

## ARTICLE

# Role of Myofascial Release Therapy on Pain and Lumbar Range of Motion in Mechanical Back Pain: An Exploratory Investigation of Desk Job Workers

Arun Balasubramaniam<sup>1</sup>, Velusamy Mohangandhi<sup>1</sup>, Arun Kumar C. Sambandamoorthy<sup>2</sup>

<sup>1</sup>K. G. College of Physiotherapy, K. G. Hospital and Postgraduate Medical Institute, Coimbatore, Tamil Nadu, India.

<sup>2</sup>Om Vinayaga Physiotherapy Clinic, Kanchepuram, Tamil Nadu, India.

Corresponding author: Professor Arun Balasubramaniam

Email: barunmpt@gmail.com

Published: 03 March 2014

Ibnosina J Med BS 2014;6(2):75-80

Received: 09 August 2013

Accepted: 21 December 2013

This article is available from: <http://www.ijmbs.org>

This is an Open Access article distributed under the terms of the Creative Commons Attribution 3.0 License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

## Abstract

**Background:** Low back pain is the most common cause of work related disability in persons aged less than 45 years. Workers who sit in front of the computer for more than 40 hours per week end up with low back pain. Bad positioning of the body parts in a single day doesn't make poor postures, whereas adaptation of the incorrect posture for a longer duration results in weak muscles and postural problems. Abnormal posture results in pain, disability and muscle weakness. Most of the management of low back pain focuses on the rehabilitation of the pain and very few studies focus on work station corrections. **Aim:** This study aims to find out the effect of work station modification with Myofascial release therapy on pain and lumbar flexion range of motion in mechanical low back pain in desk job workers. **Methods:** Forty subjects were included using simple random sampling method, subjects were chosen following an inclusion and exclusion criteria. Group A, underwent myofascial release therapy, whereas group B

underwent myofascial release therapy technique with work station modification. The outcome measures were pain and range of motion of lumbar spine, which measured using visual analogue scale and modified schober's method. Student 't' test was used to find out the difference between the groups. **Results:** This study showed that there was a significant difference between the group A & group B. **Conclusion:** The study concludes that the work station modification along with myofascial release therapy was very effective in improving range of motion, and reducing pain.

**Key words:** Myofascial release therapy, Desk job workers, Mechanical Low Back pain, Lumbar range of motion, Schober's method. Work station modification, Pain.

## Introduction

Low back pain (LBP) affects approximately two-thirds of adults at some point in their lives (1). It occurs at least once

in 85% of adults younger than 40 years. It affects men and women equally and the onset occurs more frequently at the age of 30-50 years (2). Sedentary workers often complain of back pain (3). It usually occurs due to sprains and strains in the back as an outcome of static or awkward posture. Patients with chronic LBP and disability for more than 3 months duration use more than 80% of all health care for back pain (3). LBP has become a major medical and socio-economic problem among working populations in industrialized countries. LBP can significantly impact an injured worker's quality of life and productivity, generating substantial costs related to medical service use, sick leave compensation, disability pension and replacement costs (4).

Use of computers in the work place leads to a set of peculiar characteristics of the work station, which require workers to stay in a static posture for long periods of time (5). They spend a minimum of 40 hours per week sitting in front of a computer screen. Poor posture develops and becomes a habit, which eventually leads to muscle strain and contribute to repetitive strain injury. Repeated wrong positioning, wrong adaptation of muscles leads to weak muscles and result in abnormal posture. Abnormal posture results in pain, disability and muscle weakness. Reducing pain or correcting the posture is the ultimate aim for a medical professional or physiotherapist, until the sitting position is corrected, the treatment fails, or these complains reoccur. Limited range of motion is a common symptom seen in mechanical low back pain. There is a temporary reduction of the joint mobility in the facet joints and it is often focus of treatment for mobilization and manipulation (6).

There is a strong clinical relationship between joint impairments and the trigger point, as defined by several authors (7,8). Muscle dysfunctions or facial contraction may result in reduction of mobility in spine. Myofascial release therapy produces improvement of painful, firm or overtired muscles by hastening the waste products removal and momentarily increasing the local blood supply. It is a combination of technique designed to relax, release, and stretch soft tissues. This augments local circulation, stimulates lymphatic system and increases the flexibility and range of motion of the stiff joint. It also helps to normalize the muscle tone, relaxing the muscles (9). Numerous treatment guidelines have been proposed regarding the evaluation, treatment, and management of LBP (2,3). We aimed to investigate the effect of work station modification with myofascial release therapy on pain and lumbar flexion range of motion in mechanical LBP in desk job workers.

## Subjects and Methods

The study was approved by our institutional ethical committee. Written informed consent was obtained from all participants. Forty subjects were selected by simple random sampling method as an exploratory study. Inclusion criteria were age of 28-35 years of either gender, work in desk job for more than 40 hours per day, a history of LBP for no more than one year duration, work in a cluster work station, not participating in any other research studies and who are not having undergone any rehabilitation techniques in the previous 90 days. We excluded subjects with neurological problems, cardiovascular symptoms, infections, or spinal abnormalities. The study was conducted over 6 months; individual subjects underwent 8 weeks duration. Follow up was made for 3 and 6 months. An ergonomic session was conducted prior to the selection of the study; the session included education of the participants on how to sit in the chair, stand, walk and the position of monitor, advises given on mini-break and mega-breaks. Subjects were divided into two equal groups. Group A included 20 subjects who underwent myofascial release therapy for duration of 20 minutes followed with moist heat application. Group B included 20 subjects who underwent myofascial release therapy for 20 minutes. In addition to the treatment session, a complete work site assessment was performed and a few modifications of the work station were done as per individual needs. Modifications included: proper height of the monitor, chair height, five point base of chair, sitting in one arm distance, low back support, foot resting on the ground and provision of adjustable desk for mouse and keypad. Figure 1A demonstrates the healthy sitting position. An educational program on Ergonomics and its importance in maintenance of Good posture was provided to the participating subjects. Subject's queries were cleared during the review sessions; frequent visits were made to check whether the participants were abiding by the principles. If they are in the wrong posture, advice was given to correct their posture. Myofascial release therapy includes focused stretch of the back muscles, wringing of the back muscles, arm pull, leg pull, and the gross stretch of the back muscles (Figure 1 B, 1C, 1D). Outcome measures were pain and range of motion of lumbar spine. Pain was measured using the visual analog scale, and the range of motion was measured using modified Schober's test. Student T test was used to assess the difference between the two groups. Repeated measures ANOVA was used to find out the difference between 3<sup>rd</sup> month and 6<sup>th</sup> month improvement.

**Table 1.** Demographic data expressed by age groups for both genders.

Demographic data	Age Groups (years)			
	28-29	30-31	32-33	34-35
Number of subjects	11	10	11	8
Female	2	1	3	3
Male	9	9	8	5

**Table 2.** Range of motions before and after therapy in both groups A and B.

Groups	Mean Pre-test	Mean Post-test	Mean Difference	S.D	Paired 't' test *	Unpaired 't' test**
Group A	42	46	8	0.681	3.94 (p<0.05%)	5.19 (p<0.05%)
Group B	45	73	23	0.503	12.5 (p<0.05%)	

\* Tabulated paired 't' value is 1.7291, \*\* Tabulated unpaired 't' value is 1.6859

**Table 3.** Measures of pain.

Group	Mean Pre test	Mean Post test	Mean Difference	S.D.	Paired 't' test*	Unpaired 't' test**
Group A	137	107	30	0.761	8.82 (p<0.05%)	4.54 (p<0.05%)
Group B	136	85	51	0.999	11.4 (p<0.05%)	

\* Tabulated paired 't' value is 1.7291; \*\* Tabulated unpaired 't' value is 1.6859

## Results

The demographic characteristics of the groups are given in table 1. Age group of the participants varied from 28 years to 35 years; about 28 % from both groups are from 28-29 years, 27% are from age group of 32-33 years, 25% from

30-31 years, and 20% are from 34-35 yrs. There were a total of 40 subjects; their mean age of 31.28 with Standard deviation of 2.28.

The paired 't' test analyses for the pre-test and post-test



(1A)

(1B)

Figure 1A. Illustration of the proper sitting position

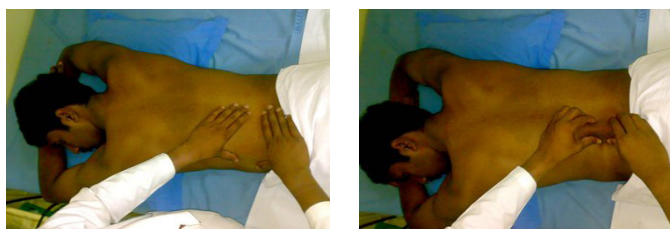
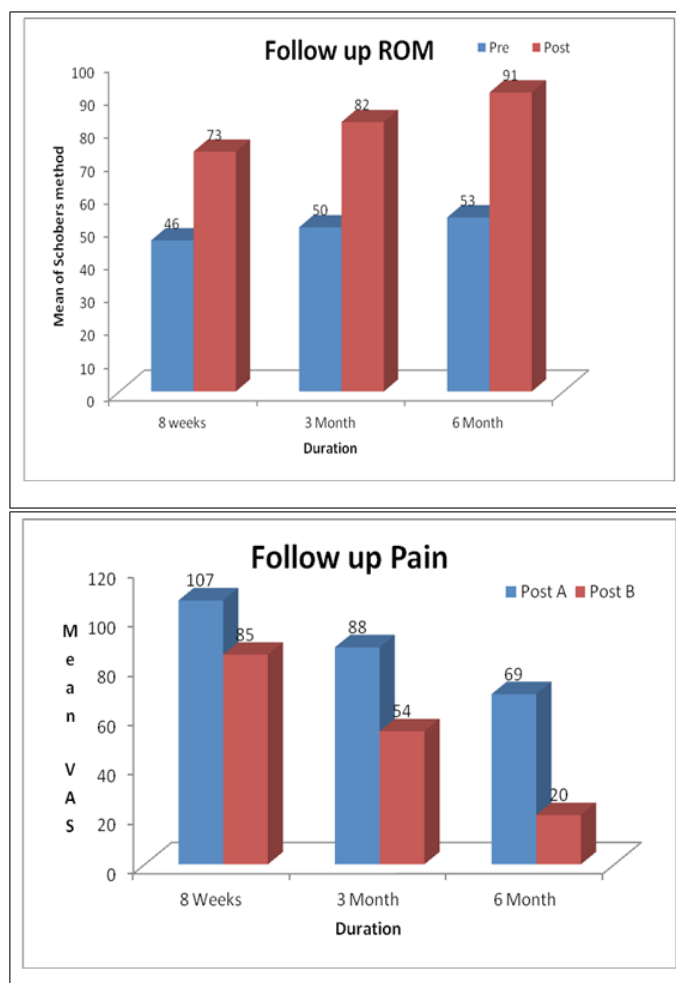


Figure 1B and 1C. Focused stretch for back muscle

variables for range of motion of lumbar spine for group A and group B are shown in table 2. Both groups showed significance differences in pre- and post-test variables. The paired 't' value for group A is 3.94 and the t value for group B is 12.5 and the unpaired 't' value is 5.19. On analysis the table 't' value at 0.05% level of significance is less than the calculated value, hence it disproves the null hypothesis. The paired 't' test analyses for the pre- test and post-test variable for pain for group A and group B were shown in table 3. Both groups showed a significant difference between the pre and post test variables. The paired 't' value for group A is 8.84, the t value for group B is 11.2, and the unpaired 't' value is 4.54. On analysis, the table 't' value of 0.05% level of significance is less than the calculated value, hence it disproves the null hypothesis.

The repeated measured ANOVA shown in figures 2a and 2b. The follow up of the subjects in the 3<sup>rd</sup> and 6<sup>th</sup> month for pain and range of motion shows that work station modification and the myofascial release therapy yields a better outcome than only with the myofascial release therapy alone.



**Figure 2.** ( a. upper) and ( b. lower) showing the range of motion of spine (upper) and pain (lower) and its follow up after 8 weeks, 3 and 6 months of therapies.

## Discussion

The purpose of the study was to compare the effect of work station modification and Myofascial release therapy on pain and lumbar flexion range of motion in mechanical LBP in desk job workers. Low back pain is one of the most common problems found in desktop job workers. Sitting more than 4 hours in poor posture (44% of computer users maintain poor posture) increases chance of developing back pain (10). Researchers show that working for more than 75% of work time in front of a computer results in low back pain. Apart from the poor posture, work pressure and infrequent rest time also predisposes to low back pain (11). Sitting in an office chair can cause more stress on the low back; this increases the pressure in the lower back, increasing pressure in the disks and the muscles which results in LBP. Pressure exerted while sitting is more than the pressure while standing. Sitting in slouched position produces strain

on spinal structures which results in pain<sup>13</sup>. Sitting on an unsuitable chair, improperly set up desk, and sitting at the wrong height can all contribute to LBP. Setting up a proper or individualized work station can reduce these symptoms. Postural back pain may occur as a result of cumulative trauma. Upon an acute injury, there is micro-trauma that promotes fibroblastic activity, forming new connective tissue fibers to reunite the wound as part of the post-inflammation fibroblastic phase (13). Local adhesions are formed as scar tissue forms (14). In addition, there is often a restrictive matrix that has spider-web like tentacles attached to surrounding structures that can alter and limit normal mobility (15). Myofascial release therapy can help in improving the mobility and dysfunctional state of soft tissues. Myofascial release therapy helps alter the scar tissue matrix (15,16). by the redistribution of internal fluids, breakdown of restrictive intermolecular cross-links, and elongation of collagenous tissue (17). It also helps in improving the vascular and lymphatic circulation (18). It helps in reducing the tone and pain which occurs due to deeper pathology. Office ergonomics or computer ergonomics can help minimize the risk of LBP. Providing proper education, advice, and training about work place posture is an integral part of minimizing the low back pain injury in computer professionals. Ergonomic office chairs help providing maximum back support to maintain good posture while sitting by adjusting the office chair to the proportions of the individual's body to improve comfort and reduce aggravating factors to the low back and neck while sitting (5). Sitting heights are adjusted based on anthropometric dimensions of the individual and work surface heights. Providing a physical match between the individual and work place should help attain postural awareness. Body movements at the work station are corrected in order to minimize awkward patterns and reduce stresses resulting from activities such as turning, twisting, over reaching and repetitive bending (19). The study disproves the null hypothesis and accepts the alternate hypothesis, in which the myofascial release therapy with work station modification helps reduce pain and improvement of range of motion. Thus the study concludes that myofascial release therapy with work station modification aids in reduction of pain and improvement of lumbar flexion range of motion when compared with myofascial release therapy alone (20). There are limitations to this study. Desk job workers only were selected, not the laptop or other users, the job profile, nutritional factor, sleep timings and the inter- and the intra-rater reliability were not assessed. Future studies can investigate the correlation between pain and the age groups. Female subjects in the study were less

in number.

Myofascial release therapy attempts to restore the abnormal alignment of the body, regain lost motion and reduces pain. It effectively breaks down the tissue resistance, erase tissue trauma and re-educates the functionality of the desired body positions (21). Direct tissue stretch applied during the myofascial release to the muscles, fascia, capsule, and ligaments provides a relief in long-standing hypomobility with pronounced fibrosis and stiffness (22).

## References

1. Kinkade S. Evaluation and treatment of acute low back pain. *Am Fam Physician* 2007;74 (8):1181-8
2. Atlas SJ, Chang Y, Kammann E, Keller RB, Deyo RA, Singer DE, Long-term disability and return to work among patients who have a herniated lumbar disc: the effect of disability compensation. *J Bone Joint Surg Am* 2000;81(1):4-15.
3. Waddell G, *The back pain revolution*, London, England, Churchill Livingstone. 1988
4. Morken T, Riise T, Moen B, Hauge SH, Holien S, Langedrag A, et al. Low back pain and widespread pain predict sickness absence among industrial workers. *BMC Musculoskelet Disord* 2003;4:21.
5. Charpe NA. Reducing back pain and increasing performance in software professionals. *International NGO J* 2009; 4(3):066-9.
6. Triano JJ. Biomechanics of spinal manipulative therapy. *Spine J* 2001;1:121-30.
7. Maitland G, Hengeveld E, Banks K, English K. *Maitland's Vertebral Manipulation*. 6th ed. London, UK: Butterworth-Heinemann, 2000.
8. Lewit K. *Manipulative Therapy in Rehabilitation of the Locomotors System*. 2nd ed. Oxford, UK: Butterworth-Heinemann, 1991.
9. Philadelphia Panel evidence-based clinical practice guidelines on selected rehabilitation interventions for low back pain. *Phys Ther*. 2001;81(10):1641-74.
10. Anema JR, Cuelenaere B, van der Beek AJ, Knol DL, de Vet HC, van Mechelen W. The effectiveness of ergonomic interventions on return-to-work after low back pain: a prospective two year cohort study in six countries on low back pain patients sick listed for 3-4 months. *Occup Environ Med*, 2004; 61(4):289-94.
11. Morken T, Riise T, Moen B, Bergum O, Hauge SH, Holien S, et al. Frequent musculoskeletal symptoms and reduced health related quality of life among industrial workers. *Occup Med (Lond)* 2002;52(2):91-8.



12. Burton AK, Balagué F, Cardon G, Eriksen HR, Henrotin Y, Lahad A, et al. How to prevent low back pain. *Best Pract Res Clin Rheumatol* 2005;19(4):541-55.
13. Furlan AD, Imamura M, Dryden T, Irvin E. Massage for low-back pain. *Cochrane Database Syst Rev*. 2008; (4):CD001929.
14. Gatty CM, Turner M, Buitendorp DJ, Batman H. The effectiveness of back pain and injury prevention programs in the workplace. *Work* 2003; 20(3):257-66.
15. Gebhardt WA. Effectiveness of training to prevent job-related back pain: a meta-analysis. *Br J Clin Psych*, 1994; 33( Pt 4):571-4.
16. Glomsrød B, Lønn JH, Soukup MG, Bø K, Larsen S. "Active back school", prophylactic management for low back pain: Three-year follow-up of a randomized controlled trial. *J Rehabil Med*. 2001; 33(1):26-30.
17. Harrison DD, Harrison SO, Croft AC, Harrison DE, Troyanovich SJ. Sitting biomechanics, part 1: review of the literature. *J Manipulative Physiol Ther*. 1999; 22(9):594-609.
18. Harrison DD, Harrison SO, Croft AC, Harrison DE, Troyanovich SJ. Sitting biomechanics, part II: optimal car driver's seat and optimal driver's spinal model. Sitting biomechanics, part II: optimal car driver's seat and optimal driver's spinal model. *J Manipulative Physiol Ther*. 2000; 23(1): 37-47.
19. Hammer WI, Pfefer MT. Treatment of a case of subacute lumbar compartmental syndrome using Graston technique. *J Manipulative Physiol Ther* 2005; 28(3):199-204.
20. Waddell G. 1987 Volvo award in clinical sciences. A new clinical model for the treatment of low-back pain. *Spine (Phila Pa 1976)*1987; 12(7):632-44.
21. Stuart WT. Fascia, collagen, and the fascial network. [Internet document; available from <http://www.healus-now.com>; accessed 31.12.2013].
22. Langevin HM, Sherman KJ. Pathophysiological model for chronic low back pain integrating connective tissue and nervous system mechanisms. *Med Hypotheses* 2007;68(1):74-80.