

## Comparison of Kaltenborn Segmental Traction Versus Mechanical Cervical Traction for the Management of Cervical Spondylosis

Shoaib Waqas,<sup>1</sup> Muhammad Fiaz Akhtar,<sup>2</sup> Ijaz Ahmad Burq<sup>3</sup>, Tariq Shafi<sup>4</sup>

### Abstract

**Back ground:** Cervical spondylosis is the most common degenerative condition of the cervical spine affecting the intervertebral joints and discs. Mechanical stresses increase load which leads to formation of osteophytes as a result of the vertebral body's attempt to grow more bone for strengthening. Changes in intervertebral disks can cause spinal cord compression in advanced cases. There are many evidences found in the literature about non-invasive treatment for cervical spondylosis with the exception of manual therapy.

**Methodology:** Single blinded, randomized clinical trial was conducted at National Hospital & Medical Center DHA Lahore with a sample of 80 patients. After randomization, the subjects were distributed into two equal groups of 40 subjects. Group A was treated by applying kaltenborn segmental traction (KST), core stability exercises (CSE) and short wave diathermy (SWD), while Group B was treated with Mechanical cervical traction (MCT), core stability exercises (CSE) and short wave diathermy (SWD). The duration of treatment was 4 weeks with 3 sessions per week. All patients were assessed at the start of treatment and then by second and fourth week by using the neck disability index (NDI). Independent t test was used to see the comparative effect of KST and MCT in terms of functional ability with  $p \leq 0.05$  % (level of significance).

**Results:** The results illustrate that the measured mean score of NDI before treatment for KST group was 3.97 and for MCT group was 3.92. While mean score of NDI after treatment for KST group was 1.50 and for MCT group was 2.30. It was noted that there was a difference between mean scores for KST and MCT groups after treatment with better improvement in KST group (the lower the mean value was an indication of good functional ability on NDI scale). The measured "p" value of NDI was 0.000, which was an indication of significant changes proved as in mean scores.

**Conclusion:** This study concluded that kalten born segmental traction (KST) shows more satisfactory results than mechanical cervical traction (MCT) in subjects of cervical spondylosis for resuming their functional status in terms of NDI.

**Key words:** Cervical spondylosis, Kaltenborn segmental traction, Mechanical cervical traction, Neck disability index, Numeric pain rating scale.

1. Physiotherapy Lecturer at LMDC, Pakistan
2. Physiotherapist at National Hospital DHA, Lahore. Physiotherapy Department National Hospital, Lahore, Pakistan
3. Senior Physiotherapist General Hospital Lahore, Pakistan
4. Physiotherapist at Shalamar Hospital Lahore.

**Corresponding Author:** Dr. Shoaib Waqas, Physiotherapy Lecturer at LMDC, Pakistan, The University of Lahore, Pakistan  
Email: shoaibphysio@hotmail.com

Received 21-07-2016; Accepted 05-09-2017

### Introduction

Cervical spondylosis is the most common degenerative condition of the cervical spine affecting the intervertebral joints and discs. Mechanical stresses increase load which leads to formation of osteophytes as a result of the vertebral body's attempt to grow more bone for strengthening.

Changes in intervertebral disks can cause spinal cord compression in advanced cases<sup>(1)</sup>.

Symptoms of discomfort in arms, muscular spasm with neck stiffness and feelings of numbness in the hands, altered sensations and weakness are described as cervical radiculopathy<sup>(2)</sup>. Patients with symptoms appearing in both neck and upper extremity have presented greater limitations of functional activities compared to the patients with symptoms in neck only, some patients have also presented with scapular pain and headaches.

In younger subjects disc herniation cases are common, whereas in old age subjects, cervical spondylosis have been reported more. The neck discomfort occurrence increases with age. Generally, it is clear that at least one episode in life of neck discomfort is experienced by 45% of working individuals, one episode of arm pain by 23% of working men and neck pain by 51% of working men. To prevent from these insults, subjects education is very necessary and that was in progress in current studies<sup>(3)</sup>.

For the management of cervical spondylosis with radiculopathy, a variety of modalities (short wave diathermy, cryotherapy, ultrasound therapy and infrared radiations) and other interventions (traction, reflexology, cervical distraction collars, muscle setting exercises, range of motion exercises, hold relax, contract relax, stretching exercises and strengthening regime) in combination with medications can be used<sup>(4)</sup>.

Literature regarding cervical tractions are lacking for pain management and restoration of normal functions but for short-term pain management cervical tractions have been proved in the studies as secure and useful method in general<sup>(5)</sup>. For cervical radiculopathy, cervical traction is used frequently. However, its efficacy has been examined in only single clinical trial<sup>(6)</sup>.

The purpose of current study was to determine which traction technique is best for cervical spondylosis having radicular pains. By this the therapists would be able to lessen the subject's pain and improve their functional status more efficiently with

less time span.

## Methods

This is a randomized clinical trial, single blinded. Simple random sampling technique (random number table) was performed in Physiotherapy Department NH & MC DHA Lahore. A sample size of 80 patients was obtained. After randomization, the subjects were distributed into two equal groups of 40 subjects. A well informed consent was taken before any investigation and management. The subjects having age between 21-50 years from both genders with CS and radicular pains were enrolled and all other subjects having pain from any other cause were excluded. Group A was treated by applying kaltenborn segmental traction (KST), core stability exercises (CSE) and short wave diathermy (SWD), while Group B was treated with Mechanical cervical traction (MCT), core stability exercises (CSE) and short wave diathermy (SWD). The duration of treatment was 4 weeks with 3 sessions per week. All patients were assessed at the start of treatment and then by second and fourth week using the neck disability index (NDI)<sup>(7)</sup>. Demographics were collected by using pre constructed questionnaire.

SPSS. 20 version was used for analysis and interpretation of results. The data was normally distributed so, parametric test (Independent sample "t" test with extension of Levene's test), was conducted to see the relative effectiveness of both techniques (KST & MCT). P-value  $\leq 0.05$  was taken as reference value for significance.

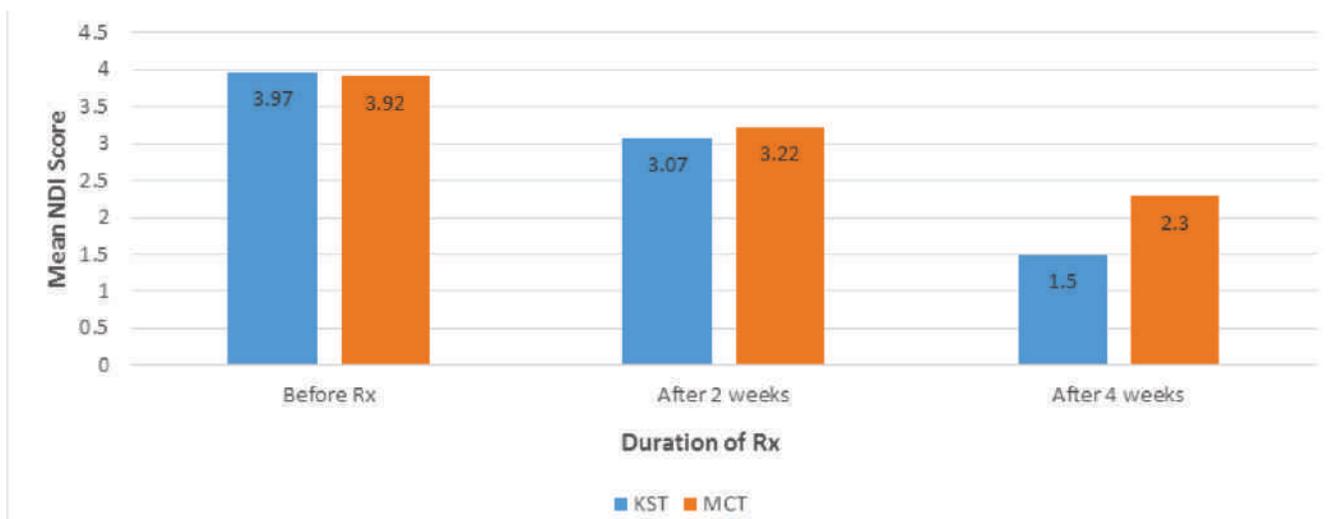
## Results

The researchers found that the mean value for age was  $48.19 \pm 5.16$  years and standard deviation was 9.9453. According to gender distribution of eighty subjects, Forty five (56%) were males and thirty five (44%) females. In group A, 24% females and 26% males while in group B 20% females and 30% males.

At the start of treatment, the mean value for disability on NDI and standard deviation for group A (KST) was 3.97 and 0.6697, whereas for group B (MCT) 3.92 and 0.7641 respectively. After the

**Table 1: Group Statistics**

	Groups of treatment	N	Mean	Std. Deviation	Std. Error Mean
NDI before treatment	Group A (KST)	40	3.97	.65974	.10431
	Group B (MCT)	40	3.92	.76418	.12083
NDI after 2 weeks	Group A (KST)	40	3.07	.26675	.04218
	Group B (MCT)	40	3.22	.42290	.06687
NDI after 4 weeks	Group A (KST)	40	1.50	.87706	.13868
	Group B (MCT)	40	2.30	1.01779	.16093



**Fig1: Neck Disability Index and Duration of Treatment**

**Table 2: Independent Sample “t” Test**

		Levene's Test for Equality		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% level of Confidence	
									Lower	Upper
NDI before Rx	Equal variances assumed	1.905	.171	.313	78	.755	.05000	.15963	-.26779	.36779
	Equal variances not assumed			.313	76.374	.755	.05000	.15963	-.26790	.36790
NDI after 2 weeks	Equal variances assumed	16.719	.000	-1.897	78	.061	-.15000	.07906	-.30739	.00739
	Equal variances not assumed			-1.897	65.792	.062	-.15000	.07906	-.30785	.00785
NDI after 4 weeks	Equal variances assumed	2.379	.127	-3.766	78	.000	-.80000	.21243	-1.22292	-.37708
	Equal variances not assumed			-3.766	76.334	.000	-.80000	.21243	-1.22307	-.37693

completion of treatment (at the end of 4th week) , the mean value for disability on NDI and standard deviation for group A (KST) was 1.56 and 0.9011, whereas for group B (MCT) 2.30 and 1.0177 respectively. The measured value of “t” score was (-3.766) and “p” value was (0.000) which showed a significant difference in both groups after the treatment. The calculated “p” value was 0.000 which was less than the reference value (0.05) that was an indication of significant improvement in functional abilities. On the basis of difference in mean scores for KST and MCT groups, it was further proven that KST is more effective treatment than MCT for restoration of normal functions in cervical-spondylosis subjects with radicular pain.

## Discussion

The researchers took all the subjects above 40 years till 60 because that is the age in which degenerative changes mostly occur<sup>(8)</sup>.

A universal plan for all neck discomfort subjects with and without radicular pain is a routine planning in Pakistani clinics, which is unsatisfactory to treat all these neck complaints. Specially, the subjects of cervical spondylosis who are suffering from deep pain and disability after having a prolapse. KST treatment protocols precisely focus on the pressure on the nerve roots and numerous studies have shown how MCT and KST can be helpful in reduction of symptoms produced due to cervical disc prolapse<sup>(9)</sup>.

The researcher used a study design randomized clinical trials (RCT) in the current study to see the comparative effectiveness of two types of tractions as in previous study<sup>(10)</sup>.

The current study proved that mechanical traction plays a vital role in decreasing neck pain, as in 2008, Graham et al conducted a study to assess the effectiveness of mechanical traction for neck diseases by using mechanical intermittent traction and placebo traction. The results of that study were significant for mechanical continuous traction and non-significance for placebo traction in sense of improvement of functions and reduction of pain

among cervical radiculopathy's patient<sup>(11)</sup>.

In current study, the researchers treated their subjects of cervical spondylosis with KST and MCT which proved that both techniques were effective in pain reduction and restoration of normal functional level but KST was more beneficial than MCT in comparative aspects and KST is a new emerging technique which was missing in literature.

Furthermore, it was also observed after subjective feedback that patients reported less soreness after KST treatment due to minor soft tissue contact in comparison to MCT, which was a key element for rate of recovery and comfort during and after treatment.

## Conclusion

This study concluded that kaltenborn segmental traction (KST) shows more satisfactory results than mechanical cervical traction (MCT) in subjects of cervical spondylosis for resuming their functional status in terms of NDI.

## References

1. Jiang L, Tan M, Yang F, Yi P, Tang X, Hao Q. Comparisons of Safety and Clinical Outcomes Between Multiple-level and Single-level Cervical Disk Replacement for Cervical Spondylosis: A Systematic Review and Meta-analysis. *Clin Spine Surg.* 2016;29(10):419-426.
2. Cheng C-H, Tsai L-C, Chung H-C, Hsu W-L, Wang S-F, Wang J-L, et al. Exercise training for non-operative and post-operative patient with cervical radiculopathy: a literature review. *J physical ther sci.* 2015;27(9):3011.
3. Ashina S, Bendtsen L, Lyngberg AC, Lipton RB, Hajiyeva N, Jensen R. Prevalence of neck pain in migraine and tension-type headache: A population study. *Cephalalgia.* 2015;35(3):211-9.
4. Lin Q, Zhou X, Wang X, Cao P, Tsai N, Yuan W. A comparison of anterior cervical discectomy and corpectomy in patients with multilevel cervical spondylotic myelopathy. *Eur Spine J.* 2012;21(3): 474-81.
5. Kroeling P, Gross A, Graham N, Burnie SJ, Szeto G, Goldsmith CH, et al. Electrotherapy for neck pain.

- Cochrane Database Syst Rev. 2013;8 : CD004251.  
DOI: 10.1002/14651858.CD004251.pub5
6. Landel R. Use of traction to treat cervicogenic dizziness: a case study. *Physiotherapy*. 2015;101: e818.
  7. Croft AC, Milam B, Meylor J, Manning R. Confirmatory Factor Analysis and Multiple Linear Regression of the Neck Disability Index: Assessment If Subscales Are Equally Relevant in Whiplash and Nonspecific Neck Pain. *J Chiropr Med*. 2016 Jun;15(2):87-94. PubMed PMID: 27330510. Pubmed Central PMCID: PMC 4913116. Epub 2016/06/23. eng.
  8. Graham N, Gross A, Goldsmith CH, Klaber Moffett J, Haines T, Burnie SJ, et al. Mechanical traction for neck pain with or without radiculopathy. *The Cochrane Library*. 2008;16(3): DOI: 10.1002/14651858.CD006408.pub2
  9. Bukhari SRI, Shakil-ur-Rehman S, Ahmad S, Naeem A. Comparison between effectiveness of mechanical and manual traction combined with mobilization and exercise therapy in patients with Cervical Radiculopathy. *Pak j med sci*. 2016; 32(1):31.
  10. APTA. 5. APTA Vision Sentence and Vision Statement for Physical Therapy 2020. 2016 [cited 2016 2nd December]. Available from: <http://www.apta.org/vision>.
  11. Khan K, Yasmeen S, Ishaque F, Imdad F, Lal W, Sheikh SA, et al. Effectiveness of manual traction and other physiotherapy treatment in the management of painful cervical radiculopathy. *inter j phy*. 2016; 3(3):286-90

<p>Conflict of Interest : None Funding Source: None</p>
---