RELATIONSHIP OF POSTOPERATIVE EXERCISES
TO RECOVERY OF RADICAL
MASTECTOMY PATIENTS

by

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[Signatures]

Reader, Supervisory Committee
ACKNOWLEDGMENTS

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ABSTRACT

The incidence of breast cancer is widespread and usually necessitates a radical mastectomy procedure.

The literature is replete with articles suggesting that postoperative exercising is necessary to prevent edema and/or limitation of motion of the arm on the operative side, when a radical mastectomy is performed.

The purpose of this study was to determine whether planned and supervised exercising to mastectomy patients would alter the recovery and return to usual activities. It was hypothesized that special predischarge care and teaching would significantly influence recovery and return to usual activities.

The sample consisted of 10 female patients, ranging in age from 35 to 73. Criterion for selection was radical mastectomy with removal of accompanying lymphatics and pectoral muscles. The patients were alternately placed in a control or experimental group. The experimental group received planned and guided exercises by researcher for seven days. The control group received usual hospital care.

The results did not support the hypothesis. One month post-discharge no measurable differences were found between the groups.

There were findings from the study that indicated further research would be of value in determining whether special exercises are needed for all mastectomy patients or just a selected group.
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CHAPTER I

INTRODUCTION

Breast cancer is a problem of utmost concern in our society. Each year approximately 68,000 women in the United States develop breast cancer (Gribbons & Aliapoullos, 1969, p. 1945). It was estimated that approximately 141,000 women were living with breast cancer in our population (Pack & Ariel, 1960, p. 3). Statistics from the American Cancer Society (1969) estimate that 1 out of 17 newly born girls might be expected to develop breast cancer at some time in their lives.

One of the most effective methods presently available for curing breast cancer is the radical resection of the diseased organ. This includes removing the primary tumor, breast, skin, fascia, underlying muscles, intervening lymphatics and regional lymph nodes (Pack & Ariel, 1960, p. 29; American Cancer Society, 1969, p. 58).

The necessity for radical mastectomy was explained by Haagensen (1960) who stated that mammary tissue extends far more widely over the chest wall than the protuberant breast itself. This makes it necessary to include not only the mammary gland in the operative specimen, but also regional lymph nodes and the lymphatics accompanying the subfascial vessels which are one of the routes along which the breast carcinoma extends. He further stated that it was impossible to adequately dissect the axilla and internal mammary vessels containing the lymphatics without dissecting
the pectoral muscles. The transpectoral and retropectoral lymphatic routes which often contain metastases are further reasons for dissecting these muscles (Haagensen, 1960, pp. 86-99).

One of the objectives following breast amputation is to restore the arm on the affected side to full usefulness. Two problems require control to achieve this objective: (1) to prevent limitations of motion of the arm due to the removal of pectoral muscles and the resulting scar tissue formed in healing of the wound and, (2) to prevent or limit edema of the hand and arm (Beland, 1965, p. 987).

The restoration of the arm to full usefulness by preventing disability due to contractures is accomplished by arm exercise (Smith, 1950, p. 336; Beland, 1965, p. 987). Exercises are essential to prevent shortening of muscles and contracture of joints and to preserve muscle tone so that the affected arm can be used without limitations (Shafer, Sawyer, McCluskey & Beck, 1964, p. 693).

According to Guyton (1968, p. 100) forceful muscular activity causes muscle size to increase, a phenomenon called hypertrophy. The diameters of the individual muscle fibers increase, and the fibers gain in total quantity of contractile protein as well as various nutrient and intermediary metabolic substances, such as adenosine triphosphate, phosphocreatine, and glycogen. Muscular activity increases both the motive power of the muscle and the nutrient mechanisms for maintaining increased motive power.

Weak muscular activity, even when sustained over long periods of time, does not result in significant hypertrophy. Instead, hyper-
Muscular atrophy is mainly the result of forceful muscle activity, though it might occur for only a few minutes each day.

Muscular atrophy is the converse of muscular hypertrophy; it results any time a muscle is not used or even when a muscle is used only for very weak contractions. Atrophy is particularly likely to occur when limbs are immobile, thereby preventing muscular contractions. As little as one to two months of disuse can sometimes decrease the muscular size to one-half normal.

It is evident that muscular activity is necessary to prevent atrophy. This can be accomplished through the use of postoperative muscle training exercises, using remaining muscle groups with similar actions to adequately perform the functions of the pectoral muscles, (Sparkman, 1963, p. 557; Sugarbaker & Wilfley, 1950, p. 333).

According to Pansky and House (1968, pp. 168-187), the pectoral muscles perform the following functions: rotate the scapula down & forward, forward protraction, flex, extend, adduct and rotate arm medially, flex shoulder joint, shoulder adduction and medial rotation of shoulder. Similar motions can be accomplished by actions of the following muscles: levator scapulae, rhomboids, latissimus dorsi, seratus anterior, subclavius, teres major, subscapularis, deltidoid, coracobrachialis, biceps and triceps.

According to Guyton (1968, pp. 455-6), edema develops through the following mechanism. A small amount of protein filters continually into the tissue spaces, but this protein cannot be re-absorbed into the circulatory system through the capillary membrane.
the only route by which the protein can be returned to the circulatory system is through the lymphatics. If the lymphatic drainage from any area of the body becomes blocked, more and more protein collects in the local tissue spaces until finally the concentration of this protein may approach the concentration of protein in the plasma. Due to osmotic pressure principles, fluid collects in the tissue until the interstitial fluid pressure rises to a value equal to the capillary pressure. The elevated tissue pressure rapidly expands the tissue spaces with resultant edema.

Because the lymph nodes draining a cancerous area of the body must be removed in order to prevent possible spread of the cancer, the return of lymph to the circulatory system from that area will be blocked. The resultant edema that develops usually regresses in two to three months as new lymph channels develop (Guyton, 1968, p. 456). Elevation of the arm with each joint positioned higher than the more proximal joint enables gravity to remove the fluid by remaining lymphatic and venous pathways (Brunner, Emerson, Ferguson and Suddarth, 1964, p. 789). For this to be effective, it is necessary that the arm be elevated above the level of the heart. The higher the arm is raised, the easier it becomes for the fluid to escape (Sparkman, 1963, p. 558).

The rehabilitation of mastectomy patients involves the correction of the dropped shoulder and limitation of arm movement by means of a plan for daily exercises (Patterson, 1960, p. 568). According to Sparkman (1963), full restoration of movement can be
expected in one or two months. With the advice of the doctor, the patient can help herself to retrain the muscles so that she will be able to use the arm on the operated side as well as she did before the operation (American Cancer Society, 1967).

Haagensen (1960, p. 108) states that in achieving full range of motion, patients have to bear some discomfort, but this is not greater than most will tolerate. According to Brunner, et al (1964, p. 789), exercises should not be accompanied by pain, but done only to the point of pain.

According to Beland (1965, p. 987), when exercises are to be started and what type are to be used at a given point are decisions made by the surgeon. Shafer, et al (1964, p. 693) states that it is best to begin with simple exercises which are not too painful. Usually the patient is encouraged to flex and extend her fingers immediately upon return to her room even when the arm is held partly immobile in a sling. According to Higginbotham (1957, p. 1573), Beland (1965, p. 987), Wolf (1967, p. 593), and Gribbons et al (1969, p. 1946), the next step is to encourage the patient to alternately flex and extend the elbow as well as the wrist and fingers. Because movement at first is painful, arm movements should be started slowly. As soon as the doctor permits, the patient should carry on her usual activities with her arm. These include feeding herself, washing her face and hands, brushing her teeth, and combing her hair. Brunner et al (1964, p. 789), state that failure to encourage exercises such as "climbing the wall with the fingers" may
prolong disuse of the arm and promote the development of contractures.

All exercises should be bilateral and much emphasis should be placed on having the patient watch her posture in the mirror. Exercise of only one arm may be disastrous and in a short time may produce a curvature of the spine which will disfigure a woman for her lifetime as well as limit her activities (Wolf, 1967, p. 594; Smith, 1950, p. 336).

According to Alexander (1957, p. 1572), the patient must be helped to realize that to regain complete use of her arm in the future, she must begin to use it within 24 hours postoperatively. Soon after her return home, she should gradually begin to assume her household duties because, as she works, she will use her arm. Beland (1965, p. 987) stated that as the patient returns to normal activity the need for special exercises is lessened.

Exercises taught in the hospital should incorporate muscle groups used to perform actual household activities so that the patient returns to her home as nearly normal as possible following discharge. Wall climbing with fingers could become reaching up and placing dishes on a shelf, or cleaning a window with a circular motion, or dusting under a table or chair. Other activities that will put the patient's arm and shoulder through complete range of motion include sweeping, vacuuming, gardening, pulling out and pushing in drawers, mopping the floor, raising windows, hanging clothes, washing and drying dishes, buttoning a blouse that fastens in the back, and setting the hair. For the business woman typing is excellent. For the woman with leisure, such activities as piano playing, golfing,

Despite the implicit and explicit claims in the above literature concerning the efficacy of exercises, a survey of the literature, using indices to nursing and medical literature, has failed to reveal a study where the claims are substantiated.

The purpose of this study was to determine if a rehabilitation program for mastectomy patients consisting of routine graduated and supervised exercises started postoperatively in the hospital would significantly prevent or lessen lymphedema and also help the patient regain full range of motion. By comparing an experimental group with a control group, the investigator wanted to determine if patients receiving a planned exercise routine had a more complete return to usual activities than patients receiving routine hospital care.

The hypotheses formulated for this study were:

Null hypothesis. Special predischarge care and teaching given to mastectomy patients will not influence their recovery and return to their usual activities.

Experimental hypothesis. Special predischarge care and teaching given to mastectomy patients will significantly influence recovery and return to their usual activities.
CHAPTER II

METHOD

For clarification, the following terms are defined (American Academy of Orthopaedic Surgeons, 1965):

**Definition of Terms**

- **Flexion**—is a decrease in the angle between adjoining bones.

- **Extension**—is an increase in the angle between adjoining bones.

- **Pronation**—the elbow is flexed to a 90 degree angle. Rotate the palm downward.

- **Supination**—the elbow is flexed to a 90 degree angle. The forearm is rotated palm upward.

- **Elbow Flexion**—the elbow joint is moved through the sagittal plane until the palm of the hand nearly touches the shoulder.

- **Elbow Extension**—the elbow is moved through the sagittal plane from flexed position to the extended anatomical position.

- **Sagittal Plane**—is a plane parallel to the longitudinal axis of the body which passes through the body from front to back dividing it into a right and left part.

- **Coronal Plane**—is a plane parallel to the longitudinal axis of the body passing through the body from side to side dividing it into an anterior and a posterior part.

- **Shoulder Forward Flexion**—is the forward upward motion of the arm in the anterior sagittal plane of the body, from zero to 180 degrees.

- **Backward Extension**—is the upward motion of the arm in the posterior sagittal plane of the body from zero to approximately 50 degrees.
Shoulder Abduction & Adduction--abduction is the upward motion of the arm away from the side of the body in the coronal plane, from 0 to 180 degrees. Adduction is the opposite motion of the arm toward the midline of the body.

Goniometer--is an instrument with two indicators on an arm used to measure a straight line or angles. Accuracy of this device is limited.

The study took place from June 1 to August 30, 1969, in a 450 bed general hospital. The sample consisted of a total of 10 female patients who had had radical mastectomies following breast biopsies and frozen sections which revealed malignant growths. The patients were alternately placed in a control or an experimental group. There were no age restrictions.

Each patient in the experimental group was seen one day postoperatively. The researcher explained that she would demonstrate daily exercises which would help prevent edema and limitation of motion. All five patients agreed to perform exercises as demonstrated.

Certain exercises were introduced in a specific order on the experimental group. Description of the exercises is presented in Appendix A.

The first exercises were very simple, performed slowly, and where possible, bilaterally. Instructions were given to repeat each set of exercises once again during the day. They were also instructed to elevate the arm on the affected side above the level of the heart during bed rest.

The patient was also asked to do as much self care as
possible every day. When exercises were introduced, equivalent home activities were mentioned which could supplement or replace these formal exercises when the patient was discharged from the hospital.

The following procedure was used:

**First day:**

1. Flexion and extension, abduction and adduction of the fingers 10 times.
2. Flexion and extension of the wrist 10 times.
3. Radial and ulnar deviation 10 times.
4. Elbow flexion and extension with arm at the side 10 times.

**Second day:**

The above exercises were increased to 15 times each.

Introduced were:

5. Forward flexion and backward extension of the shoulder in the sagittal plane 10 times.
6. Abduction and adduction of the shoulder in the coronal plane 10 times.

**Third day:**

All preceding exercises were performed 15 times each.

Introduced were:

7. Rope turning exercise 5 times in one direction, then reversed and repeated 5 times.
8. Pendulum swing 5 times (limited as forward position tended to make patient dizzy).
9. Hair brushing (propping the affected arm and having the patient hold head erect and brush as much of her hair as she could comfortably reach).

*Fourth day:*

All preceding exercises were performed 15 times each except pendulum swing which was limited to 10 times. The following were introduced and each done 5 times:

11. Forehead touch.
12. Elbow pull in.
13. Internal rotation of shoulder posteriorly (back scratcher).
15. Arm bending.

*Fifth, sixth and seventh days:*

All preceding exercises were performed 10 times each.

The prop was removed during hair brushing and the patient urged to brush or comb as much of her hair as she could comfortably reach while holding the head erect.

The daily degree of flexion, extension and abduction was measured by use of the goniometer and recorded (American Academy of Orthopaedic Surgeons, 1965). The level of other exercises were also recorded. See Appendix B for Data Sheet for Exercises in Experimental Groups.

Four doctors allowed all the daily exercises as proposed. One doctor would not allow any exercise requiring abduction of the
operated arm to be started until the third postoperative day. Abduction exercises were then added and done to the degree that this patient was using her arm in abduction for her daily activities.

Arm dressings were removed by the third postoperative day. A check was made for possible edema in the following way: Reference points six inches above the elbow were used to measure the circumference of both the right and left arms of each patient. Theoretically, an increase in normal size would indicate the presence of edema. This measurement was used as a base line for comparison in one month.

No exercises were introduced to the control group, however, each patient in this group was visited prior to discharge from the hospital. The purpose of the visit was to acquaint the patient with the researcher and to obtain permission to make a postdischarge home visit. Exercises had been demonstrated by the hospital rehabilitation team to three of these patients, with an accompanying booklet of explanation. The other two patients received no instructions of exercises. These five patients were performing self care activities, however, they denied performing any other exercises.

An explanation was made to the patients in both groups that the purpose of the home visit would be to evaluate the return of function to the operated side. Permission to make a home visit was granted by all 10 patients.

In order to determine whether patients had returned to their usual activities, researcher chose an arbitrary time limit of
one month to allow patients sufficient time for recovery.

A home visit was made to each of the 10 patients. Measurements were taken and recorded as follows: The degrees of flexion, extension, and abduction were measured by use of the goniometer; right and left arm circumferences were measured; questions were asked in relation to self-care, household activities, social interaction, and employment. The purposes of the measurements were to check for edema, limitation of arm movement, and return to usual activities.
CHAPTER III

RESULTS

The findings of this study revealed that when flexion, extension and abduction exercises were introduced to the experimental group, all patients were sharply limited in this range of motion. The mean range of motion for each day in the hospital is presented in Table 1. The range of forward flexion was 45 to 70 degrees, backward extension 20 to 25 degrees, and abduction 30 to 40 degrees. After seven days of supervised exercises, the range of motion for these movements was increased, but still less than normal. On the seventh day, the range of forward flexion was 120 degrees to 140 degrees, backward extension 40 to 50 degrees, abduction 115 to 120 degrees. The patient who was restricted in abduction for three days showed a 1/2 inch increase in arm circumference on the third day. A tolerable discomfort was noted with all exercises. The discomfort diminished by the seventh day. After seven days of exercises, all patients were to a comparable degree and level of achievement.

One month postdischarge, comparisons were made between the control and experimental groups. No patient was found with an increase in arm circumference. All patients in both groups could reach to 180 degrees of forward flexion and 60 degrees of backward extension. Nine of the patients could reach to 180 degrees of abduction while one patient was limited to 165 degrees. This
TABLE 1
Changes in Forward Flexion, Abduction and Backward Extension for the Experimental Group

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<th>Day 2</th>
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<th>5</th>
<th>6</th>
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<tr>
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<td>65</td>
<td>86</td>
<td>105</td>
<td>108</td>
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patient was in the experimental group and had participated in the hospital exercises. All 10 patients could reach to the opposite scapula in interior rotation of the shoulder posteriorly.

Further findings revealed that all 10 patients were performing all self care activities. Each patient had returned to her previous level of household, recreational, and social activities. Three patients had returned to gainful employment.

The study indicated there were no measurable differences between the patients in the experimental group who received a planned exercise routine and the control group who had no planned exercise routine.
CHAPTER IV

DISCUSSION

Although there were no measurable differences found between the control and the experimental groups there were some interesting findings which may be of value in determining whether planned and supervised postoperative exercise for mastectomy patients will be of value.

The findings in the experimental group indicated that even though a planned exercise routine was carried out, full range of motion was not reached at the end of seven days. However, marked improvement was noted. To determine whether reduction would be greater in a non-exercised group, measurements would have to be taken on this group at comparable times.

Results of the study indicated that 30 days following surgery there were no differences between patients who were exercised and those who were not. Significance was sharply limited due to the small number of patients and other controls which may affect limitation of motion and edema such as: age, different operative procedures, emotional status, interests, demands, and responsibilities placed on the patients.

Facts of interest were: Even though the control group did not participate in a planned exercise program, these patients all had full range of motion one month after discharge from the hospital. Four patients in the experimental group had full range of motion but
the fifth was limited in abduction to 165 degrees. The patient in the experimental group who had an indication of edema on the third postoperative day, showed no evidence of edema one month after discharge. The social history of the patients provides possible indices to these facts.

The ages of the patients in the experimental group ranged from 35 to 73. Four were married and one patient, age 73, was widowed. This patient was the oldest in either group, widowed only 9 months and very despondent. Subjective observation by researcher revealed that she had exhibited little interest in household or social activities since the death of her husband. At the end of one month she was still dutifully performing the exercises learned in the hospital. This was her main form of exercise, for she rarely dressed in anything but a housecoat, cooked very little, had no leisure interest, performed only minimal household duties, and had no social activity.

The other four patients in this group had replaced hospital exercises with other activities which used similar motions. One patient had a teen age child, one pre-teen and teen age children. One month after discharge, two patients had recently returned to former employment, one as a typist, one as a store clerk. Another patient had resumed full care of her 9 month old baby, in addition to care of her other children. These four patients had resumed all household activities necessary to care for a family. In addition they had resumed social and leisure activity which varied from person
to person depending on interests.

The ages of the patients in the control group ranged from 47 to 67. Two patients had teen age children. Four were married and one patient, age 67, had been widowed for seven years. This patient had children and grandchildren who visited her often. She was also interested and active in church functions. One patient had a semi-invalid husband and from financial necessity, had recently returned to her occupation as power sewing machine operator.

Subjective questioning of patients in the control group revealed that while in the hospital, all had used the arm of the operative side for self care activities. None had exercised in any other manner. At the interval of one month, all five patients had assumed the duties necessary to care for a family, as well as to pursue the social and recreational activities of interest to them.

Appendices C and D present range of motion, household, and social activities of experimental and control groups at 30 days postoperative.

All patients, in both groups, complained of tenderness in the operative area but denied letting this restrict the use of the arm. Therefore, they were using the arm of the operative side freely in performing their activities.

Questions posed to patients in both groups at the one month interval indicated that return to activities had been gradual and varying according to the individual. In order to determine whether this return was more rapid in one group than the other, measurements
would have needed to be taken on all patients at more frequent intervals.

There was an implication that a social history might serve as a guideline in determining which patients might benefit most from an exercise program. When the patient lives alone, has little motivation and no demands for activity, exercises may be very vital in helping this patient prevent possible loss of arm movement.

If exercises are not going to significantly alter the degree to which the patient uses her arm postoperatively, it may be a waste of nursing time to routinely exercise all mastectomy patients. It is possible that nursing time would be better utilized and more beneficial if it were used in interviewing and observing the patient to determine what the patients needs are and adjusting teaching to fit the needs.

There are indications that further study may be beneficial in determining which type of patient might need to be included in planned postoperative routine exercises. In order to arrive at valid and significant results, recommendations for further study would include:

1. A larger sample of patients be used.
2. Several hospitals be used since routine postoperative care may vary from hospital to hospital.
3. Group the patients to particular doctors and restrictive age groups.
4. Take daily measurements on the control group.
5. Take postdischarge measurements on all patients at more frequent intervals in addition to the one month measure.

6. Include a competent nursing assessment of patient which identifies emotional needs, motives, and responsibilities.
REFERENCES


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APPENDIX A

EXERCISES

Standard Position For All Exercises

1. Stand erect with head high and arms at your side.
2. Place feet hip width apart for balance.
3. Flatten abdomen—avoid hollow back.
4. Low heeled shoes or stocking feet for better balance.

Hand Wall Climbing

1. Start in standard position, facing wall, with toes as close to wall as possible.
2. Bend elbows and place palms against the wall at shoulder level.
3. Work both hands up the wall parallel to each other until arms are fully extended.
4. Work hands down to shoulder level.
5. Return to standard position. Rest and repeat.

(It will relax you a bit if you rest your head against the wall.)

Equivalent activities: Hanging clothes on a line, washing windows, fixing closet shelves.
Rope Turning

Equipment: A 6-foot clothesline rope or 6 feet of bandage, 3" wide, tied to a door knob with a double knot. This exercise may seem difficult to do at first but will be easier in a few days.

1. Stand four feet away from the door in standard position. Face door.

2. Take the loose end of the rope in the hand on your operated side. Make a knot to put between your third and fourth fingers.

3. Place the other hand on your hip to help your balance.

4. Extend arm forward on your operated side. (Do not bend elbow or wrist.) Turn rope in small circle at first and gradually work into as wide a swing as possible.

5. Rest and repeat given number of times.

(Try the same exercise with your other arm occasionally.)
**Pendulum Swing**

1. Start in standard position. Bend forward from the waist, allowing arms to hang toward the floor by gravity.

2. Swing both arms together, describing an arc from one shoulder to the other. Do not bend elbows. Keep arms parallel.

3. Return to standard position and allow arms to fall to sides. Rest and repeat.

Equivalent activities: Sweeping.
Forehead Touch

1. In standard position, face wall at arm's length distance. Place hands against the wall at shoulder level, parallel to each other.

2. Slowly bend elbows, leaning forward until forehead touches wall.

3. Straighten elbows slowly, pushing body away from wall.

4. Return to standard position. Rest and repeat.

NOTE: Keep head, trunk and legs in straight line throughout exercise.
Elbow Pull-In

1. In standard position, extend arms sideways to shoulder level.

   In rhythm:

2. Bend elbows clasping fingers at back of your neck.

3. Pull elbows in toward each other until they touch.

4. Return to position (2) with elbows bent--fingers clasped at back of neck.

5. Unclasp fingers and extend arms sideways at shoulder level.

6. Return to standard position. Rest and repeat.

Equivalent activities: Fastening necklace, putting bobby pins in hair for pin curls.
Back Scratcher

1. Start in standard position.

2. Place hand of unoperated side on your hip for balance.

3. Bend elbow of arm on operated side until your fingertips reach your shoulder blade—opposite side.

4. Return to standard position. Rest and repeat.

Equivalent activities: Buttoning a blouse which fastens in the back, fastening your bra, washing your back.
Arm Bending

1. In standard position extend arms sideways to shoulder level.

   In rhythm:

2. Bend elbows, touching fingers at back of neck.
3. Extend arm sideways to shoulder level.
4. Bend elbows, touching fingers at back of waist.
5. Return to standard position, rest and repeat.

Equivalent activities: Drying back with bath towel.
Pulley Motion

Equipment: A 6-foot rope or 6 feet of bandage, 3" wide; a shower rod or similar rod above your head. Place knots in rope at ends and at two intervals (see drawing).

1. Toss the rope over the rod.
2. Stand directly behind the rope in standard position.
3. Hold the ends of the rope in each hand with knots between your third and fourth fingers and raise arms sideways.
4. Using see-saw motion and with arms stretched sideways, slide the rope up and down over the rod, until the knots in the rope touch the rod.
5. Return to standard position, rest and repeat.
6. Do not bend at the waist. Keep your feet flat on the floor during this exercise.

Equivalent activities: Drying back with bath towel, pulling venetian blinds, or adjusting window shades.
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<td>Forward Shoulder Flexion</td>
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<td>Hair Brushing with Prop</td>
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<td>Arm Bending</td>
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<td>Arm Circumference</td>
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</tr>
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<td>Pulley Motion</td>
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## APPENDIX C

Range of Motion, Household and Social Activities
of Experimental Group at 30 Days Postoperative

<table>
<thead>
<tr>
<th></th>
<th>Patient A</th>
<th>Patient B</th>
<th>Patient C</th>
<th>Patient D</th>
<th>Patient E</th>
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<tbody>
<tr>
<td><strong>Age</strong></td>
<td>35</td>
<td>44</td>
<td>52</td>
<td>63</td>
<td>73</td>
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<td><strong>Marital Status</strong></td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>Widow</td>
</tr>
<tr>
<td><strong>Number of Children at Home</strong></td>
<td>3</td>
<td>1</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td>Housewife</td>
<td>Housewife &amp; Typist</td>
<td>Housewife &amp; Clerk</td>
<td>Housewife</td>
<td>Housewife</td>
</tr>
<tr>
<td><strong>Abduction &amp; Adduction of Shoulder--Coronal Plane</strong></td>
<td>180°</td>
<td>180°</td>
<td>180°</td>
<td>180°</td>
<td>165°</td>
</tr>
<tr>
<td><strong>Sagittal Plane:</strong></td>
<td>180°</td>
<td>180°</td>
<td>180°</td>
<td>180°</td>
<td>180°</td>
</tr>
<tr>
<td><strong>Flexion</strong></td>
<td>60°</td>
<td>60°</td>
<td>60°</td>
<td>60°</td>
<td>60°</td>
</tr>
<tr>
<td><strong>Extension</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Internal Rotation of Shoulder Posteriorly</strong></td>
<td>to scapula</td>
<td>to scapula</td>
<td>to scapula</td>
<td>to scapula</td>
<td>to scapula</td>
</tr>
<tr>
<td><strong>Self Care i.e., Button &amp; Zip Dress in Back--Wash &amp; Set Hair</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>except hair</td>
</tr>
<tr>
<td><strong>Movies, Church, Dancing</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td><strong>Have friends in--go to friends house</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td><strong>Cook, Vacuum, Dust, Sweep, Hang clothes, Sew, Iron</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>little</td>
</tr>
<tr>
<td><strong>Wash Windows and/or Walls, Garden, Paint</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td><strong>Play Piano, Golf, Swim</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>no</td>
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<tr>
<td><strong>Arm Circumference</strong></td>
<td>11&quot;</td>
<td>12&quot;</td>
<td>12 1/2&quot;</td>
<td>15 1/2&quot;</td>
<td>13 1/2&quot;</td>
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<tr>
<td><strong>Right</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Left</strong></td>
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## APPENDIX D

Range of Motion, Household and Social Activities
of Control Group at 30 Days Postoperative

<table>
<thead>
<tr>
<th></th>
<th>Patient F</th>
<th>Patient G</th>
<th>Patient H</th>
<th>Patient I</th>
<th>Patient J</th>
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<td>54</td>
<td>56</td>
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<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>Widow</td>
</tr>
<tr>
<td><strong>Number of Children at Home</strong></td>
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<td>0</td>
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<tr>
<td><strong>Occupation</strong></td>
<td>Housewife</td>
<td>Housewife</td>
<td>HW &amp; pwr sew</td>
<td>Housewife</td>
<td>Housewife</td>
</tr>
<tr>
<td><strong>Abduction &amp; Adduction of Shoulder—Coronal Plane</strong></td>
<td>180°</td>
<td>180°</td>
<td>180°</td>
<td>180°</td>
<td>180°</td>
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<tr>
<td><strong>Saggital Plane:</strong></td>
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<td></td>
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</tr>
<tr>
<td>Flexion</td>
<td>180°</td>
<td>180°</td>
<td>180°</td>
<td>180°</td>
<td>180°</td>
</tr>
<tr>
<td>Extension</td>
<td>60°</td>
<td>60°</td>
<td>60°</td>
<td>60°</td>
<td>60°</td>
</tr>
<tr>
<td><strong>Internal Rotation of Shoulder Posteriorly</strong></td>
<td>to opposite scapula</td>
<td>to opposite scapula</td>
<td>to opposite scapula</td>
<td>to opposite scapula</td>
<td>to opposite scapula</td>
</tr>
<tr>
<td><strong>Self Care i.e., Button &amp; Zip Dress in Back—Wash &amp; Set Hair</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Movies, Church, Dancing</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td><strong>Have friends—in—go to friends house</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Cook, Vacuum, Dust, Sweep, Hang clothes, Sew, Iron</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td><strong>Wash Windows and/or Walls, Garden, Paint</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Play Piano, Golf, Swim</strong></td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td><strong>Arm Circumference</strong></td>
<td></td>
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<tr>
<td>Right</td>
<td>12 1/2&quot;</td>
<td>13 1/2&quot;</td>
<td>14 1/2&quot;</td>
<td>14&quot;</td>
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<td>Doris Jenkins Pike</td>
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| Elementary School | Newton Grade School  
Newton, Utah |
| Secondary School | North Cache High School  
Richmond, Utah |
| University | Idaho State University  
Pocatello, Idaho  
1966-1968 |
| Degree | B. S. Idaho State University  
Pocatello, Idaho, 1968 |
| Certificates | R. N., Thomas D. Dee Memorial Hospital  
Ogden, Utah, 1945  
State registration to practice nursing in Utah, Idaho, Wisconsin, and Washington |
| Professional Organizations | American Nurses' Association  
Utah State Nurses' Association |
| Professional Positions | Staff Nurse, 1945  
Thomas D. Dee Memorial Hospital.  
Office Nurse, 1946  
Dr. W. R. Rumel, Salt Lake City.  
Head Nurse, 1947-1949  
L.D.S. Hospital, Salt Lake City.  
Staff Nurse, 1949  
Student Infirmary, Madison, Wisc.  
Staff Nurse, 1950  
L.D.S. Hospital, Salt Lake City.  
Head Nurse, 1951  
St. Joseph's Hospital, Tacoma, Wash.  
Public Health Nurse, 1952  
Logan, Utah.  
Head Nurse, 1953-1954  
L.D.S. Hospital, Idaho Falls, Idaho.  
Public Health Nurse, 1959-1960  
Idaho Falls, Idaho. |
Head Nurse, 1964-1965
L.D.S. Hospital, Idaho Falls, Idaho.
Medicare Nurse, 1965-1966
Idaho Falls, Idaho.
Head Nurse, 1968
Idaho Falls, Idaho.
Staff Nurse, 1969
L.D.S. Hospital, Salt Lake City