

# To analyse the effect of pneumatic compression therapy and manual lymphatic drainage on Disability and Quality of life of patient post mastectomy- A case report

Devi Manju , Kaur Anujot

Lovely Professional University, Punjab, India

## ABSTRACT

**STUDY DESIGN:** A case report

**BACKGROUND:** Following mastectomy, loss of function of upper extremity is a common occurrence. The dependent position of the upper extremity makes it more prone to development of lymphedema. Early application of Pneumatic compression therapy and manual lymphatic drainage with elevated arm helps decreasing lymphedema and increased arm circumference which will improve the quality of life, increase ROM and decrease disability in patient post mastectomy.

**CASE DESCRIPTION:** This is a case of 53 years old female who underwent right radical mastectomy 1.5 year ago for breast cancer (stage II) right side. Patient participated in a physiotherapy program six months after the surgery; for these 1.5 years she was made to undergo chemotherapy and radiotherapy. Patient was assessed for muscle strength, muscle grip, upper limb circumference, disability and quality of life before and after the physiotherapy intervention at the baseline (1.5 years after surgery) and after 8 weeks of physiotherapy protocol.

**OUTCOMES:** After 8 weeks of physiotherapy intervention, the patient showed an increase in muscle strength, decrease in upper limb circumference and disability. An increase in quality of life was noticed in patient after 8 weeks of intervention.

**DISCUSSION:** The result of the present study highlighted the importance of physiotherapy for reducing lymphedema post mastectomy. The present case showed that physiotherapy helps increasing the quality of life of patient post mastectomy; a kind of surgery which is still considered to be a taboo for females.

**KEY WORDS:** LYMQOL, DASH, Arm circumference and Lymphedema.

## Introduction

Breast cancer is among the most popular types of female's cancer and can lead to high incidence of morbidity and death. The high incidence as well as mortality rate of breast cancer in India which is 25.8 per 100,000 women and mortality 12.7 per 100,000 women has ranked it first among all types of cancers affecting females. The surgical procedures undertaken as part of the treatment of breast cancer include

mastectomy and conservative surgery [1]. Such procedures can be followed by axillary lymph nodes drainage, which can induce upper limb lymphedema, regardless of what type of surgery is done. There are undesirable changes such as reduced mobility of the treated side of shoulder joint, secondary lymphedema, post mastectomy pain syndrome, reduction of muscle strength [2]. Lymphedema involves upto 50% of all patients of breast cancer. It is a form of lymphatic dysfunction in which chronic swelling occurs due to an irregular accumulation of protein- rich fluid in an area of the extremity or other body and is followed by marked subcutaneous changes in the skin as the condition deteriorates [1]. The frequency of lymphedema linked to breast cancer increases significantly from 3% to 15% after sentinel node biopsy, from 10% to 20% after full axillary dissection and from 3% to 50% after radiotherapy.

Physiotherapy plays a significant role in post operative physical recovery, prevention and treatment of problems such as lymphedema, reduced mobility range of upper limb joint, correction of postural misalignment and reactive changes, thus facilitating full healing and improved quality of life [1]. Numerous techniques are used by the physiotherapists for the rehabilitation of post mastectomy patients. Out of which pressure therapy is one of the widely used technique to relieve lymph edema. The pressure therapy technique is provided by equipment having sleeves and pneumatic pump. There are different designs of machines which are available. The air chambers can be available in the form of garments like gloves or boots. Due to lymphedema the patient's day to day activities were difficult to perform which affected the overall quality of life. The literature supports the fact that due to swelling range of motion, muscle strength and sensation gets affected. This case report intends to highlight the intervention framed for a post radical mastectomy patient for improving the quality of life using Physiotherapy techniques. The prime focus is on reduction of edema, improvement in range of motion and quality of life along with overall disability. This work describes the results of a 8 week intervention which included soft tissue manipulation, Pneumatic Compression therapy.

## CASE DESCRIPTION

A 53 year old female presented with complain of swelling in the right unilateral upper extremity. She was diagnosed with breast cancer and was operated 1.5 years ago. The surgical intervention done was right radical mastectomy. She was a business woman and her quality of life was affected by lymphedema. On subjective examination she was hypertensive since ten years and was under medication. The medical history also revealed that she was diabetic from past 10 years and was under oral medication. On pain evaluation the onset of pain was gradual in right limb and type was dull. The patient rated it 6 on NPRS Scale while doing movements. The pain was 3 at rest. It uses to aggravate on doing activities such as picking glass or bottle, doing household work and writing etc. She revealed that pain used to get better when the limb was positioned above the eye level. On observation the right upper extremity was swollen. The patient was able to move the upper extremities but right shoulder, elbow and wrist ranges were restricted for all movements. There were no trophic changes observed on the limb. On palpation there was pitting edema on arm and forearm. She reported grade 2 tenderness on right arm and forearm. On Motor Examination the ranges were pain free and complete for right elbow and wrist whereas shoulder

flexion and abduction were painful and restricted. On assessing strength in upper extremities using manual muscle testing Medical Research Counsel grading the shoulder flexors, extensors, rotators, adductors and adductors were having strength of grade 3 as compared to the unaffected side which was grade 4. The grip strength was examined by hand held dynamometer; it was reduced for the affected arm. The sensory examination depicted recued sensation for touch and superficial pain. The patient already has complained of numbness and tingling during initial history taking and interview. The deep sensations such as proprioception, kinesthesia and vibration were also diminished. The overall quality of life was affected drastically for the patient.

## EXAMINATION

The patient came to Physiotherapy Clinic after 1.5 years of surgery. Due to lack of awareness she has not undergone any physiotherapy management for breast cancer related lymph edema. The patient was examined 1.5 years after the right radical mastectomy. The swelling increased gradually after the surgery. The examination was done using detailed clinical assessment format. She was examined after written consent signed by the patient. The pain was assessed using Numeric Pain Rating Scale, tenderness was assessed using clinical grading system of tenderness, and the muscle strength was examined using manual muscle testing. All the parameters are given in table 1.

### Tables

Table 1: Outcome Measures for assessment of lymphedema in post mastectomy

Outcome Measures	Outcome Tool
Pain	Numeric Pain Rating Scale
Tenderness	Clinical Grading
Muscle Strength	Medical Research Counsel Grading System
Grip Strength	Hand held dynamometer
Range of Motion	Universal Goniometer
Sensory Assessment	Clinical Assessment using Monofilament, Tunic fork 128 Hz
Upper Extremity Limb Circumference	Measuring Tape
Quality of Life	Lymph Edema Quality of Life Arm Scoring System
Disability	Disability of Arm, Shoulder and Hand Questionnaire

The primary outcome measures for this case report were Range of motion of upper extremity edema (Table 2), Quality of Life and Disability. Outcome measures used were Universal goniometer, DASH Scale and SP-36 Questionnaire and measuring tapes. Upper extremity functional assessment was performed with a DASH scale. It is a questionnaire on the upper limb disability. The questionnaire's

score is obtained by dividing the total score of the items calculated by the number of items and minus 1 and multiplying the total score by 25. It is normal between 0 and 20 points, mild between 21 and 40 points, moderate between 41 and 60 points, and severe disability between 61 and 80 points. Higher scores show more disability. The patient was having score of 72 points showing severe disability.

Table 2 Range of Motion pre and post intervention

Parameter	Pre intervention (starting from 0 degree)	Post Intervention (starting from 0 degree)
Shoulder Flexion	70	120
Shoulder extension	30	38
Shoulder Abduction	75	105
Internal Rotation	55	70
External Rotation	40	65
Elbow Flexion	95	105
Wrist Flexion	70	78
Wrist Extension	65	75

The LYMQOL questionnaire is used to evaluate the quality of life of patient before and after physiotherapy intervention. Individual scores are summed up. If the patient is not able to check any point it needs to be marked as 0. Domain totals will be calculated by sum up of patient scores and the summed up value will be divided by total questions which will be answered by patient. (More than half of the questions need to be answered to calculate the scores). There are four domains and their corresponding questions are: Function 1 (a–h), 2, 3; Appearance 4, 5, 6, 7, 8; Symptoms 9, 10, 11, 12, 13, 14; and Mood 15, 16, 17, 18, 19, 20. Overall quality of life (Q21) is calculated, between 0–10. Circumference of arm was measured using measuring tape at 10, 20, and 30, 40 cm above the wrist joint before and after the intervention. (Table 3)

Table 3 Pre and Post interventions findings for lymph edema after unilateral radical mastectomy

Parameter	Distance	Pre intervention	Post Intervention
<b>Arm Circumference taken from the volar wrist joint crease</b>	10 cm	25 cm	21 cm
	20 cm	33 cm	27 cm
	30 cm	40 cm	32 cm
	40cm	48 cm	35 cm
LYM-QOL Arm Scoring System		3.5	5.8
DASH		72	46

## INTERVENTION

The study was carried out at Guru Gobind Singh Medical College and Hospital, Faridkot, Punjab. This case report included the woman who had right breast cancer (Stage II) and was operated for the same by right radical mastectomy. Patient was included in the study 18 months post mastectomy with the complaint of lymph edema on right upper limb. Physiotherapeutic intervention for this patient was given for total 15 sessions, 8 weeks, 3 days/week [5]. The treatment protocol followed was: effleurage technique with fast stroking from distal to proximal for 7 minutes for the drainage of edema to the axillary lymph nodes. This was followed by positioning of limb in pneumatic compression therapy with 60° of elevation for 10 minutes. In addition, the patient was advised to use pressure garments at home during night time.

## OUTCOME MEASURES

The assessment for the intervention was carried on the 2 scales, viz. The lymphedema quality of life arm (LYMDQL) scale and Disability of arm, shoulder, and hand (DASH) scale for the disability index. The other reference for the reduction of edema was carried out using the limb girth measurement by measuring tape at 10cm, 20cm and 40cm above wrist along with the goniometric joint range of motion measurement for right upper limb [6]. After 1.5 years of physiotherapy intervention the patient demonstrated improvement in right upper extremity range of motion, reduction in edema and an improved disability and quality of life. The findings are depicted in table 2.

## DISCUSSION

Lymphedema is a highly morbid problem resulting in excess lymphatic fluid and swelling of subcutaneous tissues due to obstruction, destruction, or hypoplasia of lymphatic vessels and is one of the great challenges in plastic surgery, where a satisfactory solution has not yet been found [1]. The result of this present study reported a significant difference among the various parameters used to reduce the lymphedema in patient post mastectomy. The difference was observed in parameters such as LYMQOL, DASH, limb girth circumference and ROM using goniometer. These results are in accordance to the work done by Skutnik K. et al [2], that did study to review the effect of physiotherapy in women after breast cancer treatment and reported that physiotherapeutic methods are beneficial in managing complication and improving the quality of life of patient after mastectomy. Tomris Duymaz et all [1], in year 2018, did study on the efficacy of pneumatic compression devices in the treatment of patients with lymphedema after mastectomy and concluded that physiotherapy is effective in reducing the lymphedema in patient.

Sayed A. Tantawy, et al, did study on comparison of taping with elastic garments on Lymphedema and Quality of Life after Mastectomy and was concluded that overall quality of life of patient improved after using pressure garments and was concluded that overall quality of life of patient



improved after using pressure garments. The shoulder range of motion gets restricted after radical mastectomy [3] this has been highlighted in the work done by Umar et al. The present patient was also having similar finding which has shown improvement after the intervention. The findings for effect of pneumatic compression are contradictory to the work done by Duymaz in which compression bandage and pneumatic compression was compared. This study depicted that there was no significant difference in improving function by using both the methods. In fact, compression bandage has proved to be more effective. The pneumatic compression has proved to be effective when used as an adjunct to self-drainage techniques [1] In this case report the patient was advised to wear compression sleeves other than intervention techniques used. The Physiotherapy can be beneficial for patients if started from early stages [2]. However, the patient in this case study has not taken any physiotherapy intervention immediately after surgery. The reason behind improvement in patients over all function may be described due to reduction of edema by intermittent compression therapy; the range of motion of upper extremity has improved which in turn has direct effect in improving function. The manual lymphatic drainage was given to the patients also enhanced the flow of lymph from distal to proximal lymph nodes and ultimately to the heart. The current study may have proved to be even more beneficial for the patient if the physiotherapy was started during early post surgical phase. Even better outcomes may be expected if it has been done in collaboration with multidisciplinary team [4]. The limitations of the present study were related to focus on upper extremity only and not using any exercise protocol for improving disability. This study was not done on lower limb lymphedema. Exercise prescription such as Range of motion exercises could be added in the study along with pneumatic compression therapy and manual lymphatic drainage Future study can focus on both the gender and their prevalence. Future study can also be done on lower limb lymphedema.

## CONCLUSION

This case report has depicted that Breast Cancer Related Edema may be improved by Intermittent Compression Therapy given along with Soft tissue manipulation in chronic Radical Mastectomy patients. The improvement may be observed in the terms of upper extremity ranges, reduction in swelling, pain and disability along with improvement in overall quality of life.

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