



ORIGINAL RESEARCH PAPER

Neurology

Effect of pectoralis minor mobilization Vs self stretching on forward head posture

KEY WORDS:

snehal samal

ABSTRACT

Aims & Objectives :

- =To determine effects of pectoralis minor mobilization and stretching on forward neck posture.
- =To determine effects of pectoralis minor self stretching on forward neck posture.

Study design : Pre and post experimental design.

Sample Size :

- =50 subjects
- =Two groups- control group – 25 subjects
- = Treatment group – 25 subjects
- =19-40 yrs of age

Sample Technique: Purposive sampling

Sample technique : Simple random sampling technique.

Inclusion Criteria :

- =Persons working for a prolong period of time (8-12hrs) in sitting posture (forward head with stooping upper back)
- =Persons sitting without back support for 8-12 hrs.

Exclusion criteria :

- =Persons having any injury or shoulder joint pathology
- =Persons having upper respiratory and lower respiratory tract disease.

Material : A measuring tape, Plinth

Methodology: The subjects of forward head posture are selected and then the tightness of pectoralis minor is measured from acromion process and external auditory meatus in standing position against the wall. Then after given self stretching and soft tissue mobilization the length is measured in a duration of 7 days, 14 days, and 21 days and thus the progress of treatment is judged and compared.

Result: The treatment group shows highly significant improvement.

Conclusion: The subjects who are under treatment group found a reduction in FHP as measured from external auditory meatus.

INTRODUCTION

The cranium, cervical spine and shoulder girdle form the functional unit for maintaining natural head posture. Different components of this unit are linked to each other forming a kinematic chain. Impairment in one or more components of the unit may lead to altered biomechanics of the cervical or shoulder region which can result into forward head posture (FHP) and slouched shoulders. Slouched shoulders are basically a complication of forward head posture. By protracting shoulder blades slouched posture narrows thoracic outlet and compresses nerves and blood vessels in cervical area which is known to trigger pain in shoulder and along the arm.

When resting posture is altered more energy is required to perform or control movements resulting in increased stress on the surrounding structures, (eg. FHP puts increased stress on cervicothoracic spine) thus produces muscle imbalances.

Imbalances in the flexibility of musculature causes asymmetric forces on cervical spine leading to increased injury risk. Poor posture has a faulty relationship of various parts of the body which produces increased strain on supporting structures and in which there is less efficient balance of the body over its base of support.

Muscles habitually kept in stretched position beyond the physiologic resting position tend to weaken resulting in stretch weakness. Thus hyoid, lower cervical, thoracic erector spinae, middle and lower trapezius and rhomboids undergo stretch weakness in forward head and slouched shoulder posture.

Similarly, the muscles which are habitually kept in a shortened position tend to lose their elasticity. These muscles test strong in the shortened position but become weak as they are lengthened.

This is known as tight weakness. Thus levator scapulae, sternocleidomastoid, scalenes, suboccipital, upper trapezius, pectoralis major and pectoralis minor undergo tight weakness. Thus, in FHP resulting stretch weakness in one group of muscles and tight weakness in other group places atlanto-occipital joint, cervical spine, temporomandibular joint at increased levels of stress.

Stress to the shortened structures causes pain and strength and flexibility imbalances may predispose the area to injury or overuse syndromes that a normal musculoskeletal system could sustain and this leads to FHP.

NEED FOR STUDY

Increase in thoracic kyphosis, normally associated with FHP further increases cervical lordosis. This malalignment in the upper back, neck and head can result in compensatory dysfunctional adjustments in the lower back which is a biomechanical overload from improper posture.

The impact of various factors in occupation may predispose the person to impairment and disability. Persons sitting without back support for a prolong period i.e., 8-12 hrs. have more chances of developing FHP. So stretching and strengthening of the muscles involved is necessary.

Also occupational safety and health administration exposure concern that there are disorders affecting shoulder, head, cervical region leading to FHP and protracted or rounded shoulder. So ergonomic exercises are important to correct the posture. Also good postural habits are necessary to avoid postural dysfunctions. Thus, the study is conducted to study the effect of stretching and strengthening exercises on FHP.

AIMS & OBJECTIVE

- = To determine effects of pectoralis minor mobilization and stretching on forward neck posture.
- = To determine effects of pectoralis minor self stretching on forward neck posture.

LITERATURE REVIEW

- 1) John V. Christman, found that in general population, the incidence of forward head posture is very high. On study of 88 healthy subjects, ages 20-50, found FHP in 66%, kyphosis in 38%, right rounded shoulder in 73% and left rounded shoulder in 66%. He gave them regular exercises for 10-15 minutes, in the form of neck stretching and chin glides and found a very significant improvement in reduction of the FHP.
- 2) Donald W. Meyer studied 25 subjects out of which 13 were males and 12 were females between age 17-68 yrs. He gave traction and manipulation for 12-16 days, each session lasting for 16-20 minutes and found that there is reduction in FHP in 96% of subjects and the amount of reduction ranged from 2 millimeters to 18 millimeters.
- 3) Jeb McAviney, Dan Schulz, Richard Bock found that there is a decrease in cervical lordosis thus decrease in FHP after the treatment. Maintenance of cervical lordosis in range of 31-40 degree was a clinical goal of treatment which is achieved.
- 4) Dr. Pertibons in his article of FHP studied that giving stretching exercises for longer than 30 seconds, along with postural correction exercises can exacerbate the forward head posture.
- 5) Korthals-de Bas IB, Hoving JL, in his research studied 183 patients with chronic neck pain, out of which 60 subjects were treated by spinal manipulation for 2 weeks. They were given manual therapy regularly and 59 subjects were given exercise only. He found that thus manual therapy group showed faster improvement than exercise group.
- 6) Lane BA, Hunt GC in his study conducted on a 28 yrs male with tightness of right pectoralis minor muscle with an associated FHP found no significant improvement in forward shoulder posture after giving autogenic (direct) and reciprocal (indirect) stretching techniques. MATERIAL AND

METHODOLOGY

Material :A measuring tape, plinth.
 Methodology :
 Study Design :Pre and Post experimental design.
 Study Setting :R.N.P.C. Sawangi (Meghe) Wardha.
 Sample Size :

- = 50 subjects
- = Two groups- control group – 25 subjects
- = Treatment group – 25 subjects
- = 19-40 yrs of age
- Sample Technique: Purposive sampling

Inclusion Criteria:

- = Persons working for a prolong period of time (8-12hrs) in sitting posture (forward head with stooping upper back)
- = Persons sitting without back support for 8-12 hrs.

Exclusion criteria :

- = Persons having any injury or shoulder joint pathology
- = Persons having upper respiratory and lower respiratory tract disease.

Procedure

The subjects of forward head posture are selected and the tightness of pectoralis minor is measured by asking the subjects to stand against the wall bare feet with arms by the side of the body and looking straight ahead. Normally ear, shoulder, hip, knee and ankle should sit in a vertical alignment. In other words if you drop a plumb line from your ear it should pass through all these points.

The distance is measured by using a tape from two points viz a) from external auditory meatus to the wall b) from posterior lateral acromion process to the wall. Patients were randomly divided into two groups viz Group A) Control group and Group B) Treatment group.

The length of pectoralis minor is measured after duration of 7 days, 14 days and 21 days.

Treatment

For Control group:

- Group-A
 Ergonomic exercises which includes
- = Hot fomentation
 - = Pectoralis minor stretching
 - = PIR
 - = Trapezius stretching
 - = Chin tucking exercises
 - = Shoulder bracing exercises
 - = Cryotherapy

For Treatment group- Group-B

- = Passive exercises with home ergonomic program
- = Hot Fomentation
- = MET
- = Pectoralis minor stretching
- = PIR
- = Trapezius stretching
- = Chin tucking exercises
- = Shoulder bracing exercises
- = Massage
- = Cryotherapy

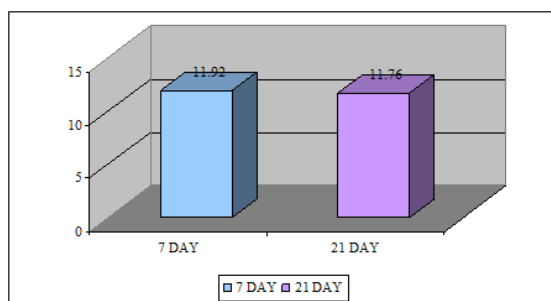
DATA ANALYSIS AND GRAPHICAL REPRESENTATION TREATMENT GROUP

DAYS	MEAN	T-value	P-Value		
			External auditory meatus	Acromion	
7th day	12.6	8.84	4.55	3.59	<0.001
14th day	11.22	8.2	5.91	4.91	<0.001
21st day	9.66	7.56	9.05	5.21	<0.001

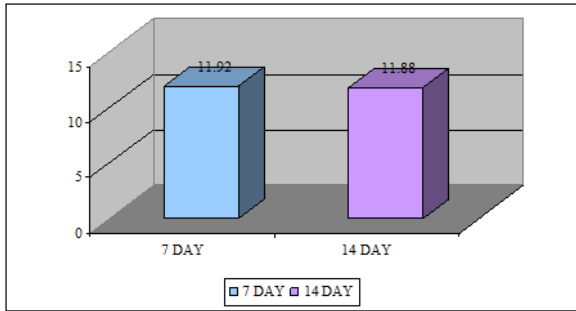
CONTROL GROUP

DAYS	MEAN	T-value	P-Value		
			External auditory meatus	Acromion	
7th day	12.6	8.84	0.14	0.32	>0.05
14th day	11.22	8.2	0.03	0.04	>0.05
21st day	9.66	7.56	0.002	0.08	>0.05

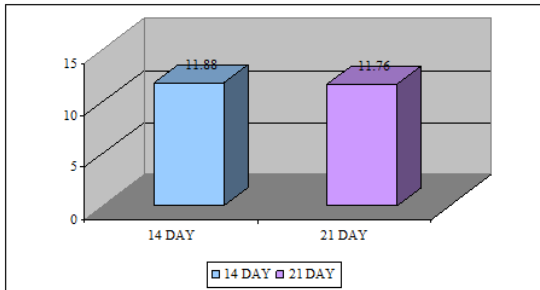
CONTROL GROUP From Acromion



Difference between 07 and 21 days

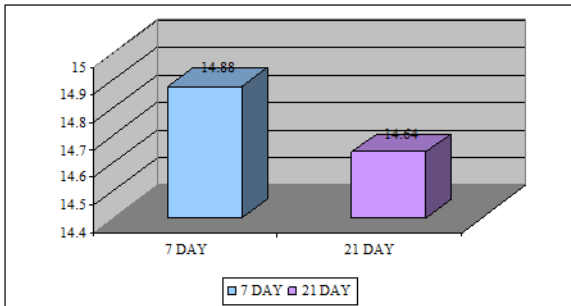


Difference between 7 and 14 days

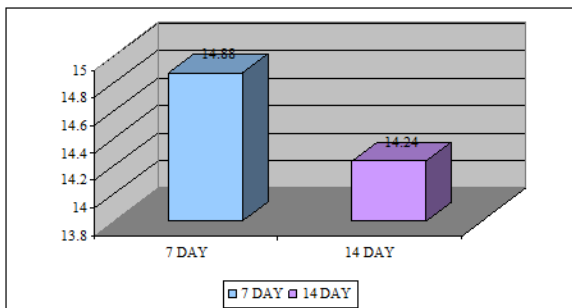


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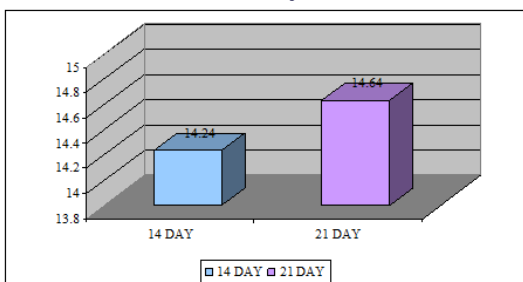
CONTROL GROUP
From external auditory meatus



Difference between 7 and 21 days

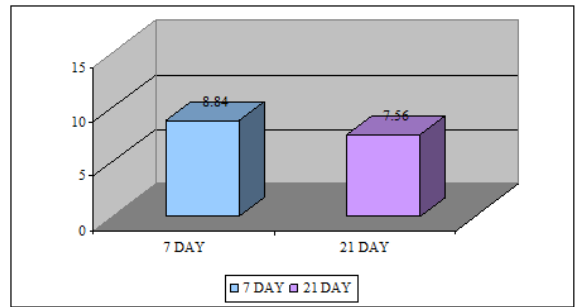


Difference Between 7 And 14 Days

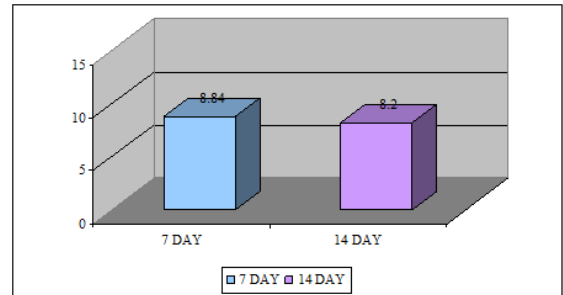


Difference between 14 and 21 days
TREATMENT GROUP

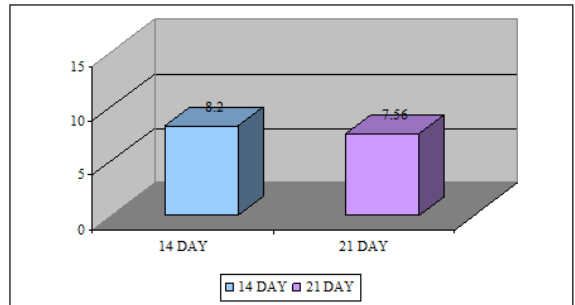
From Acromion



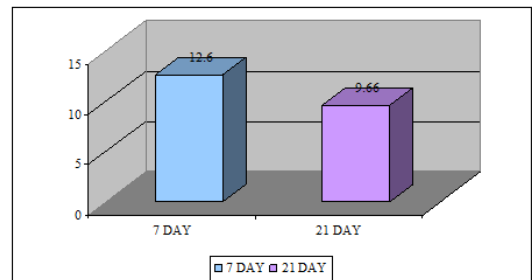
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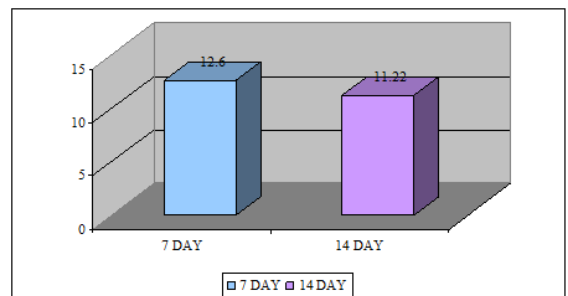
Difference between 7 and 14 days



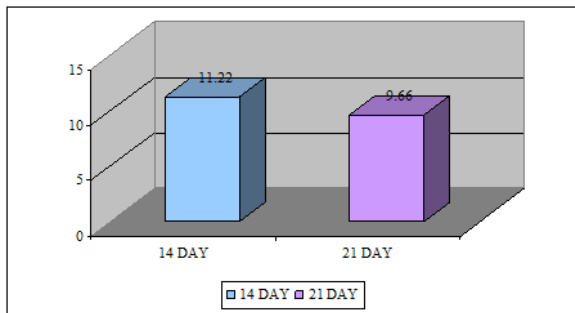
Difference between 14 and 21 days
TREATMENT GROUP
From external auditory meatus



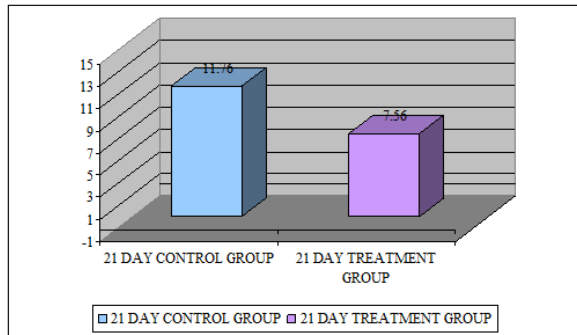
Difference between 7 and 21 days



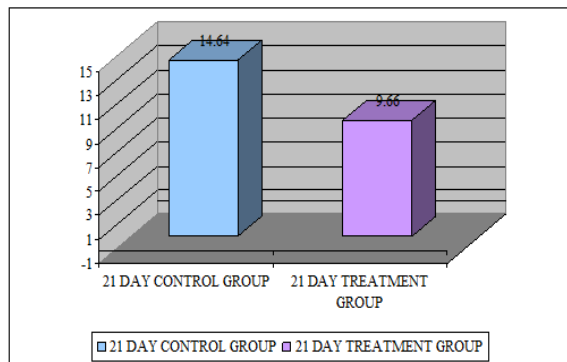
Difference between 7 and 14 days



Difference between 14 and 21 days



Difference after 21 days from acromion process of both control group and treatment group



Difference after 21 days from external auditory meatus of both control group and treatment group

RESULT

From the study it is found that the subjects under control group shows no significant improvement as the t value at the 21st day is 0.08 from acromion and 0.02 from external auditory meatus.

In the treatment group the tvalue from acromion at 21st day is a 5.21 and from external auditory meatus is 9.05 which shows that the study is highly significant.

DISCUSSION

Treatment group showed a significant improvement in FHP and slouched shoulders. On comparison, treatment group showed highly significant improvement as they were passively mobilized. As already documented by various researchers, passive stretching and strengthening programmes have given better results than active one.

PIR exercises are given prior to stretching as it provides relaxation to muscle and prevents it from soreness and injury. It constitutes hold-relax of the contracted muscle, bringing about relaxation of the muscle. This relaxed muscle (improved length) allows further passive stretching thereby increasing the length of shortened musculo-tendinous unit. Strengthening exercise improves the ability of contractile tissue to produce tension and improves the maintenance of muscle length, power and endurance. It also increases the strength of connective tissues, tendons, ligaments and thus decreases the stress on joints during physical activity and reduces the risk of soft tissue injury. Strengthening exercises bring about increased recruitment of the redundant muscle fibres in the earlier days, thus could be the reason of increased strength observed in first week.

In the study done by Donald W. Meyer, found that after given manipulation, traction and exercise program there is reduction of FHP in 96% of subjects which co-relates with my study; as subjects who received treatment regularly under treatment group found a very significant improvement of 1.5-2cm decrease in FHP in 7 days and further 3-4cm decrease in FHP in 14-21 days as measured from external auditory meatus whereas subjects under control group found no such improvement.

APPENDIX - I MASTER CHART TREATMENT GROUP

Sr. No.	Age/Sex	MEASUREMENT	7-DAYS		15-DAYS		21-DAYS			
			Ext. Aud. Mea.(cm)	A(cm)	A(cm)	E(cm)	A(cm)	E(cm)	A(cm)	E(cm)
1	23/M	11	17	10	14	9	12	8.5	10	
2	23/F	9	14.5	8	13	7.5	12	7	10.5	
3	21/F	10	14	8.5	12.5	8	12.5	7.5	9.5	
4	21/F	8.5	13	8	12.5	8	11.5	8	10.5	
5	24/F	10	13	9	12	8	11	7.5	9.5	
6	24/F	11	15	9	13	8.5	11	7.5	10	
7	24/M	8	12	7.5	11	7	10	7	9	
8	23/F	10.5	13	9.5	12	9	11	8	9	
9	24/F	11	16	9	14	8	12	8	11	
10	22/F	9.5	13	9	12.5	8	11.5	7.5	10.5	
11	23/F	10	13.5	9	12.5	8.5	10	7.5	9	
12	24/F	9	12	8	11	7.5	10	7	9.5	
13	24/F	10.5	14	8.5	12	7.5	10.5	7	9	
14	23/F	9.5	13	8.5	12	8	11	7	9.5	

15	23/F	8.5	11	8	10.5	7	9.5	7	8
16	23/F	10.5	15	10	14.5	9	12.5	8	10.5
17	24/F	11	16	10	15	8.5	13	7.5	10
18	21/F	10.5	14	9.5	13	9	11	8	9
19	22/F	11	15	10	14	9.5	11.5	8.5	10.5
20	24/F	9.5	13	9	12.5	8.5	11.5	7.5	10
21	24/F	8.5	14	8	13.5	8	12	7	9.5
22	24/F	10	12	9	10	8.5	9.5	8	9
23	23/F	11	16	10	15	9	13	7	10
24	24/F	8	13	8	12	8	11	7.5	9.5
25	23/F	9	12	8	11	7.5	10	7	9

CONCLUSION

The subjects who are under treatment group found a reduction in FHP as measured from external auditory meatus.

LIMITATIONS AND SUGGESTIONS

Limitation:

- = Due to lack of isometric dynamometer , stretch force applied could not be measured.
- = Also increase in strength could not be documented .

Suggestions:

- = Effect of traction to improve FHP and slouched shoulders can be further studied.

**APPENDIX - II
CONSENT FORM**

I _____ Voluntarily agreed to be a subject for the project "EFFECT PECTORALIS MINOR MOBILISATION VS SELF STRETCHING ON FORWARD HEAD POSTURE" after clearly understanding the study.

SIGNATURE

REFERENCE

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7. Lane Ba, Hunt Gc, Lilly D; Autogenic (Direct) Vs. Reciprocal (Indirect) Inhibition: Stretching Of The Pectoralis Minor Muscle. American Physical Therapy 2003.

CONTROL GROUP

Sr. No.	Age/Sex	MEASUREMENT	7-DAYS			15-DAYS			21-DAYS		
			Ext. Aud. Mea.(cm)	A(cm)	E(cm)	A(cm)	E(cm)	A(cm)	E(cm)	A(cm)	E(cm)
1	35/M	13.5	18	13.5	18	13	17.5	13	17		
2	40/M	12	16	12	15.5	11.5	15.5	11.5	15.5		
3	32/M	14	17	13.5	17	13.5	16.5	13.5	16		
4	28/M	13	16	13	16	12	15.5	12	15.5		
5	36/M	11	14	11	14	10.5	13.5	10.5	13.5		
6	25/M	12	14	11.5	13.5	11.5	13.5	12	14		
7	30/M	10.5	13	10	13	10	12.5	10	13		
8	32/M	12.5	14	12.5	14	12	13	12	13		
9	34/M	12.5	15	12	14.5	12	14.5	12	14.5		
10	38/M	10.5	14	10	14	10	13.5	10	13.5		
11	40/M	11.5	14	11.5	14	11	13.5	11	13.5		
12	39/M	12.5	15	12.5	15	12.5	15	12.5	15		
13	37/M	13.5	16.5	13	16	13	16	13	16		
14	34/M	12	15.5	11.5	15	12	15.5	11.5	15		
15	26/M	11.5	14	11.5	14	11.5	14	11.5	14		
16	24/M	13.5	17	13	16.5	13	16.5	13	16		
17	29/M	13	16	13	16	13	16	13	16		
18	38/M	12	15	11.5	14.5	11.5	14.5	11.5	14.5		
19	40/M	12.5	15	12.5	15	12.5	15	12	14.5		
20	37/M	11	14	10	13	11	14	10	13		
21	28/M	10.5	13	10	13	10	12.5	10	12.5		
22	22/M	13	16	12	15	13	16	12	15		
23	31/M	13.5	16	13	15.5	13	15.5	12.5	15.5		
24	40/M	12	15	12	15	12	15	12	15		
25	39/M	13	16	12	15	12	15	12	15		