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**A COMPARATIVE STUDY BETWEEN KINESIOTAPING AND INSTRUMENT
ASSISTED SOFT TISSUE MOBILIZATION ALONG WITH COMPLETE
DECONGESTIVE THERAPY TO IMPROVE PAIN, RANGE OF MOTION,
LYMPHEDEMA AND DISABILITY IN POST MASTECTOMY FEMALES**

SALUJA J^{1*}, PARMAR R² AND PATEL GJ³

^{1,2,3}Ahmedabad Physiotherapy College, Opp. Kabir Enclave, Bopal Ghuma Road, Ghuma,
Ahmedabad – Parul University, India

***Corresponding Author: Dr. Jasmin Saluja: E Mail: salujajasmin19@gmail.com**

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ABSTRACT

Background: Breast tumor is a particularly prevalent kind of carcinoma that strikes females, it is a serious health issue. Mastectomy-related consequences might include sleep disturbances, pain, aesthetic difficulties, bleeding, upper extremity lymphedema, muscle wasting, and reduced shoulder mobility.

Methodology: 30 Mastectomy patients were selected for the study. They were divided into two groups. 15 in each group. Group A (KT + CDT), Group B (IASTM + CDT). The duration of the study was 3 days for 4 weeks. Pre and Post Pain, ROM, Lymphedema and Disability was assessed by NPRS, Goniometer, Arm Circumference and SPADI.

Result: For comparisons in mean and SD in both inter and intra-group analyses, Student paired t-test and independent t-test were utilized. Within-group analysis of Group A and B shows, a comparison of all outcome measures suggested a t value less than 0.05. Between-group comparison shows a significant effect on NPRS, Abduction, External rotation, and elbow and wrist circumference, which suggests p value of less than 0.05.

Whereas, Other outcome measures such as flexion, axillary, mid-arm and Mid-forearm circumference show more than 0.05 value, which suggests a non-significant effect.

Conclusion: This study reveals that Group A (KT+CDT), demonstrated significantly greater improvement compared to Group B, which received IASTM+CDT. Findings suggest that while both KT and IASTM contribute positively to post-mastectomy females, KT emerges as the superior method for enhancing all assessed aspects – pain, ROM, lymphedema, and disability

Keywords: Modified Radical Mastectomy, Kinesiotaping, Instrument assisted Soft Tissue Mobilization, Complete Decongestive Therapy

INTRODUCTION

Breast Cancer is the most prevalent malignancy and leading cause of cancerous related death among women worldwide. Various types of treatment including surgery, chemotherapy, and radiotherapy have been developed for its treatment [1].

Mastectomy is the surgical removal of the cancerous portion of the breast tissue as well as margin of normal tissue surrounding it before normal margins are found (i.e. no cancer cells are found at the edges of the tissue removed) [2].

Lymphedema is a pathological state of chronic tissue swelling induced by the restriction of lymph drainage. It is reported that more than 20% of breast cancer patient are inflicted with lymphedema. Since most of the surgical procedure are accompanied by removal of lymphnodes of upper extremity. The etiology of lymphedema is primarily caused by reduced capacity of processing lymph fluid in axillary region of the affected area [3].

The American Society of Clinical Oncology (ASCO) revealed that majority of women who

had undergone Breast cancer surgery complained of postsurgical shoulder pain with limited upper arm range of motion extending until 1.5 years after surgery. This adversely affect activities of daily living [4].

The limitation of Range of motion can be caused due to lymphedema, muscle weakness, infection, pain, paresthesia, sensitivity changes leading to a decreased function and affection of shoulder range [5].

Kinesio Taping was developed by Dr Kenzo Kase in 1973. The concept involves application of tape that is attached to the skin. The material used was 100% acrylic, latex free and heat activated. It is made up of 100% cotton to allow quickening of drying process. This allows the patient the freedom to wear it even when taking a shower without the need of replication and can be worn approximately 3 to 4 days [6].

The following physiological effects are produced when Kinesio Taping is properly applied; to decrease pain or abnormal sensation, supports the movement of muscles, correcting misalignment of joints, and

removing accumulated lymphatic fluid. Other effects include sensory stimulation, decrease adhesion and contracture, improvement of pliability and reduction of scar formation [7]. Instrument Assisted Soft Tissue Mobilization (IASTM) is a common skilled myofascial intervention. It is applied using uniquely designed instrument to provide soft tissue mobilization by various direct compressive stroke technique [8].

Regarding IASTM applied to shoulder, one goal is to produce plastic changes in the targeted tissue in order to create additional length and mobility and thereby regaining normal range of motion and functioning of affected tissue [9].

Hence the purpose of the study is to compare the effects of Kinesio Taping (KT) and Instrument Assisted Soft Tissue Mobilization (IASTM) along with Complete Decongestive Therapy (CDT) to improve Pain, Range of Motion, Lymphedema and Disability in Post Mastectomy Females.

MATERIALS & METHOD

The study was conducted after taking institutional ethical authorization. The participants were taken from Starlit Cancer Center, Ahmedabad. 30 patient who have undergone Modified Radical Mastectomy were divided using convenient random sampling into 2 groups. Kinesiotaping +

Complete Decongestive Therapy was given to Group A (n=15) whereas Instrument Assisted Soft Tissue Mobilization + Complete Decongestive Therapy was given to Group B (n=15). The study inclusion criteria are age between 50 to 70 years females, after 6 month of Modified radical mastectomy, Existence of shoulder pain accompanied by a restriction in the shoulder's ROM in terms of flexion, abduction, and external rotation, arm circumference greater than or equal to 2 cm or less than 8 cm relative to opposite side [2, 4, 6]. The exclusion criteria are Dermal sensitivities to kinesiotape substance evident, a cardiovascular infection, a seizure, coagulation disorders, elevated BP, and the existence of a defibrillator, widespread edema brought on by compromised liver, kidney, and heart health, Current metastases, Presence of any allergy and skin disease, No history of shoulder surgery on affected side since last 6 month, No current shoulder injury on affected side from last 6 month [2, 4, 9]. Each group received intervention of 3 days per week for 4 weeks. The outcome measure were Numerical Pain Rating Scale (NPRS), goniometer (flexion, abduction, external rotation), Arm circumference (at 5 levels) and Shoulder Pain and Disability Index (SPADI) were assessed pre and post intervention.

Group A Kinesiotaping + CDT group: Four strips of kinesiotape were used in the investigation. The first strip, an I band, was placed from the ending to the starting of the Supraspinatus muscle. The first strip used an inhibition strategy with tape tension ranging from 15% to 25%. This initial band was applied during internal rotation, adduction, and extension of the shoulders, and the limb was extended across the spine in a motion identical to grasping for the opposing back pocket, while also flexing the contralateral neck. The anchor placed immediately beneath the larger tuberosity of the humerus devoid of any stress. The remainder of the band followed the spinous process- scapula, ending without any tension.

In the application of the second strip, a Y-shaped band was utilized for the Deltoid muscle, characterized by a tape stretch with a central split, creating two separate tails. Employing an inhibitory technique, the tape tension ranged from 15% to 25%. The anchor point was established at the deltoid insertion, with the initial tail secured to the anterior deltoid during external and horizontal arm rotation. Simultaneously, the second tail was positioned on the posterior deltoid while the arm underwent horizontal adduction and internal rotation. Both tails concluded without applying any tension.

For the third strip, an I-shaped band was applied from the coracoid process to the posterior deltoid, applying approximately 50% to 75% tension. Additionally, inferior pressure was exerted on the tape in the region where extreme pain was perceived, aiming to facilitate shoulder mechanical correction. During the application of this band, the upper limb underwent external rotation while at the side, transitioning into shoulder flexion and slight horizontal adduction, and the KT tape was affixed without introducing any stress at the end.

As for the fourth strip, a Y-shaped KT band was used on the lower trapezius, extending from the thoracic spine to the medial edge of the scapula, with an approximate 50% tension. Participants were told to remain with the tape in place until their next treatment session [4, 10].

Group B Instrument Assisted Soft Tissue Mobilization + CDT group: 1) For Pectoral muscles Patient Position: Supine Position while Glenohumeral joint is in 120° abduction to place adequate tension on pectoral region 2) Concerning the rotator cuff, periscapular muscles, and posterior deltoid, the muscles involved include Supraspinatus, Infraspinatus, Teres Minor, as well as the upper, middle, and lower portions of the Trapezius muscle. Additionally, the

Rhomboids Major and Minor, along with the Lattissimus Dorsi, are part of this musculature group. Patient Position: Patient is in prone lying position with Glenohumeral Joint in 90⁰ abduction and internal rotation at edge of plinth.

Prior to IASTM application, ultrasound gel is implemented to the investigated area to mitigate potential skin discomfort. The IASTM technique was employed over the relevant muscle group to identify soft tissue adhesions by assessing changes in the fluidity of the instrument's strokes. Regions with elevated adhesion were recognized by the sensation of traversing a roughened surface with the instrument, In positions with less soft tissue constraints, the instrument flowed smoothly across the subject's skin.

The IASTM approach involves a 20-second administration Alongside the muscle fibers, then an additional 20 seconds in a direction perpendicular to the muscle fibers., for an overall treatment time of around 40 seconds. Throughout the entire procedure, the device was clasp at a 45-degree angle to the skin [11, 12].

Complete Decongestive Therapy: Complete decongestive therapy consists of a combination of manual lymph drainage, compression therapy, decongestive exercises, and skin care.

Massage techniques were applied to the swollen limb, starting from the neck's base and proceeding towards the affected limb. The strokes consistently moved in a proximal direction, going from the upper arm to the axilla and then from the hand to the elbow. In conclusion, a thorough massage was administered to the entire limb, advancing from the distal to the proximal area.

Therapeutic exercises were integrated with intermittent diaphragmatic breathing sessions, overseen by a proficient physiotherapist who followed this sequential approach for corrective exercises: 1) initiating with a five-minute warm-up involving moderately paced active mobilization of major joints, 2) mobilizing the shoulder girdle through activities such as scapular retraction, protraction, depression, shoulder extension, elbow flexion and extension, wrist flexion and extension, and ball squeeze; and 3) conducting stretching exercises focused on the pectorals and trapezius muscles. Individuals assumed a comfortable position with hands resting on their abdominal muscles in a relaxed state. Diaphragmatic breathing was facilitated without exertion, involving deep inhalations through the nose followed by slow exhalations through the mouth.

Compression was achieved using multi-layer compression bandages. All participants were

given counselling on proper skin care techniques, including skin cleanliness, daily body lotion usage, and the avoidance of severe heat and trauma [1, 13].

RESULTS

The data analysis was done using SPSS version 26 and Microsoft Excel. The Shapiro-

Wilk test was employed to assess normality. For comparisons in mean and standard deviation in both inter and intra-group analyses, Student paired t-test and independent t-test were utilized. The study maintained a 95% Confidence Interval, and the significance level was set at <0.05.

Table 1: Demographic data analysis for both groups

Data	Group A			Group B		
	Age	Height	Weight	Age	Height	Weight
Mean	57.27	158.30	67.87	53.47	157.11	67.00
Std. Deviation	7.22	5.49	7.65	5.96	4.27	7.38
Gender (Female)	15			15		

Table 2: Within-group comparison of all outcome measures of Group A

Group A	PRE		POST		T
	Mean	SD	Mean	SD	
NPRS	7.07	1.75	2.93	1.28	<0.001
SPADI	60.67	14.19	23.73	12.01	<0.001
Flexion	132.40	18.38	163.73	11.98	<0.001
Abduction	131.00	19.91	167.00	7.46	<0.001
E.Rotation	54.13	9.11	79.93	5.16	<0.001
Axillary	42.12	4.03	35.35	4.07	<0.001
Mid-arm	33.53	3.95	26.47	3.66	<0.001
Elbow	22.98	5.15	16.87	4.29	<0.001
Mid-forearm	24.17	5.82	16.99	5.60	<0.001
Wrist	22.72	6.53	14.69	5.83	<0.001

Within-group analysis of group A shows, a comparison of all outcome measures suggested a t value less than 0.05 which was lower than the significant value of 0.05. Hence, group A suggested a statistically significant effect post-intervention

Table 3: Within-group comparison of all outcome measures of Group B

Group B	PRE		POST		T
	Mean	SD	Mean	SD	
NPRS	7.07	1.49	4.80	1.42	<0.001
SPADI	65.27	13.14	48.93	14.63	<0.001
Flexion	132.07	16.82	155.07	17.79	<0.001
Abduction	140.80	14.63	155.93	14.36	<0.001
E.Rotation	57.05	11.04	69.22	9.19	<0.001
Axillary	42.57	4.57	38.34	4.52	<0.001
Mid-arm	31.91	4.11	27.63	3.30	<0.001
Elbow	24.56	4.93	21.06	4.89	<0.001
Mid-forearm	23.47	4.32	19.14	4.48	<0.001
Wrist	23.91	5.20	20.68	4.65	<0.001

Within-group analysis of group B shows, a comparison of all outcome measures suggested a less than 0.05 which was lower than the significant value of 0.05. Hence, group B suggested a statistically significant effect post-intervention

Table 4: Between-group comparison of all outcome measures

Variables	Group A		Group B		T
	Mean	SD	Mean	SD	
NPRS	2.93	1.28	4.80	1.42	<0.001
SPADI	23.73	12.01	48.93	14.63	<0.001
Flexion	163.73	11.98	155.07	17.79	0.129
Abduction	167.00	7.46	155.93	14.36	0.013
E.Rotation	79.93	5.16	69.22	9.19	<0.001
Axillary	35.35	4.07	38.34	4.52	0.067
Mid-arm	26.47	3.66	27.63	3.30	0.367
Elbow	16.87	4.29	21.06	4.89	0.019
Mid-forearm	16.99	5.60	19.14	4.48	0.255
Wrist	14.69	5.83	20.68	4.65	0.004

Between-group comparison shows a significant effect on NPRS, Abduction, External rotation, and elbow and wrist circumference, which suggests p value of less than 0.05. Whereas, Other outcome measures such as flexion, axillary, mid-arm and Mid-forearm circumference show more than 0.05 value, which suggests a non-significant effect

DISCUSSION

The goal of research to compare effects of KT and IASTM along with CDT to improve Pain, ROM, Lymphedema and Disability in Post Mastectomy subjects. An experimental design was implemented for 4 weeks; 3 days a week and the outcome measures were NPRS, Universal Goniometer, Arm Circumference and SPADI. After 4 weeks all the outcome measures were re-assessed. Pain was assessed using NPRS. The ROM was measured using a goniometer, which took into account shoulder flexion, abduction, and external rotation. Arm circumference were assessed using tape. Assessments have been obtained on both sides at five anatomical areas: axilla, Halfway from the antecubital fossa to the axilla, Antecubital fossa, Halfway from the antecubital fossa to the wrist, and the wrist. Disability was assessed by SPADI.

This study entailed 30 females (15 in each group). Females were split in two separate

groups. Group A - 15 females to which KT was administered while Group B comprised of 15 females to which IASTM was administered. Furthermore, CDT was administered to both the groups.

KT can provide support to muscles, fasciae, and joints while permitting unrestricted ROM. The tape has the capacity to engage the skin, enhance fascial structure alignment, and provide extra space by raising fasciae and soft tissue when the stretch degree is adjusted. This elevating action not only expands the region, relieving localized tension, but it also enhances circulation and lymph drainage. This implementation is thought to underlie the cause for reducing edema and muscular spasm [4].

Tantawy and Kamel et.al. investigated 74 postmastectomy females following modified radical mastectomy. Group B, the control group, only got conventional treatment; in contrast, group - KT with conventional

treatment. The research suggests that KT, when combined with conventional treatment, could be recommended as an effective intervention for addressing postmastectomy-related issues such as shoulder discomfort, ROM limitations, and reduced functional abilities [4].

Another trial by “Sayed A. Tantawy et.al. Comparative Study Between the Effects of Kinesio Taping and Pressure Garment on Secondary Upper Extremity Lymphedema and Quality of Life Following Mastectomy: A Randomized Controlled Trial”. The findings of their investigation revealed a A substantial distinctions KT & PG class [6].

IASTM has the potential to encourage the regeneration of connective tissue by actively eradicating residual fibrosis and promoting collagen rejuvenation and restoration through the activation of fibroblasts. This mechanism facilitates myofascial release, enhancing the mobility of underlying tissues through its connective tissue remodeling effects [8].

Claire C Davies et.al. Their study sought to analyze the influence of Astym therapy on ADLs of subjects who had undergone surgery owing to breast cancer. A quasi-experimental design involving forty post-mastectomy patient was employed to evaluate five outcomes before and after ASYTM. The findings suggest that Astym treatment not

only enhanced active ROM in the affected region but also improved overall functional outcomes for patients post-mastectomy [13].

The findings of the current trial indicate a significant between-group effect on NPRS, Abduction, External Rotation, & elbow - wrist circumference, with p-values less than 0.05. However, other outcome measures including flexion, axillary, mid-arm, and mid-forearm circumference exhibit p-values exceeding 0.05, suggesting a non-significant effect.

Upon analyzing the mean difference in pre-post data, it is evident that the KT technique demonstrated superiority over the IASTM technique in upgrading all measured outcomes.

CONCLUSION:

This study reveals that Group A, which underwent a combination of KT+CDT, demonstrated significantly greater improvement compared to Group B, which received IASTM+CDT. Consequently, the findings suggest that while both KT and IASTM contribute positively to post mastectomy females, KT emerges as the superior method for enhancing all assessed aspects – pain, ROM, lymphedema, and disability

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