

PHYSICAL THERAPEUTIC MEASURES IN HEMIPLEGIA

SHELBY G. GAMBLE, M.D. and WALTER J. ZEITER, M.D.

Department of Physical Medicine

THE management of a patient with hemiplegia is a difficult problem since many of the basic factors are not understood. In general, the purpose of such a program is the prevention and correction of deformities, increase of muscle function, and the instruction of the patient in performing the activities essential to daily living. It has been demonstrated by Dinken¹ that there are 22 basic activities regarding locomotion and traveling, 8 having to do with dressing, 7 in toilet activities, 8 concerned with eating, and 15 associated with hand function.

There is no set rule as to when the necessary physical measures should be initiated. It is important in cardiovascular accidents to attempt the differentiation of etiology, as there is a definite relationship in respect to early treatment.

Gilbert and deTakats² have listed the following differential points:

| | Cerebral Embolism | Cerebral Thrombosis | Cerebral Hemorrhage |
|------------------------------|--|--------------------------|--|
| 1. Onset | Sudden | Gradual (55%) | Sudden |
| 2. Spinal fluid | Clear Normal pressure | Clear Normal pressure | Bloody Often slight in- crease in pressure |
| 3. Average age | 53 | 60.8 | 58.9 |
| 4. Average blood pressure | 143/85 | 166/97 | 213/120 |
| 5. Predisposing disease | Rheumatic heart disease Bacterial endocarditis Postcoronary disease Hypertensive cardio- vascular disease | Arteriosclerosis | Hypertension Congenital aneurysms |

As a general rule, in those patients having a diagnosis of thrombosis or embolism, the indicated physical measures may be started immediately. In patients with a diagnosis of hemorrhage, little if any treatment should be started until the spinal fluid is clear or at least until the signs of meningeal irritation have practically subsided. Obviously, in some cases in which deformity seems to be developing, cautious passive exercises are indicated.

Usually the prognosis for functional recovery is best in patients who have had thrombosis and poorest in patients having experienced hemorrhage and emboli. Prolonged flaccidity is a poor prognostic sign and any muscle that

remains completely paralyzed after a period of 3 months is not likely to return to the point of satisfactory functional value. However, there are exceptions in these cases also. The greatest over-all return of function undoubtedly takes place in the 6 months subsequent to onset; thereafter it is only a matter of trying to improve the remaining function. Lengthy programs of treatment are not indicated even though relatives insist on continued therapy.

The initial step for any patient is a specific program of passive exercises, and only in patients critically afflicted should this be deferred. Each part of the involved extremity should be subjected to a full range of motion several times, and at intervals of two to three times daily. Special attention should be given to the shoulder, and it is most important that such exercises be taken with the shoulder girdle immobilized as well as freely movable. If there is any indication of periarthritis of the shoulder or shoulder-hand syndrome, stellate blocks should be given once daily, prior to the indicated exercises, except in instances where such a procedure is contraindicated because of hemorrhage. Pulley exercises are of great value when the patient is able to cooperate. In such cases relaxation becomes more spontaneous as the patient controls the stretching and, with the fear of being hurt thus minimized, will do a better job than with assistance. Such exercises also give an opportunity for reciprocal motion which is important in later functional activities.

When active motion starts to return, a program of careful assistive active exercises is instituted with the therapist guiding the extremity through a full range of motion. This is of utmost importance in gaining coordination, and in the early treatment to prevent substitution and bizarre motions. During this phase the therapist is essential in the development of satisfactory patterns; these may assure later independence in the efficient use of a weak muscle rather than encouraging reliance on strength alone. Free active exercises should be employed when a patient is able to move the part through a full range of motion in the horizontal plane. Resistive exercises to strengthen muscles are usually initiated after coordination has been established, and the member can be moved through a full range of motion against gravity.

Heat, massage, and electrical stimulation have little over-all value in the hemiplegic patient. Most persons enjoy heat and massage and most families request such measures. Heat does promote reflex relaxation as well as vasodilation to a moderate degree. Light stroking massage is relaxing and, when given correctly with the stroke in the direction of the venous and lymphatic return, will improve circulation to a mild degree. Heat and massage must not be employed at the expense of the exercises which are the most important part of the program. These measures may be carried out by the family, several times daily, with beneficial results.

When there is sufficient active motion of the upper extremity occupational therapy, stressing functional activities, should be started. Such therapy is an excellent means of improving coordination. Diversional activities, while useful, must be minimized in order that the patient may concentrate upon those procedures of greatest importance.³

Balance training should be begun as early as the condition of the patient permits. The patient should at first be supported by pillows in bed, then elevated to a sitting position. Next, the feet should be allowed to descend gradually over the side of the bed until, finally, a standing position is attained.⁴

Ambulation is essentially of great concern to both patient and family. When the motor power is severely restricted it is most important that one may speak and make one's wants known—a fact too often overlooked. The ability to use the hands and arms in order to insure independence regarding daily needs is more important than walking, since there are many ways and means of getting about if necessary.

Although no set rule can be established, the general procedure is initiated by standing at the side of the bed after the patient has experienced sufficient return of power in the hip flexors and knee extensors to be able to lift the leg 1 to 2 inches off the bed. Usually a patient who can stand will eventually walk. A heel-toe gait is taught in order to overcome the effects of any residual ankle clonus. Crutches and canes are of value and should be used in establishing balance and for assistance in stepping. Practice walking in parallel bars is advocated. Occasionally elevation of the normal foot by a plank, $\frac{1}{4}$ to 1 inch, is advised to allow clearance of the involved foot; this inhibits extensor spasm of the involved leg and may prove a worth-while supplementary aid. Later a lift on the shoe may be utilized.

Appliances have an important place in the over-all treatment program. Approximately 50 per cent of patients will need a leg brace. Most patients will require a short caliper with 90 degree ankle stop to control the drop foot and ankle clonus, plus an outside "T" strap placed well forward on the sole and cut back on an angle so as to control the inversion of the forefoot. This gives the patient a firm base upon which to stand and walk. A few patients with especially weak quadriceps will need long leg braces; these patients must be studied carefully as they often have concomitant involvements such as disturbance of balance, vision and hands, which prohibit the effective use of a brace.⁵

Splints are often needed for the fingers and wrist as flexor power usually returns first. Often the extensors are so over-stretched they never have the opportunity of regaining their normal resting length or functioning to any degree of efficiency when active return is limited.

Such a program obviously occupies a long period of time with the greater part of treatment conducted on an outpatient basis. As few patients experience complete return of function, varying degrees of disability are to be expected. Since this eventually becomes a family problem the cooperation and intelligent help of relatives is important. They should be introduced into the program early in the course of therapy, thereby insuring better adjustment to the ultimate problem.

Obviously, a daily program for the patient is essential and best regulated by the family with assistance and supervision of a trained therapist. Much later, depending upon the development of functional and ambulatory activities, consideration should be given to the question of vocational possibilities; these, for most hemiplegic patients, are greatly limited.

References

1. Dinken, H.: Evaluation of disability and treatment in hemiplegia. Arch. Phys. Med. **28**:263 (May) 1947.
2. Gilbert, N. C. and deTakats, G.: Emergency treatment of apoplexy. J.A.M.A. **136**:659 (March 6) 1948.
3. Dinken, H.: Physical treatment of hemiplegic patient in general practice. J.A.M.A. **139**:1255 (April 30) 1949.
4. Covalt, D. A., Yamshon, L. J. and Nowicki, V.: Physiologic aid to functional training of hemiplegic arm. Am. J. Occup. Therapy **3**:286 (Nov.-Dec.) 1949.
5. Covalt, D. A.: Rehabilitation of hemiplegic patient. Phys. Therapy Rev. **29**:514 (Nov.) 1949.