

Effectiveness of Occupational Therapy in Low Back Pain among Computer Operators

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ABSTRACT

To see the effect of occupational therapy program in low back pain among computer operators. It includes re-educating the sitting posture, strengthening activity program. To identify whether males or females are more prone to low back pain. Around 30 subjects (15 males & 15 female) with mechanical low back pain among computer operators were evaluated and strengthen activity program & postural corrections was administered for 2 month. The Oswestry low back pain questionnaire was used before and after and program to find the effects. Statistical analysis was used to derive analysis. The study perceived that all the clients got relieved back pain. The result shows that low back pain score also decline and their functional activities and occupational task has become easier as compared before. This gives clear concept that most of the computer operators having low back pain which gives better results or prognosis if treated with occupational therapy program. And also it gives clear concept that males and females are equally affected by low back pain among computer operators.

Keywords

Lowback pain, Occupational Therapy, operator

INTRODUCTION:

No one likes to have backache but it comes like an unwelcome visitor at the most inappropriate times without much warning. It remains for a long time, and once the friendship is developed it visit frequently. The International Association for the study of pain defines pain as "unpleasant sensory and emotional experience associated with actual or potential tissue damage. Pain is a complex set of action and reactions modified by intellect, emotion and many other factors.

In 1992, The American occupational Therapy Association published its definitive document in the area of Practice (Jacob's et al. 1992). "According to this document any activity that contributes of the goals and services of a society, whether paid or unpaid is considered a work activity". The concept of work is fundamental to our profession. The definition of work has been varied over the extent of our history but has primarily been broadly defined to view crafts and as work done for goals such as intensive productivity and personal fulfillment rather than for financial remuneration. In the 1950s work was redefined as employment for remuneration and crafts were seen unrelated to the vocational demands of the contemporary world. Work is one of the most important social roles a person fulfils in a life time. Indian Back Pain Association reported that in 1992-1993 there were at least 81 million certified days of incapacity reported due to back pain. According to 1990 survey, the 39.3% who were

working either full or part time earned 35% less than their able bodied co-workers.

As low back pain was found to be common problems affecting all status of population. For more pathologic changes showed that sedentary work appeared to have stronger relationship than heavy work. KELSEY et al 1992 suggest that jobs that are primarily sedentary increases the risk of low back pain. Secretaries and computer operators frequently complain of upper or lower back pain due to maintained sedentary postures.

Today professional level office worker spend about 70% of their time sitting in their offices, usually for 45 minutes at a stretch. Data entry workers spend nearly 100% of their working time sitting. The percentage of time spent in a seated position continues to use as computer advances permit office workers to file, retrieve files, pick up their mail & some times even attend meetings without leaving their seats. This increasingly sedation work style leads to budget breaking occupational health costs & work absenteeism associated with a low back pain.

Aim & Objectives

- The aim of the study is to determine the effectiveness of occupational therapy management of low back pain among computer operators.
- To identify whether males or females are more prone to low back pain.

REVIEWS OF LITERATURE

FRITZ. JM, et.al., (2001)

Conducted an experimental study on 67 patients with acute, work related low back pain comparison of modified Oswestry low back questionnaire and the Quebec back pain disability scale. The results suggest that modified low back questionnaire showed higher level of test-retest reliability and responsiveness compared with Quebec back pain disability scale.

HOLN.I., et. al., (2003)

Conducted a reliability study on measuring self reported functional status and pain in 42 patients with chronic low back pain by postural questionnaire – a reliability study. The results that the Oswestry Disability Index (ODI) was highly reliable than general functional score.

DAVID M. IETRYS., et. al., (2007)

Conducted randomized study on work time activity programs on 72 computer operators. This randomized control trial assessed adherence pain and satisfaction after 4 weeks at work time activities. Out comes included satisfaction survey of visual analogue pain scale, Oswestry disability index, The VAS & ODI were analyzed together work time activities were help full to reducing discomfort in the low back pain.

DEUSCLIFE (1996)

Conducted a randomized study on isolated lumbar strengthening rehabilitation of chronic low back ache in 25 year old female computer operators suffered from 7 month history of debilitating low back pain. The out comes of the study shows that 38% increase in average lumbar sagittal plane, range of motion and decrease the pain.

METHODOLOGY:

Study Setting:

I conducted the study in CSC COMPUTER CENTER in Komarapalayam the subjects were taken related to continuous working with computer operators.

Study design:

Pretest Vs post test comparative experimental study design.

Study Sampling:

A total of 30 subjects with low back pain among computer operators (15 males & 15 females) were selected by a purposive sampling method after consideration to inclusion and exclusion criteria.

Inclusion criteria.

- With mechanical back pain
- Of Age 20 – 45 years
- with pain duration of more than 1 month
- both males & females
- Computer professionals having deformed posture due to musculoskeletal strain.

Exclusion criteria.

- of age below 20 & above 45 yrs
- With pain duration of less than 1 month
- With any physical disability
- With other neuro muscular conditions
- With vertebral disc prolapse
- With renal dysfunction.

Materials

- Floor – Smooth and non slippery
- Therapy ball
- A large firm exercise mat

PARAMETER

To assess subject pain, which has affected the ability to manage in every day life “OSWESTRY DISABILITY QUESTIONNAIRE” as illustrated on.

Scoring:

- The questionnaire was scored for 10 items.
- Pain intensity
 - Personal care
 - Lifting
 - Walking
 - Sitting

- Standing
- Sleeping
- sex life
- Social life
- traveling

Procedure:

A total of 30 subjects 15 males & 15 females were involved in this study who were suitable for the inclusion criteria. After the informed consent was obtained, they were divided in to two groups for the study as Group A and Group B with 15 males in A group & 15 females in B group by purposive sampling method.

Pre data were collected before giving treatment with the help of revised Oswestry low back pain disability index. Then Individualized occupational therapy programmes for the patient was charted out & the subjects are taught to understand, manage & protect low back pain by using proper body mechanics to sitting posture & some strengthening activities . Those are strictly followed by the patient for two months.

Simultaneously ergonomic advice regarding chair and table designs, adjustability, and monitor height & posture correction was given. After completed the treatment sessions post data were collected from each patient.

RELATED LITERATURE

Definition

Low pack pain is a disabling problem manifesting it self as pain in the back and some times leg.

Epidemiology:

The estimated yearly prevalence of low back pain ranges for 15-20% in U.S.A.

Men & women as equally affected but woman more often report low back symptoms after the age of 60 yrs. Community services indicate that the incidence of back pain is higher in females than in males.

Industrial surveys demonstrate the reverse, the incidence of low back pain in the middle year of life and declines in old age when degenerative changes of the spine are universal.

Work related risk factors for low back pain

The new emerging strategy in occupational therapy is the role in industry based on ergonomic principles; work is one of the important social roles a person fulfills in a life time. Work provides economic security, intellectual or physical challenge & friendship helps to promote self satisfaction, helps in self definition and estimating self work.

Working environment also include the involvement in occupations that require repetitive lifting, especially in forward bending & twisting positions, particularly when lifting requirements exceed the workers. Physical capacity exposure to vibration caused by motor vehicle or industrial machinery. work classified in to sedentary work light work, heavy work & very heavy work.

Sedentary work related to low back pain

Many studies suggest that are primarily sedentary increase the risk for low back pain. Intra discal pressure is higher in sitting position than when standing or lying down an association with sedentary occupation is biologically plausible. Interpretation of studies concerned with sedentary occupation is difficult. In cross sectional studies persons who already have back pain may have changed to sedentary jobs. Persons with primarily sedentary jobs may find that prolong sitting aggravates the back pain and may seek job that allow more movements.

Other risk factors seen on low back pain are poor posture. The side of the spine has a gentle S shaped curve. This stands gives good posture to the body. If the curvature becomes abnormal the persons starts assuming wrong posture resulting in low back pain.

Management

ROLE OF OCCUPATIONAL THERAPY

The occupational therapist teaches the principles of body mechanics related to static & dynamic postures as well as transition patterns. To facilitate learning occupational therapist applies the biomechanical principals to commonly perform task & shows the patient how to integrate the principles in to every day tasks. Therapeutic activities , and simulated activities of daily living are selected for practice.

Methods of Re educating the sitting posture

- The patient was asked to sit / stool a posture wedge on his hands with the palms upper most. So that he can feel his ischial tuberosities.
- Next he was asked to slouch and notice what happens to his “sitting bones” (they move forwards)
- he was asked to over arch his back (his sitting bones moves back wards) and asked to stop when he feels his bones directly on the palms of his hand. This usually places the lumbar spine in a “natural” optimum position. Then the patient was asked to feel the weight of his trunk going down through these bones.
- If the patients back collapse at this point, the therapist places a firm supportive hand over the patient. Sacrum and release the support only when he finds it was not needed. Weight should also be borne by the feet.
- The patient was asked to release his shoulders down and back wards not to brace them back wards. To assist, the therapist can guide the movements of the scapula by placing one hand on the shoulder and other under the inferior angle of the scapula, giving gently resistance to it tracking downwards and medially.
- For thoracic extension, the therapist places one hand over the sternum and one over the mid thoracic spine, gently raising the chest anteriorly, notice the change in head posture already.
- Finally correction of head posture the therapist places one hand under the chin and one hand under the occiput, guiding the hand in upward and backward direction. The patient is asked to feel his neck lengthening. If he has marked forwards head posture only a few degree correction in one session was advisable. The therapist should hold this corrected position until one feels that he patients

has stopped pulling his head forwards and then gradually release his support.

ERGONOMIC STEPS TO SAFE AND COMFORTABLE COMPUTER USE

Joint comfort zones when sitting for work.

Spinal & pelvis	: 110 – 130 degrees
Lumbar spine	: Retain some natural lordosis
Thoracic spine	: A slight kyphosis
Head & Neck	: Erect & close to the centre of gravity.
visual angle	: 10- 30 degrees below horizontal
Shoulders	: Relaxed in line with the trunk
Elbows	: 90 – 100 degrees
Wrist	: straight with wrists extended up to 20 Degrees
Knees	: 60 – 120 degrees
Feet	: Flat on the floor or on foot rest

WORK STATION DESIGN GUIDELINES

1. Chair

- Back rest fits curve of lower back
- Seat inclines forward slightly to transfer pressure from spine to thighs. And feet
- Cushion curves downward at front to ease pressure on thighs.

2. The Monitor :

Should be adjustable for height and viewing distance usually the screen should be adjustable from 40-75 cm from the operator.

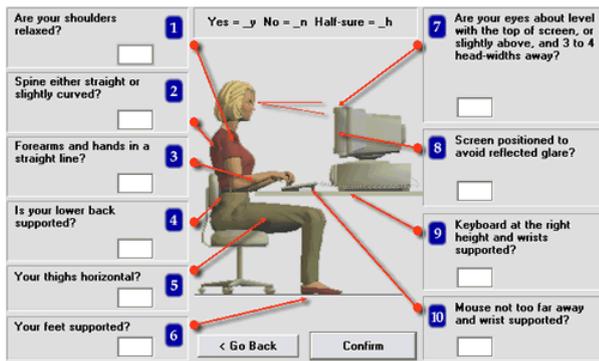
3. The keyboard :

Should be located directly in front of the operator unless only one hand is being used for data entry, in which case it should be shifted to the appropriate side

4. Mouse :

It located just to the side of the key board and slightly away from the body than the key board.

5. Wrist rest, foot rest & Document Holders should be provided upon request



Back school program

It is important in managing low back pain. The primary reason why the school was produced was important to educate the patient to be able to manage his or her back problems i.e., to allow self care. Based on current knowledge, a program was developed that would help the patient to live well in spite of back pain and understand how to prevent recurrence or aggravation by working and behaving correctly as possible.

Industrial back school

The aim is to reduce the incidence and severity of work related back injuries. It can be achieved by.

1. Providing and introduction, it is suitable explanation given to the administrative & supervisory personal.
2. Both management and workers should participate in the educational back program.
3. It is very important in the case of each worker to aim for an early return to work.

This can be achieved by slide presentation, video tape presentation computer based educational program etc.

Maintaining a positive attitude and planning a realistic goal while encouraging the patient to take responsibility for his or her own rehabilitation are the ingredients to be a successful recovery.

STRENGTHENING ACTIVITIES FOR LOW BACK PAIN

- Extension Activities, which stretch tissues along the front of the spine
 Strengthen the back muscles, and may decrease pain caused by a herniated disc. These are generally a good choice for people whose back pain is eased by standing and walking.
 - Press – up back Activities
 - Prone “swimming” activities
- Flexion activities, which strengthen stomach and other muscles, and stretch the muscle and ligaments in the back. These are generally a good choice for people whose back pain is eased by sitting down.
 - Knee – to-chest activities
 - Curl – ups
- Additional strengthening and stretching activities
 - Prone buttocks squeeze
 - Pelvic tilts
 - Bridging
 - Hamstring stretch
 - Hip flexor stretch
 - Wall sit

Regular activities to restore the strength of your back and a gradual return to everyday activities are important for their full recovery. This should be performed 10 to 30 minutes a day one to three times a day during early recovery. This guide can help you better understand the activity program, supervised by therapist and orthopaedic surgeon.

Initial Program



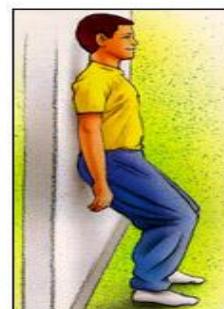
Ankle Pumps - Lie on your back. Move ankles up and down. Repeat 10 times.



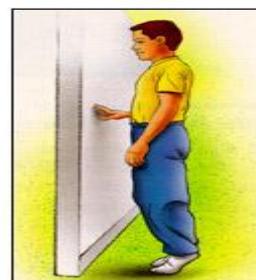
Heel Slides - Lie on your back. Slowly bend and straighten knee. Repeat 10 times.



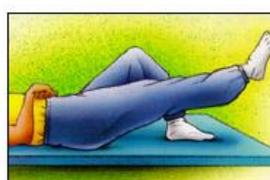
Abdominal Contraction - Lie on your back with knees bent and hands resting below ribs. Tighten abdominal muscles to squeeze ribs down toward back. Be sure not to hold breath. Hold 5 seconds. Relax. Repeat 10 times.



Wall Squats - Stand with back leaning against wall. Walk feet 12 inches in front of body. Keep abdominal muscles tight while slowly bending both knees 45 degrees. Hold 5 seconds. Slowly return to upright position. Repeat 10 times.



Heel Raises - Stand with weight even on both feet. Slowly raise heels up and down. Repeat 10 times.



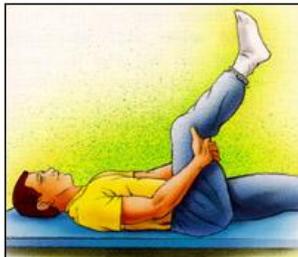
Straight Leg Raises - Lie on your back with one leg straight and one knee bent. Tighten abdominal muscles to stabilize low back. Slowly lift leg straight up about 6 to 12 inches and hold

1 to 5 seconds. Lower leg slowly. Repeat 10 times.

Intermediate Program

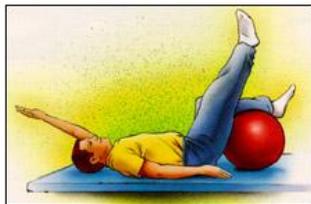


Single Knee to Chest Stretch - Lie on your back with both knees bent. Hold thigh behind knee and bring one knee up to chest. Hold 20 seconds. Relax. Repeat 5 times on each side.



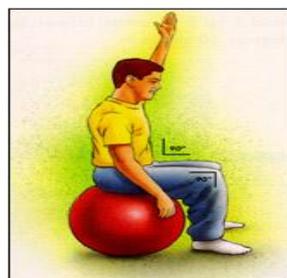
Hamstring Stretch - Lie on your back with legs bent. Hold one thigh behind knee. Slowly straighten knee until a stretch is felt in back of thigh. Hold 20 seconds. Relax. Repeat 5 times on each side.

Lumbar Stabilization With Swiss Ball - Abdominal muscles must remain contracted during each exercise. See "Abdominal Contraction" exercise from initial exercise program. Perform each exercise for 60 seconds. The further the ball is from your body, the harder the exercise.



Lie on your back with knees bent and calves resting on ball.

1. Slowly raise arm over head and lower arm, alternating right and left sides.
2. Slowly straighten one knee and relax, alternating right and left sides.
3. Slowly straighten one knee and raise opposite arm over head. Alternate opposite arms and legs.
4. Slowly "walk" ball forward and backward with legs.



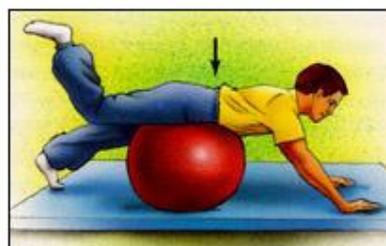
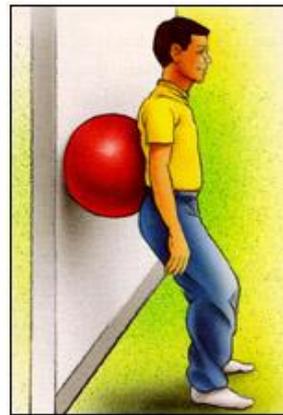
Sitting on ball with hips and knees bent 90 degrees and feet resting on floor.

1. Slowly raise arm over head and lower arm, alternating right and left sides.
2. Slowly raise and lower heel, alternating right and left sides.
3. Slowly raise one heel and raise opposite arm over head. Alternate opposite arm and heel.
4. Marching: Slowly raise one foot 2 inches from floor, alternating right

and left sides.

Standing with ball between your low back and wall.

1. Slowly bend knees 45 to 90 degrees. Hold 5 seconds. Straighten knees.
2. Slowly bend knees 45 to 90 degrees while raising both arms over head.



Lie on your stomach over ball.

1. Slowly raise alternate arms over head.
 2. Slowly raise alternate legs 2 to 4 inches off of floor.
 3. Combine 1 and 2, alternating opposite arms and legs.
 4. Bend one knee. Slowly lift this leg up, alternating right and left legs.
- Be careful not to arch your low back!**

Advanced Program



Hip Flexor Stretch

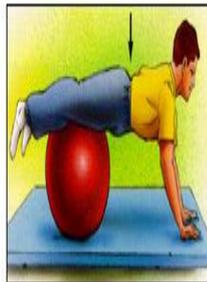
- Lie on your back near edge of bed, holding knees to chest. Slowly lower one leg down, keeping knee bent, until a stretch is felt across top of the hip/thigh. Hold 20 seconds. Relax. Repeat 5 times on each side.



Piriformis Stretch - Lie on back with both knees bent. Cross one leg on top of the other. Pull opposite knee to chest until a stretch is felt in the buttock/hip area. Hold 20 seconds. Relax. Repeat 5 times each side.

Lumbar Stabilization With Swiss Ball

Lie on stomach over ball.
 1. "Walk" hands out in front of ball until ball is under legs. Reverse to starting position.
 2. "Walk" hands out in front of ball until ball is under legs and slowly raise alternating arms over head.
 3. "Walk" hands out in front of ball and slowly perform push-ups.



15.	36	20	38	22
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DATA ANALYSIS AND INTERPRETATION

Table – II

Comparison level of low back pain between pre test and post test in Males:-

S.No.	Test	Pain Disability			Paired 't' value
		Mean	MD	SD	
1	Pretest	35-73	14.8	4.887	11.72
2	Post test	20-93			

Table II and Graph I shows that there is a highly significant difference in low back pain between pre and post test in Males.

Table – III

Comparison of level of Low back pain between pre test and post test in Females

S.No.	Test	Pain Disability			Paired + value
		Mean	MD	SD	
1	Pretest	34-66	13.6	7.02	7.501
2	Post test	21-06			

Table III and Graph II shows that there is highly significant difference in low back pain between pre and post test in females.

Table – IV

Comparison of pain disability between male & female in Post test

S.no	Sex	Test	Disability			't' Value
			Mean	MD	S.D	
1.	Male	Post test	20.93	0.13	4.86	0.07
2.	Female	Post test	21.06			

Table IV & Graph III shows that there is no significant difference between male post test & female post test score.

Table - V

Comparison of pain disability between male & female in pre test

S.no	Sex	Test	Disability			't' Value
			Mean	MD	S.D	

DATA PRESENTATION

TABLE - I

Male		Female		
Pre test	Post test	Pre test	Post test	
1.	32	24	44	24
2.	38	20	38	22
3.	36	22	30	14
4.	36	18	36	20
5.	42	20	32	14
6.	38	11	15	16
7.	46	26	38	22
8.	34	20	26	22
9.	26	14	50	22
10.	28	16	44	28
11.	38	20	34	30
12.	32	16	30	14
13.	40	16	26	22
14.	34	30	28	24

1.	Male	Pre test	35.73	1.07	6.358	0.458
2.	Female	Pre test	34.66			

Table V and Graph IV shows that there is no significant difference in low back pain between males and females in the pre test group.

DISCUSSION

This study aims at finding the effectiveness of occupational therapy for low back pain among computer operators.

Most of the Data entry workers are suffered by low back pain. These level of the pain disability were measured by modified Oswestry disability questionnaire with reliable a valid scale to measure the level of pain disability among computer operators occupational therapy program was given to reduce pain among the data entry workers. The selected samples received therapy program in daily for 2 month.

This intervention includes stretching and strengthening activities, teaching the proper body mechanics and posture corrections by ergonomic advices.

This intervention was supported by GALPER.J (2006) and BARRECA (2003) In these studies they suggested that occupational therapy program helps to reduced the low back pain among computer operators 't' test and paired 't' test have been calculated for the obtained results. The 't' test indicates that unanimity of both the Male and Female group in the pretest values and post test values.

There was a significant difference between pre and post test values of Male and Female group. Male group "t" value 11.72 is higher than table

There was a significant difference between pre and post test values of Male and Female group. Male group "t" value 11.72 is higher than table value 1.645. Female group 't' value is 7.501 is higher than the table value 1.645. So both males and females group shown significantly high reduction of pain disability. Hence alternative hypothesis 1 is proved..

Males&females are equally affected by low back pain among computer operators

This findings are supported by FRIBEG and HIRSCH(2006) that there was both male & females are equally affected by low back pain.

Male group t value is 11.72. Female group t value is 7.501, This indicates that there is no significant difference in Male & Female group. Hence alternative hypothesis 2 is proved.

CONCLUSION

From this study it is concluded that there is significant reduction in low back pain among computer operators through

occupational therapy management. Occupational therapy program includes Body mechanics, work time strengthening activities, Ergonomic changes for postural alignment. Both males females are equally affected by low back pain among computer operators

LIMITATION

- Study was done on a small sample size
- Study was done on confined age group of 20 to 45 yrs.
- Study was done for shorter duration
- Study was assessed by only one assessment tool.

RECOMMENDATION

- Study can be done on larger sample size
- Study can be measured by other assessment tools
- Study can be done for longer duration
- Study can be done on different age group

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