NURSES' KNOWLEDGE OF POSITIONING OF THE ACUTE STROKE PATIENT FOR THE PREVENTION OF CONTRACTURES

by

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ABSTRACT

The purpose of this study was to assess the knowledge of a sampling of baccalaureate and associate degree registered nurses concerning positioning of the acute stroke patient for the prevention of contractures.

Two data instruments were developed: (1) a checklist of joint positions for the examiner's use as nurses positioned a model patient and (2) a questionnaire containing 29 multiple-choice items on prevention and significance of contractures. The instruments were evaluated by a panel of 10 rehabilitation experts for validity and technical accuracy, then were revised as suggested. Ease and reliability of scoring of the checklist were tested.

The sample included 15 baccalaureate and 15 associate degree nurses in staff or head nurse positions, employed on medical, neurological, and surgical intensive care units of Latter-day Saints Hospital and University Hospital in Salt Lake City. The sample was selected on the basis of availability and willingness to participate. Of the 30 nurses, 22 were full-time employees. Length of professional experience ranged from 1 to 12 years; the mean was 3.1 years. Length of experience with stroke patients ranged from 0 to 12 years; the mean was 2.2 years.

Positioning demonstrations with a model patient were conducted under standard conditions on the units. Questionnaires were completed following the demonstrations.

Scores for the checklist (possible 24 points) included a range of 9 to 21, a mean and median of 17, and a standard deviation of 2.86. Scores for the questionnaire (possible 29 points) included a range of 13 to 24, a mean and median of 18, and a
standard deviation of 3.08. Independent \( t \) tests were not significant.

The Pearson \( r \) for checklist scores and length of professional experience was \(-.476\); the \( r \) for checklist scores and length of experience with stroke patients was \(-.668\). Both values, with 28 degrees of freedom, were significant at \( p < .01 \).

Pearson \( r \) correlations were not significant for questionnaire scores and length of experience nor for questionnaire scores and checklist scores. Chi-square tests for checklist scores and questionnaire subscores also were not significant.

Item analysis of the questionnaire revealed a positive discrimination power of 28 of the 29 items, indicating internal consistency of the questionnaire. The Pearson \( r \) for significance ratings and the number of correct responses to items was not significant.

Frequency distributions of joint positions and of positioning aids used during the demonstrations plus the scores on the checklist and the questionnaire indicated that the sample significantly lacked knowledge of the purpose of positioning, of functional positions, of the use of a variety of positions, and of the use of positioning aids.

Beginning validity of the two instruments was established. A repeat of this study and an enlargement of the study to include a sample of baccalaureate, diploma, and associate degree nurses; licensed practical nurses; and aides were indicated.
CHAPTER I
INTRODUCTION

It has been estimated that there are over two million hemiplegic persons living in the United States (Ramey, 1967) and that each year almost a quarter of a million additional persons become hemiplegic as a result of cerebrovascular accidents, or strokes (Peszczynski, 1963). It has also been estimated that with proper care up to 80% of stroke patients can be rehabilitated relatively well, achieving ambulation and independence (Martin, 1965).

The ultimate success or failure of rehabilitation is often determined not by the extent of paralysis caused by the stroke but by the presence or absence of preventable complications (Krusen, Kottke, & Elwood, 1965, p. 529). Contractures and deformities occur in stroke patients unless preventive measures are initiated early and continued (Beland, 1965, p. 1263).

Rehabilitation of the hemiplegic patient begins with proper positioning in bed (Krusen et al., 1965, p. 529). Because proper positioning of stroke patients helps prevent musculoskeletal complications, it is "probably the single most important nursing technique" (Large, Tuthill, Kennedy, & Pozen, 1969, p. 80).

A master's thesis by Klassen (University of Utah, 1964) indicated that proper positioning, range of motion exercises, and encouragement of self-care activities and ambulation by nurses decreased the number of dependent days of hospitalized stroke patients.

Nevertheless, according to De Forest (1966, p. 92), many nurses maintain their patients in poor postures in an effort to promote patient comfort. Guerrieri (1968) reported that field studies for masters' theses at Boston University had
revealed that proper bed positioning was not carried out in the daily care of the hemiplegic patient.

Guerrieri (1968) surveyed nurses' knowledge of positioning of stroke patients, using an original questionnaire containing drawings of a hemiplegic patient in poor back-, side-, and face-lying positions. Nurses were asked to describe how they would correct the positions, to list the aids they would use, and to explain what complications would be prevented. Results indicated a general lack of knowledge.

Implications of the lack of knowledge of positioning of stroke patients are serious. Therefore, the present study was done (1) to develop a more objective method of studying nurses' knowledge of positioning of acute stroke patients and (2) to conduct in Salt Lake City a pilot survey of such knowledge. The writer believed (1) that a demonstration of positioning by nurses would be more valid and reliable than a paper-and-pencil test for positioning and (2) that an objective test would be more valid and reliable than an essay test.

Proper positioning of stroke patients can prevent many complications, involving circulatory, respiratory, and musculoskeletal systems. However, the present study was limited to positioning for the prevention of contractures—limitations of range of motion produced by the shortening of soft tissues around the joints (Hirshberg, Lewis, & Thomas, 1964, p. 15).

Contractures are a serious problem with stroke patients and are prone to develop for several reasons. Flaccid paralysis produces immobility. Immobility causes the loss of the full range of shortening and lengthening of muscle fibers (Edmonds, 1967); it also causes formation of dense connective tissue instead of loose areolar connective
tissue around the joints, especially in the presence of edema or trauma (Kottke, 1966). Edema formation is promoted by the loss of the normal pumping action of the muscles, which normally assists venous return and lymphatic drainage (Large et al., 1969).

Another cause of contractures besides the immobility produced by flaccid paralysis is the maintenance of faulty positions. Positions of flexion and adduction are frequently maintained because flexor and adductor muscles are stronger than extensors and abductors, respectively, and because such positions promote comfort (Beland, 1965, p. 1263). These positions are accentuated with spastic paralysis, due to the action of hypertonic muscles. Flexion is increased by the pull of gravity, especially in the presence of muscular weakness (Morrissey, 1962). Normally an upright person locks his hips and knees in extension to bear the weight of the body with the least amount of muscular exertion, but when a person is placed in bed, the iliofemoral ligament relaxes and the hip assumes a position of slight flexion and external rotation. A soft bed and a pillow under the knees increases the hip flexion (Browse, 1965, p. 109).

"Probably the main cause of contracture of which the nurse must ever be cognizant is that of prolonged immobilization of a joint in one position" (Edmonds, 1967).

Characteristic deformities which may develop in the hemiplegic patient include: adduction and internal rotation of the shoulder; flexion of the elbow, wrist, and fingers; external rotation and flexion of the hip; flexion of the knee; and plantar flexion and inversion of the ankle (Novak, 1965).

Contractures set back rehabilitation of the hemiplegic patient, sometimes permanently (De Forest, 1966, p. 96). Footdrop postpones the wearing of shoes and
delays walking exercises (Goode, 1966). Fixed external rotation of the hip causes a limp and instability of gait (Hirschberg et al., 1964, p. 199). A knee flexion contracture of greater than 20 degrees means a hemiplegic patient can seldom learn to walk, to transfer unassisted, nor to dress himself (Peszczynski, 1963). In the presence of lower extremity weakness, hip flexion contractures are the major deterrents to ambulation for hemiplegic patients (Krusen et al., 1965, p. 449). According to Hirschberg et al. (1964, p. 199), "the patient with hip and knee flexion contractures cannot become ambulatory at all and at best will be condemned to a wheelchair for life." A frozen shoulder causes great pain and discomfort as well as limiting function of the arm. Contractures of elbow, wrist, and fingers detract from personal appearance and interfere with dressing and self-care activities. Time, money, and emotions are affected by contractures (Covalt, 1958). Contractures may totally incapacitate the hemiplegic patient (Knapp, 1959).

Prevention of contractures is much easier than treatment of contractures (Edmonds, 1967). Loss of motion may be produced in as little as three days (Kottke, 1966). Once contractures are well established, it is practically impossible to reverse their formation (Hirschberg et al., 1964, p. 199). Surgical intervention or prolonged mechanical stretching may be required to correct contractures (Edmonds, 1967). Nursing measures to prevent deformities and other complications should be done with or immediately after the intensive life-saving measures (Allgire & Denney, 1960, p. 12).

The aim of positioning is the prevention of contractures and deformities (Krusen et al., 1965, p. 529; Novak, 1965; Tyler, 1960). Emphasis should be placed on
overcoming characteristic bed positions (Newell, 1966). Functional positions should be assumed the majority of the time, since such positions could permit normal activity even if the joint were ankylosed (Wiebe, 1961, p. 87). Emphasis should be placed not on proper body alignment but rather on mobility and maintenance of function (Edmonds, 1967). "No matter how perfect positioning may be in terms of good posture, it will avail nothing if it is maintained for too long a period of time" (Morrissey, 1962, p. 60). Positioning should be dynamic; no part of the body should remain static (De Forest, 1966, p. 104).

Optimal bed positions for the hemiplegic patient have been described by the following medical and nursing publications: American Rehabilitation Foundation (1962), Krusen et al. (1965), Large et al. (1969), Madden & Affeldt (1962), and U. S. Public Health Service (1962).

**Positions of the lower extremity.** In the supine position: The hips are maintained in extension, and a trochanter roll maintains neutral alignment (no rotation). Knees are extended. A footboard keeps the ankles bent at a 90 degree angle. Heels extend over the end of the mattress or a roll is placed under the ankles to reduce pressure on the heels.

In the side-lying position: A rest position is assumed with the hips and knees flexed, though the lower, unaffected leg may be nearly straight. The ankles may be relaxed in plantar flexion if supported in neutral alignment in supine and prone positions. The entire upper leg is supported by pillows.

In the prone position: Hips and knees are placed in extension with the feet over the mattress and against the footboard, or the knees are flexed by placement
of a pillow under the legs from knees to ankles.

**Positions of the upper extremity.** In the supine position: The wrist is in dorsiflexion. A hand roll maintains slight flexion of the fingers and opposition of the thumb. Alternate positions as follows should be used each day. (1) The affected arm is abducted 90 degrees with the elbow flexed and the forearm pronated, supported by a pillow at the side of the patient. The shoulder is in internal rotation. (2) The arm is abducted 90 degrees with the elbow flexed and the forearm supported by a pillow above the shoulder, providing external rotation of the shoulder. (3) The arm is abducted slightly and extended in supine position or prone position. When the forearm is supine, a roll under the wrist maintains dorsiflexion of the wrist. When the forearm is prone, the fingers may be extended for a change.

In the side-lying position: Dorsiflexion of the wrist, slight flexion of the fingers, and opposition of the thumb are maintained. (1) The elbow is flexed, and the arm is supported on a pillow in front of the patient's trunk. (2) The elbow is flexed, and the arm is abducted slightly and placed on a pillow behind the trunk.

In the prone position: Small, firm pads are placed under the shoulders to maintain adduction of the shoulder girdle. (1) The arm is abducted 90 degrees with the elbow flexed. The arm rests in pronation above the shoulder, providing external rotation of the shoulder. A hand roll maintains the dorsiflexion of wrist, slight flexion of fingers, and opposition of thumb; or the wrist and fingers may be extended for a change in position. (2) The arm is extended in slight abduction. When the arm is prone, the wrist is in neutral alignment. When the arm is supine, a hand roll maintains wrist dorsiflexion.
CHAPTER II

METHOD

This study was designed to support methodological and descriptive aims. It included: (1) the development of two instruments and (2) a pilot survey. The two instruments developed were: (1) a checklist of joint positions for use by the examiner during each nurse's demonstration of knowledge of positioning of stroke patients and (2) a questionnaire containing items on prevention and significance of contrac-

tures.

Checklist of joint positions. The checklist was constructed on the basis of the positions described by the following medical and nursing publications: American Rehabilitation Foundation (1962), Krusen et al. (1965), Large et al. (1969), Madden & Affeldt (1962), and U. S. Public Health Service (1962).

The original checklist was submitted to a panel of 10 rehabilitation experts to help establish the validity of the tool. The panel was composed of 1 physiatrist, 1 neurosurgeon, 2 physical therapists, 1 nurse-physical therapist-educator, 1 nursing educator, and 4 nurse specialists (2 in rehabilitation nursing, 1 in stroke care, and 1 in medical-surgical nursing).

The checklist was revised as suggested for technical accuracy. The final check-
list (Appendix A) consisted of the alignment of joints which may be observed in cor-
rect positioning in the general positions of supine, side-lying, and prone.

For scoring, each check was circled by the examiner as the joint alignment was assumed the first time during the positioning demonstration. For each circle, 1 point was allocated, making the total possible score 24 points. Ease of scoring and reli-
ability of scoring were tested by independent scoring of the first three demonstrations
by the examiner and by a nurse specialist. All points of discrepancy were removed with clarification of the definition of joint positions. Reliability of the checklist itself was not further tested.

**Development of the questionnaire.** The original questionnaire consisted of 31 multiple-choice items. Content was taken from the following medical and nursing publications: Allgire & Denney (1960), American Rehabilitation Foundation (1962), Beland (1965), Covalt (1958), De Forest (1966), Edmonds (1967), Hirschberg et al. (1964), Kottke (1966), Krusen et al. (1965), Morrissey (1962), Novak (1965), U. S. Public Health Service (1962), and Wiebe (1961).

The questionnaire was submitted to the above panel of 10 rehabilitation experts for (1) choice of correct response and (2) a significance rating of each item. Items were rated as significant to the nurse caring for acute stroke patients, according to the following scale: 4 - of great significance; 3 - of moderate significance; 2 - of little significance; and 1 - of no significance.

Only 1 of 31 items received a mean rating of less than 2.9; it was deleted from the test. Of the 30 significant items, 19 received 80% to 100% agreement on correct response and were retained without change. Revisions for technical accuracy and clarity were made in 9 items. Because revisions on 2 original items were very difficult, 1 new item covering the same significant content was substituted. All revisions were approved by the nurse-physical therapist-educator of the panel.

The revised questionnaire (Appendix B) consisted of 29 multiple-choice items. One point was assigned to each correct response for a total of 29 points possible. Reliability of the questionnaire was not tested. Distribution of items according to
Position of head and trunk. In supine, side-lying, and prone positions, the head should be in neutral alignment or slightly flexed. In the supine position, a small pad is placed under the lumbar curve when the knees are extended, particularly if there is marked lordosis. In the prone position, a small pillow is placed under the abdomen for support of the normal curvature of the spine, especially in the presence of weak abdominal muscles.

The questions asked by the present study were: Do nurses possess knowledge of these correct positions? Do they know a variety of correct positions?

The major objective of the present study was to determine if a sampling of baccalaureate and associate degree registered nurses in Salt Lake City knew how to correctly position hemiplegic patients for the prevention of contractures. Contributing objectives were to examine the nurses' purposes in positioning, to study the nurses' knowledge of contracture prevention, and to assess the nurses' understanding of the significance of contractures.
Objectives was as follows:

**Objectives**

**Prevention of contractures:**

1. Determine purpose of positioning.
2. Evaluate specific positions.
3. Discuss aids to positioning.
5. Discuss general measures to prevent contractures.
6. Specify which contractures are prone to occur.
7. Explain why contractures are prone to occur.

**Significance of contractures:**

8. Analyze effects of contractures.
9. Describe the difficulty of correcting contractures.

Sample. The sample for the pilot survey was restricted to baccalaureate and associate degree registered nurses, selected according to availability and willingness to participate in the study. The sample was obtained from medical and neurological units at Latter-day Saints Hospital (a 545-bed private hospital, hereafter indicated as L.D.S. Hospital) and from medical, neurological, and surgical intensive care units at University Hospital (269 beds) in Salt Lake City. The distribution was: 10 B.S. nurses and 10 A.D. nurses from L.D.S. Hospital; and 5 B.S. nurses and 5 A.D. nurses from University Hospital.
All 30 nurses were involved with direct patient care, functioning as staff or head nurses. The sample consisted of 22 full-time nurses and 8 part-time nurses. The range of length of professional experience (Appendix C) was 1 to 12 years; the mean was 3.1 years. The length of experience with stroke or hemiplegic patients ranged from 0 to 12 years; the mean was 2.2 years.

**Positioning demonstrations.** Demonstrations were conducted on the units, using a bed in an empty room, in the hall, or in the intensive care unit. Standard conditions were provided. In all demonstrations the writer acted as examiner, recording data on the checklist. In all demonstrations the model patient was a teen-age girl, hired for a nominal fee to help with the research. The model's right side was identified as the affected side by colored scarves, and it was kept as flaccid as possible. The model's initial position was supine with extension and external rotation of the "affected" hip, extension of the knee, plantar flexion of the ankle, adduction and internal rotation of the shoulder, extension of the elbow, pronation of the forearm, neutral alignment of the wrist, and slight flexion of fingers. Each nurse was instructed to position the model patient in all of the positions she thought were good for the stroke or hemiplegic patient, including back-lying, side-lying, and face-lying positions. The model was allowed to turn and move in bed as directed by the nurses. Standard equipment included 1 footboard, 4 pillows, 2 bath blankets, 3 bath towels, and 4 washcloths. The demonstrations generally took 10 to 15 minutes.

**Implementation of the questionnaire.** The questionnaire and the biographical data sheet were given to each participant following her demonstration of positioning.
Instructions were given not to use references or confer with anyone. In 20 of 30 cases, the questionnaire was completed the same day as the positioning demonstration. In 10 cases, the nurses were too busy to complete the questionnaire. Arrangements were made with these 10 nurses for the examiner to bring back the questionnaire the next possible day, and the nurses were instructed not to study in the interim. No questionnaires were taken home by the nurses. The 10 late questionnaires were completed as follows: 5 one day after the demonstration, 2 two days after, 1 three days after, 1 four days after, and 1 five days after. The average time necessary to complete the questionnaire was 15 to 20 minutes.

Statistical analyses. Ranges, means, medians, and standard deviations were computed for the checklist scores and questionnaire scores. Independent t tests were performed to determine the significance of the differences in means between B.S. and A.D. nurses and between nurses from L.D.S. Hospital and from University Hospital.

Pearson r correlations were calculated to test correlations between: (1) checklist scores and questionnaire scores, (2) checklist scores and length of professional experience, (3) checklist scores and length of experience with stroke patients, (4) questionnaire scores and length of professional experience, (5) questionnaire scores and length of experience with stroke patients, and (6) significance ratings of items and the number of correct responses to items on the questionnaire.

Chi-square tests were performed to determine the relationship between frequencies of checklist scores and (1) questionnaire subscores for significance of contractures and (2) questionnaire subscores for purpose of positioning.
Frequency distributions of joint positions and of positioning aids used by nurses in the demonstrations were determined. Item analysis was done to determine discrimination power of items and internal consistency of the questionnaire.
CHAPTER III
RESULTS AND DISCUSSION

The highest score obtained on the checklist (possible 24 points) was 21 (88%); the lowest, 9 (38%). The overall mean and median was 17 (71%). Table 1 indicates the ranges, means, and standard deviations of scores of baccalaureate and associate degree nurses. Although the mean for nurses with bachelor degrees was higher, a t of .94 indicated that this was not a significant difference. The means for L.D.S. Hospital nurses and University Hospital nurses were 17.5 and 16, respectively; a t of 1.31 indicated that the sample was homogeneous (Phillips and Thompson, 1967, p. 520).

Table 2 lists the frequency of nurses who demonstrated each joint position. Only half or fewer of the nurses demonstrated the following joint positions: In the supine position, 9 nurses demonstrated 90 degree abduction of the shoulder; 5, external rotation of the shoulder; and 15, dorsiflexion of the wrist. In the side-lying position, 15 nurses demonstrated neutral alignment of the hip. In the prone position, 7 nurses demonstrated neutral alignment of the ankle; 13, 90 degree abduction of the shoulder; and 11, extension of the elbow.

Additional descriptive information concerning use of positions and positioning aids was recorded by the examiner during each demonstration. Only 2 of the 30 nurses ever extended the fingers during the demonstration, and 1 of these 2 never used the hand roll. Of 30 nurses, 19 spontaneously volunteered the information that they had used the prone position never or rarely. Reasons given for not using the prone position, in order of the highest to lowest frequency, included: (1) inconvenience of nurses, (2) the problem of secretions, and (3) discomfort of the patient.
TABLE 1

Checklist Ranges, Means, and Standard Deviations for Baccalaureate and Associate Degree Nurses

(Possible score = 24)

<table>
<thead>
<tr>
<th>Sample</th>
<th>N</th>
<th>Range</th>
<th>Mean</th>
<th>SD</th>
</tr>
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<tbody>
<tr>
<td>B.S. nurses</td>
<td>15</td>
<td>12 - 21</td>
<td>17.5</td>
<td>2.50</td>
</tr>
<tr>
<td>A.D. nurses</td>
<td>15</td>
<td>9 - 20</td>
<td>16.5</td>
<td>3.10</td>
</tr>
<tr>
<td>All nurses</td>
<td>30</td>
<td>9 - 21</td>
<td>17.0</td>
<td>2.86</td>
</tr>
</tbody>
</table>
# TABLE 2

Number of Nurses Who Demonstrated Various Joint Positions

(N = 30)

<table>
<thead>
<tr>
<th>General Positions</th>
<th>Supine</th>
<th>Side-lying</th>
<th>Prone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension of hip</td>
<td>23</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Neutral alignment of hip (no rotation or adduction)</td>
<td>22</td>
<td>15</td>
<td>28</td>
</tr>
<tr>
<td>Extension of knee</td>
<td>25</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Neutral alignment of ankle (foot at 90 degrees to leg)</td>
<td>25</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Abduction of shoulder, 90 degrees</td>
<td>9</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>External rotation of shoulder</td>
<td>5</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>Extension of elbow</td>
<td>17</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Dorsiflexion of wrist</td>
<td>15</td>
<td>23</td>
<td>29</td>
</tr>
<tr>
<td>Slight flexion of fingers</td>
<td>30</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>Opposition of thumb</td>
<td>27</td>
<td>26</td>
<td>25</td>
</tr>
</tbody>
</table>
A few of these nurses who reported they never used the prone position also said that they seldom placed their patients in the supine position.

As to general alignment, 25 nurses maintained the head in good alignment in supine, side-lying, and prone positions. The affected arm was elevated properly for prevention or reduction of edema by 23 nurses. The feet were placed over the end of the mattress to reduce pressure on heels and toes by 14 nurses. Only 7 of the 30 nurses supported the entire leg in the side-lying position; some nurses made no attempt for full support, and others did not use enough pillows.

The following aids were used in low frequencies as follows: In the supine position, 5 nurses used a small pad to support the lumbar curve; 3 nurses used a wrist roll to maintain dorsiflexion of the wrist; 2, an ankle roll to relieve pressure on the heels; and 1, a small pad to fill the space between the mattress and the back of the knee to prevent back-knee deformity. In the prone position, 9 nurses placed a pillow under the abdomen to support the lumbar area (and 5 nurses incorrectly placed a pillow under the chest rather than the abdomen); 5 nurses placed pads under the shoulders for correct alignment of the shoulder girdle.

The examiner observed that some nurses used only one position of joints for the supine position, one for the side-lying position, and one for the prone position. A few nurses displayed a lack of attention to detail; for instance, the thumb was not always placed in opposition when the hand roll was used, or the feet were placed near but not touching the footboard. A few nurses expressed an attitude of indifference to positioning and a belief that range of motion exercises were the only important nursing measure for prevention of contractures.
Results indicated that a few nurses had good knowledge of correct positioning of the stroke patient but that several nurses lacked knowledge of: (1) various positions to provide for mobility of joint positions, or the importance of providing mobility; (2) functional positions; and (3) positioning aids.

Such a lack of knowledge implies the production of serious effects on hemiplegic patients. The lack of mobility of joint positions leads to contracture formation. The lack of functional positions leads to deformities, such as wrist drop and frozen shoulder. The lack of positioning aids promotes faulty alignment. Failure to support the leg in the side-lying position could even cause complete dislocation of the hip (Goode, 1966).

Checklist scores and length of experience. The Pearson $r$ for the checklist scores and length of professional experience was $-.476$; the $r$ for the checklist scores and length of experience with stroke patients was $-.668$. Both values, with 28 degrees of freedom, were significant at $p < .01$. This indicated that there was a highly significant negative correlation between demonstration performance and work experience.

Possible reasons for the correlation should be investigated. Is it that education today places more emphasis upon rehabilitation than earlier education? Is it that the experienced nurses have forgotten a variety of positions because they only utilize one or two positions? Is the correlation a reflection of objectives of patient care, or the objectives of inservice education?

Limitations of the positioning demonstration and checklist. The use of a model patient facilitated standard conditions and facilitated a minimum of time required
for the research but may have imposed some limitations to the study. Nine nurses placed the trochanter roll much too low to hold a genuinely affected leg in neutral alignment, but credit was given for neutral alignment because the model patient's leg was maintained in correct position. Some nurses stated that they could position a real patient better than the model patient because they could see the deformities in a real patient. Nevertheless, this indicated a possible lack of knowledge of which deformities can be anticipated and often prevented in the acute hemiplegic patient with flaccid paralysis. The model patient was allowed to move at the request of the nurses in order to save time during the demonstration, so the ability to move the patient was not tested. Some nurses made comments which indicated they probably lacked knowledge of how to help the conscious hemiplegic patient to move himself rather than to have two nurses move him.

A limitation of the checklist was the failure to provide for the time factor in positioning. For example, a nurse who extended the knees momentarily but stated she usually maintained the gatch up under the knees received the same credit for knee extension as the nurse who maintained the functional position the majority of the time.

The checklist also failed to reflect the positions normally used by the nurse. Some nurses who said they had never used the prone position received low scores on their demonstrations of the prone position, yet other nurses who said they seldom used the supine position and never used the prone position received high total scores on the checklist.

Questionnaire. The highest score obtained on the questionnaire (possible 29
points) was 24 (83%); the lowest, 13 (45%). The overall mean and median was 18 (62%). Table 3 indicates the distribution of ranges, means, and standard deviations. Although the mean of the baccalaureate nurses was higher, a \( t \) of 1.24 showed that the difference of means was not significant. The means for nurses at L.D.S. Hospital and University Hospital, respectively, were 17.7 and 18.7; a \( t \) of .86 revealed that this was a homogeneous sample.

Table 4 indicates the level of difficulty and the discrimination power of each test item (National League for Nursing, 1965, p. 75). All but one item (#25) showed a positive discrimination value, ranging from +2 to +55. This demonstrated internal consistency of the questionnaire, as well as discrimination validity of the items.

Table 5 ranks items according to their significance values, as determined by the panel of experts, and it lists the number and percentage of correct responses to each item. A Pearson \( r \) of .072 with 28 degrees of freedom indicated no correlation between the significance rating and the number of correct answers. This means that nurses missed the more significant items as readily as the less significant ones. Correct responses on items ranged from 27% to 97%, giving the test a variation of difficulty of items.

The Pearson \( r \) for the questionnaire scores and length of professional experience was .046; the \( r \) for the questionnaire scores and length of experience with stroke patients was .220. Neither value, with 28 degrees of freedom, was significant.

Only 40% of the nurses answered item #1 correctly; there was variance of opinion on purpose of positioning. Since experts had not agreed upon the correct response before the item was revised, a survey of experts and nurses regarding purpose
**TABLE 3**

Questionnaire Ranges, Means, and Standard Deviations for Baccalaureate and Associate Degree Nurses

*(Possible score = 29)*

<table>
<thead>
<tr>
<th>Sample</th>
<th>N</th>
<th>Range</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.S. nurses</td>
<td>15</td>
<td>13 - 24</td>
<td>18.7</td>
<td>3.07</td>
</tr>
<tr>
<td>A.D. nurses</td>
<td>15</td>
<td>13 - 22</td>
<td>17.3</td>
<td>2.91</td>
</tr>
<tr>
<td>All nurses</td>
<td>30</td>
<td>13 - 24</td>
<td>18.0</td>
<td>3.08</td>
</tr>
</tbody>
</table>
### TABLE 4

Percentage of Nurses Above and Below the Median Total Score Who Answered Each Item Correctly

*(Median = 18)*

<table>
<thead>
<tr>
<th>Item Number</th>
<th>% Correct Above Median</th>
<th>% Correct Below Median</th>
<th>Percentage Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>43</td>
<td>38</td>
<td>+ 5</td>
</tr>
<tr>
<td>2</td>
<td>79</td>
<td>63</td>
<td>+16</td>
</tr>
<tr>
<td>3</td>
<td>71</td>
<td>56</td>
<td>+15</td>
</tr>
<tr>
<td>4</td>
<td>100</td>
<td>94</td>
<td>+ 6</td>
</tr>
<tr>
<td>5</td>
<td>79</td>
<td>38</td>
<td>+41</td>
</tr>
<tr>
<td>6</td>
<td>71</td>
<td>56</td>
<td>+15</td>
</tr>
<tr>
<td>7</td>
<td>86</td>
<td>81</td>
<td>+ 5</td>
</tr>
<tr>
<td>8</td>
<td>64</td>
<td>56</td>
<td>+ 8</td>
</tr>
<tr>
<td>9</td>
<td>50</td>
<td>25</td>
<td>+25</td>
</tr>
<tr>
<td>10</td>
<td>36</td>
<td>25</td>
<td>+11</td>
</tr>
<tr>
<td>11</td>
<td>93</td>
<td>88</td>
<td>+ 5</td>
</tr>
<tr>
<td>12</td>
<td>43</td>
<td>25</td>
<td>+18</td>
</tr>
<tr>
<td>13</td>
<td>50</td>
<td>44</td>
<td>+ 6</td>
</tr>
<tr>
<td>14</td>
<td>93</td>
<td>38</td>
<td>+55</td>
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<td>15</td>
<td>86</td>
<td>56</td>
<td>+30</td>
</tr>
<tr>
<td>16</td>
<td>57</td>
<td>38</td>
<td>+19</td>
</tr>
<tr>
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<td>43</td>
<td>13</td>
<td>+30</td>
</tr>
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<td>63</td>
<td>+23</td>
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<tr>
<td>19</td>
<td>86</td>
<td>81</td>
<td>+ 5</td>
</tr>
<tr>
<td>20</td>
<td>71</td>
<td>69</td>
<td>+ 2</td>
</tr>
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<td>21</td>
<td>86</td>
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<td>79</td>
<td>63</td>
<td>+16</td>
</tr>
<tr>
<td>28</td>
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<td>31</td>
<td>+26</td>
</tr>
<tr>
<td>29</td>
<td>79</td>
<td>50</td>
<td>+29</td>
</tr>
</tbody>
</table>
### TABLE 5

Number and Percentage of Correct Responses for Each Item

in Rank Order of Significance

<table>
<thead>
<tr>
<th>Significance Rating</th>
<th>Item Number</th>
<th>Number Correct</th>
<th>Per Cent Correct</th>
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</thead>
<tbody>
<tr>
<td>4.0</td>
<td>8</td>
<td>18</td>
<td>60</td>
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<tr>
<td>3.9</td>
<td>1</td>
<td>12</td>
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<tr>
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<td>29</td>
<td>97</td>
</tr>
<tr>
<td>3.8</td>
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<td>21</td>
<td>70</td>
</tr>
<tr>
<td>3.8</td>
<td>9</td>
<td>11</td>
<td>37</td>
</tr>
<tr>
<td>3.7</td>
<td>10</td>
<td>9</td>
<td>30</td>
</tr>
<tr>
<td>3.7</td>
<td>19</td>
<td>25</td>
<td>83</td>
</tr>
<tr>
<td>3.7</td>
<td>22</td>
<td>26</td>
<td>87</td>
</tr>
<tr>
<td>3.5</td>
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<td>70</td>
</tr>
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<td>3.5</td>
<td>25</td>
<td>21</td>
<td>70</td>
</tr>
<tr>
<td>3.4</td>
<td>5</td>
<td>17</td>
<td>57</td>
</tr>
<tr>
<td>3.4</td>
<td>7</td>
<td>25</td>
<td>83</td>
</tr>
<tr>
<td>3.3</td>
<td>13</td>
<td>14</td>
<td>47</td>
</tr>
<tr>
<td>3.2</td>
<td>12</td>
<td>10</td>
<td>33</td>
</tr>
<tr>
<td>3.2</td>
<td>27</td>
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<td>70</td>
</tr>
<tr>
<td>3.2</td>
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</tr>
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<td>3.1</td>
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<td>63</td>
</tr>
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<td>11</td>
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<td>90</td>
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<td>20</td>
<td>21</td>
<td>70</td>
</tr>
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<td>3.1</td>
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<td>70</td>
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<td>3.1</td>
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<td>13</td>
<td>43</td>
</tr>
<tr>
<td>3.0</td>
<td>17</td>
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<td>27</td>
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<tr>
<td>3.0</td>
<td>18</td>
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<td>73</td>
</tr>
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<td>24</td>
<td>20</td>
<td>67</td>
</tr>
<tr>
<td>2.9</td>
<td>14</td>
<td>19</td>
<td>63</td>
</tr>
</tbody>
</table>
of positioning is indicated. Perhaps lack of agreement on purpose is a contributing cause of inconsistent positioning by various personnel.

Of 30 nurses, only 3 answered both items #9 and #10 (concerning functional positions) correctly; 14 answered either #9 or #10 correctly; and 13 answered neither item #9 nor #10 correctly. Those nurses who viewed functional positions as the primary guide to positioning (item #1) answered items #9 and #10 no better than other nurses. The majority of wrong answers included palmar flexion of the wrist and flexion of the knee. The implications of this lack of knowledge of functional positions are serious, involving formation of contractures and deformities in hemiplegic patients.

Only 27% of the nurses answered item #17 (placement of the trochanter roll) correctly. Since neutral alignment of the hip cannot be maintained in a weak or paralyzed leg by a trochanter roll if it is placed too low, fixed external rotation of the hip could result from this lack of knowledge.

**Questionnaire scores and checklist scores.** The Pearson $r$ for questionnaire scores and checklist scores was $-0.243$ with 28 degrees of freedom, indicating there was no significant correlation. The chi-square (Table 6) for questionnaire subscores on items concerning significance of contractures (Items 26, 27, 28, 29) and the checklist scores was 1.31; the $\chi^2$ for the subscores on items concerning purpose of positioning (Items 1, 14, 21, 23, 24) and the checklist scores was 0.29. Neither $\chi^2$ value was significant.

The lack of correlation between questionnaire scores and checklist scores implies that knowledge of positioning is not related to knowledge of contracture prevention,
### TABLE 6
The Relationship Between Checklist Scores and Questionnaire Subscores

<table>
<thead>
<tr>
<th>Checklist Scores</th>
<th>Questionnaire Subscores</th>
<th>Significance of Contractures (Items 26, 27, 28, 29)</th>
<th>Purpose of Positioning (Items 1, 14, 21, 23, 24)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0-2 points</td>
<td>3-4 points</td>
</tr>
<tr>
<td>9 - 16</td>
<td></td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>17 - 21</td>
<td></td>
<td>9</td>
<td>8</td>
</tr>
</tbody>
</table>
of purpose of positioning, or of the significance of contractures. However, the
guessing variable in the questionnaire must be considered, and reliability of both
instruments must be further tested. It is possible that scores may show more cor-
relation if the checklist is used in the actual nursing setting rather than in the test situation.

Sample. The selection of nurses according to voluntary participation may have
limited the results of the study. Four nurses refused to participate, on the basis that
they lacked recent experience with positioning of stroke patients. Since these
nurses were presently working on units which frequently received stroke patients
and were responsible, if not for direct patient care, for the direction and teaching
of auxiliary personnel, their knowledge of positioning would have been important to
this study. All four nurses were part-time employees; two expressed a need and desire
for more inservice education for themselves as older, part-time nurses.

The actual positioning of stroke patients in L.D.S. Hospital and University
Hospital was done not only by B.S. and A.D. nurses but also by diploma nurses, by
licensed practical nurses, and by aides. Additional samples of diploma nurses and
auxiliary nursing personnel would be valuable.

Implications. The writer believes that the following implications can be drawn
from this study.

1. A beginning validity was established for the two instruments developed for
this study. If reliability is established, the checklist and the questionnaire could
be used for: (1) evaluation purposes in setting up inservice education programs on
positioning of stroke patients and (2) further research.
2. Scores and descriptive data indicated a need for inservice education on positioning of stroke patients. The study showed a need for emphasis on purpose of positioning, functional positions, the use of a variety of positions, and use of positioning aids.

3. Lack of knowledge of positioning implies a lack of application of knowledge. There is a need for consistent objectives of patient care and a need for care plans describing the positions each nurse should use in order to prevent contractures and deformities.

4. Future studies were indicated by the present investigation: (1) a test for the reliability of the checklist and the questionnaire used in the present study; (2) a test for the correlation between demonstration performance in actual situations and in test situations; (3) a survey of positions for stroke patients used by nurses and the length of time each is maintained; (4) a study to test the correlation between knowledge and the application of knowledge of positioning; (5) a survey of experts' and nurses' opinions on purpose of positioning; (6) a survey to determine the cause and the method of correction of the highly significant negative correlation between checklist scores and length of work experience; (7) a study to investigate contracture formation in hemiplegic patients, using a controlled amount of range of motion exercises and variables of (a) the one or two positions usually used by nurses, (b) extensive use of functional positions, and (c) use of a variety of positions for each major joint; and (8) an enlargement of the present study to include a sample of diploma nurses, licensed practical nurses, and aides.
REFERENCES


### APPENDIX A

### CHECKLIST FOR JOINT POSITIONS

<table>
<thead>
<tr>
<th>Alignment Desired</th>
<th>Positions in Which Observed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supine</td>
</tr>
<tr>
<td>Extension of hip</td>
<td>✓</td>
</tr>
<tr>
<td>Neutral alignment of hip (no rotation or adduction)</td>
<td>✓</td>
</tr>
<tr>
<td>Extension of knee</td>
<td>✓</td>
</tr>
<tr>
<td>Neutral alignment of ankle (foot at 90 degrees to leg)</td>
<td>✓</td>
</tr>
<tr>
<td>Abduction of shoulder, 90 degrees</td>
<td>✓</td>
</tr>
<tr>
<td>External rotation of shoulder</td>
<td>✓</td>
</tr>
<tr>
<td>Extension of elbow</td>
<td>✓</td>
</tr>
<tr>
<td>Dorsiflexion of wrist</td>
<td>✓</td>
</tr>
<tr>
<td>Slight flexion of fingers</td>
<td>✓</td>
</tr>
<tr>
<td>Opposition of thumb</td>
<td>✓</td>
</tr>
</tbody>
</table>

**Comments:**

Infrequent use of prone  
Reason:

**General alignment**

- Head  
  - neutral alignment or slight flexion
- Trunk  
  - pillow under abdomen
  - pad under lumbar curve
  - shoulder pads
- Legs  
  - feet over mattress
  - support of entire leg on side
  - ankle roll
- Arm  
  - elevated
  - wrist roll
- Fingers  
  - extended

**Score**

---
APPENDIX B

QUESTIONNAIRE ON POSITIONING OF ACUTE STROKE PATIENTS

Definition of terms used in the questionnaire:
Abduction—movement away from the midline of the body
Adduction—movement toward the midline of the body
Extension—straightening of a joint
Flexion—bending of a joint
External rotation—turning outward, away from the midline of the body
Internal rotation—turning inward, toward the midline of the body
Pronation—rotation of the forearm so that the palm is downward when the elbow is at the waist, bent at a 90 degree angle
Supination—rotation of the forearm so that the palm is upward when the elbow is at the waist, bent at a 90 degree angle
Opposition—movement of the thumb out and around to touch the tip of the little finger
Palmar flexion—bending the wrist so that the palm is toward the forearm
Dorsiflexion—bending the wrist so that the back of the hand is toward the forearm; bending the foot upward toward the leg
Plantar flexion—bending the foot downward away from the leg

Directions:
Please read each item carefully. Select the one choice which best answers the question or completes the statement. Circle the letter corresponding to your choice. Please answer every question.
1. In order to help prevent contractures, which goal is the best guide for proper positioning of the acute stroke patient?

a. Good body alignment  
b. Mobility of joints  
c. Functional position of joints  
d. Comfort of the patient

2. Unless proper nursing care is given, within one or two weeks the stroke patient tends to maintain a characteristic bed position. Which of the following positions is typical?

a.  
b.  
c.  
d.

3. A contracture is the direct result of

a. a network of dense connective tissue around the joint.  
b. increased calcium deposits at the joint.  
c. decreased synovial fluid at the joint.  
d. damaged proprioceptors at the joint.

4. Measures to prevent contractures in the stroke patient should be initiated

a. immediately after life-saving measures are performed.  
b. as soon as joint stiffness begins to develop.  
c. only after paralysis becomes spastic.  
d. when a good prognosis for the patient is determined.
5. When spastic paralysis is present in the stroke patient, certain positions tend to prevail because some muscles are stronger than others. Which of the following muscle groups are generally stronger?

1. Abductors—muscles which hold the extremity away from the body
2. Adductors—muscles which hold the extremity close to the body
3. Extensors—muscles which straighten joints
4. Flexors—muscles which bend joints

a. 1 and 3
b. 1 and 4
c. 2 and 3
d. 2 and 4

6. The hemiplegic patient frequently maintains positions of comfort. Which of the following positions usually provides the most comfort for the stroke patient?

1. Abduction—extremities away from the body
2. Adduction—extremities close to the body
3. Extension—joints straight
4. Flexion—joints bent

a. 1 and 3
b. 1 and 4
c. 2 and 3
d. 2 and 4

7. When paralysis is flaccid, contractures in the involved extremities

1. may result from joint immobility.
2. may result from gravitational forces.
3. may result from improper positioning.
4. cannot be produced.

a. 1 only
b. 2 and 3
c. 1, 2, and 3
d. 4 only
8. Which of the following measures are important to prevention of contractures?

1. Elevation of the hand and forearm to reduce edema
2. Support of joints in the weakened extremities
3. Range of motion exercises
4. Frequent change of positions

a. 1 and 2
b. 3 and 4
c. 2, 3, and 4
d. All of these

9. A functional position is the position which affords greatest use or efficiency of an extremity when the joint is fixed. What is the functional position of the hand?

a. Palmar flexion of wrist, slight flexion of fingers, opposition of thumb
b. Palmar flexion of wrist, extension of fingers, flexion of thumb
c. Dorsiflexion of wrist, slight flexion of fingers, opposition of thumb
d. Dorsiflexion of wrist, extension of fingers, flexion of thumb

10. What is the functional position of the lower extremity?

a. Flexion of hip, external rotation of hip, flexion of knee, foot at 90 degree angle to leg
b. Extension of hip, neutral alignment (no rotation) of hip, extension of knee, foot at 90 degree angle to leg
c. Extension of hip, neutral alignment (no rotation) of hip, flexion of knee, foot at 90 degree angle to leg
d. Flexion of hip, neutral alignment (no rotation) of hip, extension of knee, dorsiflexion of ankle

11. When the patient is in a back-lying position, which type of pillow is most beneficial under the head?

a. A small, firm pillow
b. A large, firm pillow
c. A large, soft pillow
d. A small, soft pillow
12. A nurse positions a patient in the back-lying position with his affected arm abducted, elbow flexed, and hand and forearm on a pillow at the side of the patient. A hand roll is in place. This position is

a. good because it maintains a functional position of all upper extremity joints.

b. good because it promotes rest and reduces the chance of some upper extremity contractures.

c. poor because it causes strain, though it reduces some contracture formation.

d. poor because it causes strain and promotes contractures of most upper extremity joints.

13. When the patient is in the back-lying position, a nurse abducts his affected arm, flexes his elbow, and places his hand on a pillow above the shoulder. This position

a. is the only acceptable position of the upper extremity when the patient is in the back-lying position.

b. should be used frequently for long periods of time because it is the only position which counteracts internal rotation of the shoulder.

c. should be used for limited periods because it counteracts internal rotation of the shoulder but is usually uncomfortable.

d. is not suggested because it is usually uncomfortable.

14. What is the best reason for placing the affected arm in extension at the side of the patient when the patient is in the back-lying or face-lying position?

a. It reduces the chance of flexion contractures of the elbow.

b. It provides comfort to the patient.

c. It promotes good circulation in the arm.

d. It distributes pressure evenly in the arm.

15. A hand roll should be used for the hemiplegic patient

a. at all times.

b. at all times except during range of motion exercises.

c. at all times except during range of motion and periodic positioning for extension of fingers.

d. at all times during the flaccid stage but never during the spastic stage.
16. When the patient lies on his back and his affected arm is extended in a supine position, a small roll or pad under the wrist is
   a. helpful because it reduces pressure on the fingers.
   b. helpful because it maintains a functional position of the wrist.
   c. harmful because it causes the hand to be lower than the arm.
   d. harmful because it hinders movement of the weakened extremity.

17. To fulfill its purpose, a trochanter roll should extend from
   a. the waist to two inches above the knee.
   b. the top of the thigh to two inches above the knee.
   c. midthigh to two inches below the knee.
   d. two inches above the knee to the ankle.

18. When the patient is in the back-lying position, a small pad or towel placed under the ankles is
   a. helpful because it helps counteract external rotation of the hip.
   b. helpful because it reduces pressure on the heels.
   c. harmful because it causes pressure on superficial nerves at the ankle.
   d. harmful because it reduces circulation of the feet.

19. When a nurse has difficulty keeping the feet of an acute stroke patient against the footboard, the footboard should be
   a. removed because the ankles are not being maintained in a neutral position.
   b. removed because the hips are not being maintained in neutral alignment—no external rotation.
   c. maintained because it provides a support for foot exercises.
   d. maintained because it keeps the covers off the feet, reducing plantar flexion of the ankles.

20. In back-lying and face-lying positions, placing the feet over the edge of the mattress is
   a. helpful because it relieves pressure on toes and heels.
   b. helpful because it helps counteract external rotation of the hip.
   c. harmful because it places the feet lower than the thighs.
   d. harmful because it promotes footdrop.
21. When the patient is in the back-lying position, a nurse positions his legs in extension, but the patient complains of back discomfort. What should the nurse do?

a. Flex the knees and place them on a pillow.

b. Raise the head of the bed and raise the knee gatch.

c. Place a small pad under the lumbar curve and leave the knees extended.

d. Explain that extension helps reduce contractures and leave the knees extended.

22. Use of a firm mattress or bedboards is important

(a) for all stroke patients.

b. only if the stroke patient has a weak back.

c. only if flaccid paralysis is present.

d. only if spastic paralysis is present.

23. Occasional use of rest positions is

a. encouraged because fatigue contributes to contracture formation.

b. encouraged because rest positions provide comfort and intermittent change from functional positions.

c. discouraged because rest positions promote contracture formation.

d. discouraged because rest positions promote lethargy of the patient.

24. For an adequate change of positions for the hemiplegic patient, what are the best actions for the nurse to take?

1. Turn the patient from side to back to side.

2. Turn the patient from side to back to prone.

3. Change the position of all major joints periodically.

4. Change the position of those joints which cannot be maintained in a functional position.

a. 1 and 3

b. 1 and 4

c. 2 and 3

d. 2 and 4
25. When the patient is in a back-lying position, a pillow under the knees contributes to

1. knee flexion contractures.
2. hip flexion contractures.
3. dorsiflexion contractures of the ankles.
4. plantar flexion contractures of the ankles.

   a. 1 only
   b. 3 only
   c. 1, 2, and 3
   d. 1, 2, and 4

26. Flexion contractures of the hips in the hemiplegic patient make which of the following activities difficult?

1. Standing
2. Ambulating
3. Transfering
4. Dressing

   a. None of these
   b. 1 and 2
   c. 2 only
   d. All of these

27. In the hemiplegic patient who has return of motor function, a contracture of the shoulder usually causes

   a. no disability as long as the hand functions well.
   b. minor disability due to pain in the shoulder joint.
   c. serious disability due to loss of function and pain in the shoulder joint.
   d. grave disability due to loss of independence.

28. Correction of fixed contractures usually necessitates

   a. surgical intervention.
   b. vigorous physical therapy.
   c. frequent range of motion only.
   d. frequent change of positions only.

29. Severe contractures may at worst

   a. postpone rehabilitation until after the contractures are corrected.
   b. prolong rehabilitation but not limit rehabilitation goals.
   c. necessitate intensive rehabilitation but not limit rehabilitation goals.
   d. limit the goals of rehabilitation which can be attained for the patient.
APPENDIX C

BIOGRAPHICAL INFORMATION

Instructions: Please complete appropriate blanks with checks or information desired. No names will be used.

1. Type of basic nursing program from which you graduated:
   - Baccalaureate degree
   - Associate degree

2. Year of graduation from nursing school: ___________

3. Name of school from which you graduated: ___________

4. Hospital at which employed:
   - L.D.S. Hospital
   - University Hospital

5. Number of days per week that you work: ___________

6. Length of professional experience in months or years:
   - Months ___________
   - Years ___________

8. Any rehabilitation courses taken:
   - Length of course ___________
   - When taken ___________
   - Where taken ___________
| **VITA** |
|------------------|------------------|
| **Name**         | Bonnie Eakle Benson |
| **Birthplace**   | Salt Lake City, Utah |
| **Birthdate**    | March 18, 1944 |
| **Elementary School** | Emerson School  
Salt Lake City, Utah, 1949-1957 |
| **Secondary Schools** | Roosevelt Junior High School  
Salt Lake City, Utah, 1957-1959  
East High School  
Salt Lake City, Utah, 1959-1962 |
| **University**   | University of Utah  
Salt Lake City, Utah  
| **Degrees**      | B.S., Nursing  
University of Utah, 1966  
Magna Cum Laude  
Phi Kappa Phi  
M.S., Nursing  
University of Utah, 1969 |
| **License**      | Registered Nurse, Utah License |
| **Professional Position** | Staff Nurse  
Latter-day Saints Hospital  
Salt Lake City, Utah, 1966-1967 |
| **Professional Organizations** | American Nurses' Association  
Utah State Nurses' Association |