresses on the cervical spine structure, can produce cervical pain, stiffness, headache and scapular arm pain resulting in low quality of sleep. A neutral position of spine maintains cervical spine curvature prevents any cervical waking symptoms by minimizing end range positioning of spinal segments. Maintenance of normal cervical curve is a good cervical posture and will maintain a healthy neck. Normal lordosis with neck in neutral position with respect to rotation and side flexion leads to relaxed spinal cord. Alterations in the cervical posture can lead to headache, arm pain, maybe even mid back pain problems. So it is important to know about the type of pillow being used by the person. Foam pillows tend to retain their shape and have more bounce; they do not offer much support to the spine. The type of mattress a person uses also affects the cervical spine curvature. All these factors may lead to increased stresses on the cervical spine.

Objectives: To analyse and compare the effect of improved sleeping posture with respect to cervical spine as an intervention to pharmacological treatment on

a. Pain at rest and movement in cervical region.
b. Ranges of motion of cervical flexion, extension, side flexion (left and right) and rotation(left and right).
c. Tightness of trapezius, sternocleidomastoid, levators, scalenes and pectorals in patients of cervical pain.

Methodology: Patients coming to Orthopaedic OPD, GMCH Nagpur and complaining of cervical pain and who fulfilled the inclusion criteria were divided into two groups. The patients were shown the proforma of study in a language they understood and their consent was taken. There was random allocation of subjects into two groups, that is, the patients who fulfilled the inclusion criteria, were divided as per the following- Even number of patients were alloted to Group A and odd number to Group. They were assessed for the sleeping posture assumed by them during sleep by asking them about their sleeping posture as per the proforma and were asked to demonstrate their sleeping posture on the treatment table. The patients were enquired about type of pillow used by them, surface on which they slept and the position of neck in Supine, Side lying and Prone. Group A and Group B received pharmacological drugs namely analgesics, antacids and calcium as prescribed by the orthopaedician. Group B was put on an intervention of modified sleeping posture and head support conjunction with pharmacological treatment. Pre intervention measures of cervical range of motion, pain at rest and movement and tightness of the muscles were taken at the start of the study and post intervention measures were taken 7 days later for Group A and B. The results of the two were compared.

Results: The relief in pain at rest and movement post 7 days for Group A was not significant but was significant for Group B. However the cervical range of motion and tightness of muscle showed no significant difference pre and post intervention for Group A and B.

Conclusion: From this study, it can be concluded that modification in the sleeping posture as an intervention to pharmacological treatment seems to be better at relieving cervical pain but seems to haveno effect on increasing on range of motion of cervical spine and relieving the tightness of the muscles, specifically trapezius, pectorals, scalene, sternocleidomastoid, levators.

**Corresponding Author*

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INTRODUCTION

Sleep comprises one third of a person's life, hence using an optional pillow for appropriate neck support to maintain cervical curve may contribute to improved quality of life (Susan, 2000). Specifically, poor cervical posture during sleep, which is believed to increase biomechanical stresses on the cervical spine structure, can produce cervical pain, stiffness, headache and scapular arm pain resulting in low quality of sleep. A neutral position of spine maintains cervical spine curvature prevents any cervical waking symptoms by minimizing end range positioning of spinal segments (Susan, 2000). Stress and musculoskeletal discomfort are one of the major cause of lack of sleep. Musculoskeletal discomfort that disturbs sleep frequently includes neck pain. Although incorrect postures can aggravate pain, the use of appropriate pillow can relieve cervical pain. A number of studies have focused on pillow support to restore cervical lordosis (Susan, 2000). Definition of problem and magnitude of problem: maintenance of normal cervical curve is a good cervical posture and will maintain a healthy neck. Normal lordosis with neck in neutral position with respect to rotation and side flexion leads to relaxed spinal cord. Alterations in the cervical posture can lead to headache, arm pain, maybe even mid back pain problems. Chronic neck pain, stiffness and other symptoms. So it is important to know about the type of pillow being used by the person. Foam pillows tend to retain their shape and have more bounce; they do not offer much support to the spine. The type of mattress a person uses also affects the cervical spine curvature. All these factors may lead to increased stresses on the cervical spine (Susan, 2009). Neck pain is one of the commonest problem of today's population and is also a reason for sickness absenteeism. It is also a rising complaint among the adolescent due to faulty postural habits. The causes of neck pain are varied ranging from poor postural habits, faulty sleeping posture, age related changes etc (Jeon *et al.*). It is often seen in that people complain of neck pain and stiffness in the morning. The reason for this might be a bad sleeping posture i.e. sleeping in prone position or with neck in extremes ranges of motion. Sleeping posture might have an effect on the cervical spine, which when left unattended, may lead to undue stresses on cervical spine, causing shortening of muscles on one side and overstretching on the opposite one in the future (Susan, 2009).

Cervical pain may be attributed to many reasons, one of which is cervical spondylosis. Cervical spondylosis is a degenerative clinical condition that involves changes in the bones, spinal discs and joints of the neck, it is quite common in people who spend long hours on a computer lead a sedentary life and those who have careers that require excessive stress on their neck like gymnasts and athletes. Spondylotic changes are seen earlier and to a greater degree in those whose joints have been subjected to strain more than usual. Trapezitis is an inflammatory pain arising from the trapezius muscle causing severe neck spasm. Bad posture is frequently a cause for trepezitis. Keeping the neck in extremes of range of motion while sleeping or even the use of a thick pillow can cause frequent episodes of neck spasm. A bad sleeping posture adopted recurrently can lead to spasm and consequently tightness of muscles. Medications are usually used to relieve pain, however, this pain relief seems to be temporary. Furthermore, medications cannot be continued lifelongbasis due to their side effects.

Need of the study

What is studied and what are the gaps

- Although many respects if sleep have been studied extensively, bodily position assumed and their effects during sleep appear to have received very little attention.
- In physiotherapy practice a number of complain of rising up with neck pain in the morning, this pain can be a likely cause of their sleeping posture.
- It is necessary analyse whether this neck pain is the cause of bad sleeping posture and does it relieve with change in sleeping posture. In order to avoid this type of pain, it is necessary that the individuals are advised regarding the good and bad sleeping posture. Hence, this study was conducted to analyse whether altering the sleeping posture with respect to cervical spine will alter the cervical pain, tightness and range of motion at cervical region of the patients.

Hypothesis: An improved sleeping posture with respect to cervical spine will reduce the pain and tightness of the muscles and also increases the range of motion of the cervical spine.

Null hypothesis: an improved sleeping posture with respect to cervical spine will have no effect on the range of motion of cervical spine, pain and tightness of cervical muscles.

Aim of the study: To analyse the effect of improved sleeping posture with respect to cervical spine as an intervention in patients of cervical pain.

Objectives

To analyse and compare the effect of improved sleeping posture with respect to cervical spine as an intervention to pharmacological treatment on

1. Pain at rest and movement in cervical region.
2. Ranges of motion of cervical flexion, extension, side flexion(left and right) and rotation(left and right).
3. Tightness of trapezius, sternocleidomastoid, levators, scalenes and pectorals in patients of cervical pain.

Review of literature

- Susan. J. Gordan conducted a study on understanding sleep quality and waking cervical-thoracic symptoms in the year 2007 and concluded that sleeping position is associated with arm pain, neck pain, stiffness and headache.
- Susan J. Gordan, Karen Grimmer, Patricia Trott conducted a study on pillow use: the behavior of cervical pain, sleep quality and pillow comfort in side sleepers in December, 2009 and the study provides evidence to support recommendation of rubber pillows in the management of waking cervical pain, and to improve sleep quality and pillow comfort. The rubber pillow performed better than subjects' own pillow in most instances
- Joseph De. Konink conducted a study on Sleep position in young adults and their relation with the subjective quality of sleep in the year 1983.And concluded that

poor sleepers recorded significantly higher incidences of depression and other neuro deficits and vice a versa.

- Huysmans, T., B. Haex conducted a study on 3Dactive shape model for evaluation of alignment of spine during sleep in the year 2005.Sample size: 12 volunteers. And compared the spinal deformation of a subject in relation to sleeping postures
- Efranian P, Tenzin F conducted a study on assessing effects of experimental semi customized cervical pillow on symptomatic adults with chronic neck pain with and without headachein the year 2004. Sample size: thirty six adults were recruited for the trials, and randomly assigned to experimental or non-experimental groups of 17 and 19 participants respectively. This study showed that compared to conventional pillows, this experimental semi customized cervical pillow was effective in reducing low neck pain intensity, especially in the morning, following its 4 week long study.

Methodology: Study design

- **Study setting:** Physiotherapy School and centre, Government Medical College, Nagpur.
- **Time line:**2 months(1st January 2015 to 1st March 2015)
- **Study design**: Randomised controlled trial
- **Sample selection**:

Reference population: individuals with neck pain coming to orthopaedic OPD GMCH Nagpur from areas of Vidharba and peripheries of Madhya Pradesh, Chattisgarh and Andhra Pradesh.

Study population: the individuals in reference population who agreed to participate in the study formed the sample size.

Participants

Subjects were selected on the basis of the following criteria(selection criteria)

Inclusion criteria: patients with cervical pain in the age group of 20 to 70 years.

Exclusion criteria: patients with cervical fracture, traumatic injuries, congenital cervical defects, cervical myelopathy.

Sample size: 60 individuals with neck pain fulfilling the inclusion criteria.

Materials used

- Measuring tape
- Universal goniometer
- Treatment table

MATERIALS AND METHODS

- The study started on 1st january 2015
- Patients coming to Orthopaedic OPD, GMCH Nagpur and complaining of cervical pain and who fulfilled the inclusion criteria were divided into two groups
- The patient were shown the proforma of study in a language they understood and their consent was taken.
- There was random allocation of subjects into two groups, that is, the patients who fulfilled the inclusion criteria, were divided as per the following- Even number of patients were alloted to Group A and odd number to Group.
- They were assessed for the sleeping posture assumed by them during sleep by asking them about their sleeping posture as per the proforma and were asked to demonstrate their sleeping posture on the treatment table.
- The patients were enquired about type of pillow used by them, surface on which they slept and the position of neck in Supine, Side lying and Prone.

The subjects were asked if there neck was:

1. Bent forwards
2. Bent backwards
3. Bent to either side or
4. Rotated in these various sleeping positions

Group A and Group B received pharmacological drugs namely analgesics, antacids and calcium as prescribed by the orthopaedician.

Group B was put on an intervention of modified sleeping posture and head support conjunction with pharmacological treatment.

- The patients in Group B were advised to modify their sleeping posture so that the neck was maintained in neutral with respect to lordosis and flexion, extension, side flexion and rotation.
- All these patients were advised modification in supine and sidelying sleeping posture
- The towel roll that was to be kept under the patients neck was to be made as follows:
- The patients were asked to take Turkish towel, fold it in rectangular shape with three to four layers and place it under their neck in such a way that it supports their lordosis.
- The arm of the patients were to be held in neutral position with respect to flexion, extension, abduction, adduction and rotation(medial and lateral)
- They were demonstrated the sleeping posture in person and were asked to follow it for seven days
- Also, the patients using a very hard or a too soft pillow were advised to discontinue it
- As also, the patients sleeping on an uneven, too soft or hard surface were advised modification for it.

The modified sleeping posture and head support as advised to the patients

- In supine and sidelying position, the patients were advised to put a towel roll under their neck
- The arms were to be held in neutral position with respect to flexion, extension, abduction, adduction and rotation (medial and lateral).
- In sidelying position the roll was kept under the neck such that it supported the lordosis and the neck was in same line with head i.e. in neutral position. The upper arm of the patients was supported on a pillow.

Supine lying modified sleeping posture with roll supporting cervical lordosis

Outcome measures pre and post seven days

All the patients were assessed for the following outcome measures pre treatment and after seven days.

- Pain at rest and movement on Numerical pain rating scale.
- Tightness of muscles- levators, sternocleidomastoid, scalenes, trapezius and pectorals.
- Ranges of motion for flexion, extension, side flexion and rotation.

Pain on Numerical rating scale: The patients were shown numerical rating scale with values from 0 to 10. 0 was no pain at all and 10 was worst possible pain.

- Next the tightness of the muscles was assessed for trapezius, sternocleidomastoid, scalene, levator and pectorals.
- For trapezius, the patients shoulder was depressed on one side, side flexion was performed on the opposite side, rotation was perform to that same side for neck.
- For sternocleidomastoid, side flexion was performed to opposite side, then rotation to the same side.
- For scalene, the axial rotation was performed accompanied by same flexion to opposite side and rotation to the same side.
- For levator, the patient's neck was completely flexed, then side flexion and rotation was performed to opposite side.
- For pectoralis major, both the arms were flexed, taking them behind head and the patient was asked to lie supine. The distance between the lateral epicondyl of elbow and treatment table was measured using measuring tape.
- For pectoralis minor, the patient was asked to lie supine and the distance between the acromion process and the treatment table was taken using measuring tape.

The tightness was categorized as follows

- 0-none
- 1-slight
- 2-moderate
- 3-marked(3)

Then the range of motion of the cervical spine was measured with universal goniometer for flexion, extension, side flexion and rotation bilaterally

Data collected both pre and post intervention was subjected to statistical analysis.

Statistical analysis and results

Table 1. Shows the number of patients for Group A and Group B for Trapezitis and Cervical Spondylitis each in the age groups 20 to 30, 30 to 40, 40 to 50, 50 to 60 and 60 to 70 respectively

Age group	Group A (Trapezitis)	Group A (Spondylitis)	Group B (Trapezitis)	Group B (Spondylitis)
20-30	10	-	10	-
30-40	3	-	6	-
40-50	-	5	-	7
50-60	-	6	-	3
60-70	-	3	-	4

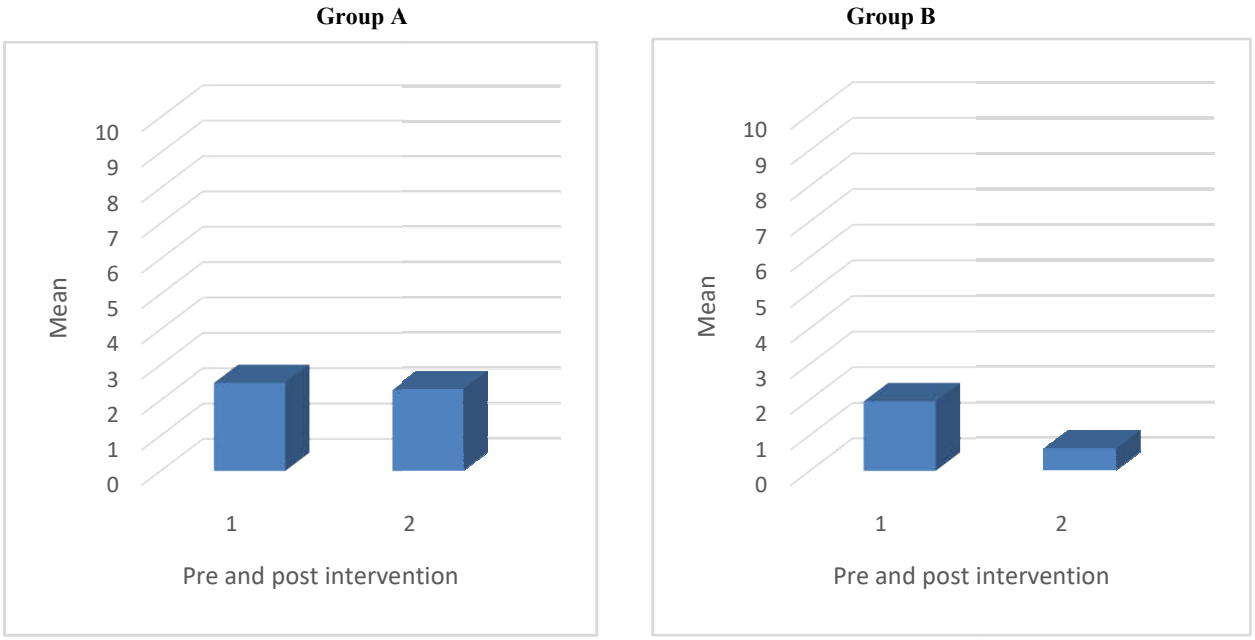
- Statistical analysis was done using the graphpad prism6 software
- The mean for all the outcome measures was found out pre and post intervention
- The paired t test was used for intra group comparison pre and post intervention for group A and group B
- Next, the unpaired t test was used for inter group comparison
- The difference in the pre and post intervention values was taken out for each group and then the unpaired t test was applied to these values for comparison

Mean NPRS scores pre and post intervention of pain at rest and movement for Group A

Table 2. Shows the p value for pain at rest and movement for Group A pre and post intervention which is not significant. Thus it is interpreted that there was no significant relief for pain at rest and movement for Group A post 7 days, i.e. just pharmacological treatment was not effective in relieving pain at rest and movement in cervical region

Pain	Mean pre intervention	Mean post intervention	P value	Significance
Pain at rest	+2.5	+2.3	0.93	Not significant
Pain on movement	+5.3	+4.9	0.06	Not significant

Graph showing pain at rest at cervical region for Group A and B



Graph showing pain on movement at cervical region for Group A and B

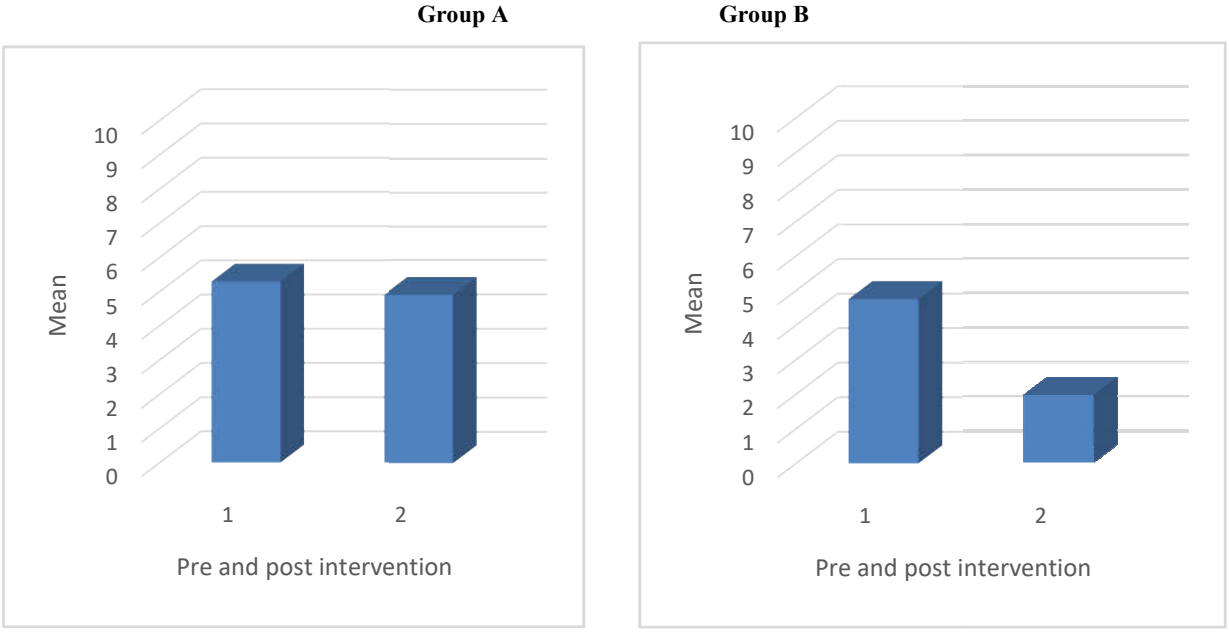


Figure 4. Sidlying modified posture with roll under the neck, supporting cervical lordosis

Unpaired t test for pain	Mean of the difference for Group A	Mean of the difference for Group B	P value and significance
Pain at rest	0.5	2.8	<0.0001 Highly significant
Pain on movement	0.3	3	<0.0001 Highly significant

According to Table 4, when the inter group comparison was made for Group A and B for the pain at rest and movement in cervical region the result was that for group B the pain reduced significantly as compared to group A. Thus it is interpreted that an improved sleeping posture is significant in relieving pain if given in conjunction with pharmacological treatment

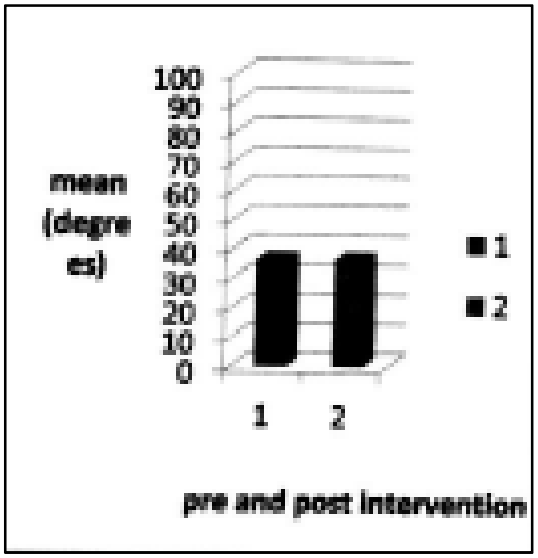
Mean scores pre and post intervention for range of motion for group A

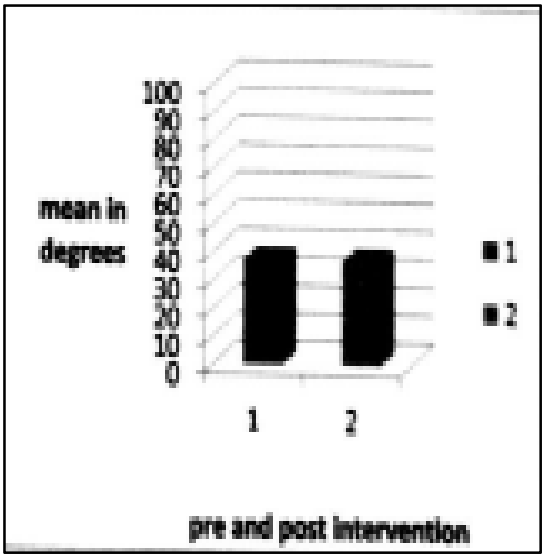
Table 5. Shows the p value for Group A which was not significant post 7 days. Thus it is interpreted that the range of motion post intervention was not increased significantly for Group A, i.e. the group on only pharmacological treatment

Ranges of motion	Mean pre intervention (in degrees)	Mean post intervention (in degrees)	P value	Significance
Flexion	+36.3	+36.43	0.1387	Not significant
Extension	+36.96	+36.73	0.198	Not significant
Side flexion (right)	+36.5	+36.63	0.32	Not significant
Side flexion (left)	+37.6	+38	0.32	Not significant
Rotation (right)	+50.5	+50.5	0.18	Not significant
Rotation (left)	+50	+50	>0.99	Not significant

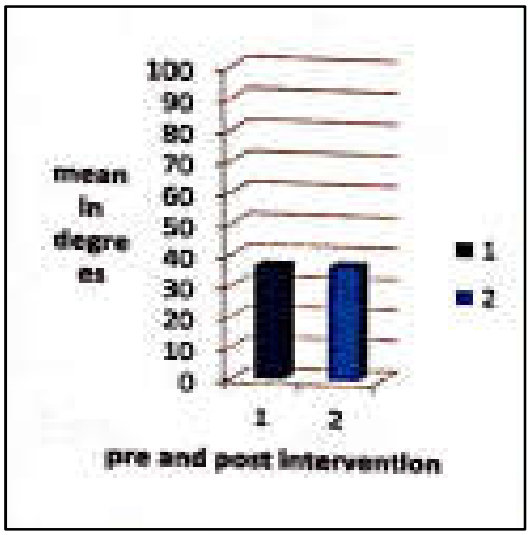
Graph showing ranges of motion for Group A

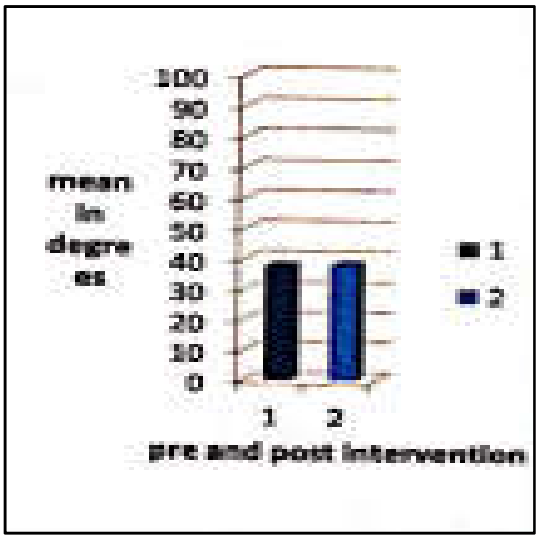
FlexionExtension



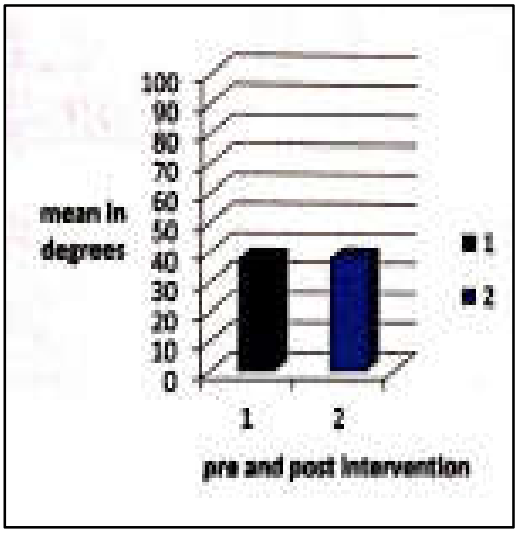


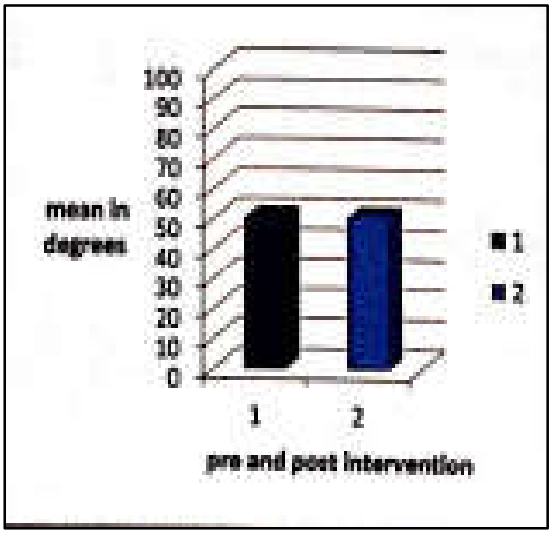
Side flexion (right)Side flexion (left)





Rotation (right)Rotation (left)





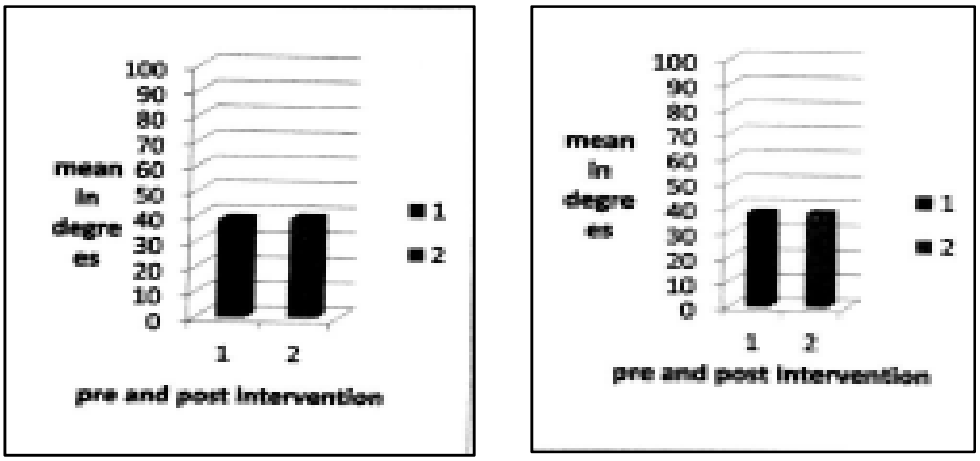
Mean scores pre and post intervention for range of motion for group B

Table 6. Shows the p value for Group B which was not significant post 7 days. Thus it is interpreted that the range of motion post intervention was not increased significantly for group B, i.e. the group on improved sleeping posture in conjunction with pharmacological treatment

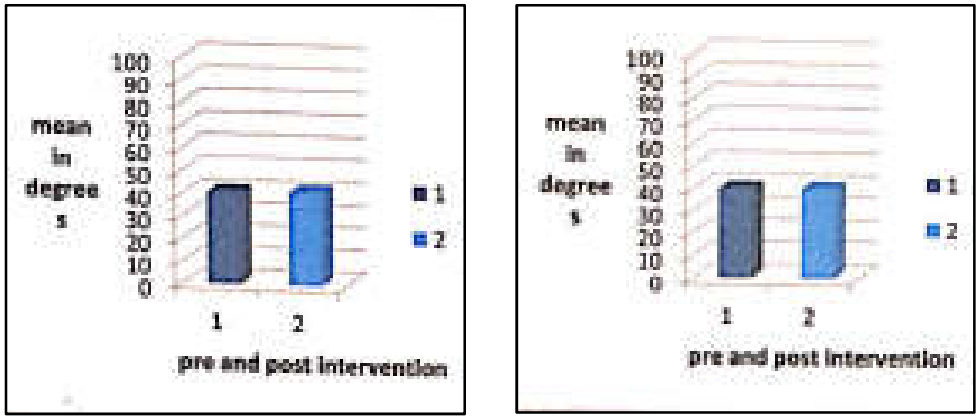
Ranges of motion	Mean pre intervention (in degrees)	Mean post intervention (in degrees)	P value	Significance
Flexion	+38.6	+39.2	0.78	Not significant
Extension	+37.8	+38.03	0.24	Not significant
Side flexion (right)	+40.73	+41.23	0.083	Not significant
Side flexion (left)	+39.9	+39.96	0.32	Not significant
Rotation (right)	+49.5	+50.3	0.98	Not significant
Rotation (left)	+49.5	+50	0.32	Not significant

Graph showing Ranges of motion at cervical region for Group B

Flexion Extension



Side flexion (right)Side flexion (left)



Rotation (right)Rotation (left)

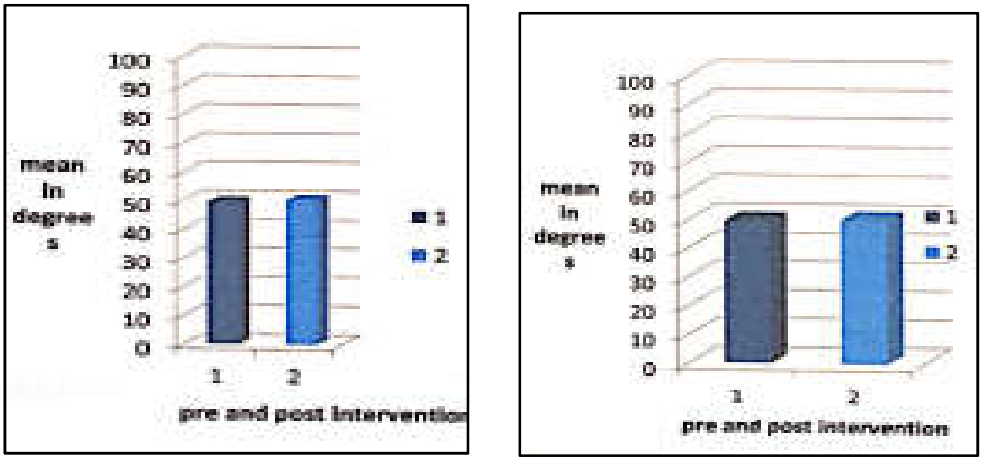


Table 7.

Unpaired t test for ranges of motion	Mean of difference for Group A	Mean of difference for Group B	P value and significance
Flexion	0.2	0.3	>0.99 Not significant
Extension	0.73	0.72	>0.99 Not significant
Side flexion (right)	0.3	0.25	>0.99 Not significant
Side flexion (left)	0.83	0.78	>0.99 Not significant
Rotation (right)	0.66	0.67	>0.99 Not significant
Rotation (left)	0.33	0.34	>0.99 Not significant

According to Table 7 when an intergroup comparison was made for Group A and B for the ranges of motion, it was seen that neither of the groups showed a significant increase in the range of motion. Thus it is interpreted that pharmacological treatment alone or given along with sleeping intervention is ineffective in increasing cervical range of motion in 7 days

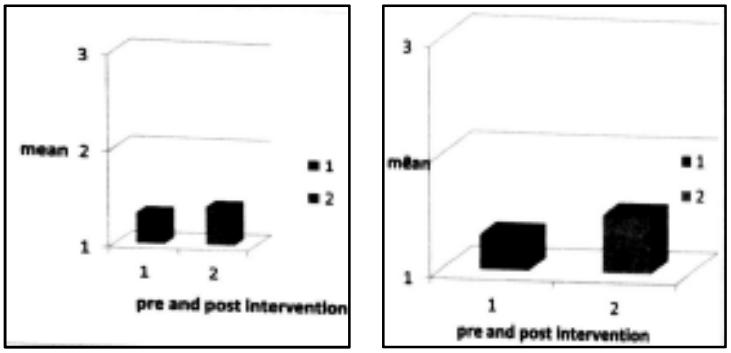
Mean scores for tightness of muscles for Group A

Table 8. Shows the p value for group a which was not significant post 7 days. Thus it is interpreted that tightness of the muscles was not relieved significantly for the patients who were only on pharmacological treatment

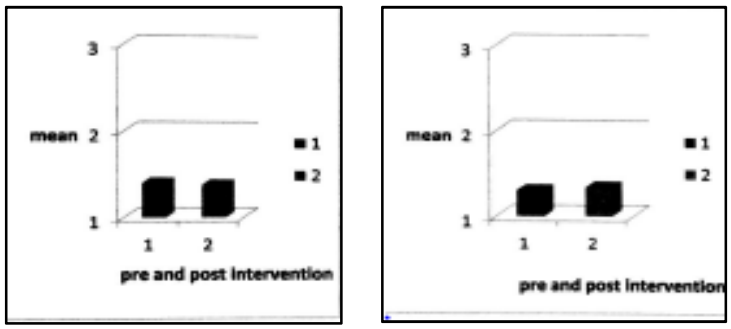
Muscle tightness	Mean pre intervention	Mean post intervention	P value	Significance
Trapezius	+1.4	+1.5	0.326	Not significant
Pectoralis major	+1.3	+1.32	0.4	Not significant
Pectoralis minor	+1.36	+1.35	0.32	Not significant
Levator	+1.26	+1.28	0.2	Not significant
Scalene	+1.26	+1.3	0.23	Not significant
Sternocleidomastoid	+1.4	+1.2	0.5	Not significant

Graphs showing tightness of muscles for group A

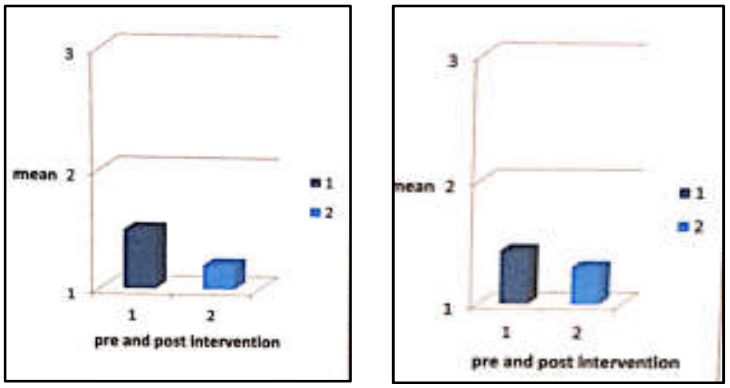
Trapezius Levator



Sternocleidomastoid Scalene



Pectoralis major Pectoralis minor



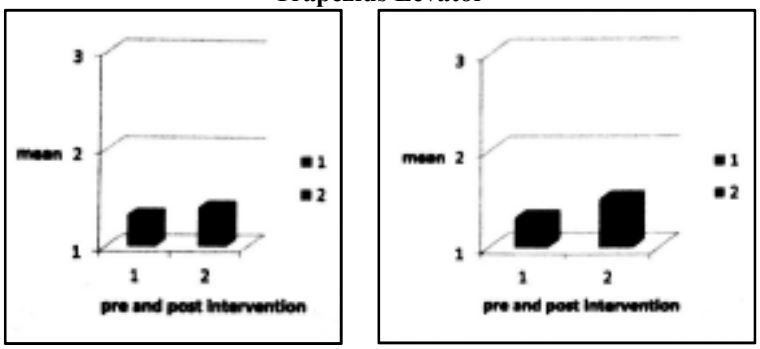
Mean scores for tightness of muscles for group B

Table 9. Shows the p value for group B which was not significant post 7 days. Thus it is interpreted that tightness of the muscles was not relieved significantly for the patients who were on an improved sleeping posture in conjunction with pharmacological treatment

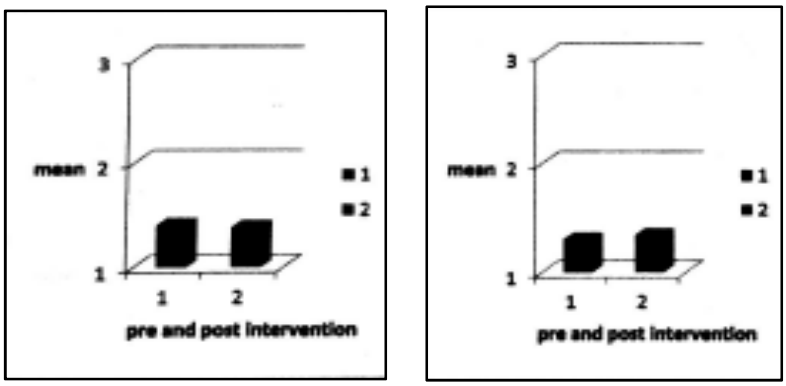
Muscle tightness	Mean pre intervention	Mean post intervention	P value	Significance
Trapezius	+1.32	+1.4	0.33	Not significant
Pectoralis major	+1.44	+1.3	0.5	Not significant
Pectoralis minor	+1.5	+1.2	0.4	Not significant
Levator	+1.3	+1.5	0.26	Not significant
Scalene	+1.3	+1.34	0.21	Not significant
Sternocleidomastoid	+1.4	+1.38	0.43	Not significant

Graphs showing tightness of muscles for Group B

Trapezius Levator



Sternocleidomastoid Scalene



Pectoralis major Pectoralis minor

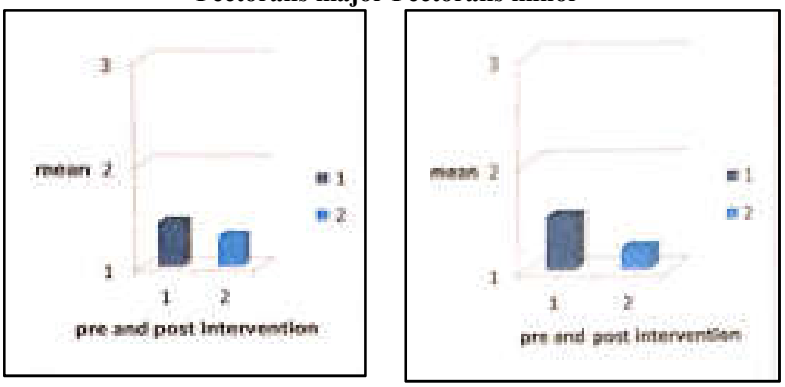


Table 10.

Unpaired t test for ranges of motion	Mean of difference for Group A	Mean of difference for Group B	P value and significance
Trapezius	1.3	1.4	>0.99 Not significant
Pectoralis major	1.4	1.45	>0.99 Not significant
Pectoralis minor	1.5	1.6	>0.99 Not significant
Levator	1.3	1.4	>0.99 Not significant
Scalene	2	2.4	>0.99 Not significant
Sternocleidomastoid	1.8	1.9	>0.99 Not significant

According to Table 10, when an intergroup comparison was made for Group A and B for the tightness of muscles, it was seen that neither of the groups showed a significant relief in tightness of muscles. Thus it is interpreted that pharmacological treatment alone or given along with sleeping intervention is ineffective in relieving muscle tightness in 7 days

DISCUSSION

- The study was conducted by selecting 60 patients who fulfilled the inclusion criteria and dividing them into two groups A and B, group A being on pharmacological treatment and group B on an improved sleeping posture head support in conjunction with pharmacological treatment.
- The patients in Group B who were given modified head support and improved sleeping posture in conjunction with pharmacological treatment have shown highly significant relief in cervical pain at rest and movement.
- A similar study by Jeon MY, Jeong H, Lee S , Choi W.(PubMed) conducted a study on – "Improving the quality of sleep with an optimal pillow"- a randomized, controlled study, where they found out that proper support can increase the contact area between the neck and pillow so that the pressure exerted upon the muscles can be evenly distributed.
- They have also stated that pillows with firm support for cervical lordosis could be recommended for management of neck pain and improvement of sleep quality.
- Jackson et.al conducted a study using lateral radiographs of the cervical spine with and without exposure to regular and roll shaped pillows and have stated that roll shaped pillows restored cervical lordosis and decreased neck pain and discomfort while sleeping.
- Her JG, Ko DH, Choi Ye conducted a study on "Development and Comparative evaluation of new shapes of pillow" and although incorrect cervical posture can aggravate pain, the use of appropriate stated that if a person with cervical pain uses a pillow that can support his/her neck, his/her sleep quality can be enhanced.
- They also stated that although incorrect cervical postures can aggravate pain, the use of appropriate pillow can relieve pain.
- Another study conducted by Robert A. Lavin, M.D Mareo Pappagalo on "Cervical pain-a comparison of three pillows' states that proper selection of a pillow can significantly reduce pain and improve quality of sleep.
- In cervical flexion, if the flexed posture of neck is assumed for a long time, the muscles on the anterior aspect of the neck namely longuscapitis, longuscolli, rectus capitis anterior and lateralis are shortened and that on the posterior aspect of the neck are overstretched which include levator scapulae, trapezius, semispinaliscapitis and cervicis as also longissimuscapitis and cervicis.
- In extension of the neck, the opposite occurs i.e. muscles of anterior aspect of the neck are over stretched while that on posterior aspect of neck are shortened. In side flexion, the muscles on convex side of neck are overstretched and those on concave side of neck are shortened. These muscles includes scalenes, logissimus, and sternocleidomastoid. In rotation, the muscles on the side to which the neck is rotated are shortened, while those on the opposite side are overstretched.
- The anterior longitudinal ligament and other ligaments on the anterior aspects on neck are stretched in extension and shortened in flexion. The posterior longitudinal ligament and other ligament on posterior aspect of neck are stretched in flexion and shortened in extension. The intertransverse ligament on the lateral aspect of neck is stretched and shortened alternately depending upon the side to which neck is side flexed.
- In a prone position, the cervical spine may be held inflexion, extension or rotation. Torsional force are created during axial rotation that occurs as a part ofcoupled motion that take place in the cervical spine. When the disc is subjected to torsion, half of theannulus fibrosis fibers resist clockwise rotation, whereas fibers oriented in opposite direction resist counter clockwise rotations.
- Risk of rupture of discs is increased when torsion, heavy axial compression and bending are combined. Alar and intertransverse ligaments limit rotation of the head to the same side, lateral flexion to the opposite side and contralateral flexion respectively.
- In supine position with neutral cervical spine there is no undue stretch on cervical ligaments and muscles. This prevents postural discomfort and consequently neck pain.
- The posture of keeping the arms in neutral position with respect to flexion, extension, abduction, adduction and rotation will prevent discomfort as the arm, if kept in any other position than this, pulls on the scapula and thereby stretches the trapezius and the cervical spine.
- It was seen in the study that there was no significant change in the range of motion and tightness of the muscles of cervical spine.
- The reason behind this could be attributed to the fact that a person changes his sleeping posture at fixed intervals in the night, and hence the cervical spine not maintained in the same position for a long period of time.
- Gordon et al. conducted a study on the topic "your pillow may not guarantee a good night's sleep or symptom free waking" in which they stated that there is no association between pillow comfort and waking symptoms(headache, stiffness, scapular pain and arm pain) which suggests that participant's perception of pillow comfort and their reports of waking symptoms are independent.
- They also stated that there are factors which significantly constrain sleep quality, i.e. presence of medical condition, past history of injury, psychological factors which lead to the subject changing his sleeping posture after a particular interval.
- Jin Gang Her, Do Heung Ko conducted a study on "Development and comparative evaluation of new shapes of pillow" in which they have stated that studies conducted thus far have not considered that people change their positions while they sleep , allowing them to take not only supine position but also side lying ones.

Conclusion

From this study, it can be concluded that modification in the sleeping posture as an intervention to pharmacological treatment seems to be better at relieving cervical pain but seems to have no effect on increasing on range of motion of cervical spine and relieving the tightness of the muscles, specifically trapezius, pectorals, scalene, sternocleidomastoid, levators.

Clinical implication

- As shown by the study, modifying a patients sleeping posture and head support provides pain relief to the patient.
- Thus, in any medical practice, advising a good sleeping posture and head support to the patient will help in allaying his symptoms recovering faster.

- A good sleeping posture can be practiced lifelong for maintaining a healthy cervical posture.

Limitations and Suggestions

- A group of only 60 individuals was taken hence the results cannot be organised.
- A faulty sleeping posture does not solely contribute to cervical pain. Driving, sedentary jobs, etc will also cause pain which was taken into consideration while conducting the study.
- The density of the pillow wasn't taken into consideration while conducting this study.
- Another limitation is that after assuming a particular sleeping posture the patient will not be able to tell firmly whether the same position was assumed throughout the night in sleep.
- Also, there will exist a possibility that the patient might not reproduce his original sleeping posture perfectly during assessment.
- The future scope of this study will include installing an 8 hour video camera to see the and how is the sleeping posture of the subject.
- Customized bed pillows have a standard shape and size, while the person's head angle and shoulder width varies accordingly, pillow support will vary.

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