

Staff Meeting Bulletin  
Hospitals of the » » »  
University of Minnesota

Kenny Treatment  
Of Infantile Paralysis

STAFF MEETING BULLETIN  
HOSPITALS OF THE . . .  
UNIVERSITY OF MINNESOTA

Volume XIII

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INDEX

	<u>PAGE</u>
I. LAST WEEK . . . . .	380
II. WEDDINGS . . . . .	380
III. SISTER ELIZABETH KENNY . . . . .	380
IV. KENNY TREATMENT OF INFANTILE PARALYSIS . . . . .	
. . . . . M. E. Knapp . . . . .	381 - 386
V. GOSSIP . . . . .	387

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William A. O'Brien, M.P.

I. LAST WEEK

Date: May 22, 1942

Place: Recreation Room  
Powell Hall

Time: 12:15 to 12:45 p.m.

Program: "Surgical Treatment of Ulcer"  
B. G. Larmin

Discussion  
B. C. Schiele

Present: 105

Gertrude Gunn,  
Record Librarian

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II. WEDDINGS

Fred Mears and Helen Scallen

Karl Sandt and Ruth Lindgren

Congratulations!

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III. SISTER ELIZABETH KENNY

Sister Elizabeth Kenny is an Australian "bush" nurse. Early in life she decided to be a nurse and go to the back country to help the people who were without nursing care. One day she saw some children who were ill with a disease which she did not understand. She cabled headquarters for help. They suggested that she was probably dealing with infantile paralysis and advised her to use her own judgment in treating them. Sister Kenny, a real scientist at heart, treated what she saw in these children. Pain and spasm were treated by hot packs. The inability to move the muscles was treated by assistance and encouragement. Later she visited headquarters and there she saw the children who had been taken ill at the same time as her charges. She noted that there was greater improvement in her group than in the other group. Her conviction that she had discovered something came to her there and as a result, she has spent her time and money trying

to convince others of the fact. Sister Kenny has an inventive mind and has perfected a special stretcher for transporting the wounded. She adopted the principle of incorporating the fixation apparatus in the stretcher. She also had difficulty convincing the authorities that this method was of value. One day, riding back in an ambulance with an injured child, the car was upset and badly damaged. She and the doctor were thrown out but the child did not receive further damage. Her stretcher is now widely used. In World War #1 she exhibited the same heroic determination to eschew her guns when she believed that she was right. Sister Kenny, a true nurse at heart in spite of reported difficulties with the medical profession, remains true to the proper relationship between nursing and medical service. An advanced position was to be abandoned. The enemy would start to shell the site occupied by a hospital at a certain time. Some of the soldiers remained as the hour of the attack arrived. Sister Kenny remained on duty in the face of enemy fire and bears today scars of this encounter. In her own country her method of treatment had been widely adopted. She felt, however, that other countries should use it and as a result started on her pilgrimage. There are certain features of her treatment which she does not completely understand. Lacking medical knowledge, she has gone to scientific authority for help and advice. An old friend in Australia urged her to put her ideas on paper so that others might study them and explain what was taking place. This she has done in a book published by the Bruce Publishing Company, St. Paul. It was written by Sister Kenny and explains her views on infantile paralysis. As a result of her presence the National Foundation for Infantile Paralysis has assisted the University of Minnesota in a program of investigation and education. Kenny courses are conducted at the Center for Continuation Study for physicians, nurses (hot packing), and physical therapy technicians. The newspaper and feature writers have dwelt upon medical opposition so much that many do not realize that Sister Kenny is deeply grateful to the medical profession in general and to her own group in particular for help and guidance.

#### IV. KENNY TREATMENT OF INFANTILE PARALYSIS\*

M. E. Knapp

The Kenny Method of treatment for infantile paralysis has been studied under the direction of the Departments of Orthopedic Surgery and Physical Therapy of the University of Minnesota since June, 1940 in specially designated wards at the Minneapolis General Hospital and the University Hospitals. In the Journal of The American Medical Association of June 7, 1941, a preliminary report was published in which it was concluded that "we think it is possible and appropriate to state definitely that these patients (of infantile paralysis) are much more comfortable and cheerful during the acute stage than are those cases who are immobilized and that we have seen absolutely no contractures following this treatment. Even the most severely paralyzed patient has passively full range of motion in all his joints. No scoliosis or other spinal deformity has developed in these cases and most of them are more limber than they were before the onset of the disease. The patients are more comfortable, more cheerful and we believe that the paralysis is less severe than would be expected in nearly every case. Certainly no harm has resulted in any of the observed cases under Miss Kenny's care from "abandonment of immobilization." The final conclusion was that the Kenny Method would be the basis for the future treatment of Infantile Paralysis.

The conception of Infantile Paralysis propounded by Miss Elizabeth Kenny of Australia is fundamentally different from the flabby flaccid paralysis which has been taught in the textbooks. Therefore the treatment is also fundamentally different. The symptoms pointed out by Miss

Kenny are essentially as follows:

1. The muscles affected present the condition of spasm.
2. The affected muscles become shortened.
3. Coordination is disorganized and incoordination frequently seen.
4. The patient frequently loses power in non-affected muscles because affected muscles are pulling the non-affected muscles from their normal resting place and retaining them in this lengthened position through the unrelaxed spasm in the affected group.
5. The non-affected muscles frequently refuse to contract due to so-called mental alienation.

These symptoms can be condensed into the three factors which distinguish the Kenny idea of Infantile Paralysis; i.e.,

1. Muscle Spasm
2. Incoordination
3. Mental alienation

#### Muscle Spasm

By the term "muscle spasm" is meant a group of symptoms including fibrillary twitchings (fasciculation), hyper-irritability of the muscle to stretching, and a tonic state of contraction of the muscle fibers which frequently cannot be overcome even by great force. The exact pathological significance of these symptoms is not well understood at present.

Examination of the patient acutely ill with anterior poliomyelitis brings strikingly to attention that he suffers from something more than weakness of muscles. Rather are the affected muscles painful, tender, irritable and in spasm and it is probable that this acute process in the muscle bears an important relationship to the deforming fibrotic changes in muscle unfortunately still common in the chronic stages of the disease. It follows that the treatment of poliomyelitis must begin immediately

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\*Condensed and adapted from a pamphlet prepared by Wallace H. Cole, M.D., John F. Pohl, M.D., and M. E. Knapp, M.D. for the National Foundation for Infantile Paralysis.

with the onset of the disease, if grievous after effects are to be avoided.

If unrelieved, spasm will result in destruction of muscle tissue and in eventual permanent changes and deformities. Upon the prompt relief of this spasm, keeping the muscles soft, long and receptive, rests the only hope of restoring function to the damaged motor mechanism. Beside the actual damage to the muscles affected, it can be shown that muscle spasm will cause further disruption of the motor system by eliminating or alienating non-affected muscles from conscious control and will produce incoordination of the muscles concerned in the joint motions of the region involved.

To examine a patient who has not been treated for spasm is to be convinced that he suffers frequently from stiffness and contractures, rather than from pure paralysis or weakness. The shortening of muscle from the process of spasm is the cause of the deformities. Furthermore, inability of a muscle to lengthen imposes a severe restriction upon the action of its opposing muscle.

To attempt to keep a hyperirritable muscle under tension, as in a cast or splint, is to set up a stretch reflex which further increases the spasm and adds to the damage in the muscle tissue. Active spasm, if untreated, passes over into a state of chronic contraction and finally results in fibrosis and fixed contractures. With treatment the active stage of spasm can usually be made to subside within a short time but the tendency of the affected muscle to remain in a state of contraction may remain for weeks or months. Treatment, however, must be persistent until all stiffness has been relieved and the muscles restored to their full length, as evidenced by full and complete range of joint motions. If proper treatment is carried out there will be no contractures and the muscles will be preserved in a soft, flexible state, receptive to nerve impulses.

Spasm may be diagnosed by observation alone in many instances through the presence of abnormal skin creases, prominence of muscle bellies or tendons, and char-

acteristic positions assumed by the part, so that often one is able to locate the spasm by observation and palpation without necessarily carrying out any painful motions. The diagnosis becomes obvious when the muscle in spasm is passively stretched. Care should be taken not to aggravate spasm by too frequent examination during the acute stage in order to demonstrate spasm. The diagnosis should be made by observation alone if possible.

### Incoordination

Incoordination is principally of two types:

1. That due to the spreading of motor impulses intended for a certain muscle to other muscles or groups of muscles due to such conditions as pain on attempted motion of the involved muscle or inability of that muscle to perform its proper function.

2. That occurring within the involved muscle itself so that ineffective contraction is produced instead of a coordinated rhythmic contraction producing maximum motion at the insertion of the muscle.

It can readily be seen that uncontrolled voluntary motion when attempted in the presence of spasm leads to the symptom of incoordination by the development of abnormal motion patterns. Active motion on the part of a patient unless very carefully supervised and directed can do great harm, therefore, and lead to marked difficulties in the securing of the return of normal function.

### Mental Alienation

Mental alienation, the third of the major symptoms of infantile paralysis, is the term used by Miss Kenny to describe a condition where there is inability on the part of the patient to produce a voluntary, purposeful movement in a muscle in spite of the fact that the nerve paths to the muscle are intact. This is a physiological block which must

be distinguished from the organic interruption resulting from destruction of anterior horn cells by the disease. Mental alienation can conceivably be produced in several ways, the most frequent being the following:

1. An uninvolved muscle is pulled beyond its normal resting length by its involved opponent.
2. An unaffected muscle may become alienated when pain in its involved opponent is produced on its attempting to contract.
3. The spasm, or its later results, in an affected muscle may be so severe that the braking action or check on the normal opposing muscle may discourage the latter enough to produce alienation.
4. The disease may produce changes in the central nervous system which do not actually destroy the cells or fibers but do cause loss of conduction power and interference with normal neuromuscular action.

Muscles that are non-functioning due to mental alienation may remain permanently in this state unless treated.

### Treatment

The Kenny treatment should be begun as soon as the diagnosis of infantile paralysis is made. The patient is put to bed on a firm mattress with bedboards placed beneath it and a foot board is used which extends from 18 inches to 2 feet above the level of the springs to assist in keeping the bed clothes off the patient's toes. This foot board is propped away from the end of the mattress by 4" wooden blocks. The purpose of the foot board is to allow the patient to maintain the normal standing reflexes during his stay in bed and it is not in any sense a splint. The mattress is separated from the foot board so that the heel can rest against the board when the patient is lying on the back, and the toes can project below the mattress when he is lying on his abdomen. The patient is placed in bed in a position as closely

approximating the normal standing position as possible with the body straight, the arms at the sides, the legs in a straight line. A folded towel or small pad may be used under the knees to prevent hyperextension. If spasm is severe, modifications of this position may be necessary to allow relaxation of the spastic muscles. If there is active spasm in the posterior calf muscles, the foot is not put in contact with the foot board until the spasm has been released.

### Spasm

As soon as spasm is diagnosed treatment should be started by the use of hot fomentations which are prepared in a manner somewhat different from the usual procedure. Woolen cloths, such as old blankets, are cut to fit the parts accurately so that there will not be too much bulk by folding, but so that there are two thicknesses over each area to be treated. A thin waterproof covering is used and around this a piece of woolen material is wrapped and pinned in position.

The fomentations are wrung from boiling water twice through a very tight wringer at the bedside so that as much water as possible is removed. They are then applied directly and as quickly as possible to the part so as to minimize any chance for cooling. It is unnecessary to protect the skin with ointments although some patients show sensitivity to the application of wet heat by a skin rash but no burns should occur. The packs are placed accurately over the entire muscle and care should be taken to make them of adequate size since the wool tends to shrink from the boiling.

Joints should not be covered by the packs unless the involved muscle itself covers a joint, as for example, the deltoid covering the shoulder joint. In the hand and foot, of course, joints are necessarily covered because of the small area involved. The packs do not in any way constitute splints and they must not give the patient any sense of fixation. They are renewed usually every two hours,

but may be applied as often as every fifteen minutes where the spasm is unusually acute or threatening the life of the patient as in involvement of the muscles of respiration and in such a case the wet packs may be used without covering. The packs are continued uninterruptedly being changed as indicated throughout twelve hours of each day. The alternate heating and cooling of the parts as accomplished by these packs seems to be the factor which tends to overcome spasm.

There is no place in the Kenny Technique for muscle testing or respirators. Muscle testing which has never been accurate in the acute stage of infantile paralysis anyway is definitely dangerous because of the likelihood of exaggerating spasm, or producing incoordination and alienation. The respiratory is not used because by its mechanical action in pulling upon the ribs it tends to aggravate the condition of spasm in the intercostal muscles and because in the cases in which spasm is the cause of respiratory difficulty the treatment should be by hot fomentations.

#### Muscle Re-education

The Kenny Method of muscle re-education is based upon the symptoms and conception of the disease previously described.

The purpose of re-education is to restore connection of the part with the central nervous system, (to restore "mental awareness"). Muscle strength is not a primary consideration but the re-establishment of "awareness" and the production of a normal rhythmic motion, no matter how weak, is the aim of the treatment. Increase in muscle strength will follow by daily use.

In starting muscle training substitution of muscle action must be completely removed and prevented, for every mental and physical effort of the patient must be guided to the muscle which is being trained and to that alone. To allow and encourage a patient in the free choice and substitution of muscles for the mere satis-

faction of haphazard joint motion is to invite disaster.

For purposes of explanation the part may be considered comparable to that of an infant who has never made any coordinated movement. In the first few days of life reflexes are predominant, and coordinated, purposeful movement is not carried out. However, repeated stimulation from the outside results in the production of conditioned reflexes which eventually become part of the subconscious mind of the individual and by repetition may become automatic. Finally they become conscious, controllable motions subject to the will of the conscious mind. The Kenny method of re-education is an attempt to repeat this process in the muscles which have become "alienated." The attempt therefore is made to start from the proprioceptive and exteroceptive sensory endings so as to produce reflexes through the cord and by repetition to change these into conditioned reflexes, and finally to bring them under conscious control. Each motion must produce a definite action by moving the insertion of the muscle. Great care is taken to prevent ineffective contractions at the origin of the muscle or in the muscle belly only.

As soon as joints can be moved passively through a small range without pain or incoordination indicating that spasm is lessening, muscle re-education within that range is started with the patient still in bed. At first this consists largely of maintaining or developing "mental awareness" of the muscles and their insertions. Later, as spasm decreases, the more active re-education can be added.

If there is no trace of motion in spite of absence of spasm, the proprioceptive reflexes are stimulated by placing the muscle slightly on the stretch and then stimulating the muscle through the tendon by moving the joint backward and forward. This procedure is repeated daily or several times daily even while the patient is receiving hot fomentations. Sister Kenny has shown that as long as the muscle can be stimulated by this

procedure so that the course of the tendon can be followed from its insertion to the muscle belly, the function of that muscle should eventually return. "Loss of tendon" which indicates complete loss of muscle tone is an indication of probably permanent loss of function. This procedure is called maintaining or restoring mental awareness and is the first important step in muscle re-education.

For a proper understanding and carrying out of muscle re-education by Miss Kenny's technique a knowledge of her classification of muscles is necessary.

- "Group 1. Muscles that contract within their normal resting length.
- Group 2. Muscles that have to be removed from their normal resting length before a suitable contraction can occur to perform their primary action.
- Group 3. Muscle group with separate origin and common insertion and multiple action.
- Group 4. Muscle groups with dual origin and dual insertion and multiple action.
- Group 5. Muscles that stabilize positions obtained by other muscle groups."

The first two are the most important groups.

The biceps of the arm and the hamstrings belong to the first group and the triceps and quadriceps to the latter and one example will show the importance of this classification. The quadriceps, in order to be trained or to contract so as to perform its normal action, must first be pulled from its normal resting position by flexion of the knee. Only then can the pull be placed at the insertion of the patellar tendon and the knee extended, the performance of which motion is the function of the quadriceps muscle. So-called "setting" of the muscle with the knee extended does not have any place in the Kenny method.

Muscle re-education, then, depends upon the relief of spasm, the teaching of muscle awareness, the combating of incoordination and alienation, and the re-training of nerve pathways back to the non-functioning muscles.

### Technique

For muscle re-education the patient is placed on the treatment table in as normal a position as possible. This is considered to be the usual standing position with the arms at the side, the legs in a straight line with the body, the feet at right angles and the knees straight. The patient must be relaxed and cooperative. Re-education cannot be carried out in babies who are crying, or in children or adults who are fearful of pain or other harm. Therefore re-education cannot be attempted before painful spasm is eliminated.

Before treatment is started the patient is instructed to lie perfectly quiet without using any muscles other than the ones to be treated. His attention must be concentrated solely on the motion to be performed. The technician then firmly grasps the part to be treated but without causing pain and carries out the intended motion passively through whatever range is possible without pain. The technician instructs the patient concerning the part to be moved by stroking the exact insertion of the muscle group to be trained. With the patient concentrating on this point of insertion the motion is carried out twice passively and then the patient is instructed to attempt to carry out that motion actively. A muscle, whether paralyzed or alienated, which is being trained must be made to contract at least in a mental sense if in no other way and the conscious mind must accept this awareness of the muscle if orderly and coordinated action is to be obtained. If any visible or palpable motion is accomplished, the treatment is stopped immediately in order to leave with the patient the memory of the accomplishment. If any muscles other than the one to be trained come into play, the attempted motion is stopped immediately and the unwanted muscles put out of action by instructing the

patient to do so or by finger pressure against the muscle. Great care is taken to prevent incoordination which is evidenced by this attempt of the patient to bring other muscles into play. Great care is taken not to tire the patient in any way and treatment must be discontinued if the patient shows evidence of fatigue or is uncooperative for any reason. As the patient learns how to move the muscles, more movements are given, gradually increasing the range and number of motions, although enough work to tire the muscle is never allowed.

### Summary

1. The Kenny treatment is based upon a conception of infantile paralysis that is almost a direct opposite of the previous ideas.
2. The treatment should be started as soon as the disease is diagnosed, that is, during the contagious stage.
3. Adequate treatment requires highly trained personnel and much attention to details.

## V. GOSSIP

At Rochester Sunday, May 24, members and guests of the Minnesota Hospital Association were conducted on a tour of the new St. Mary's Hospital addition. Just completed at a cost of over \$2,500,000 it houses medical, obstetric, and pediatric services. Each medical floor, whenever possible, is connected with the floor in the older building where the surgical patients are located. For example, gastrointestinal disorders will be found on medicine in the new building and on surgery in the old building. Silence and effortless efficiency seem to be emphasized everywhere. In the kitchen trays pass by on a continuous belt with the menu marked on each one. From the end of the belt line to the dumb waiter is but a step. There are no diet kitchens on the floor, only rooms for removing the trays from the dumb waiter. The tray can not be put down so it must be carried to the patient's bed. The total serving time from kitchen to patient for over 200 patients was about 30 minutes. Most interesting was the manner of collecting garbage which is taken at once to a refrigerated room and from here once a day to the farm. The cool room eliminates odors and decreases the possibility of flies. The kitchen is arranged according to the specialty units so that each part specializes in one phase of food preparation. As these rooms are built around a central unit it is but a step from each one to the loading platform. One of the efficiency units on each floor is a special room for the maids and floor men. A vacuum cleaner for mops, a special drying oven for mop rags, etc. In the children's department, the parents sign over their children to the unit even though they are private patients. Visiting is highly restricted. One marvels at the speedy method of sending records, drugs, and messages, through the hospital. Records and x-ray films are sent by tube from the clinic, a good mile away. The total elapsed time for sending is  $2\frac{1}{2}$  minutes. They are cleared through a special delivery room in the hospital and re-routed to special floors. Pharmacy is located on the first floor, just under the nurses' station on each floor above. Larger drug supplies are sent by special

dumb waiter which has a special lock to avoid unauthorized persons taking drugs from the platform. The complete centralization of service appears to be efficient. The training school office has a series of demonstrations which any hospital could copy. They stress the elimination of waste and breakage. Many hospital nurses, doctors, and others fail to appreciate the cost of the materials with which they work. If a hospital was asked to set up an operating room for a craniotomy and it started with a bare room with all the fixture outlets in place the complete cost of the equipment would be over \$6,000. A collection has been made of all damaged materials from the hospital and these are on display in another room. Breakage of glass and cigarette burns seem to lead the list. Both are the result of carelessness and poor house-keeping. If smoking were stopped completely there would be an enormous saving in any institution. P.S. It is at the Henry Ford Hospital, Detroit. Smoking is not allowed even in the doctors' dining room after meals. A third room demonstrated waste in food and a fourth was an idea room, for suggestions on how to eliminate waste. Many hospitals find it difficult to prevent personnel and others from stealing property. The idea that it does not belong to anyone in particular seems to be prevalent. Some years ago an intern left a hospital with quite a good deal of stolen property. Among other things he included bottles of stain from the laboratory. The express man dropped the trunk and everything in it was stained. Sometimes people reason that they give so much in excess of what they receive that taking something has the effect of equalizing the discrepancy. I believe most people assume taking that which does not belong to you is stealing no matter what excuse is offered. The meeting of Minnesota Hospital Association was well attended by state and national figures. The Hospital Association is 25 years old and when it was founded there were only 5 state or regional organizations. Minnesota is also proud of its record of having the largest percentage of hospital members of any state association. They have been firm supporters of the continuation courses at the Center for Continuation Study. Over 2,000 registrations in the past  $5\frac{1}{2}$  years.