

Progress of the Case.—On the fourteenth day after operation the sutures were removed and the patient was taken out of the oxygen tent for one hour. The time was gradually increased daily until the 19th day, when the tent was finally dispensed with. There was no cyanosis nor respiratory distress and the pulse rate was now steady at 90. On the 20th day the child sat in an armchair for half an hour, and a fortnight later she was walking round the ward, and even running when she thought she was unobserved.

The periodical examinations which she has since undergone have shown her condition to be satisfactory, and now, a year later, she is living a normal life.—*By courtesy of "The Nursing Mirror."*

The Kenny Method

Nursing responsibilities in relation to the Kenny method of treatment for Infantile Paralysis.

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To appreciate the nursing responsibilities in relation to the Kenny method of treatment for infantile paralysis in the acute stage, it is essential for the nurse to understand the Kenny theory of the disease and how this theory differs from previously accepted concepts.

The symptoms observed by Miss Kenny in the acute stage are pain and spasm of the affected muscles, mental alienation of the opposing muscles, and muscle inco-ordination. If these symptoms are not relieved, deformities and functional disability may occur. It should be explained at this point that the muscles in spasm which Miss Kenny considers primarily affected are those which previous authorities considered normal.

Spasm.—The muscles in spasm may shorten and have a tense, taut appearance so that the entire outline of the muscle belly and tendon is prominent. Fibrillary twitching may be present and hyperirritability is pronounced, particularly if an attempt is made to move the muscle from the shortened position which it assumes because of the spasm. Knowledge of muscle action enables one to observe readily which muscles are in marked spasm. For example, if the sternocleidomastoid of the right side is in spasm, the neck will be flexed to the right and face turned to the left so that the chin points toward the opposite shoulder. Spasm should be detected as far as possible by observation, for palpitation or passive stretching of muscles in spasm tends to aggravate spasm and increase inco-ordination.

Mental alienation is the inability of a muscle to perform voluntary movement even though the nerve paths to the muscle are intact. At first the muscle is unable to contract because it has been pulled from its normal resting length by its opponent which is in spasm, and because an attempt to contract produces pain. If mental alienation is not overcome, paralysis and atrophy from disuse may occur. The alienated muscles are those which according to previous concepts were considered weak or paralysed. Miss Kenny recognizes that destruction of the anterior horn cells may occur, and if this is extensive the muscles may not be alienated, but paralysed. True paralysis cannot be distinguished from mental alienation until spasm of the opponent has been completely released and persistent muscle re-education given a satisfactory trial.

Inco-ordination is the substitution of muscle action by a muscle or group of muscles for the muscle which normally performs a certain movement. It may be due to pain when an attempt is made to lengthen a muscle which is in a shortened position because of spasm, or to inability of the opposing muscle to perform the desired movement. Some illustrations of muscle inco-ordination are: Substitution of the two extensors for the tibialis anticus when an attempt is made to perform dorsi-flexion of the foot in

the presence of spasm of the calf muscles; contraction of the adductors when the gluteus medius is unable to perform abduction of the thigh. Inco-ordination may also occur within an involved muscle. An example of this would be contraction of the long head of the biceps femoris when knee flexion is attempted. Miss Kenny believes that the long head of the biceps femoris is a prime mover in extending the thigh and that flexion of the knee is performed by the short head which has its origin on the linea aspera.

Treatment.—The Kenny method of treatment of infantile paralysis is in accord with her concept of the disease. Treatment should begin immediately after the diagnosis has been made. Naturally, the entire course of treatment is under the direction of the physician, and the efforts of the physician, nurse, and physical therapy technician should be closely correlated.

Treatment is directed first to overcoming pain and spasm of the affected muscles. This is accomplished by the application of hot packs which is a nursing procedure. Its importance cannot be stressed too much since all subsequent treatment is dependent on relief of spasm. Muscle re-education is then instituted to develop mental awareness of alienated muscles and re-establish muscle co-ordination. The muscle re-education aspects of treatment should be carried out by physical therapy technicians well trained in the Kenny method. Early relief of spasm makes it possible to begin muscle re-education much earlier than has been customary in previous methods of treatment. For this reason the services of a physical therapy technician should be available during the acute stage of the disease.

Natural Rest Position —The natural rest position is encouraged as soon as pain lessens in order to maintain the normal alignment of the body. This position approximates the standing position except that the body is in the horizontal instead of the vertical plane. The patient is placed between woollen blankets and a rubber ring or small pillow may be used under the head. Boards are placed under the mattress and a footboard which extends from eighteen inches to two feet above the level of the springs is attached to the foot of the bed. Blocks of wood four by four inches are placed between each end of the footboard and the end of the mattress, which is four inches shorter than the bed. When the soles of the patient's feet are in contact with the footboard his heels do not rest on the mattress. The purpose of the footboard is to maintain the standing reflex. It is not considered a splint and is not used while there is painful spasm in the posterior muscles of the lower parts of the legs. A folded bath towel is placed under the knees, particularly when spasm of the hamstrings exists. The arms are at the side.

In the face-lying position the feet are placed over the edge of the mattress so that they are at right angles to the lower parts of the legs. In this position the plantar surfaces of the feet are also in contact with the footboard. A folded bath towel is placed under the legs above the ankles. If there is a tendency to lordosis a pillow may be placed under the abdomen. Usually patients are turned in the prone position for an hour twice a day. The side-lying position is not used except during the application of packs.

In the stage of acute pain, however, the patient is permitted to assume any position which is comfortable. Although frequent change of position is essential for comfort the patient should be handled as little as possible. Alcohol rubs should not be given since even slight pressure increases spasm, and bathing is omitted until acute pain is overcome. No splints are used since it is believed that they aggravate spasm, prolong mental alienation by giving the patient the impression that he cannot move, and shorten the alienated muscles, thereby causing functional disability. A shortened muscle is not considered functionally useful.

Widespread publicity in regard to lack of use of splints in the Kenny treatment has unfortunately given the impression that normal alignment of the body is ignored. This is not true. Although efforts must be directed first to the relief of spasm, meticulous attention is given to encouraging normal body alignment just as soon as it is possible.

Muscle Analysis.—When the patient is first seen at the onset of the acute stage of the disease he is carefully observed to note which muscles are in spasm. It is

important that spasm be detected at the initial examination to determine where the hot packs should be applied. Later observations are made to determine the extent to which spasm has been relieved, the presence of mental alienation and muscle inco-ordination and progress in treatment of these symptoms.

Hot Packs.—Hot wet packs for the relief of pain and spasm are begun during the period of isolation and are continued until all spasm is relieved, which may be from a few weeks to several months. While the patient is critically ill, fomentations may be applied only to the muscles of the chest, back, and neck to avoid overtiring. Packs to these areas, however, may be changed as often as every fifteen minutes if spasm is acute or if life is endangered because of spasm in the muscles which affect respiration. When pain lessens fomentations are also applied to other muscles in spasm and are changed every two hours, from 8-00 a.m. to 8-00 p.m. They are not applied at night in order to permit rest for the patient. The packs must cover the entire muscle, but should not include the large joints unless the muscle itself covers the joint, as in the case of the deltoid. There should be no feeling of fixation since the belief is that this would prolong mental alienation. The packs are applied very hot and allowed to cool gradually. The intense heat produces dilatation of the blood vessels and gradual cooling allows normal contraction.

The shortening of the muscle which is present after pain has subsided is what has formerly been called a contracture. When the muscle is restored to its maximum length and is no longer hard or tense, spasm has been released and packs are discontinued.

Materials and Equipment for Packs—Army blankets or old woollen blankets—preferably 60 per cent wool—are considered the most satisfactory material for the packs. Shrinkage is greater in all woollen materials. New wool is irritating to the skin of many patients. If old thin blankets are used two or three pieces may be stitched together around the edges and diagonally from corner to corner. This method has proved effective in prolonging the life of the blanket. The sizes and shapes of the pieces of blankets vary according to the size of the patient and the part of the body to which they are applied. They may be square, triangular, or rectangular. A single bed-size blanket torn into four squares makes a suitable pack for hips and shoulders of an adult. The pack is folded in such a way that two thicknesses of blanket cover the muscles. When spasm is pronounced in certain muscles additional strips or squares may be added for re-enforcements. Cotton material, such as old diapers, may be used for this purpose. These pieces should be applied over the layer of wool which is always next to the skin. Waterproof material, such as rubber sheeting, oiled rayon or pliofilm is used to cover the pack and a piece of dry blanket is placed around the waterproofing. A heavier blanketing, such as mill ends from blanket factories, is satisfactory for this covering since it does not come in contact with the skin. Outer coverings made of sheeting, terry cloth, or diaper material may be used if desired. They help to keep the blanket covering clean. Obviously the blanket packs should be washed with soap and water at definite intervals to ensure cleanliness. This point needs emphasis since the fact that blankets are submerged in boiling water may exclude the idea that they should be clean also. Breast binders with shoulder straps attached are used to hold chest packs in place and a scultetus binder is used for the back and abdomen.

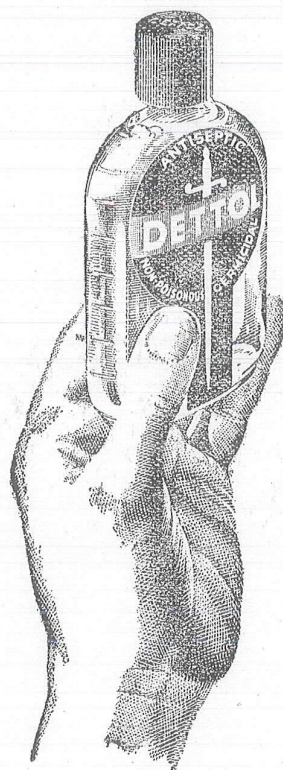
Ordinary galvanized wash tubs mounted on a platform on wheels and with an attached wringer are used to convey packs from the sterilizer to the bed. A larger piece of rubber sheeting is placed inside the tub and packs are lifted from the sterilizer to the tub with long surgical clamps and quickly covered with the rubber sheet.

Procedure in Applying Packs.—A complete set of packs for the entire body would include packs to the back, neck, upper arm including anterior and posterior shoulder girdle, chest, abdomen, forearm, and, thigh, lower part of leg, and foot.

Two sets of packs are required for each patient since fresh ones are applied immediately after the removal of the previous.

The blankets are dried during the night, folded, and placed in the sterilizer by the night nurse. In some hospitals, cotton mesh bags with indelible ink name tapes are used to separate packs for individual patients. Packs for different parts of the

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The cool packs (about body temperature at time of removal) are folded as they are removed and the patient's bed straightened and binders and coverings placed in readiness before the hot fomentations are brought to the bedside. The waterproof and outer coverings are first placed in position ready to be applied before the hot pack is removed from the container. The hot packs are put through a tight wringer twice in order to prevent burns which might be caused by free moisture, and are quickly applied and covered to minimize cooling. Ointments for the skin are not necessary since burns do not occur with proper technique.

At the onset of the illness if the posterior neck and back muscles are in painful spasm, the patient is placed in the prone position and several pillows are used under the head and chest and under the legs to prop the trunk into the hyper-extended position to avoid placing tension on muscles in spasm. As the spasm is relieved by the hot fomentations the pillows are removed gradually one by one until the body is in normal alignment. Usually this is possible within a few days. If the spasm is pronounced in the abdominal muscles the patient is placed in the supine position for packs and the hips and knees are flexed at right angles and supported with pillows.

When there is respiratory embarrassment, packs for the chest and neck may be applied every fifteen minutes until respirations are improved. These packs should be of light-weight material and covered only with oiled silk. A chest binder should not be applied. The patient is taught abdominal breathing. The respirator is not used by Miss Kenny.

Patients with bulbar involvement are packed high to the back of the neck. Other nursing care includes suctioning of mucus as necessary. Patients are fed very slowly with a spoon. Although there may be slight variations on the part of individual nurses in the technique of applying the fomentations, the essential principles should be carefully observed. These are that the packs should be applied as hot as possible, but free of excess moisture; they should cover the entire muscle, but should not include the large joints unless the muscle itself covers the joint; and the packs and covering should not be so thick that the patient feels weighed down. Substitution of heavy cotton bath towels for woollen blankets is not advisable for this reason.

When spasm in the muscles is less acute, the order in which individual packs are applied is less important since the patient can move more freely without pain. The patient is turned on his side and the thigh pack is applied first. This pack is triangular and is placed so that the apex of the triangle is on the posterior aspect of the buttock reaching as far upward as the posterior superior spine of the ilium. The pack extends well above the crest of the ilium, encircles the thigh, but does not include the knee joint. It is quickly covered by the waterproof and outer covering which have previously been placed in position and is pinned with safety pins.

Breast binder, scultetus binder, dry blanket covering, and waterproofing in respective order are placed in readiness for the back pack. This pack of double thickness extends from the neck to the buttocks and the ends are tucked into the shoulder packs above and the thigh packs below. The patient is then turned in the supine position and the shoulder pack is usually applied next. This pack is also triangular. The apex of the triangle is placed upward and posteriorly so that it extends well over the upper trapezius. The shoulder, axilla, and upper part of the arm are included, but the elbow is free.

The chest pack may be applied next. If spasm in the pectoral muscles is persistent, extra light-weight thickness of blankets are applied from the anterior portion of the shoulder to the nipple line on either side and the edges are pushed well into the axilla. The breast binder is then pinned. It holds the upper part of the back pack and the chest pack securely but is applied loosely enough to permit normal expansion of the chest. Shoulder straps of the breast binder are left free until the pack for the neck is applied. The neck pack is a folded rectangular strip and extends posteriorly from the occiput to the back pack and anteriorly to the chest pack. The ends are brought around to the front and tucked into the chest pack, but are not crossed in front in order to prevent any feeling of restriction at the throat. The shoulder straps of the breast binder are brought over and pinned in such a way that they anchor the

neck and chest packs. The pack for the abdomen extends from the lower end of the sternum to the crest of the pubis. When it has been applied the sculteus binder is pinned. This holds the part of the back pack not included in the breast binder and the pack for the abdomen securely. It should not be applied low enough to restrict free movement of the hips.

The pack for the lower part of the leg extends from just below the knee to the malleoli. The coverings are pinned in the same manner as the thigh pack.

The foot pack is placed over the dorsum of the foot as far as the toes with extra thickness under sole. If the sole of the foot is not in contact with the foot-board because unreleased spasm does not permit bringing it to a position at right angles to the lower part of the leg, the foot pack may be pinned to the lower leg pack so that the effect of gravity and the weight of the foot may not permit it to drop farther than the position in which it is held by the calf muscles which are shortened because of spasm.

A complete pack can be given by a nurse and attendant in eight minutes to a patient who is not in severe pain.

The Kenny Packs in Home Care.—This procedure can readily be adapted for use in the home. It will not be necessary to sterilize the packs when they are used for the same patient. They can be heated to the boiling point in a galvanized tin pail, either on a stove or an electric plate. The pail can be set in a small tub with a wringer attached in order to prevent spilling when the packs are wrung. Additional care is required in the home to prevent accidents especially if there are other small children.

Administrative Problems and Teaching Opportunities.—It can readily be seen that the application of hot packs at intervals of two hours or oftener for a twelve-hour day increases the load of a nursing staff already depleted because of war needs. In order to meet this problem, careful planning is essential in order to give the necessary care to the patient and make the most economical use of the nurse's time. Some of the duties which should be delegated to ward attendants are folding, sterilizing, and wringing of packs. An electric wringer reduces the physical labour considerably. After the period of painful spasm is over, packs may be applied by attendants under supervision of a nurse. During the period of isolation and as long as spasm is acute, packs and other nursing care should be given by nurses.

Since emphasis is placed upon applying the packs to include the entire muscles in spasm, knowledge of location of skeletal muscles, including their origin and insertion, is important. This procedure therefore offers an opportunity to correlate the student nurse's previous study of functional anatomy of the muscle-skeletal system with her clinical practice.

For some time it may be increasingly difficult to secure a sufficient number of woollen blankets especially during an epidemic. Volunteers may give assistance in meeting this need. Many families have old blankets which they would be glad to contribute in an emergency. These can be collected and

the help of women's organizations enlisted in cutting them and stitching them as previously described. Old shower curtains and raincoats also may be contributed to use as substitutes for rubber sheeting.

Opportunities for Instruction in the Kenny Method.—In view of the very great interest in this new treatment, nurses should be informed on the subject and should be prepared to carry out the nursing aspects when this treatment is prescribed by the physician. Information about courses for physicians, nurses, and physical therapy technicians may be obtained by writing to the National Foundation for Infantile Paralysis, 120 Broadway, New York City.

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