

Effect of Inhibitive Distraction on Cervical Flexion in Asymptomatic Subjects

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Abstract

Aim and objective: The purpose of this study was to determine the immediate effects of manual therapy technique called inhibitive distraction (ID) on active range of motion (AROM) for cervical flexion in asymptomatic subjects. **Methodology:** 50 subjects (mean age 24.12 year) with decreased cervical flexion ROM (less than 50°) were randomly assigned to an experimental and a control group of 25 subjects each. We used the universal goniometer to measure pre and post intervention cervical flexion AROM in the sagittal plane within a single treatment session. Group A underwent ID and group B received placebo protocol. **Result:** Though both the groups improved significantly, group A-ID group result shows more significant in cervical flexion ROM improvement when compared with group B, the control group. **Conclusion:** Results concluded that ID can be effectively used to enhance the cervical flexion ROM even in asymptomatic subjects.

Keywords: Inhibitive distraction; Cervical flexion; Forward head posture; Neck dysfunction.

Introduction

Physical therapists place a diagnostic emphasis on identifying impairments that may be amenable to management with interventions within their scope of practice. Inhibitive occipital distraction technique is a combination of direct fascial technique and manual traction. It involves the use of digital compression for occipital extensors, in which occiput is distracted away from C1 by pulling it in a cephalward direction toward the therapist in second phase. This technique has been described within various manual medicine disciplines under various names such as cranial base release, sub-occipital release, and trigger point pressure release.[1,2]

Dvorák *et al* attributed cervical hypomobility to either a voluntary or

reflexogenic muscular restraint caused by pain or a purely mechanical restraint caused by degeneration of the joint surfaces and ligaments. Corresponding to said degenerative process, Cantu and Grodin described a fibrotic process in connective tissue, whereby it shrinks progressively, caused by arthrokinematic dysfunction, poor posture, overuse, habit patterns, or structural or movement imbalances. They further suggested that in many cases the surrounding musculature maintains a hypertonic recruitment pattern long after the inducing injury has healed, potentially immobilizing joints by the surrounding muscle hypertonicity.[3,4]

Various postural changes have been seen in individual in second decade of life, which involves forward head posture, musculoskeletal disorders like trigger points. Estimated data shows that 80-90% of the population suffered from forward head posture. It has been postulated that myofascial trigger points exist as band of high sensitivity in abnormally tense muscles. These do not cause motor nerve activity but are related to physiologically abnormal motor endplate function, with the release of excessive

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acetylcholine and localized contraction, which may lead to local inflammation, nociceptor stimulation and pain. This mechanism could account for localized increase in resting muscle tone.[5,6]

Myofascial trigger points (MTrP) in the cervical muscles constitute another potentially relevant muscle dysfunction leading to limited cervical spine mobility. These are defined as hyperirritable spots in skeletal muscle with a potential to give rise to characteristic referred pain, motor dysfunction, and autonomic phenomena. Motor aspects of MTrPs may include disturbed motor function, muscle weakness as a result of motor inhibition, and – most importantly in the context of this study – muscle stiffness and restricted range of motion. [7]

Zhongguo Yi Bao (2009) proposed that abnormal neck posture is associated with sympathetic symptom of degeneration which may include: headaches, abnormal functions of the eyes and the ears and psychological and mental disorders. An acceptable range of motion for flexion is 50 to 60 degrees. Cervical flexion restriction may result from forward head posture, taut cervical extensor, poor sleeping or sitting positions, watching T.V, working on a VDT unit where the head is flexed at an acute angle for extended periods of time, sleeping wrong on a couch or reading with too many pillows all can lead to the epidemic of restricted motion.[8]

Various researches have proposed that decreased cervical flexion ROM is associated with forward head posture. Abnormal posture also leads to major part of head, neck & shoulder pain including fibromyalgia, myofascial pain syndrome, temporomandibular joint dysfunction, muscle strain, disc herniations, arthritis, pinched nerves, instability and chronic fatigue syndromes.[8,9]

Paris *et al* (1999) described a technique called Inhibitive distraction technique (IDT) which originated from cranial osteopathy. In this technique therapist uses the fingers of both the hands to exert a sustained ventrocranial force on occiput just caudal to superior nuchal line.[2]

The effect of Inhibitive distraction technique involve inhibition of local and general posterior muscle tone, inactivation of suboccipital muscle trigger points, spasm of connective tissue between rectus capitis posterior minor muscle and the dura matter and gentle joint mobilization. These effects probably may reduce peripheral sensitization and indirectly reduce central sensitization also. This mobilization is also effective in activation of descending inhibitory pathway. Kristin Breim *et al* (2007) did not confirm immediate effects of ID on cervical flexion AROM & recommended for future research and clinical use of the technique.[10]

There is dearth of literature about a precise physical management by immediate effects of ID on range of motion. Therefore present study was design to find out the validity and application of inhibitive distraction, a myofascial technique & hence upgrading the rehabilitation protocol for subjects with restricted cervical flexion.

Methodology

Study design was experimental in nature.

Inclusion

Subjects both gender male and females of 20-27 years age group & Individuals with restricted cervical flexion less than 50° with Patients having forward head posture were included in this study.

Fig 1: Measurement of Cervical Flexion AROM (Starting Position)



Exclusion

Subjects with recent cervical spine surgery, traumatic injury to head & neck, Neurological dysfunction of cervical spine, Spondylarthrosis, rheumatoid arthritis, vertebral insufficiency were excluded from this study.

Instrumentation

Universal goniometer, Couch, Chair, stopwatch.

Procedure

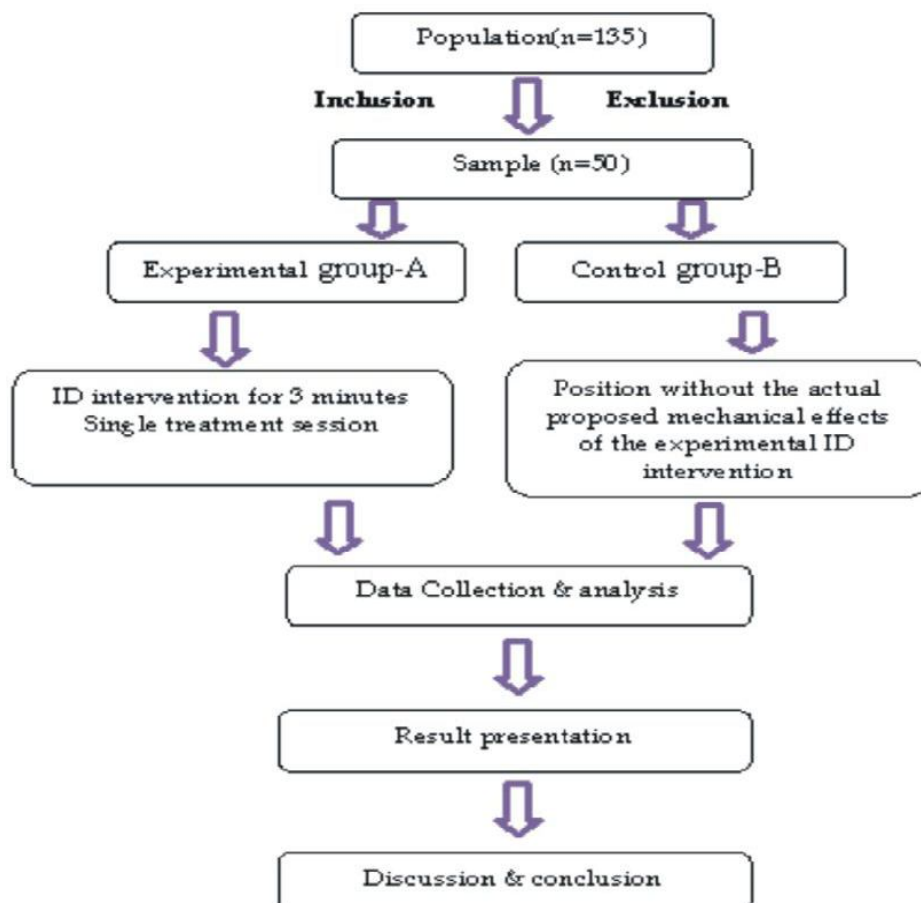
The 135 subjects were invited to participate in the study, out of which 50 asymptomatic subjects were selected as per inclusion and exclusion criteria. A detailed explanation of the procedure was given after which the subjects were signed the informed consent.

Group A and group B was assigned 25 subjects each between the age of 20-27 years. Cervical ROM was taken by universal goniometer and single intervention of ID technique was given to group A and sham (placebo) intervention was given to group B. again post intervention CROM was taken and comparison of post intervention was done.

Protocol

- For experimental group position of patient was Supine with head supported and eyes closed. Whereas Position of therapist was standing at the head end of patient. While hands resting on treatment table the pressure exerted was slow, maintained and then released slowly in upward & towards therapist by fingertips. The pressure applied was to long axis of muscle and tendon for 3

Flow Chart



minutes & then released slowly to achieve muscle inhibition during treatment. Single treatment session was given and reading was taken.[11]

- For control group position of patient was Supine with head supported and Position of therapist was standing at the head end of patient. Subjects will be resting their heads in the palms of the therapist for the same duration to mimic the treatment position as much as possible. In this way, these subjects received the effects of touch, warmth, and rest, without the actual proposed mechanical effects of the experimental ID intervention.[12,13]

Statistics analysis were performed using statistical package software (SPSS) version 17 & Microsoft excel 2010. Intra group and inter group analysis was done to analyze and compare the intervention scores. t-test was used for group analysis. Significance level was set at $p \leq 0.05$.

Result

Intra group analysis showed significant improvement in both the groups. Inter group analysis revealed significant improvement in inhibitive distraction group when compared with the control group which can be seen by the mean difference which was statistically

Data Analysis

Table 1: Comparison of M±SD between Post Treatment Values of Inhibitive Distraction Group (Group A) and Control Group (Group B)

Post treatment values	Mean ± St deviation	p value
Experimental group	50.15 ± 5.191	= 0.05
Control group	47.01 ± 3.070	

Fig 2: Intragroup Comparison of Mean and Standard Deviation for Pre Test and Post Test Readings for Group A and Group B

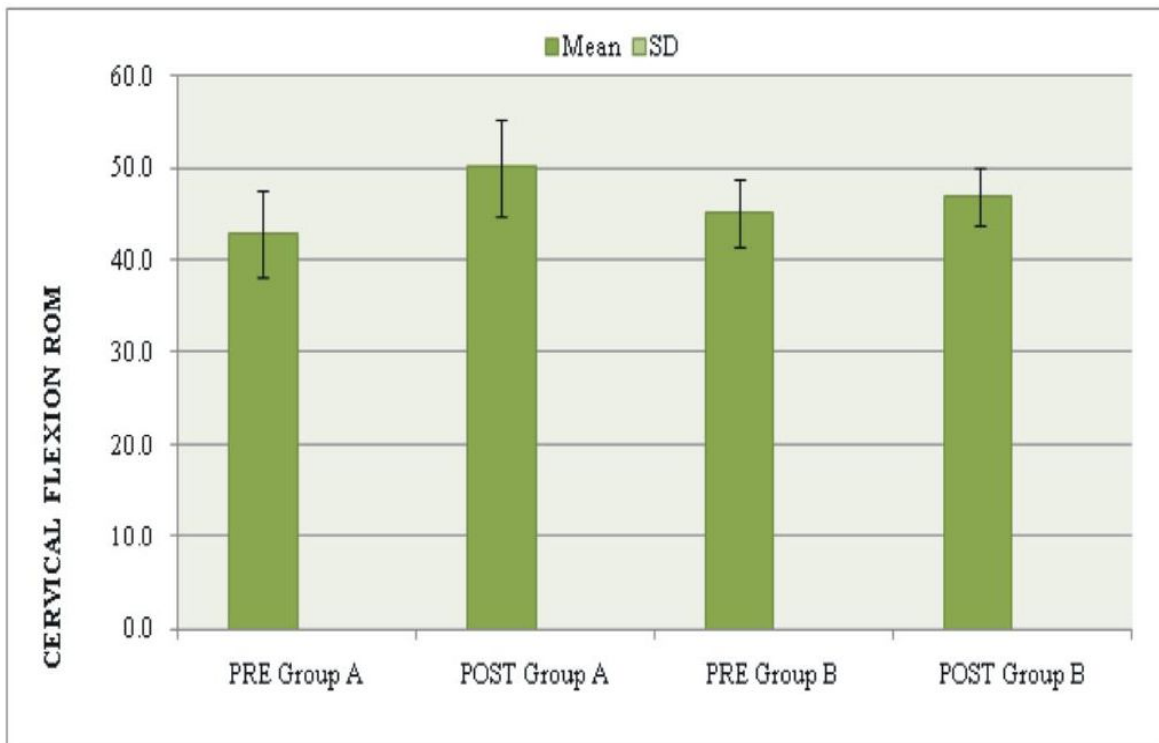
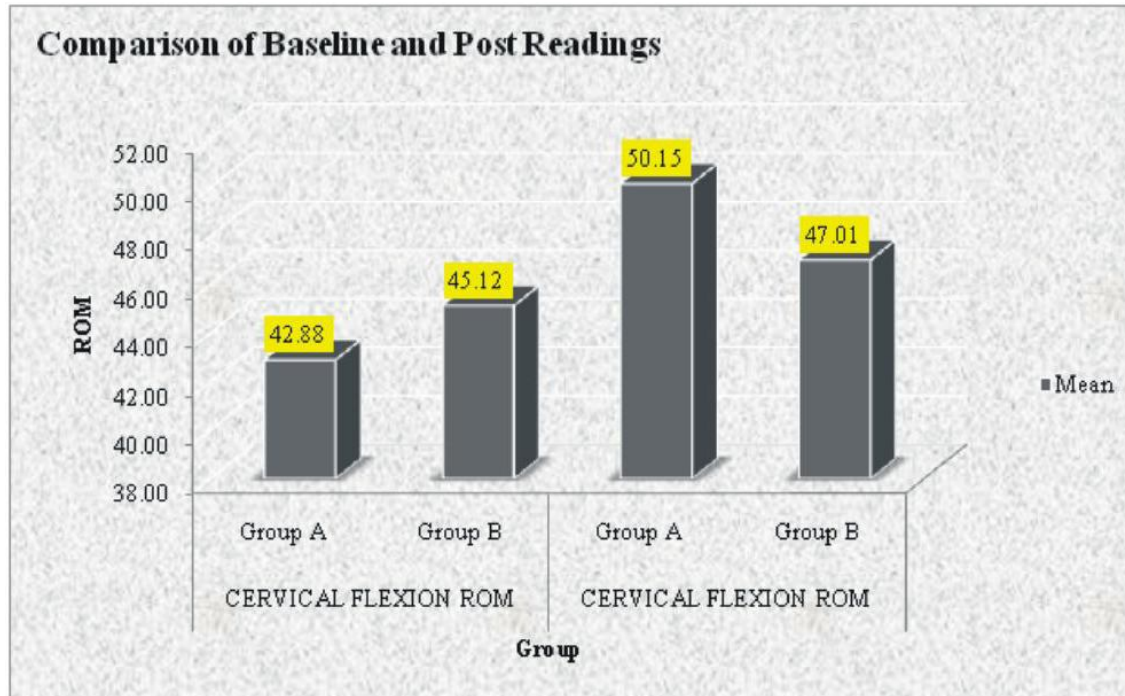


Fig3: Intergroup Comparison of M±SD between Post Treatment Values of Experimental Group (Group A) and Control Group (Group B)



significant.

Discussion

The results of the present study supported the effectiveness of ID in the field of rehabilitation. Both the groups were found to be significantly improved in cervical flexion however, group A (ID group) improved more significantly than group B (control group).

As inhibitive distraction technique involves slow and sustained stretching of posterior cervical structures such as suboccipital muscles, ligaments & capsules which leads to firing of GTO & inhibits tension in the muscle, allowing the parallel elastic component (sarcomere) of the muscle to remain relaxed & lengthen, hence increasing cervical flexion ROM in experimental group.[14]

Other factors also can be attributed to significant improvement in experimental group like inhibition of local and general posterior muscle tone, inactivation of suboccipital muscle. It has been postulated that ID also deactivates MTrPs which in turn

normalizes disturbed motor function, improve muscle strength and reduces muscle stiffness leading to increase range of motion.[7]

Paris *et al* proposed that decreased excitability of motor neurons and gentle joint mobilization, leading to relaxation of surrounding structures and hence influencing cervical flexion range.[2]

Cantu and Grodin described a fibrotic process in connective tissue, whereby it shrinks progressively, caused by arthrokinematic dysfunction, poor posture, overuse, habit patterns, or structural or movement imbalances. They further suggested that in many cases the surrounding musculature maintains a hypertonic recruitment pattern long after the inducing injury has healed, potentially immobilizing joints by the surrounding muscle hypertonicity.[4]

The placebo intervention may have been a confounding factor in that relaxation and touch may have had a positive effect on some subjects in the control group. The area of touch was large, which can result in raised temperature in the most superficial soft tissues.

Superficial heat increases the extensibility of collagen tissue, reduces muscle spasm, produces analgesia and hyperemia, and increases metabolism. However in the absence of a deforming force, heat will not alter collagen deformation during subsequent movement, and in any case the physiological effects would have been small and limited to the most superficial tissues.[15,16]

Conclusion

The study concluded that inhibitive distraction technique can significantly improve cervical flexion in asymptomatic subjects. Therefore inhibitive distraction technique should be employed while planning rehabilitation protocol for subjects having decreased cervical flexion range of motion which in turn will help in preventing the consequences like forward head posture, cervicogenic headache, mechanical cervical pain, in young population. Moreover ID technique can be used prior to any cervical manipulation for relaxation purpose.

Clinical Implications

The following study demonstrated the effectiveness of inhibitive distraction in increasing the flexion ROM in asymptomatic subjects. Therefore ID should be incorporated in the preventive rehabilitation program for management of consequences of decreased cervical flexion range.

Future Research and Limitation

- This inhibitive distraction technique can be compared with another technique which is effective in increasing cervical ROM.
- The study was done on a small sample size, and follow up was not conducted. So future research is necessary with a comparatively large sample size.

Conflict of Interest & Ethical Approval

There was no conflict of interest was reported among all authors. This research work was approved by ethical committee of HIPMS, HIHT University (UK) India.

References

1. World Health Organization (WHO). International Classification of Functioning, Disability and Health. Geneva, Switzerland: WHO; 2001.
2. Paris SV. Course Notes: Introduction to Spinal Evaluation and Manipulation. 2nd ed. St. Augustine, FL: Patris Press; 1991.
3. Dvorák J, Panjabi MM, Grob D, Novotny JE, Antinnes JA. Clinical validation of functional flexion/extension radiographs of the cervical spine. *Spine*. 1993; 18: 120-127.
4. Cantu RI, Grodin AJ. Myofascial Manipulation: Theory and Clinical Application. Gaithersburg, MD: Aspen Publishers Inc; 1992.
5. Simons DG, Travell JG, Simons LS. Travell and Simons' Myofascial Pain and Dysfunction: The Trigger Point Manual. Volume 1: Upper Half of Body. 2nd ed. Baltimore, MD: Williams & Wilkins; 1999.
6. Lucas KR, Polus BI, Rich PS. Latent myofascial trigger points: Their effect on muscle activation and movement efficiency. *J Bodywork Movement Ther*. 2004; 8: 160-166.
7. Fernández-de-las-Peñas C, Alonso-Blanco C, Cuadrado ML, Gerwin RD, Pareja JA. Trigger points in the suboccipital muscles and forward head posture in tension-type headache. *Headache*. 2006; 46: 454-460.
8. Zhongguo Yi Bao *et al*. The Relationship between the active cervical range of motion and changes in head and neck posture after continuous VDT work industrial health. 2009; 47: 183-188.
9. Linda Engh, Marie Fall, Marianne Hennig, *et al*. *Physiotherapy Theory and Practice*. 2003; 19(3): 175-18.
10. Kristín Briem, *et al*. Immediate Effects of Inhibitive Distraction on Active Range of

- Cervical Flexion in Patients with Neck Pain. *Journal of Manual & Manipulative Therapy*. 2007; 15(2): 82-92.
11. James W Youdas, James R Carey and Tom R Garrett. Reliability of Measurements of Cervical Spine Range of Motion— Comparison of Three Methods. *Physical Therapy*. 1991; 71(2).
 12. Hole DE, Cook JM, Bolton JE. Reliability and concurrent validity of two instruments for measuring cervical range of motion: effects of age and gender. *Manual Therapy*. 1995; 1(1): 36-42.
 13. Anderson AV, Boline P, Bronfort G, *et al*. *Journal of Manipulative and Physiological Therapeutics*. 1998; 21(8): 511-9.
 14. Anabela G. Silva *et al*. Head Posture and Neck Pain of Chronic Nontraumatic Origin: A Comparison Between Patients and Pain-Free Persons. *Arch Phys Med Rehabil*. 2009; 90: 669-74.
 15. Chuen-Ru Hou *et al*. Immediate Effects of Various Physical Therapeutic Modalities on Cervical Myofascial Pain and Trigger-Point Sensitivity. *Arch Phys Med Rehabil*. 2002; 83: 1406-1414.
 16. Erika Quintana *et al*. Immediate effect of suboccipital muscle inhibition technique in subjects with short hamstring syndrome. *J Manipulative Physiol Ther*. 2009; 32: 262-269.
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