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# Effectiveness of PNF Techniques on Neck Pain and Cervical ROM (Cervical Extension) in College with Text Neck Syndrome - An Experimental Study

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## ABSTRACT

**Background:** Smartphone usage has been increased significantly over last decade in college students. As students spends more than 6 hours on their cell phone during a day, Text Neck Syndrome is a growing concern of today's era. Sustained poor posture of cervical spine and increased screen time results in neck pain, muscle spasm, reduced mobility of cervical spine and discomfort. Various treatment options & corrective interventions should be made to treat Text Neck Syndrome.
**Method:** This study was conducted to check effectiveness of PNF stretching techniques on Text Neck Syndrome. Total 63 college students were participated in the study between age group of 18-25 years. The pre and post data for neck pain and cervical ROM were collected after a 2 week protocol. VAS score and universal goniometer used as outcome measures.
**Results:** The study included 63 college students. Unpaired T test were used for data analysis. The pre and post data were calculated. After a 2-week protocol, a significant reduction in neck pain, and improvement in cervical extension ROM was seen ($p < 0.05$).
**Conclusion:** Due to increasing use of smart phones and prolonged screen time among college students, the Text Neck Syndrome has become a growing concern of today's era. This study concluded a significant use of PNF stretching techniques on college students with Text Neck Syndrome providing a new corrective intervention for it.

***Keywords:*** Text Neck Syndrome, neck pain, PNF Stretching Techniques.

## INTRODUCTION

The term "Text Neck" coined by Dr. Dean L. Fishman a US chiropractor, is described as a repetitive stress injury or overuse syndrome where a person has his/her hung or flexed in a forward position and is bent down for prolonged period of time. [1] As smartphones has become an integrated part of our life, there is constant increase in smartphone usage and prolonged screen time is seen over the decade. Text Neck most commonly causes neck pain and muscle soreness. In addition, looking down at your smart phone too much can lead to upper back pain ranging from chronic, nagging pain to sharp and severe upper back muscle spasm. Shoulder pain and tightness, possibly resulting in painful shoulder muscle spasm. Smartphone usage time has a positive relationship with flexibility and postural deformity of subject. The most common condition that contributes to neck pain is forward head posture. 62.3% of users experienced pain in the neck when working on the smartphones. [1]

Proprioceptive neuromuscular facilitation techniques are used to target all aspects of muscle training, e.g. sustained isometric activity to mobilize muscle groups thus improving range of motion and/or reduce

pain, functional patterns and handling techniques to facilitate both co-ordination and stability in muscle groups.[8] Moreover, the PNF techniques are frequently used in the clinical and athletic environments to improve active and passive range of motion and agility to enhance motor performance and rehabilitation.[3] PNF stretching technique is one of the most effective forms of flexibility training for increasing ROM.[2]

In a study conducted among medical students with smartphone users, the study concluded the prevalence of Text Neck Syndrome was 68%. [4] Mobile devices users frequently adopt prolonged forward head posture while looking down at the screen of mobile devices. Text neck may cause harmful symptoms such as neck pain, upper back pain, chronic headache & increased curvature of spine. [1] but there are very studies available for the correction of Text Neck Syndrome. Curative interventions should be made for a condition like Text Neck Syndrome with such high prevalence among college students. On other hand, It is important to emphasize that whilst the majority of the research base into PNF focuses on its effect on ROM. Nevertheless, there is a growing body of research investigating PNF not only in functional rehabilitation, neurological and strengthening, but also across a wide range of populations, from students-athletes, to trained and untrained older adults and the neurological impaired. [8] Hence the study was undertaken.

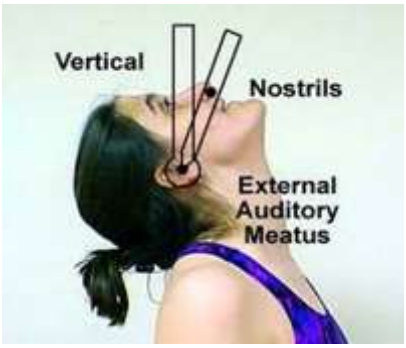
## MATERIALS & METHODS

It is an experimental study, approved by ethical committee. Participants voluntarily participated in this study and written informed consent was obtained from all participants. All subjects were included according to inclusion and exclusion criteria. Inclusion criteria included college students between 18 to 25 years of age, having VAS score between moderate (3.5) to severe (>7.5) for neck pain and cervical extension limited to 30°-50° (normal >70°). The students must be a regular smartphone user since 1 year or more and should be using mobile for 6-7 hours a day. Participants with history of recent trauma to spine, having any pathological condition, any surgery in past 10 years or with vascular compromise or systemic disease were excluded. Total 63 college students were participated in the study out of which 29 were males and 34 were females.

### OUTCOME MEASURES

Visual Analogue Scale (VAS) score was used to calculate severity of neck pain. participants were asked to mark a point from 0 to 10 representing severity of their pain. [5]


Universal goniometer was used to measure the degree of cervical extension ROM.




Fulcrum was placed at external auditory meatus, stable arm perpendicular to ground and movable arm parallel to nostrils.

### THERAPEUTIC INTERVENTION

Subjects were seen 4 times a week over 2 weeks. Dynamic Reversal Technique were used for improving cervical extension and Rhythmic Stabilisation technique to reduce neck pain. subjects were sitting in a comfortable position and proper instructions were given to them.

I. Dynamic Reversal Technique:

Instructions =

- Therapist asked the patient to move his head backwards & gave a passive resistance for the motion. Held for 5 sec.
- Then, try to bend your neck forward & again provided a passive resistance. Held for 5 sec.
- Again, take your head into new ROM gained backwards & gave passive resistance. Held for 5 sec.
- Lastly, bend the neck forward & maintained again passive resistance & held for 5 sec.
- Performed 3 Repetitions of the technique with breaks of 30 sec – 1 min between each session according to patient's comfort.

II. Rhythmic Stabilization Technique:

Instructions =

- The therapist resisted an isometric contraction of cervical extension. The patient maintained the position of head without trying to move. Held for 5 sec.
- The resistance was then increased slowly as the patient started to build a matching force.
- When the patient was responding fully, the therapist began to change the resistance so that antagonistic motion was resisted.
- Repeated this procedure for 3 Repetitions with breaks of 30 sec to 1 min according to patient's comfort.


**Fig 1 and 2: Therapist giving Dynamic Reversal Technique**


**Fig 3 and 4: Measurement of Cervical Extension with Universal Goniometer.**

## STATISTICAL ANALYSIS

Data were entered in Excel Sheet (Microsoft Corporation). The results were given in mean with a standard deviation. Unpaired t-test was done to compare pre intervention and post intervention measures. P <0.05 is taken as significant. The analysis was done using GraphPad Prism software version 9.

## RESULT

After giving Dynamic Reversal Technique and Rhythmic Stabilization Technique of PNF for a duration of 2 weeks, there was good improvement in Cervical ROM and Reduction in pain. The pre and post data were compared by Unpaired t-test.

Mean values for pre intervention and post intervention measures of VAS come out to be 6.30 and 3.20 respectively. P value came out as 0.0000 which is considered as significant.

**Table 1: Mean values of pre & post VAS**

| | Mean | P value |
|---|---|---|
| Pre intervention | 6.301587 | 0.0000 |
| Post intervention | 3.206349 | |

Mean values for pre intervention and post intervention measures of ROM came out as 43.62 and 60.40 respectively. P value came out as 0.0000 which is considered as significant.

**Table 2: Mean values of Pre & Post ROM**

| | Mean value | P value |
|---|---|---|
| Pre intervention | 43.62 | 0.0000 |
| Post intervention | 60.40 | |

## DISCUSSION

The study was intended to find Effectiveness of Dynamic Reversal and Rhythmic Stabilization Techniques of PNF on neck pain and cervical extension ROM in college students with Text Neck Syndrome. In the present study it was found out that a 2week protocol of PNF techniques led to significant increase in cervical extension ROM and reduction in pain.

The increase in ROM of cervical extension and reduction in pain can be explained on the basis of theory of autogenic inhibition and reciprocal inhibition. Autogenic inhibition relies on body's self-regulatory mechanisms of the Golgi Tendon Organs (GTO) in order to protect structures. However, in PNF stretching, contraction of the antagonist muscle take advantage of this mechanism to decrease muscle tension, allowing for elongation of the muscle fibers. The reciprocal inhibition theory states that, when one muscle contracts, the other relaxes and is thus inhibited in order to prevent the muscle from working against one another. When the antagonist muscle contracts, it brings about this reflex and inhibits the targeted muscle (TM). This inhibition of TM, along with shortening contraction of antagonist muscle, allows the muscle fibers of the TM to elongate even further, creating a greater stretching force for the TM.

Almost every smartphone user hung their heads in downward position to look at their mobile screens for prolonged period of time. This sustained poor posture of head puts excessive load on cervical spine and neck muscles resulting in neck pain. Sustained forward head posture causes adoptive

shortening of muscle fibers, which again contributes to excessive neck flexion. This cycle of persistent poor posture and adoptive shortening of muscle fibers goes on leading to exaggeration of symptoms. PNF stretching techniques causes elongation of those shortened muscle fibers and hence correcting the excessive forward head posture. Load of cervical spine is reduced on correction of poor posture which results in reduction in neck pain.

A study by Fred Smedes et al established the effect of PNF techniques on increasing ROM. The study shows that this is the only area where there is clear evidence for its efficacy. In another study conducted by Kayla B. Hindle et al on Proprioceptive Neuromuscular Facilitation (PNF): Its Mechanisms & Effects on Range of Motion and Muscular Function, concluded that PNF stretching, both contract relax and contract relax antagonist contraction methods are effective in improving and maintaining ROM, increasing athletic performance, especially after exercise. According to another study conducted by T. Maicki et al on PNF and Manual Therapy Treatment results on patients with Cervical OA, showed that the PNF group achieved a greater reduction in pain than the manual therapy group. It concluded that the PNF method proved to be more effective in both short (after two weeks) and long (after 3 months) terms.

PNF stretching techniques are used conventionally to enhance motor performance and rehabilitation. This study provides a new intervention protocol for correction of Text Neck Syndrome. Further studies can be made to see effects of PNF techniques in other musculoskeletal conditions.

## CONCLUSION

This study concluded that PNF techniques have shown a statistically significant improvement in cervical extension range of motion and reducing pain in college students with Text Neck Syndrome. Thus, PNF stretching techniques can be recommended to improve Range of Motion and for Pain Reduction.

### *Declaration by Authors*

**Ethical Approval:** Approved
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**Conflict of Interest:** The authors declare no conflict of interest.

## REFERENCES

1. Neupane S, Ali UI, Mathew A. Text neck syndrome-systematic review. Imperial journal of interdisciplinary research. 2017;3(7):141-8.
2. Victoria GD, Carmen EV, Alexandru S, Antoanela O, Florin C, Daniel D. THE PNF (PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION) STRETCHING TECHNIQUE-A BRIEF REVIEW. Ovidius University Annals, Series Physical Education & Sport/Science, Movement & Health. 2013 Jul 2;13.
3. Arcanjo FL, Martins JV, Moté P, Leporace G, de Oliveira DA, de Sousa CS, Saquetto MB, Gomes-Neto M. Proprioceptive neuromuscular facilitation training reduces pain and disability in individuals with chronic low back pain: A systematic review and meta-analysis. Complementary Therapies in Clinical Practice. 2022 Feb 1; 46:101505.
4. Abdali YA, Sherwani AA, Alsharif AA, Kariri AM, Khormi YB, Jobran M, Lughbi MM. Text neck syndrome prevalence and knowledge among the saudi population in Jazan, Kingdom of Saudi Arabia: A cross-sectional study. City. 2020; 207:53-8 .
5. Gallagher EJ, Bijur PE, Latimer C, Silver W. Reliability and validity of a visual analog scale for acute abdominal pain in the ED. The American journal of emergency medicine. 2002 Jul 1;20(4):287-90.
6. Buck M, Beckers D, Adler S. PNF in Practice. Fourth fully revised edition. Berlin: Springer publishers; 2014. Page No. 37, 38, 41.
7. Chu EC. Preventing the progression of text neck in a young man: A case report. Radiology Case Reports. 2022 Mar 1;17(3):978-82.
8. Westwater-Wood S, Adams N, Kerry R. The use of proprioceptive neuromuscular facilitation in physiotherapy practice.

Physical Therapy Reviews. 2010 Feb 1;15(1):23-8.
9. David D, Giannini C, Chiarelli F, Mohn A. Text neck syndrome in children and adolescents. International journal of environmental research and public health. 2021 Feb;18(4):1565.
10. Kamaraj N, Rajasekar VD, Rangasamy S. A study on prevalence of text neck syndrome among under-graduate students of a medical college in Puducherry. International Journal of Community Medicine and Public Health. 2022 Jul;9(7):2919-22.

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