POLIO NETWORK NEWS

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PART II

Becoming an Intelligent Consumer of Physical Therapy Services

Marianne T. Weiss, P.T., Canton, Ohio

The following completes the comprehensive article begun in the Winter issue of ***Polio Network News*** (Vol. 9, No. 1).

Marianne T. Weiss, P.T., received her Bachelor of Science degree in physical therapy from The Ohio State University in 1977.

Marianne's interest in polio began when she was 11 after watching *Sunrise at Campobello,* a movie about Franklin D. Roosevelt. She consequently read every book available about FDR and polio, and she decided at age 14 to be a physical therapist. A family friend, who had polio, was the first person she had ever met with a disability. She credits him with teaching her how to react and interact with people with disabilities.

In 1981, while the director of the physical therapist assistant program at Stark Technical College in Canton, Ohio, she invited the local symphony director, a polio survivor, to speak to her students about life with a disability. He became her first patient with post-polio related problems.

Today, Marianne is in private practice and can be contacted at Community Physical Therapy, 4176 Holiday St., N.W., Canton, OH 44718-2532 (216/493-7700).

Marianne's article is based on her years of experience and on both the medical and lay literature. For a copy of her bibliography, send a business-size envelope with 52¢ postage to International Polio Network.

Strength

EVALUATION. Close, specific testing of the strength of each muscle is important. Gross testing of muscle groups is not appropriate in polio survivors. Specific testing is necessary because a hallmark of polio was the fact that it skipped about the body in seemingly random fashion, affecting parts of a muscle here and parts of a muscle there, sparing parts of muscle here and sparing parts of muscles there. I know of no other testing protocol other than that advocated by Florence P. Kendall, P.T., that is adequate to test polio survivors. Survivors and professionals may be referred to the 1983 third edition of Kendall's book, *Muscle Testing and Function,* which she co-authored with her daughter, Elizabeth Kendall McCreary. Her protocol is one of manual muscle testing. Testing with Kendall's

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Rancho Later Life Study

A two-day conference, **Meeting the Challenges of Aging with a Disability: Lessons Learned from Post-Polio and Stroke,** was held in Long Beach, CA, March, 1993. The conference was the culmination of a five-year project (***Polio Network News,*** Vol. 6, No. 3) funded by the National Institute on Disability and Rehabilitation Research (NIDRR), Department of Education.

Most persons with a physical disability, like the population at large, can now be expected to live a longer life. However, as they age, many start to experience the onset of new health problems and secondary complications which threaten to further erode their independence and well being. Among those individuals who are vulnerable to these "secondary disabilities" are the survivors of the two leading causes of paralysis in the United States today — polio and stroke.

The five-year Later Life Study conducted at the Rehabilitation Research and Training Center on Aging at Rancho Los Amigos Medical Center involved individuals 50 years or older, and compared persons with early onset of polio and spinal injury, to those with a stroke occurring after age 50, and non-disabled controls.

A total of 265 individuals, ranging in age from 50 to 88, participated in the study. These included 120 polio survivors (not all of whom were considered to have post-polio syndrome), 60 stroke survivors, and 60 non-disabled controls, plus an additional 25 persons with spinal cord injury who were not reported on during the conference. Each participant received a comprehensive medical exam, including laboratory analysis of EKG, blood chemistry, and bone density testing for osteoporosis; a physical therapy evaluation; a psychological evaluation by a clinical psychologist, and a personal history interview by a medical sociologist.

Although not all of the data had been analyzed by the time of the conference, principal investigator Margaret L. Campbell, PhD, co-principal investigators Bryan Kemp, PhD, and Kenneth Brummel-Smith, MD, presented some preliminary information at the meeting. The final report will be completed by August 15, 1993.

The Rancho Later Life Study concluded, in part, the following:

Polio survivors experiencing the greatest problem dealing with post-polio issues are those in the "sandwich" generation — individuals in their early fifties

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methods is easier if the patient is clothed in a manner to allow the evaluator to see the muscles being tested.

Many people think that testing should be done only with sophisticated exercise equipment that is found in sports therapy clinics or in clinics that specialize in the rehabilitation of injured workers. I feel that most polio survivors cannot be adequately tested by machines such as this, due to using abnormal substitutive movements that can potentially cause harm in the presence of significantly compromised strength. Again, I will emphasize that for individual, specific muscle testing, I know of no other protocol other than that advocated by Florence Kendall.

The only adaptation to Mrs. Kendall's techniques that I advocate, if possible, is using a hand-held dynamometer during the testing. If the P.T. has access to such a device and is skilled in using it, the dynamometer readings can add valuable information to a manual muscle test. For example, one muscle that grades 3+ on a 1 to 5 scale might be capable of producing only 6 pounds of force (as measured on a dynamometer) while another muscle grading 3+/5 might be capable of producing as much as 12 pounds of force.

A word of explanation regarding the grading of muscles is appropriate. The Kendalls advocate documenting muscle grades by the use of percentages, i.e., 90-100%, etc., in conjunction with the old terms used by Dr. Robert Lovett in the early decades of this century, which were, normal/good/fair, etc. Another method for labeling muscle grades is using numerals 1 to 5. I have adopted this 1 to 5 grading system as being the easiest way to document on a record the value of the strength of a given muscle.

Given the above set of numbers, on a 1 to 5 scale, a grade of 3 would be approximately 50%. However, it is important for health professionals and polio survivors to understand the concepts documented in 1961 by Beasely. He found that polio survivors' muscle grades do not correspond with the above ratios. An abbreviated version of Dr. Beasely's study is listed below.

Muscle Grade in Polio Survivors	% of Functioning Muscle Fibers in Muscles Having This Muscle Grade
5	53.5% to 100%
4	42.5%
3	9.1%
2	2.5%
1	1.0%

Given Dr. Beasely's study, it is important for polio survivors to understand that even though their best muscles may grade in the vicinity of 3+ on the 5-point strength scale, their percentage of normal muscle strength may only be 10 to 20%.

Another factor important to consider in strength testing is endurance. If the survivors can tolerate it, I usually have them perform 3 to 4 trials of a given motion before recording the final grade. Not infrequently, I find that the first trial is significantly better than the third or fourth trial. If this is the case, I will record the value on the first trial and the value on the third or fourth trial and label them as such. It is important to recognize that a survivor may be able to put forth effort with one or two repetitions, but may not be able to duplicate that effort with sustained repetitions. In fact, in some cases a survivor may be unable to even initiate a movement after 3 or 4 attempted repetitions.

TREATMENT. Given all the factors above, there is a fair amount of controversy in the literature regarding the utility of strengthening programs in polio survivors. Some sources say that even in polio muscles grading 4/5, only an 11% gain in strength is possible with a concerted exercise program, and that this cannot be sustained over time. The implication is that if grade 4 muscles react this poorly, then certainly strengthening for weaker muscles is also of questionable value or even contraindicated. There is also definite danger in over-exercise. At least four researchers have shown increased weakness in response to nonspecific, intensive exercise.

My personal experience and recommendations are as follows:

♦ "Strengthening" exercise seems most useful in assisting survivors to learn more normal movement patterns. It is doubtful that true strengthening occurs, but patients seem better able to use their available strength as a result of exercising.

♦ All "strengthening" programs should be implemented only in the context of a person's cardiopulmonary function.

♦ If a person cannot perform a given motion without substituting abnormal movement patterns, it is rarely useful to attempt to "strengthen" muscles performing that motion. Doing so would only further stress overworked muscles and further reinforce abnormal movement patterns. This sets a person up for worsening pain syndrome.

♦ If the muscles of a given extremity grade 3+/5 or better for 3 to 4 repetitions without substitution patterns, they may respond to a low-level "strengthening" program. Characteristics of this program might include:

—0-3 pounds of free weight resistance;
—hold count of 2-5 seconds followed by 2-5 seconds' rest which allows for adequate rotation of muscle fiber firing without fatigue;
—2-5 repetitions performed 2-3 times per week;
—use of abdominal-diaphragmatic breathing with sustained exhalation as a means of reducing blood pressure elevation with exercise and activating abdominals to stabilize the trunk pelvis during exercise.

♦ If the muscles of a given extremity grade 3+/5 or better without substitution patterns BUT the extremity has compensated for years for a significantly weaker contralateral extremity, in general, it should not be stressed by further exercise. This is especially true in the upper extremities. Attempts should be made, however, to teach normalization of movement patterns, e.g., normal scapulohumeral rhythm, pelvic-trunk diassociation, etc.

♦ Isometric exercise may be useful for muscles grading 2-3/5 to promote circulation in that body part. Isometrics may also help retain some joint stability in body parts with this much weakness.

♦ Low level aerobics may be useful for people
— without severe heart/lung problems;
— whose arms grade 3+/5 or greater or whose legs grade 3+/5 or greater;
— having adequate trunk strength.

Lap swimming, walking in a pool, or biking with the arms or legs seem to be best tolerated as aerobic activities. In general, 15 to 20 minutes total aerobics (including warm-up/cool down) is the maximum recommended. Minimal resistance for biking is recommended at speeds no greater than 30 MPH. Walking on dry ground is not as often recommended because of the trauma produced by abnormalities in walking patterns.

Survivors should recognize that, in general, it is considered that a muscle must have a grade of at least 3+/5 to function in A.D.L. without external support (bracing/orthotics). If a muscle grades less than 3+/5, using that muscle during A.D.L. without orthotic support puts that body part in great risk for developing joint instability and pain. If a person desires to avoid pain and further dysfunction, muscles with this degree of weakness should be properly splinted or braced.

Sometimes physicians or survivors are reluctant to recommend or accept bracing because they fear that, "whatever strength is there will decline." While this may be true to some extent, isometric exercise or simple anti-gravity exercise without weighted resistance will go a long way towards retaining the existing strength, even in the presence of orthotic support. At all costs, remember that the trade-off for not using adequate orthotic support in the presence of significant weakness is further pain and dysfunction.

Posture

EVALUATION. As with gross strength testing, gross posture assessment yields little useful information. How-ever, using the results of a very specific posture and strength assessment can be the basis for important recommendations for assistive devices.

Posture assessment should encompass evaluation of bone angulation and length and joint abnormality, along with the more traditional concept of posture that includes alignment of the major body parts with one another. It is important to evaluate both sitting and standing posture. It is important to make some conjecture on the posture evaluation as to whether a specific posture deviation is a fixed, permanent type of deformity or a flexible one that might be possible to change with appropriate intervention.

TREATMENT. Addressing posture can be very helpful in minimizing or preventing pain and increasing endurance for sitting/standing/walking. Sometimes simple instructions in posture correction techniques, both in sitting and standing, are helpful. Other times, selective strengthening exercises are helpful in normalizing posture.

In the presence of more pronounced weakness, foot, trunk, or extremity orthoses may be necessary. Correction of leg length (even slight differences) may make the difference between the presence of pain and being pain free.

Bed Mobility and Transfers

EVALUATION AND TREATMENT. A P.T. should look closely at a survivor's ability to move in bed. The P.T. can then use this as a teaching time for offering suggestions as to positioning for comfort to minimize

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pain-producing or skin-irritating stress on body parts.

Evaluating the survivor's ability to rise from a chair and to sit from standing can yield valuable information about how a person is able to functionally use his/her strength. This information can be used to point out painful biomechanic stresses on the body that result from the methods used and to suggest possible alternative movement patterns or assistive devices that may be helpful (e.g., lift chair, tub seat, etc.).

Gait Testing

EVALUATION. If polio survivors are able to walk, it is important to evaluate them on level surfaces, inclines, curbs, and stairs if possible. Some clinics are able to videotape walking performance. This is helpful so the survivors can see for themselves the abnormalities that the P.T. is identifying on the evaluation.

Evaluation of a person's gait is often traumatic for poliosurvivors. I have found frequently that polio survivors have been reluctant to even watch themselves in mirrors. The survivors are surprised and sometimes dismayed at the deficient quality of their gait. Sometimes it is the evaluation of gait that is the deciding factor in a polio survivor's mind as to whether or not to accept assistance from a P.T. or whether or not to consider positively suggestions for use of assistive devices.

The biomechanic stress resulting on the survivor's body from abnormal gait must be pointed out. For example:

- the stress on the back during a profound forward/sideways/backward leaning of the trunk;
- the repetitive stress on the joints and muscles of the legs that results from severe "back knee";
- trauma to the arms resulting from using crutches, etc.

The P.T. may also point out how a person may be compensating with one muscle for weakness in another muscle. Correlating the strength and ROM evaluations with the gait evaluation is helpful.

If survivors are unable to walk, the P.T. should assess their ability to use wheelchairs, etc. Again, observation on more than flat surfaces is helpful.

TREATMENT. If most leg muscles grade 3+/5 or greater, low-level exercise (see above) and instruction in gait normalization may be all that is necessary. For significantly weaker muscles, orthotic devices or canes/crutches, etc., might be recommended. Often upper body weakness or pain is so pronounced that use of crutches, etc. must be discouraged. In these cases, encouraging the use of power wheelchairs or scooters may be necessary.

Skin

EVALUATION. A P.T. should do at least a gross assessment of the easily visible skin. The P.T. should comment on the presence of swelling, skin color, temperature, and quality (scaliness, moist, dry, thin, etc.). The P.T. should pay special attention to any areas of skin in contact with braces, special shoes, etc. If the survivor sits the majority of the time, the P.T. may wish to request permission to look at the skin over the buttocks.

TREATMENT. The P.T. should instruct survivors in measures for controlling swelling, skin care, turning schedules, skin inspection, etc. In some cases, the use of pneumatic pumps or pressure gradient garments (Jobst, etc.) are helpful in controlling swelling or improving skin quality.

Assessment of Appliances

EVALUATION AND TREATMENT. Survivors should bring all special equipment that they have used in the preceding five years to the evaluation, if possible. The P.T. should observe the survivor's ability to use this equipment and comment on whether modification of the equipment may be helpful or whether alternative devices may be necessary.

Pain

EVALUATION AND TREATMENT. The P.T. should evaluate the presence of pain and use the results of the rest of the evaluation to determine contributing factors to the pain. Sometimes correction of posture, movement patterns, ROM, etc. can decrease pain. Other times use of orthotic devices or reduction of ambulation time will reduce pain.

If polio survivors suffer acute sprains, etc., often treatment with traditional physical therapy physical agents (hot packs, cold packs, ultrasound, etc.) is helpful. However, chronic pain in polio survivors often responds best to special massage techniques such as craniosacral therapy, myofascial release, soft tissue mobilization, etc. The survivor should request if the P.T. is trained in these pain-relief massage techniques. If the evaluating P.T. is unskilled in these techniques and chronic pain is a significant problem, the survivor should request a referral to a P.T. who does perform these techniques.

Summary

Physical therapists can offer valuable comprehensive evaluative services to polio survivors. Based on the results of the evaluation, treatment plans may be developed and implemented that may significantly improve the quality of life for polio survivors. Physical therapists can also serve as educators of both polio survivors and their referring physicians.