

ORIGINAL RESEARCH

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A COMPARATIVE STUDY ON THE EFFECT OF SELF SNAGS VERSUS DYNAMIC ISOMETRIC EXERCISES IN DESK JOB PEOPLE WITH CHRONIC NECK PAIN

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ABSTRACT

Background: Neck pain is a common global problem, an important source of disability. Bad posture of neck with respect to chest is one of the commonest causes of chronic neck pain. This is common to the job related (e.g. computer professionals, clerks, bank employees) where the neck is kept in a flexed position for long periods of time.

Objectives: To compare the effectiveness of self SNAGs with dynamic isometric exercise in chronic neck pain.

Methods: It is a comparative experimental study. This study includes (N=40) desk job people with chronic neck pain subjects with age group of 25-45 years. They were randomly assigned into 2 groups (Group A and B). Group A had 20 (N=20) subjects who are treated with self SNAGs, Group B had 20 (N=20) who are treated with dynamic isometric exercise using resistance band. The subjects were given intervention once a day for 6 weeks.

Results: At the end of 6 weeks, both neck pain and disability decreased in both groups, range of motion had also improved statistically significantly in both groups, but the results showed that the pain scores are significantly improved in group A ($t = -2.707$) which is significant at 5% level of significance ($p = 0.01$). It has been inferred that VAS decreases more when self SNAGs was applied and the difference of means of NDI, $t = -4.468$ which is highly significant ($p = 0.00$) implying that NDI decrease more when self SNAGs was applied as compared to dynamic isometric exercise.

Conclusion: From the above study it is concluded that, self SNAGs is an effective way of decreasing pain and increasing functional ability when compared to dynamic isometric exercise using resistance band.

Keywords: Neck pain, Self SNAGS, Dynamic isometric exercise, Resistance Band.

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INTRODUCTION

Neck pain is an important source of disability and common global problem. The functional task of the cervical spine is to control head movements in relation to the rest of the body. It affects 30–50% of the general population annually.¹ At any point in time, the prevalence of Neck pain is about 12% for the adult female population and 9% for the adult male population. Approximately 45% of the working population will have one attack of a stiff neck.²

Bad posture of neck with respect to chest is one of the commonest causes of chronic neck pain. This is common to the job related situations where the neck is kept in a flex position for long periods of time.³ Decreased strength in the neck muscles has been thought to be associated with chronic neck pain, because as researchers have pinpointed the neck flexor muscles as a site of weakness.⁴ Others have found weakness in the flexor and extensor muscles.^{5,6} Chronic neck pain is often a widespread sensation with hyperalgesia in the ligaments and muscles during both passive and active movements.⁷

Sitting at desk hunched over computer keyboard can be a major cause of neck pain and neck problems. When combined with the fact that many people with desk jobs spend most of their time sitting without moving for hours at a time, it's no surprise that desk jobs are associated with increased instances of neck pain. By implementing a few self-help techniques, may be able to reduce neck pain, improve mobility in cervical spine and prevent the development of certain neck problems.⁸ Desk job neck pain is a common patient complaint suffered by a great number of people who must sit at a desk to work all day long. Sitting is an activity which seems so innocuous, yet is cited as a direct cause or contributor to lower back, neck and sciatica pain more than any other singular positional factor.

Bad posture can cause neck pain. Ligaments are overstretched, muscles become tired and the neck joints and nerves are put under pressure. Slouching your shoulders with your head pushed forward, sleeping with the head in an awkward position, or working with the head down for long periods, will all tend to cause or worsen neck pain.⁹ Muscle work in static posture causes a rise of pressure within the muscle which compresses the blood vessels, decreasing the amount of blood flowing into them in proportion to the force of contraction and leads to the accumulation of waste products. This impairment of blood flow causes the muscle to get fatigue, resulting in discomfort initially and pain

later. The stresses placed on the body by static muscle loading increases when the body required twisting or reaching out.¹⁰

According to advanced health and physical medicine, individuals who fail to “educate” themselves about maintaining a natural, correct posture during desk work are primary “candidates” for chronic neck pain. Although working a desk job is not physically demanding, it can cause neck pain through improper posture. Several factors can accelerate the process. First of all, people who work desk jobs frequently are physically unfit and have a sedentary life. Of course, there are people who go to the gym right after work, but the tendency for low levels of physical activity is common among this category of people. Even if a person may be initially “blessed” with a correct spinal architecture and vertebral alignment, these things may be ruined easily by years of “abstinence” from exercise and physical work.¹¹

Proper spinal mechanics are also influenced by the individual placement and alignment of the neck vertebrae. When an incorrect alignment or narrowing of inter - vertebral space occurs due to incorrect posture or collateral medical problems, the individual may experience neck pain but also more dangerous symptoms, such as compression of the spinal nerves, muscle weakness or functional impairment in the limbs.

Neck pain may lead to the inability to move and strain the neck normally and may the subjects to avoid exercising. At worst, pain can significantly restrict an individual's activities of daily living. Severe neck pain can also be more persistent than low back pain.¹² Neck pain arises from musculoskeletal impairments and traditional physical therapies such as manipulative therapy, therapeutic exercise, electrophysiological agents have been used.

Mulligan's concept of mobilization with movements (MWMs) first used in cervical spine, carry the acronym, SNAGs, stands for sustained natural Apophyseal glides, used to improve function, restriction or pain in flexion, extension, rotation, side flexion of cervical spine. Self treatment using SNAGs with hand towel can also be beneficial. Mulligan proposed that when an increased in pain free range of movement occurs with a SNAGs, also influences the entire spinal functional unit. Clinically, SNAG on a painful mobile level may not always achieve full free movements whereas restricting the movement of a painful mobile segment or gliding a nearby stiff segment does achieve the desired result.

Isometric exercises, involve muscular actions in which the length of the muscle does not change and there is no visible movement at the joint¹³. An isometric exercise is a form of exercise in which the length of the muscle and the angle of the joint do not change, though contraction strength may be varied. Resistance bands are widely used for rehabilitation from muscle and joint injuries. Resistance bands use can improve the cooperation of muscle groups. It also works on strength and range of motion. Their unique properties allow it to be stretched and relaxed in a smooth and consistent manner. This prevents the bounce at the end of a range of motion exercise that can cause muscle spasms. Resistance bands and tubing are low-cost, portable and versatile, made of natural rubber latex.¹⁴ Both these techniques were found effective separately in decreasing pain and increasing functional ability.

METHODOLOGY

Subjects were selected based on the criteria and informed consent was obtained from them. A convenient sample of 40 desk job workers at Big Bazar, Bhangagarh Guwahati was randomly assigned to 2 groups, 20 in each. All the participants were aged between 25 to 45 years and they belong to both genders. The subjects with nerve root involvement, spinal pathology including IVDP, TB spine, rheumatoid arthritis, vertigo, malignancy. Recent fracture of spine and upper limb were also eliminated from the study. Vertebro basilar insufficiencies, recent surgery of cervical spine, sensory deficit, and Psychological disorder were also considered to exclude the subjects. The neck pain and neck disability were assessed by Visual Analogue Scale and Neck Disability Index before treatment (pretest) and at the end of 6 weeks (posttest).

On the first day of treatment, participants in both groups were taught how to perform self SNAGs with hand towel and dynamic isometric exercise using resistance band. In the following sessions the participants were performing under the therapist's supervision to minimize the error and for the better results. The neck pain and neck disability were assessed by Visual Analogue Scale and Neck Disability Index before treatment (pretest) and at the end of 6 weeks (posttest).

The Subjects in group A were taught carefully self SNAGs for extension, rotation and lateral flexion of cervical spine with the help of hand towel and advised on correct posture during work hours.

For cervical extension

- Towel is held on the cervical spine and the selvage on one side is hooked under the spinous process.
- The patient grips each end of the towel and pulls up along the treatment plane as he or she extends the neck.
- Extension overpressure must be applied at the end range by patient or by someone in the patient's household and sustained until neck returns to neutral position.
- Repeat it 6-10 times
- If there is pain experienced by the patient while performing SNAGS stop the treatment immediately and try other levels until they get it right.

For cervical rotation

- The selvage on one side of the towel is hooked under the spinous process.
- For right rotation, grasp the left side of the towel with right hand and the right side of the towel with the left hand.
- The left arm (beneath) is hooked on the back of the chair to stabilize the arm. The right hand now pulls the towel up in the direction of facet joint or towards the direction of eyeball and patient rotates his/ her head to the right.
- Overpressure is then applied at the end range and sustained for few seconds until neck returns to neutral position.
- Repeated 6-10 times

For lateral flexion

- Similar done as cervical rotation, only difference is while towel is being pulled; patient side flexes the neck and then overpressure applied at the end range.
- Repeated 6-10 times.

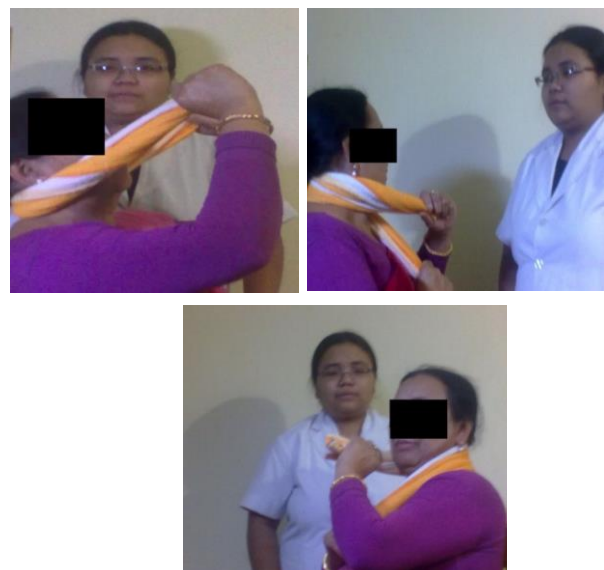


Figure 1: Figure showing self SNAGs exercises

Subjects in group B stabilizes the neck and performs a 'hip-hinge' over 20-30 degrees against elastic band resistance. The exercise is performed in flexion, extension, and side bending to both sides

Thera-Band Cervical Flexion-Dynamic Isometric (Sitting)

- **Instructions:**
Begin in sitting with a loop of band securely attached on one end, and the loop around the head. Keep the back and neck straight while slightly lean forward from hips, moving the head about 10cm forward. Then hold and slowly return to the starting position, keeping the neck straight, moving with shoulders.
- 2 to 3 sets for 10-15 repetitions.

Thera-Band Cervical Extension-Dynamic Isometric (sitting)

- **Instructions:**
Begin in sitting with a loop of band securely attached on one end, and the loop around head. Keep the back and neck straight while slightly lean forward from hips, moving the head about 10cm forward. Then hold and slowly return to the starting position, keeping the neck straight, moving with the shoulders
- 2 to 3 sets for 10-15 repetitions.

Thera-Band Cervical Sidebending-Dynamic Isometric (sitting)

- **Instructions:**
Begin in sitting with a loop of band securely attached on one end, and the loop around the head. Keep back and neck straight while slightly lean to the side from the hips, moving the head about 10cm. Then hold and slowly return to the starting position, keeping the neck straight through the exercise.
- 2 to 3 sets for 10-15 repetitions.

Postural advice will be given for prevention of bad posture.

- Keep the spine upright while sitting on chair during work hours.
- Keep the shoulders straight and retracted.
- Take frequent breaks between work hours.



Figure 2: Figure showing dynamic isometric exercises using resistance band

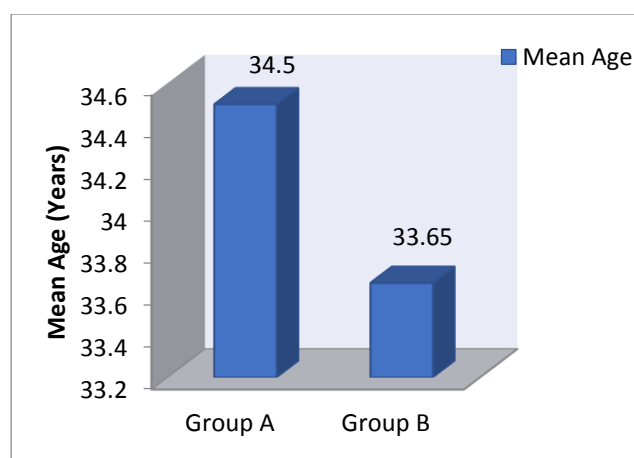
STATISTICAL INTERPRETATION

All analysis was carried out in SPSS windows Version 20.0. An alpha-level of 0.05 was used to determine statistical significance. Paired t-test was performed to find effectiveness of self SNAGs and dynamic isometric exercise. Independent sample t-test was carried out to compare self SNAGs and dynamic isometric exercise.

A. Demographic information:

Group	Age (Mean \pm SD)	34.50 \pm 5.021
Group A	Gender (Male : Female)	2 : 3
	Age (Mean \pm SD)	33.65 \pm 5.354
Group B	Gender (Male : Female)	2 : 3

Table 1: Demographic information



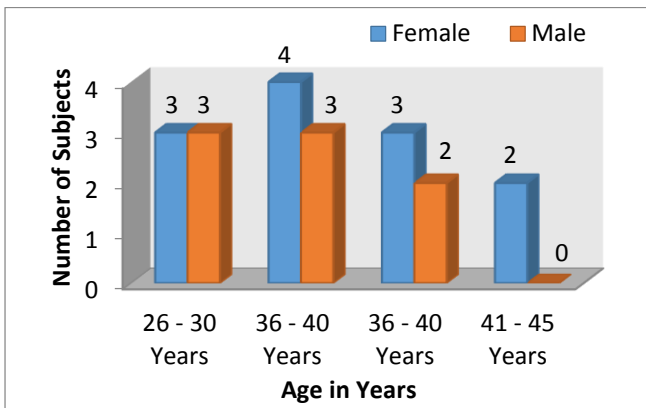
Graph 1: Mean age of subjects of Group A and Group B

Age and Gender Distribution of the subjects of Group A

Age Group	Gender of Group A		Total
	Female	Male	
26 - 30 Years	3	3	6
36 - 40 Years	4	3	7
36 - 40 Years	3	2	5
41 - 45 Years	2	0	2
Total	12	8	20

Table 2: Age and Gender Distribution of the subjects of Group A

Out of 20 subjects in Group A, there were 8 males and 12 females with mean age of 33.5 years ranging from 27 years to 44 years.



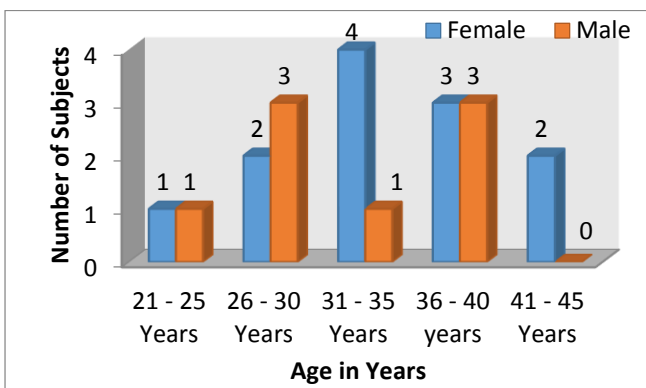
Graph 2: distribution of Gender with respect to age in Group A

Age and Gender Distribution of the subjects of Group B

Age Group	Gender of Group B		Total
	Female	Male	
21 - 25 Years	1	1	2
26 - 30 Years	2	3	5
31 - 35 Years	4	1	5
36 - 40 years	3	3	6
41 - 45 Years	2	0	2

Table 3: Age and Gender Distribution of the subjects of Group B

Out of 20 subjects in Group B, there were 8 males and 12 females with mean age of 33.5 years ranging from 25 years to 42 years.



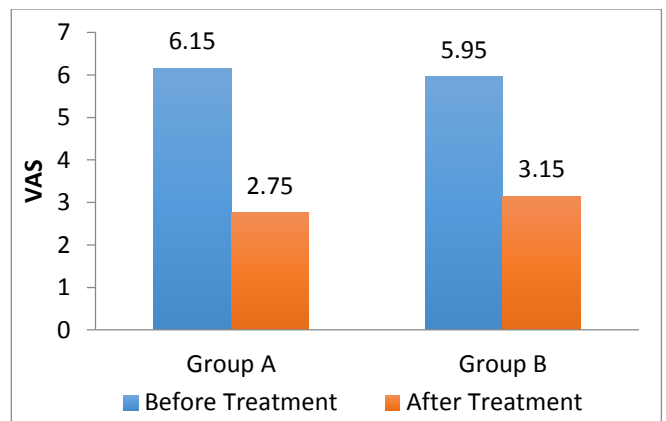
Graph 3: Distribution of Gender with respect to age in Group B

B. Analysis and Interpretation

Within group analysis of Group A and Group B of VAS

Group	VAS	Mean	N	t	df	p
		\pm SD				
Group A	Before Treatment	6.15	20	20.168	19	0.00
	After Treatment	2.75				
Group B	Before Treatment	5.95	20	20.342	19	0.00
	After Treatment	3.15				

Table 4: Group analysis within groups of Group A and Group B of VAS

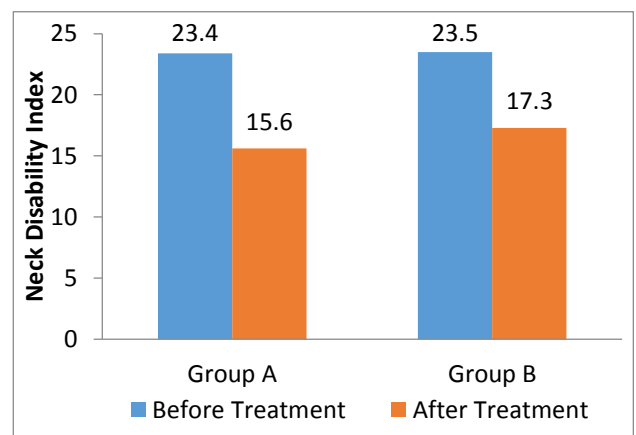


Graph 4: Mean VAS of Group A and Group B

Within group analysis of Group A and Group B of NDI

Group	NDI	Mean	N	t	df	P
		\pm SD				
Group A	Before Treatment	23.40	20	14.967	19	0.00
	After Treatment	15.60				
Group B	Before Treatment	23.50	20	10.716	19	0.00
	After Treatment	17.30				

Table 5: Group analysis within groups of Group A and Group B of NDI



Graph 5: Mean NDI of Group A and Group B

Comparison of the effectiveness of self SNAGs with dynamic isometric exercise in chronic neck pain.

	Treatment	N	Mean ± SD	t	df	p
VAS	Self SNAGs	20	2.75 ± .550	-2.707	38	0.01
	Dynamic Isometric exercise	20	3.15 ± .366			
NDI	Self SNAGs	20	15.60 ± 1.392	-4.468	38	0.00
	Dynamic Isometric exercise	20	17.30 ± .979			

Table 6: between group comparison of self SNAGs with dynamic isometric exercise

RESULTS

The present study was aimed to compare the effects of self SNAGs and dynamic isometric exercises in reducing pain and functional disability in patients with chronic neck pain. All the graphs showed significant difference for decrease in pain and improvement in functional ability in group A and group B. The level of mean difference in pre test and post test shows more decrease in pain in group A than group B.

The current study was focused on training the neck muscles using self SNAGs and dynamic isometric using resistance band in decreasing pain and increasing functional ability with chronic neck pain. In the present study, both neck pain and disability decreases in both groups, range of motion had also improved statistically significantly in both groups, but the results showed that the pain scores are significantly improved in group A ($t = -2.707$) which is significant at 5% level of significance ($p = 0.01$). It has been inferred that VAS decreases more when self SNAGs was applied, and the difference of means of NDI, $t = -4.468$ which is highly significant ($p = 0.00$) implying that NDI decrease more when self SNAGs was applied as compared to dynamic isometric exercise.

DISCUSSION

This study included 40 subjects engaged with desk job of both genders between the age group 25-45 and were randomly divided into 2 groups Group A and Group B, Group A received self SNAGs and Group B received dynamic isometric exercise using resistance band. The neck pain and neck disability were assessed by Visual Analogue Scale and Neck Disability Index before treatment and at the end of 6 weeks.

Present study was focused on improvement of neck muscles, FleckSJandKraemecWJ. In their study stated decreased strength in the neck

muscles has been thought to be associated with chronic neck pain, Christoffer H Andersen, have found weakness in both the flexor and extensor muscles with chronic neck pain¹⁵. The patients in one group were treated with self SNAGs and that of second group were treated with dynamic isometric exercises. Results showed significant improvement, when pre-test and post test data were compared.

Researchers in the Department of Physical and Rehabilitation Medicine at Jyvaskyla Central Hospital in Finland had proved increase in neck range of motion and a decrease in pain after 12 months performing dynamic isometric exercises. Some studies noted the superiority of the neck stabilization exercises, with some advantages in the pain and disability outcomes, compared with isometric and stretching exercises in combination with physical therapy agents for the management of neck pain.¹⁶

Niyati Desai concluded that patients with chronic nonspecific neck pain can be advised to perform Self Sustained Natural Apophyseal Glides (SNAGs) instead of therapist administered SNAGs on chronic neck pain.¹⁷ The SNAG treatment had an immediate clinically and statistically significant sustained effect in reducing dizziness, cervical pain and disability caused by cervical dysfunction.

Fallow up study of 4 weeks post intervention, and at 12 months post intervention also showed significant results which provided evidence for the efficacy of the C1-C2 self-SNAG technique in the management of individuals with cervicogenic headache.¹⁸ Shilpi Chhabara Et Al (2009) Depicted that group receiving self-snags showed better carry over effect during treatment phase and more during follow up phase as compared to group receiving conventional physiotherapy alone. From all the above findings it has been proved that results of the present study have shown similar results with other studies done using self SNAGs and dynamic isometric exercises in chronic neck pain.

CONCLUSION

The results showed that the pain scores are significantly improved in group A ($t = -2.707$) which is significant at 5% level of significance ($p = 0.01$). .and the difference of means of NDI, $t = -4.468$ which is highly significant ($p = 0.00$) implying that NDI decrease more when self SNAGs was applied as compared to dynamic isometric exercises. From the above study it is concluded that, self SNAGs is an effective way of decreasing pain and increasing functional ability when

compared to dynamic isometric exercises using resistance band.

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