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EFFICACY OF MUSCLE ENERGY AND MYOFASCIAL RELEASE TECHNIQUES IN CORRECTING ANTERIOR PELVIC TILT IN ASYMPTOMATIC SUBJECTS WITH LOWER CROSS SYNDROME

Yadav P* Arora M.** Raghuveer R.***

INTRODUCTION
Anterior tilt of the innominate is essentially the product of the hypertonicity of the lumbar extensors or hip flexors and contractures of the rectus femoris, and also due to the tightness of the fascia of the flexor muscles of the hip joint. Therefore it is important to correct the anterior pelvic tilt for a proper biomechanical alignment.

Lower crossed syndrome is characterized by overactive/shortened gastrosoleus, hamstrings, hip flexors (iliopsoas), adductors, TFL, piriformis and lumbar spinal erectors due to improper conditioning or a shortened physiology from prolonged sitting and inactivity, creating a reciprocal inhibition and resultant weakness to the gluteal and abdominal muscles. Such an imbalance promotes a forward pelvic tilt with slight flexion at the hips with the resultant hyperlordosis of the lumbar spine, creating a swayback posture.

jamming of the posterior elements of the spine and the common mechanical low back pain. Specific postural changes seen in Lower Cross Syndrome include anterior pelvic tilt, increased lumbar lordosis, lateral lumbar shift, lateral leg rotation, and knee hyperextension. Muscle Energy Technique (MET) is a manual technique that involves precise contraction of a subject’s muscle, and is claimed to increase muscle extensibility and joint motion.

Muscle energy techniques can be used to lengthen a shortened, contractured or spastic muscle; to strengthen a physiologically weakened muscle or group of muscles; to reduce localized edema, to relieve passive congestion, and to mobilize an articulation with restricted mobility.

As stated by Barnes, the fascia is a tough connective tissue which spreads throughout the body and surrounds every muscle. The myofascial release

Aims and Objectives: To find out whether the two techniques (MET and MFR) are effective and if either the two techniques are effective, which is better in correcting anterior pelvic tilt in asymptomatic subjects with lower cross syndrome in comparison to moist hot pack.

Methodology: 30 girls were selected who fulfilled the criteria of lower cross syndrome. Proper assessment of erector spinae and iliopsoas muscle tightness is done. Anterior pelvic tilt was measured using the inclinometer and a base to determine the angle formed by the horizontal plane and a line drawn between the ASIS and PSIS.

Results: All the three types of treatment (hot pack, MET and MFR) influenced standing pelvic tilt angle but MET shows better result in improving anterior pelvic tilt angle in asymptomatic subjects with lower cross syndrome.

Conclusion: After analysis, the result shows significant improvement in standing pelvic tilt angle in all the three groups however on comparison MET showed better results than MFR and control group.
technique can be used to release the restricted or pathological fascial structures.6

Correction of lower cross syndrome is done by restoring the normal length and tonicity of tight muscles while increasing the tonicity and strength of weak muscles.7 Due to various treatment options, there is a need to quantify the effects of these strategies and also compare these strategies to find out the effective treatment to correct anterior pelvic tilt in asymptomatic subjects with Lower Cross Syndrome. So, in this study, Muscle Energy Technique and Myofascial Release of erector spinae and iliopsoas muscle is considered for correcting the anterior pelvic tilt in subjects with lower cross syndrome.

METHODS

30 girls were selected who fulfilled the criteria of lower cross syndrome. Proper assessment of erector spinae and iliopsoas muscle tightness is done. Anterior pelvic tilt was measured using the inclinometer and a base to determine the angle formed by the horizontal plane and a line drawn between the ASIS and PSIS. 30 subjects were randomly assigned to control and experimental group. After recording the pre-treatment values for the dependent variable, the treatment was assigned according to group allocation.

Group A (n=10) - Moist hot pack.
Group B (n=10) - Moist hot pack and MET of erector spinae and iliopsoas muscle.
Group C (n=10) - Moist hot pack and MFR of erector spinae and iliopsoas muscle.

RESULTS

The results were analyzed using the paired t-test and ANOVA test. All the three types of treatment (hot pack, MET and MFR) influenced standing pelvic tilt angle but the difference in means also shows that group B (MET) is better than group A (control) and group C (MFR) in improving anterior pelvic tilt in asymptomatic subjects with lower cross syndrome.

DISCUSSION

This can be attribute to the work of Leon Chaitow who wrote in his book muscle energy technique that there is a subsequent reduction in tone of the agonist muscle after isometric contraction. This occurs due to stretch receptors called Golgi tendon organs that are located in the tendon of the agonist muscle. These receptors react to overstretching of the muscle by inhibiting further muscle contraction. This is naturally a protective reaction, preventing rupture and has a lengthening effect due to the sudden relaxation of the entire muscle under stretch. This stops the discharge of the efferent motor neuron’s impulse and therefore prevents further contraction, the muscle tone decreases, which in turn results in the agonist relaxing and lengthening.7

According to Karel Lewit (1999), MET is Post Isometric Relaxation. The term post isometric relaxation refers to the effect of the subsequent reduction in tone experienced by a muscle, or group of muscles, after brief periods during which an isometric contraction has been performed.8 The scientific documentation of the MFR approach appears to be limited. Experimental evidence does not currently exist to support the claims of clinical effectiveness for myofascial release techniques. There are no reliability studies on MFR tests for fascial looseness/tightness, and no studies that demonstrate that manual force applied through the skin can stretch fascias.9

If muscle imbalances occur, the pelvis is more frequently tilted anteriorly than posteriorly, and normal standing pelvic tilt is generally considered to be between eight and eleven degrees of inclination between a line from the ASIS to PSIS in reference to the horizontal.10

According to Kendall et al. (2005), anterior pelvic tilt can be the result of a combination of weak
anterior abdominal muscles, tight hip flexors (especially iliopsoas), tight low back musculature, and weak hip extensor muscles. The hip flexor muscle group has also received considerable attention regarding their influence on pelvic inclination. Pelvic inclination is typically determined using the anterior superior iliac spine (ASIS) and posterior superior iliac spine (PSIS) of the ilium as marker placement.

Although the same anatomical landmarks are used, a variety of techniques have been utilized by researchers to determine pelvic inclination, including computerized systems, radiographs, goniometers and meter sticks with trigimetric calculations. Researchers have more commonly used an inclinometer to directly determine the angle formed from the line between the anterior superior iliac spine and the posterior superior iliac spine and the horizontal plane. The inclinometer consists of a caliper with two arms which are placed over the subject’s ASIS and PSIS, and the angle of pelvic tilt is then read from the gauge as the inclination of the PSIS relative to the ASIS in the horizontal plane. The results from the present study also showed reduction in the SPT angle within the control group (group A), which were found to be less significant than the experimental group. However, it can be theorized that the reduction achieved could be due to the beneficial effects of moist heat pack. In this study it was found that hot pack itself was sufficient to improve anterior pelvic tilt. Minton J. (1993) gave the physiological basis by suggesting that heat augments range of motion because of its physiological functions of increasing collagen extensibility and increasing blood flow. Further adding to it, as tissue temperature increases, the biomechanical characteristics of collagen changes to increase the viscous flow of collagen fibers. Subsequently, connective tissue extensibility increases, thus range of motion may also increase. Tomaszewski D et al (1992) supported this physiology by stating that superficial heat causes an increase in extensibility of soft tissue and decrease muscle spasm.

When a muscle on one side of a joint contracts, the muscle on the opposite side should be inhibited for passive lengthening. This leads to change in the tone of muscles by the process known as reciprocal inhibition. In the present study the shortened agonist were erector spinae and iliopsoas group. The lengthening of these myofascial units would have produced an effect on reduction of anterior pelvic tilt and hence correction of the pelvis.

The similar findings were also explained by Hanten W.P and Chandler S.D (1994) who suggested significant gains in straight leg raise angle after applying myofascial release technique for non disabled subjects as compared with the control group. However on contrary they found contract relax technique to be more effective than myofascial release. MET may enhance motor recruitment and stability by using isotonic (eccentric) contraction to improve motor recruitment for pelvic and hip muscle weakness and atrophy.

The increased blood flow and superficial rise in temperature creates a feeling of warmth and relaxation and may produce a positive attitude towards stretching. Kauranen K (1999) also
supported the current study by stating that hot pack can be used to increase the extensibility of the collagen tissues.18

REFERENCES:
Introduction - Work related musculoskeletal disorders have been described as one of the main health problems among health care workers. Musculoskeletal disorders among nursing staff, has been a major problem around the world, although there is limited information on its prevalence and risk factors in India.

Aim of the study - To assess the prevalence of musculoskeletal complaints among nurses and to investigate the relation between these complaints and various work-related and personal variables.

Methodology - A questionnaire survey study was conducted among 223 nurses from different civil hospitals. A self-administered questionnaire including Standardized Nordic Musculoskeletal Questionnaire was used to collect data regarding personal and occupational factors. Reliability of questionnaire, using a test-retest methodology, was found 0.84 by Cronbach’s Alpha statistics.

Results - Seventy one (33%) nurses reported that they had experienced work-related musculoskeletal problems. Respondents reported the highest prevalence rates for WRMSDs in the lower back (59.2%), neck (31.0%), lower leg (25.4%) and wrist/hands (18.3%) was calculated. The respondents rated ‘prolong standing’ as the job factor most problematic in terms of tasks that may lead to work related injury.

Conclusion - The current study concluded that low back pain is highly prevalent among nurses and the results indicate that an association exists between the MSDs and age. As age increases nurses reported chronic pain. Also, significant association was found between total years of experience in profession and work-related MSDs. The main route to prevention of musculoskeletal problems among nurses is likely to lie in improved ergonomics in their work place.

Keywords: Musculoskeletal disorders; Back pain; Personal factors; Prolong standing

INTRODUCTION

Work related musculoskeletal disorders (WRMSDs) are non-traumatic disorders of the soft tissues of the musculoskeletal system that can be caused or aggravated by work activities such as repetitive forceful motions, awkward postures. These disorders are considered to be work related when the work environment and the performance of work contribute to causing these disorders. Work related musculoskeletal disorders have been described as one of the main health problems among health care workers. Work in health care units has been shown to be associated with complaints relating to the musculoskeletal system. Musculoskeletal disorders comprise significant occupational injuries and disability within the nursing profession. Risk factors are known to include workplace activities such as manual handling, heavy lifting, strenuous tasks and work environment. Nursing work is physically demanding, requiring heavy lifting, bending, twisting and other awkward postures that are implicated in musculoskeletal disorders. The number of hour spent on repeated activities at work is associated with prevalence of back pain. Nurses working in various departments have different rate of musculoskeletal disorders.

Several epidemiological studies have considered the relation between exposure to physical loads at work and musculoskeletal disorders. However, there are limited data on the effects of the duration of exposure to factors of physical load. Long exposure seems to increase the risk of some
disorders of the neck and upper limbs.\textsuperscript{5} Musculoskeletal symptoms, of which low back pain is a common health condition in working populations. Considering the life time prevalence of 60\%-85\%, low back pain will eventually affect almost everyone.\textsuperscript{6} It has been suggested that individual factors are possible risk factors. Age, gender, money problems and number of preschool children are included as individual factors. Biological changes related to the aging process, for example degenerative changes of muscles, tendons, ligaments and joints are suggested to contribute to the pathogenesis of musculoskeletal disorders. Secondly, the increasing numbers of years in service during which aging workers are exposed to harmful work demands may be associated with an increasing risk of disorders. The disorders may arise as a consequence of many years of accumulated workload. Thirdly, a chronic overload for the elderly worker caused by a disruption of the balance between physical workload and physical work capacity. Increasing age may increase the susceptibility of tissues to physical loads.\textsuperscript{7}

**METHODOLOGY**

In the present study descriptive survey method of investigation was done. Sample for the present study included 223 registered both male and female nurses working in different hospitals. Subjects were being selected with the help of convenience sampling technique from civil hospitals situated in Panipat, Rohtak, Sonepat, and Karnal. Sample was also taken from the different primary health centers like Meham, Sampla, Samalkha etc. We included both male and female nurses, age between 22-44 yrs, with minimum two years of clinical experience registered with INC. Exclusion criteria was Post Menopausal women, nurses on leave due to (Pregnancy, maternity, child care & sickness absence) and any trauma/fracture case. First of all permission of the concerned hospital administration had been taken. All nurses who were in age group 22-44 years were selected and exclusion criteria was introduced and final sample was made for analysis. An explanation of the procedure of the study was given. Subjects were made comfortable by telling them about the purpose of the research. They would also told that their responses will be kept confidential and will only be used for research purpose.

**RESULTS**

The 223 respondents included 219 females and 4 males of mean age 33.48 years (range, 22-44 years). Out of 223, 220 nurses were right handed and three nurses were found left handed. The questionnaire answers indicated that the respondents had average 10.51 years of experience. Nurses spent on average 8.73 hours per day in direct patient care. Seventy one (33\%) nurses reported that they had experienced work-related musculoskeletal problems or discomfort at some time in their occupational lives. 12 (5.4\%) nurses reported pain within last one year and 59 (26.5\%) complained before one year. Younger nurses had more musculoskeletal problem from one year than old nurses. As age increases nurses reported chronic pain. There was found a highly significant of age with musculoskeletal disorders (\(p, 0.001\)).

![Graph – Showing the number of respondents reported the body part(s) affected.](image)

Highest percentage of musculoskeletal problem was found in medicine department, but there was no statistically significant association between MSDs and department. Mean/average total years of experience of nurses who reported MSDs is 14.82\% than those who did not report (8.49\%). Statistically highly (\(p, 0.001\)) significant association was found between total years of experience in profession and work-related MSDs. P value of working hours with MSDs was 0.99 and statistically no significant was found. 12 nurses got relief with clinical experience and 59 (83.1\%) nurses had no impact of clinical experience on MSDs.

Respondents reported the highest prevalence rates for WRMSDs in the lower back (59.2\%), neck (31.0\%), lower leg (25.4\%) and wrist/hands (18.3\%) was
calculated. The respondents rated ‘prolong standing’ as the job factor most problematic in terms of tasks that may lead to work related injury. The respondents who had experienced a WRMSD indicated that working in forward bent position (59.2%), working when physically fatigued (54.9%), working long in same posture (49.3%), working in uncomfortable position (38.0%) and performing repetitive task (15.5%) were the activities that most often exacerbated their symptoms during job timings. Sixty two (87.3%) of the respondents with WRMSDs had visited a physician for the problem. The respondents who had suffered reported they used rest (63.4%), medical (83.1%), physiotherapy treatment (52.1%), surgical (2.8%) and personal knowledge of postural adaptation due to experience (26.8%) to treat the problem.

**DISCUSSION**

The prevalence of musculoskeletal complaints at any of the body sites during our study was 31.8% (life time, 26.5% & 12 month, 5.4% prevalence), which is lower than previous studies conducted in China (70%), Turkey (69%), Japan (85.5%), Belgium (66.8%), Taiwan (91.6%), South-west Nigeria (84.4%). Life time prevalence varied from 16.9% at age below 25 years to 39.4% at age 36-40 years in present study (A.K. Burton et al, 1997). The major finding of our study suggest that there is relationship between the WRMSDs to the age and duration of employment.

The prevalence of LBP (59.2%) was the highest in the body regions followed by neck (31.0%) and lower leg (25.4%). This low back pain finding was higher than some other studies.(Shoko Ando et al, 2000) found prevalence of LBP (54.7%), but neck symptoms (31.3%) were similar to our study. (Tezel, 2005) reported prevalence of LBP and neck symptoms 41% and 25% respectively among Turkish nurses. There were also higher rates of LBP in some other studies.(Kondo, 2003) found LBP the most commonly reported MSD with a prevalence of 82.6% followed by shoulder (61.1%), neck (36.8%), upper back (29.1%) and knee (23.5%). Whether we found prevalence of upper back (14.1%) and knee (14.1%). Other authors have revealed various rates of LBP in nurses: (Josephine,1996) 36%, (Chao-Kang Feng,2007) 66%, (Derek, 2006) 71.3%, (Smith, 2004) 56% and (Julia Smedley, 1995) 60%.The prevalence of reported neck, shoulder and back musculoskeletal disorder cases among United States registered nurses was 20%, 17% and 29% respectively. Shoulder prevalence rate was 15.5% in our study. Direct comparisons between those studies are difficult as different populations were examined. Also there is no evidenced data available in India to which we can compare our results.

Mean age of nurses in our study was 33.17 years. This mean age corresponds with other findings in literature (Kondo et al, 2003). Younger nurses had more musculoskeletal complaints within one year than old nurses. This pointed out that younger nurses are more at risk probably because of inexperience in patient handling. As age increased nurses reported chronic pain. Which indicates that older age was found to be a significant risk factor for chronic pain. This finding is consistent with findings by (Anna Ozguler, 2000), he also found positive co-relation between the age and chronic pain. (Monica Lagerstrom, 1995) concluded medical or a geriatric ward and age were interacting factors for severe neck symptoms. (Chao-Kang Feng, 2007) also found age to be associated with an increased risk of only chronic pain. It might suggest the existence of a degenerative process.

According to the literature the work-related activities that most commonly lead to injury in health professionals are lifting heavy equipment and patients, transferring patient, maintaining the same posture for a long period and repeated movements. In the present study, prolong standing, working in forward bent position and working when physically fatigued were the most emergent work-related risk factors. (Chao-Kang Feng, 2007) observed three risk factors including manual transfer of patient and perceived physical exertion which were consistently associated with different measures of LBP. For nursing personnel, work tasks requiring forward-bending positions were related to MSD. Physical demands directly influenced the tissues and caused physiological disturbances and MSD. Perceived physical exertion can be seen as an effect on physical demands and be on the causal pathway between work, physiological disturbances and disorders. However, the physical demands are perceived as exerting for some but not for others.
In the study sample, there was significant association between musculoskeletal symptoms and duration of employment. This agrees with a questionnaire survey study investigated by (Josephine A Engles, 1996). They showed specific positive association of arm or neck complaints with total years of experience, but no association with back and leg complaints.

(Josephine, 1996) studied the working hours as a variable and concluded that complaints about the back and legs were found to be positively associated with the number of hours worked a week. But, (Shoko Ando et al, 2000) found no association of working hours with musculoskeletal complaints. The present study favor this result that working hours have no impact on WRMSDs. either it is six hours, eight hours or thirteen hours duty, it doesn’t matter. Again matter is work schedules characteristics, nursing staff and work load during working time.

CONCLUSION
Prevalence rate of musculoskeletal disorders among India was lower than the other countries. Major finding of this study was that an association exists between the MSDs and age. More problems were found between the age group 36-40. No association was found with working hours. In the study sample, there was significant association between musculoskeletal symptoms and duration of employment. 31.8% Indian nurses reported WRMSDs at some body site in their occupational lives with the low back being injured most often. Working in prolong standing, forward bent position and working when physically fatigued were the most perceived job risk factors for WRMSDs.

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INTRODUCTION

With 1 million new cases in the world each year, breast cancer is the commonest malignancy in women and comprises 18% of all female cancers. In India, global breast cancer incidence increased from 641,000 (95% confidence intervals 610,000—750,000) cases in 1980 to 1,643,000 (1,421,000—1,782,000) cases in 2010 (an annual rate of increase of 3.1%)2.

Breast cancer is the most common cancer of adult females all over the world and after lung cancer; it is the second leading cause of cancer death. The causative factors include age, genetics, family history, diet, alcohol, obesity, lifestyle, physical inactivity, as well as endocrine factors (both endogenous and exogenous).4

Most women with breast cancer may undergo surgery in order to remove a breast tumor which can include breast-conserving surgery and mastectomy. Lymph node biopsy and an axillary (armpit) lymph node dissection is done if lymph nodes are also involved in cancerous growth. Adjuvant therapy in the form of Radiation, Chemotherapy, Targeted therapy, and Hormone therapy is used to kill any cancer cells that may have been left behind post-surgery. But these adjuvant therapies do have some side effects which could be short term or long term. Short term side effects may include firmer breast tissue, shrinking of breast tissue, swelling of the breast area, small red marks on your skin, darker skin. While long term side effects may include long lasting change in appearance as short term side effects, physical impairments, cough or breathlessness due to lung fibrosis. Physical impairments includes impairments of upper extremity range of motion (ROM) and strength, upper extremity and/or breast lymphedema, pain, fatigue, loss of sensation, and reduction in levels of physical activity and health-related quality of life (QOL).7

ABSTRACT

Objective: To provide information and recommendations of management of lymphedema in breast cancer patients.
Options: Compression garments, pneumatic compression pumps, massage and physical therapies, other physical therapy modalities.
Outcomes: Symptom control, quality of life
Recommendations: Lymphedema can be assessed and diagnosed by measurements of both arms through circumferential measurements at 4 points. A difference of more than 2.0 cm at any of the 4 measurement points may indicates the presence of the lymphedema but only after its differential diagnosis is ruled out. Practitioners should encourage long-term and consistent use of compression garments and pneumatic compression which provides additional benefit over compression garments alone. Various exercises and the use of various therapeutic modalities requires further evaluation in randomized trials. Still more researches on rehabilitation programs for breast cancer patients needs to be encouraged, particularly in light of the early rehabilitation of breast cancer in order to reduce the risk of complications after surgery.
Key words: Lymphedema, Activities of Daily Living (ADL’s), Rehabilitation

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The majority of cancer patients encounter a multiplicity of physical and psychological difficulties after finishing or in between cancer treatment. They suffer from fatigue, dizziness, insomnia, lymphedema, discomfort of incision site and other physical symptoms like shoulder pain (from 12 to 51%), for reduction of the shoulder ROM (from 2 to 51%), and for muscle strength (from 17 to 33%) due to which major difficulties occurs in performing their ADL’s independently. All these features may influence the patients’ quality of life, which could be influenced in turn by psychological factors, such as body image and mood disturbance.

Out of the physical impairments, “lymphedema” is major issue which maximally effect the quality of life of breast cancer sufferers. Lymphedema in women treated for breast cancer is an accumulation of protein-rich fluid in the arm that occurs when axillary lymphatic drainage from the arm is interrupted because of axillary lymph node dissection or axillary radiation, or both. It could cause pain, swelling of the arm, tightness and heaviness in the arm and recurrent skin infections. Lymphedema could be of 3 stages: Stage I presents with pitting and is considered reversible; some women with this stage have no increased arm girth or heaviness and no signs of pitting edema. As the edema progresses, it becomes brawny, fibrotic, non-pitting and irreversible known as Stage II. In advanced lymphedema i.e. Stage III, which rarely occurs following breast cancer treatments, cartilaginous hardening occurs, with papillomatous outgrowths and hyperkeratosis of the skin.

Rehabilitation is the process of restoration of skills by a person who had an illness or injury to regain maximum self-sufficiency and function in a normal or as near normal manner as possible (Webster’s New World Medical Dictionary, 2003). Rehabilitation may play a role as one approach in maintaining and improving the quality of life of such cancer patients. Without rehabilitation these impairments and difficulties may lead to functional limitations, disabilities, and mental issues which show the importance of early rehabilitation.

Approaches to cancer patient rehabilitation include both psychosocial and physical aspects which are based on understanding the patient’s physical, psychological and social aspects. Thus, a multidisciplinary team care is required including psychologists, nurses, and rehabilitation specialists such as physical therapists and occupational therapists for the rehabilitation of cancer patients. In this guideline, we provide an evidence-based approach to the management of this difficult problem.

**RECOMMENDATIONS:**

**A. Measurements:**
There are many methods mentioned in literature to measure lymphedema which includes absolute increase in volume or percentage increase in volume: determined by water displacement, circumferential measurements and patient symptoms. But circumferential measurements are widely used because tape measures are readily available and easy to perform clinically while volumetric measurement is logistically difficult. Tewari et al (2008) and Taylor et al (2006) supported circumferential method in their studies. Number of literature shows different level of measure points for measuring lymphedema. But a standard method used is 3,5,7 inches above and below lateral epicondyle of humerus and 2 inches below radial styloid process. Differences greater than 2.0 cm at any point are defined by some as “clinically significant,” whereas others classify this degree of lymphedema as mild.

**MANAGEMENT:**
Rehabilitation consisted of a multidisciplinary intervention of at least ten sessions of physiotherapy depending upon the amount of swelling; lasted around 1 hour 15 minutes. The main treatment identified in the literature for the
management of lymphedema is Complex decongestive therapy (CDT)—also known as combined decongestive therapy and complex decongestive physiotherapy. Its components are: compression therapy, arm and shoulder exercises, deep-breathing exercises, manual lymphatic drainage (MLD) to promote venous and lymphatic flow. Along with this psychological and cognitive-behavioral rehabilitation is equally important.

1. Compression therapy:
It includes compression garments and pneumatic compression pumps.

A. Compression garments:

Ideal compression garments (fig.2) deliver pressures of 20 to 60 mm Hg. Many literatures recommended the use of compression garments for 24 hours or the maximum time according to patient’s comfort. Also many literatures suggested not to use them while sleeping. It may also protect the extremity from injuries such as burns, lacerations and insect bites. Ideally compression garments should be custom-made according to patient’s swelling and should be fitted by trained personnel so that not a single crease is present. According to the type and area of swelling compression garments can be customized. It should be replaced every 4 to 6 months, or when they begin to lose their elasticity.

Bandages (fig.3) are also recommended for providing compression.

B. Intermittent pneumatic compression therapy:

Intermittent pneumatic compression (fig.4) with single or multi-chamber pumps does effectively remove excess fluid from the extremity and can be used as a primary or adjunctive therapy for lymphedema. Multi-chambered pumps are more effective than mono-chambered pumps. It produce a linear pressure wave from distal to proximal portions of the limb that reduces the tendency of fluid to collect in the hand. It is recommended 20-30 minutes of session per day until the difference in swelling reduce to 1.5 cm. Although complications of compressive therapy have not been reported, but pressures might damage skin lymphatics and that the residual proteins, which remain after forceful fluid displacement, can induce secondary inflammation and accelerate fibrosclerotic
changes. Pump therapy is contraindicated in the presence of active infection or deep vein thrombosis in the limb.

2. Exercises
Exercise therapy is important for improving restricted shoulder ROM, muscle strength and pain reduction. It is divided into two phases. Phase 1 exercise program (table 1) can be started on day 1 post surgery but up to only 90 degrees of shoulder range as stitches and drains are present. While phase 2 exercise program (table 2) should be started immediately after removal of drains and stitches.

<table>
<thead>
<tr>
<th>Exercises</th>
<th>Description</th>
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<tbody>
<tr>
<td>Clenching of hands</td>
<td>Hold both hands together and pull against each other</td>
</tr>
<tr>
<td>Ball Squeezing</td>
<td>Standing, Sitting or lying in bed, hold a rubber ball in your hand on the operated side. Keep your arm slightly bent, with your palm towards the ceiling, while lifting your hand higher than your heart. Squeeze &amp; then relax the ball. Repeat.</td>
</tr>
<tr>
<td>Arm Lifts</td>
<td>Hold the scarf in both hands with your palms facing up and lift it up over your head as far as you can. Use your other arm to help lift the scarf up to 90 degrees only. It can be done both in sitting or lying position</td>
</tr>
<tr>
<td>Sideways lift</td>
<td>Raise your arms sideways and joining both the hands overhead up to 90 degrees only. Can be done both in sitting or lying position</td>
</tr>
<tr>
<td>Arm Reach</td>
<td>In sitting position, try to stretch the hand towards opposite shoulder</td>
</tr>
<tr>
<td>Shoulder winging</td>
<td>Clasp your hands behind your neck with your elbows pointing toward the ceiling. Move your elbows apart and down toward the bed or floor.</td>
</tr>
<tr>
<td>Exercises</td>
<td>Description</td>
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<tr>
<td>Deep Breathing</td>
<td>Keep shoulders relaxed, breathe in deeply through nose filling out lower rib cage, and breathe out slowly through mouth.</td>
</tr>
<tr>
<td>Shoulder Shrugs</td>
<td>Shrug shoulders up to your ears and then relax them. Breathe in when you lift and breathe out when you lower</td>
</tr>
<tr>
<td>Neck Stretch</td>
<td>Tilt head to one shoulder to stretch opposite side of neck and repeat to opposite side</td>
</tr>
<tr>
<td>Shoulder Circles</td>
<td>Roll shoulders backwards. Repeat rolling shoulders forward</td>
</tr>
<tr>
<td>Arm Lifts</td>
<td>Hold the scarf in both hands with your palms facing up and lift it up over your head as far as you can. Use your other arm to help lift the scarf. It can be done both in sitting or lying position</td>
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</tr>
<tr>
<td>Wall Walking-forward</td>
<td>Facing a wall, &quot;walk&quot; fingers up (with both hands) the wall as far as you can until you feel a stretch. &quot;Walk&quot; back down and return to the starting position</td>
</tr>
<tr>
<td>Wall Walking-sideways</td>
<td>Walk sideways up a wall with the hand, elbow should be straight. As you climb up the wall, keep moving closer to the wall keeping elbow straight. Walk back down to the starting position</td>
</tr>
<tr>
<td>Taking the hand behind the back</td>
<td>Try to touch hands behind your back. Repeat the opposite way.</td>
</tr>
<tr>
<td>Wrist stretches-flexion and extension</td>
<td>Stretch the hand in &quot;Namaste&quot; and &quot;reverse Namaste&quot; positions</td>
</tr>
</tbody>
</table>
3. Manual lymphatic drainage via massage

It helps in stimulating the lymphatic system via an increase in lymph circulation, expediting the removal of biochemical wastes from body tissues, enhancing body fluid dynamics, thereby facilitating edema reduction, and decreasing sympathetic nervous system responses while increasing parasympathetic nervous tone yielding a non-stressed body-framework state. Many literatures shows many techniques out of which most commonly used is effleurage (fig 5) and drainage of lymphatic fluid towards opposite axilla or groin region.

Self-lymphatic drainage also showed significant results in reduction of edema of arm (table 3).

4. OTHER PHYSICAL THERAPY MODALITIES:
Cryotherapy, thermal therapy, interferential therapy for pain management and also for the drainage of swelling can be used on certain parameters. In Max Super-specialty hospital, Saket, Interferential therapy is used at standard parameters for pain management and drainage of swelling i.e. 2500 Hz for 20 minutes.

Many literatures studied the effect of ultrasonography in lymphedema which doesn't show any significant reduction in swelling. Although ultrasound is contraindicated to areas of potential metastatic disease such as the hips, lumbar area, ribs, chest wall or axillae.

Application of local hyperthermia to the lymphedematous limb has been recommended by few literatures which showed reduction in limb volume. The treatment was applied for 30 to 45 min/day over 15 days.

Table 3: Self-lymphatic drainage of arm

<table>
<thead>
<tr>
<th>Self-lymphatic drainage of arm</th>
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<tr>
<td>Sit comfortably on a chair with the back well-supported.</td>
</tr>
<tr>
<td>Place two fingers in the inside of collar bone, move up in the soft tissues and pump slightly on either side of neck for about 25-50 times with a speed of 1 pump/sec.</td>
</tr>
<tr>
<td>Now, take your hands &amp; cup them, at the back of your neck, using the same slower pressure pull the fluid downwards &amp; pump there for about 25 times.</td>
</tr>
<tr>
<td>Then, work on the sides of the neck, with the ears lying in between your four fingers and pump downwards for about 25 min.</td>
</tr>
<tr>
<td>Then, again go at the back of the neck, pump there for about 25 times.</td>
</tr>
<tr>
<td>Now finish up by doing 50 pumps over the inside of the collar bone, the point from where we started.</td>
</tr>
<tr>
<td>Next, leave your arm relaxed, if swelling is more elevate it on a pillow, now place your four fingers under the armpit &amp; pump for about 25-50 times, a bit deeper, then the pressure applied over the neck region.</td>
</tr>
</tbody>
</table>
4. Psychological and Cognitive-behavioral rehabilitation:
Psychosocial rehabilitation consists of psychological and social approaches to solving the psychosocial discomfort of breast cancer patients. Interview, recreation, counseling, and self-management are commonly used strategies. Rehabilitation programs composed of psychology-based education, exercise, and peer support group activity promote the recovery of the affected shoulder joint range of motion, alleviate physical symptoms, and improve psychosocial adjustment and the quality of life for early breast cancer patients. Cognitive-behavioral rehabilitation are problem solving activities that are focused on discovering and challenging automatic negative thoughts, activity planning, and discovering by breast cancer patients themselves.

5. PRACTICAL TIPS:
Clinical experience supports encouraging patients to consider some practical advice regarding skin care, exercise and body weight (table.4).

Scrupulous skin care should be encouraged. Women should avoid cuts, pin pricks, hangnails, insect bites, contact allergens or irritants, pet scratches and burns to the affected extremity. Patients should avoid medical procedures such as vaccination, blood drawing, intravenous access, blood pressure monitoring, acupuncture, venography and lymphangiography in the affected arm. Lymphedema may be exacerbated if women use saunas, steam baths or hot tubs, spend time in hot climates or travel. Many patients report worsening of their lymphedema during flight, which suggests that patients who use compression sleeves should probably use them during air travel.

Maintenance of ideal body weight should be encouraged. Obesity is a contributing factor for the development of lymphedema and may limit the effectiveness of compression pumps or sleeves.

Precautions to be taken post-surgery and while active lymphedema

- Avoid letting your arm become over-exposed to the sun.
- Avoid cuts, burns and insect bites.
- Use skin cream to keep skin moist on affected arm(s).
- Seek immediate medical advice if any areas or cuts become hot, red and swollen.
- Avoid carrying anything heavy with the affected arm for a prolonged time.
- Avoid blood being taken, blood pressure being checked, injections and needles being inserted in the affected arm.
- Wear loose clothing and loose jewellery to avoid constriction and swelling.
- Use of compression sleeves during flights
- Maintenance of ideal body weight

Table 4: Precautions

ROLE OF OCCUPATIONAL THERAPIST IN MANAGEMENT OF LYMPHEDEMA
Occupational Therapy is a profession concerned with promoting health and well-being through occupation. The primary goal of Occupational Therapy is to enable people to participate in the activities of everyday life. Occupational Therapists achieve this outcome by enabling people to do things that will enhance their ability to participate or by modifying the environment to better support participation. The OT’s skills in activity analysis will facilitate addressing a client’s challenges through introducing adaptive strategies, equipment and biomechanical education to promote client independence. The OT may incorporate client appropriate adapted strategies and equipment to support improved client performance. An Occupational Therapist opportunity to address workplace set up, work conditioning, and work behaviors to support a successful return to work after completion of an ergonomic assessment and job demands analysis provides.

CONCLUSIONS AND RECOMMENDATIONS
Rehabilitation of breast cancer patients is a long and slow process. Frequently, life-long rehabilitation is needed because an increasing
number of women are increasingly diagnosed at an early stage of the disease and have to live with the condition. The early rehabilitation of patients diagnosed with breast cancer has taken an increasing importance because of the recognized importance of quality of life for patients with cancer in general. Breast cancer patients need rehabilitation programs that are systematically designed by health care professionals to support and improve their quality of life.

Early rehabilitation is expected to become an important support that sustains the hopes of patients and their families, as through rehabilitation patients able to improve their ADL’s as much as possible which will provide them a hope of living with happiness. But if the rehabilitation delays could be of any reason then there is a possibility of development of physical complications like restriction of shoulder ranges, lymphedema. So it is very important to keep a proper follow ups as recommended by rehabilitation team up to 2-3 years post-surgery in order to avoid these complications (table 5).

But still more research on rehabilitation programs for breast cancer patients needs to be encouraged, particularly in light of the early rehabilitation of breast cancer in order to reduce the risk of complications after surgery.

**RECOMMENDATIONS**

- Exercise should be done gently within your own comfort level.
- If you are experiencing numbness over the chest, arm and armpit area, continue these exercises gently.
- If you experience severe pain do not persist with the exercises – stop and do them gently later on during the day.
- You should experience a gradual increase in shoulder movement.
- To improve your arm movements, use your arm for combing your hair, getting dressed, putting on make-up and reaching for light objects.
- Proper follow ups as recommended by rehabilitation team post-surgery in order to avoid these complications and should report immediately with the signs of swelling in order to start early rehabilitation for swelling.

**REFERENCES**


“THE EFFECT OF LOADED SIT TO STAND RESISTANCE EXERCISE VERSUS WEIGHTED CIRCUIT EXERCISE TO IMPROVE WALKING EFFICIENCY AND FUNCTIONAL MUSCLE STRENGTH IN CHILDREN WITH MILD SPASTIC DIPLEGIA: A COMPARATIVE STUDY”

Pooja Sharma*, Rama Saraswat**

INTRODUCTION

CEREBRAL PALSY (CP) is described as “a group of disorders in the development of movement and posture, causing activity limitation, due to nonprogressive disturbances that occurred in the developing fetal or infant brain.”[2] Children with spastic CP usually have problems of muscle weakness, which cause movement dysfunction. The muscle strength of lower limbs correlates with the motor activity function in children with CP. Most children with CP are of the spastic type, with mild CP and at the Gross Motor Function Classification System (GMFCS) levels I and II.[8] Although school age children with mild spastic CP can walk independently, their walking abilities are worse than their peers without disability, and may get worse with age, resulting in a loss of their ability to walk. Therefore, an effective intervention for children with mild CP to preserve or improve their motor ability.

Many causes of the brain damage including abnormal development of the brain anoxia, intracranial bleeding, trauma, hypoglycemia, virus and other infections results in CP.[14] CP is increased among low birth weight infants particularly those weighing less than 1000 gram at birth, primarily because of intra cerebral hemorrhage and Peri Ventricular Leukomalacia (PVL).[13]

Introduction - Work related musculoskeletal disorders have been described as one of the main health problems among health care workers. Musculoskeletal disorders among nursing staff, has been a major problem around the world, although there is limited information on its prevalence and risk factors in India.

Aim of the study - To assess the prevalence of musculoskeletal complaints among nurses and to investigate the relation between these complaints and various work-related and personal variables.

Methodology - A questionnaire survey study was conducted among 223 nurses from different civil hospitals. A self-administered questionnaire including Standardized Nordic Musculoskeletal Questionnaire was used to collect data regarding personal and occupational factors. Reliability of questionnaire, using a test-retest methodology, was found 0.84 by Cronbach’s Alpha statistics.

Results - Seventy one (33%) nurses reported that they had experienced work-related musculoskeletal problems. Respondents reported the highest prevalence rates for WRMSDs in the lower back (59.2%), neck (31.0%), lower leg (25.4%) and wrist/hands (18.3%) was calculated. The respondents rated ‘prolong standing’ as the job factor most problematic in terms of tasks that may lead to work related injury.

Conclusion - The current study concluded that low back pain is highly prevalent among nurses and the results indicate that an association exists between the MSDs and age. As age increases nurses reported chronic pain. Also, significant association was found between total years of experience in profession and work-related MSDs. The main route to prevention of musculoskeletal problems among nurses is likely to lie in improved ergonomics in their work place.

Keywords: Musculoskeletal disorders; Back pain; Personal factors; Prolong standing
Diplegia: involvement of four limbs with legs more affective than hands.\cite{7}

Spastic C.P: It is characterized by hypertonus of the clasp variety, abnormal posture, weakness in initiation of motion, intelligence varies.\cite{14}

Sensory dysfunction and perception problems also associated features.\cite{14}

Resistance exercises: it is any form of active exercises in which a dynamic or static muscle contraction is resisted by an outside force applied either manually or mechanically.\cite{15}

Progressive resistive exercises: It is a system of dynamic resistance training in which constant external load is applied by some mechanical means and incrementally progressed.\cite{15}

Weighted circuit exercises: A pre-established sequence of continuous exercises are performed in succession at individual exercises stations that target a variety of major muscle group as an aspect of total body conditioning\cite{15}

METHODS

30 patients of spastic diplegic CEREBRAL PALSY both male and female were included in the study.

INCLUSION CRITERIA:
- Age between 5-12 years old.\cite{8}
- Mild spastic diplegia.\cite{10} (Modified Ashworth Scale)
- IQ Level (80-90).\cite{16}
- The GMFCS level first and second. \cite{8} \cite{16}
- Able to stand up from a chair independently and maintain standing for more than 5sec without falling. \cite{8}
- Able to follow verbal instructions. \cite{8}

EXCLUSION CRITERIA:
- Have orthopedic intervention, selective dorsal rhizotomy or botulium toxin injections to the lower extremities within 6 months.\cite{8}
- Orthopedic problems or medical conditions that prevented children from participating in the exercises (Development of dysplasia, Congenital dislocation of knee/hip, CTEV, Congenital absence of fibula/tibia, scissoring gait, coxavara, heart problems, breathlessness, asthma, dyspnea etc.) \cite{8}
- Mentally unstable patient. \cite{16}

Sample Design: All the 30 subjects of mild spastic diplegia were divided into 2 groups of 15 each.
Sample Technique: All the subjects were taken by the randomized sampling method based on initial baseline data and all the subjects were referred by consultant neurologist after diagnosis.

Duration of study: Duration of the study was 8 weeks. Each subject was evaluated for study and data collection started at the 0 day, 3rd week and then end day of 6th week. Then follow up after 2 weeks. In this study, 41 patients were screened according to the inclusion and exclusion criteria and finally 30 subjects were included in this comparative study and were divided into 15 subjects each in the group.

A complete clinical assessment was done on all the subjects satisfying inclusion criteria. A written and informed consent was taken from parent of every subject of either group. All the patients were made to understand the treatment protocol.

- All the 30 subjects were divided into two groups A & B of 15 each.
- Treatment was given according to mentioned protocol.

Loaded sit to stand (Group A):
- 15 subjects with C.P. were receiving 30 minutes session, 3 days a week.
- Each training session started and finished with a warming up and cooling down period of 5-10 minutes during which muscle stretching exercises were performed. \cite{12}
- Perform sit to stand 10 times with a body vest at 20% of 1RM STS load. \cite{8}
- After 2 minute rest, STS with a load at 50% of 1RM repeatedly without stopping until fatigue. \cite{8}
- Rested for another 2 minute, STS activities again for 10 times.
- And regular PT program include passive range of motion exercise, positioning, balance training, functional training and neurodevelopment training. \cite{16}
Weighted Circuit Exercises (Group B):
• It included circuit weight training by using vest.
• Each training session started and finished with a warming up and cooling down period of 5-10 minutes during which muscle stretching exercises were performed. [16]
• During the main training phase each child performed 3 different exercises.
• These exercises were a combination of leg press, a lateral or forward step up and a half knee rise exercise. [16]
• 30 minutes session, 3 days a week in training resistance initially set to 20% of one repetition maximum then incremented by 50% of 1RM. [8]

And regular PT program include passive range of motion exercise, positioning, balance training, functional training and neurodevelopment training. [16]

OUTCOME MEASURES:
• Timed 10-metre walk test [16]
• 1 minute walk test[3][16]
• Timed stair test[5][16]
• 1 RM STS[8][10]

Statistics
• All analysis were obtained using SPSS window version 10. Demographic data of patients including age, sex, 10 MWT, 1 MWT, TST, 1-RM STS were taken. Statistical technique used for analysis was student t-test to compare between 2 groups and duration difference at significant level. Level of significance is 5%. 
The study was detailed to find the efficacy of which mode of treatment was better in the two groups using Timed 10-Metre walk test, 1 Minute walk test, timed stair test and 1 RM STS. The analysis of variance between treatments of both group using time 10-metre walk test, 1 minute walk test, Timed stair test and 1-RM STS scale exhibited significant improvement for loaded sit to stand and weighted circuited exercise.

The result of this study shows that weighted circuited exercise resulted in a significant improvement in cadence, step length, Velocity, speed, time duration and loaded weighted.

For PRE strength training in particular, every study should give a detailed description of the Key principal of the PRE: the timely progression in strength intensity, based on the child’s individual level of strength, to ensure the principle of progressive overload.\textsuperscript{[16]}

The statistical analysis done above correlated that the group taken for study; both group A treated by loaded sit to stand or group B treated by weighted circuit exercise showed significance when compared to group A treated by loaded sit to stand. Based on the data analysis I accept the experimental hypothesis. Further studies are needed to investigate the long-term effects of the loaded sit to stand resistance exercise and weighted circuit exercises for children with different severities of cerebral palsy or with other disabilities.

**CLINICAL IMPLICATIONS**  
Children with C.P have multiple and complex needs. Developmental delay, abnormal growth charts, impaired muscle tone and abnormal reflexes are early indications of C.P. A variety of benefit programs are available to children with disability or impairment. Early intervention and treatment is necessary to facilitate better life span in C.P. By the help of these two treatment techniques named as loaded sit to stand resistance exercise and weighted circuit exercises comparing in this study we can efficiently treat the C.P children. The findings of this study may serve as an advanced treatment technique for C.P children.

**RESULT:**
At the end of investigation, significant improvement in walking efficiency and functional muscle strength was found with student ‘T’ test at \( P < 0.05 \) in Group B when compared with Group A. there were significant Changes in Cadence, Velocity, step length (10 MWT), Speed (1-MWT), Time (TST) and Strength (1-RMST)

**DISCUSSION**
The objective of the study was to compare the efficacy of loaded sit to stand and weighted circuited exercise. The study undertaken included subjects who had moderate mild spastic diplegic cerebral palsy; hence this study can’t be generalized to whole of the population who are suffering from cerebral palsy.

Although many treatment methods are currently in vogue in order to deal these kinds of subjects we are in emergent need of applying the correct exercises which suits the subject’s need. The growing demand for meeting various problems associated with cerebral palsy are indeed worth considering.
FUTURE RESEARCH
Further studies are needed to investigate the long-term effects of the loaded sit to stand resistance exercise and weighted circuit exercises for children with different severities of cerebral palsy or with other disabilities.

LIMITATIONS OF STUDY
Factors, which may have led to erroneous results in the data may be due to:
- The duration of the follow up was not sufficient. The immediate effect was positive.
- Only children with limited severity and diagnosis participated in this study.
- Sample size was small. If we would have taken large sample size, the results would have been more sufficient.

CONCLUSION
- The loaded STS resistance exercise helps to improve basic motor abilities, functional muscle strength and walking efficiency in children with mild spastic diplegia. The loaded STS exercise program had high compliance.
- Weighted circuit exercise is a viable strategy with a high retention rate, safe and effective step of treatment for children with mild spastic diplegia.
- It has been recorded from the study that use of loaded sit to stand and weighted circuited exercise both produces significant improvement in walking efficiency for children with mild spastic diplegic cerebral palsy. But this study shows that cadence, step length, velocity, speed, time duration and functional muscle strength significantly improved in group B[Treated with weighted circuit exercise] as compare to group A[Treated with loaded STS resistance exercise]. So, weighted circuited exercise is more beneficial than loaded sit to stand resistance exercise.

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9. Hua-Fang Liao, Ying Chi Liu, Wen Yu Liu.(2007) Effectiveness of Loaded Sit-To-Stand Resistance Exercise for Children with Mild Spastic Diplegia: A Randomized Clinical Trial.
14. Sir John Walton “Brain’s diseases of nervous system” Ed 9th Chapter 13, Pg 351.
15. Sophie Levitt Treatment of cerebral palsy and motor delay (fourth edition)
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