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Manual Therapy Approaches in NEURO-PHYSIOTHERAPY



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CHAPTER

2

Bobath Technique

Learning Objectives

At the end of chapter the learner shall be able to:

1. Define the terms associated with this approach.
2. Describe the synergy patterns in upper and lower extremities.
3. Describe six foundations of the technique.
4. Describe the basic techniques used.

Berta Bobath, a physical therapist, and her husband Dr Karel Bobath have developed a special method of treatment commonly used in the treatment of patients with adult hemiplegia. It is most effective when used by the entire health care team in the 24 h/day care of the physiotherapy. The principles of treatment can be followed by all those concerned with the case. It is ideal to begin treatment immediately during the acute stages of illness but effective treatment can be started at any time.

This technique is mainly evolved for the patients with lesions of upper motor neurone such as hemiplegic and cerebral palsy. The main problem of these patients is that of abnormal coordination of movement patterns combined with abnormal postural tonus. Problems of the strength and activity of the individual muscles or muscle groups we see as that of secondary to that of the coordination. There is a lack of control of muscle function. Muscles are the end organs of the nervous system and hence the activity of the individual muscles and muscle groups is secondary to that of their coordination in patterns of activity. Thus, the assessment and treatment of the patient's motor problem is the only way of leading directly to functional use. In the patients with hemiplegia muscles are not paralyzed and deficits of muscular activity can be remedied by their

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action in more normal functional patterns. Holistic approach is needed for better patient management. It should take care of sensory, behavioral and perceptual problems of the patient.

The patient's main problem is his inability to direct the nervous impulses to his muscles in many varied ways and in the different combinations of patterns used by a person with an intact central nervous system. The main task of treatment is that of improving tonus and coordination by obtaining normal active reactions of the affected side in response to being moved. Normal reactions to being moved indicate the patient's ability to perform same movements independently and voluntarily.

The patient's more normal reactions to being moved during treatment shows his potential and are a guide to the therapist in planning treatment. They also show which techniques to use and not to use and how to use them, all this depending on the patient's responses throughout the treatment. It is important to monitor these responses for better or worse by a constant feedback between the patient and therapist. Heavy resistance exercises, irradiation and the use of associated reactions should be avoided in patients with spasticity as it will reinforce the existing released tonic reflexes, and with it, increases the spasticity. Following the flaccid stage, patients enter a stage of mixed tone, displaying a combination of flaccidity and spasticity for, e.g. the upper extremity might have an increased tone proximally and a reduced tone distally.

Spasticity is the most common and most difficult motor problems to treat following CVA. If not treated correctly, spasticity can progress to a point so that independent living is nearly impossible. Spasticity interferes with the patient's ability to move by interfering with selective motor function. It produces abnormal sensory feedback and contributes to weakness of the antagonistic even when there is no actual affection in the muscles. It can cause contractures, pain and fear in many patients; pain, fear and spasticity are often so intermixed that a vicious circle appears. Thus musculoskeletal problems are superimposed on the primary neuromuscular problems. The spasticity can cause an increase in pain on stretching such tightened structures which can cause an increased fear which in turn increases the amount of spasticity.

If measures are taken to reduce pain and fear the therapist has a much better chance for success with the methods used to reduce spasticity. The typical posture of the adult hemiplegic patient is a combination of strongest components of flexion and extension synergies.

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Trunk: Lateral flexion toward the involved side with rotation away from the involved side.

i.e.	Scapular	-	Depression, retraction
	Shoulder	-	Adduction, internal rotation
	Elbow	-	Flexion
	Forearm	-	Pronation
	Wrist	-	Flexion and radial deviation
	Fingers	-	Flexion

Trunk: Lateral flexion toward the involved side, trunk shortening

i.e.	Pelvis	-	Postelevation, retraction
	Hip	-	Internal rotation, adduction, extension
	Knee	-	Extension
	Ankle	-	Plantar flexion, supination and inversion
	Toes	-	Flexion

The one fortunate characteristic about spasticity is the fact that it can be influenced. This means that the therapists can reduce or inhibit the effects of spasticity to some degree.

The patient's main problem is his inability to direct the nervous impulses to his muscles in many varied ways and in the different combinations of patterns used by a person with intact central nervous system. The main task of treatment is that of improving tonus and coordination by obtaining normal active reactions of the affected side in response to being moved. Normal reactions to being moved indicate the patient's ability to perform the same movements independently and voluntarily.

In the patient with spasticity more normal coordination cannot be achieved as long as tonic reflexes are active, evidenced by the abnormal postural patterns of extensor and flexor spasticity. Since spasticity is not confined to the any one muscle group, but to the synergy patterns, inhibition of these patterns reduces spasticity and this can be done by the therapist changing and dissociating the spastic patterns. However, without the patient being active while the therapist changes a position, there is no carryover of this inhibitory action into his own and unassisted movement. The patient has to learn to control actively the widespread patterns of spasticity.

Inhibition of those parts of the movement, which are unnecessary and might interfere with a specific activity produces a great variety of motor responses which enable the normal person to perform manual skills. The hemiplegic patient not only lacks the necessary variety of motor patterns, but is also unable to combine various patterns. For instance, he will be

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able either hold or manipulate an object which is lying on a table but he will not be able to hold and manipulate it at the same time or when the arm is lifted up. The main problem in performing skilled movements is their complexity. They need constantly changing combinations of easier and less selective movements, which are a part of the more complex combinations which constitute a skill.

Normalization of movements can be accomplished by using one or more of the following techniques:

1. **Proper positioning:** The patients should be properly positioned especially in the acute stage. The upper extremity is positioned by the side of the body with elbow in extension and wrist joint in neutral position. Different positioning is needed for patients with or without extensor spasticity in the lower extremities. The flexor tendency in lower limbs is dangerous for rehabilitation. Therefore, the therapist must prevent flexion contracture in the hip and knee joints.
2. **Weight-bearing over the affected sides**: Weight bearing enhances awareness of joint position sense by stimulating the proprioceptors present in the joints (Fig. 2.1).

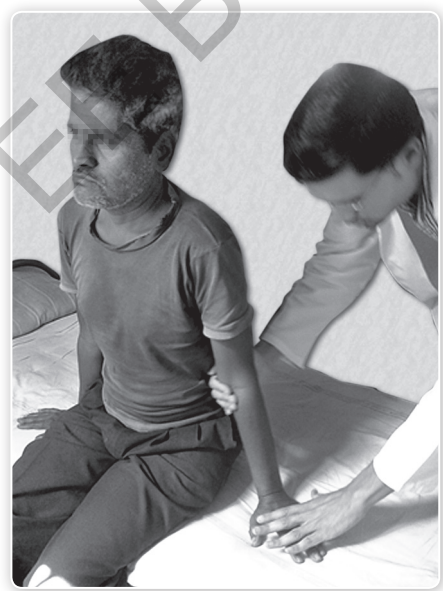

Fig. 2.1: Showing weight-bearing on upper extremity

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3. **Trunk rotation**: several things occur as patient rotates the trunk. Rotation encourages weight bearing and elongation of the affected side provides a vestibular input. Through trunk rotation the patient not only helps to normalize the movements tone but also learns to better integrate both sides of the body (Fig. 2.2).
4. **Elongation of the trunk in the affected side:** It helps in working towards the symmetry of the trunk. This can be accomplished in lying, sitting and standing positioning. The use of reflex inhibiting patterns and prolonged stretch is that it not only reduces tone in the proximal regions but also has an effect distally as well (Fig. 2.3).
5. **Shoulder protraction:** It accomplishes two goals. (a) It helps to normalize the movement tone (b) It helps to maintain scapular mobility. When the patient pulls back in scapular retractions an increase in tone in the flexor pattern can be detected throughout the upper extremity. Shoulder protraction is an effective method of reducing flexor tone in upper extremity (Fig. 2.4).

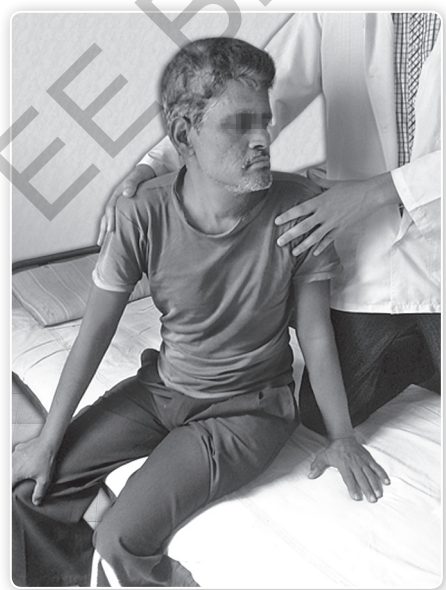

Fig. 2.2: Showing trunk rotation activities

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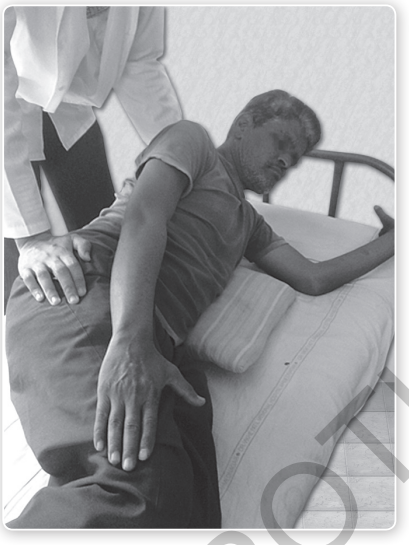

Fig. 2.3: Showing elongation of the trunk in the affected side in lying position with the affected side down

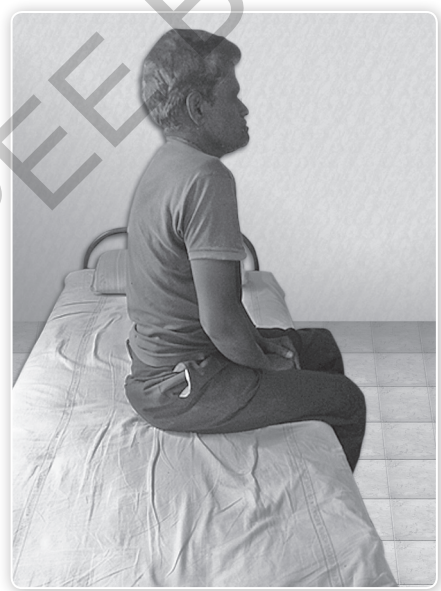

Fig. 2.4: Showing shoulder protraction exercises

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6. **Careful gradation of stimulation:** Stimulation can refer to a number of things. Auditory stimulus affects muscle tone. The therapist's voice, background noise or any loud noise can produce an in increase in tone. Tactile stimulation can also increase or decrease the muscle tone depending on how and length of time it is applied. Stimulation can also be the rate of an activity or facilitation techniques is performed.

These are six points provide foundation for treatment of adult hemiplegic using Bobath approach. The techniques are most effective and provide the best potential in the rehabilitation when they are started in acute phase at the time of admission in the hospital. These techniques however can be used in any phase of recovery.

Short-term rehabilitation in the hospital saves time and has economical advantages. However even after discharge from the hospital, the patient needs further treatment for a prolonged period in the put patient department or at home. If the potential recovery of the affected side and its treatment is taken into consideration right from the beginning and throughout the whole time of the patient's treatment, his rehabilitation will not take longer and the results will be better.

The usual aim of treatment during the early and acute stages of adult hemiplegic is that of short-term rehabilitation with a view of getting the patient out of the bed and making him as independent as possible in the activities of daily living. In order to get him to walk as soon as possible the emphasis of treatment is placed on the sound side in compensation for loss of the affected side. He is given a tripod on which to lean, which brings his whole weight to the sound side and make him use his sound leg for balance and walking. As he cannot bend his knee and ankle, he has to use his trunk to help him bring the affected leg forward to make a step, causing him to hitch-up his pelvis. The leg is stiff and is used momentarily as a prop to carry his weight, most of which is taken on a tripod or elbow crutch or later on a stick. The patient is taught also, to use his sound arm and hand for self help, for pushing and pulling himself upto sitting for getting out of bed for standing up from the chair, etc. This program of compensatory rehabilitation is usually supplemented with exercises to strengthen the muscles and to maintain joint ranges.

Even after the discharge from the hospital once the acute stage is over, patient needs further treatment for prolonged time period in the outpatient department or at home. If the potential recovery of the affected side and its treatment is taken into consideration from the beginning and throughout the whole time of treatment, his rehabilitation will not take longer and results will be better.

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The aim of treatment should be to inhibit the patient's abnormal patterns of movement. One cannot superimpose normal over abnormal. They should be reinforced and perpetuated by the effort involved in strengthening the muscles. The movements, the patient performs with or without the therapists help should not be done with undue effort. Effort leads to increase in spasticity and produces widespread associated reactions. Heavy resistance exercises, irradiation, use of associated reactions and mass synergies should be avoided in patients with upper motor neurone (UMN) lesion. In UMN lesions the tonic reflexes are disinhibited and dominant to the total. Exclusion of every other pattern of coordination. The influence of tonic reflexes is present in normal persons and produces slight and transient tonus changes among the wealth of many other postural and movement patterns. But in spastic conditions if disinhibited, the use of effort, irradiation and mass movement patterns of tonic reflexes to strengthen the muscles will only reinforce the existing released tonic reflexes and with it increase the spasticity.

It has been found ineffective to use static reflex inhibiting postures. Although, the spasticity becomes reduced temporarily, there is no carryover into the patient's own functional activity. If he attempts to move independently, spasticity returns immediately as he can only use the total spastic patterns. The therapist has to help him to use only parts of total pattern and prevents reassertion by her handling. The patient is encouraged and enabled to use parts of total pattern selectively. While he moves, the therapist prevents, i.e. inhibits the unwanted parts of the abnormal total pattern. It is the restoration of this inhibitory control that makes the permanent reduction of spasticity possible and gives him selective movements and their various combinations of functional skills. By learning to inhibit unwanted spread of activity throughout the affected parts of the body, he controls associated reactions. This process is called autoinhibition.

Initial Flaccid Stage

Treatment started in early stages should help the patient to carry weight on the affected side and to learn to balance on the affected side in sitting and standing. It should also help in working bilateral function of arms and trunk, so that the required interplay of the sound side with affected side becomes possible.

The commonly employed techniques during this stage are positioning and moving of the hemiplegic patients. Patients should be so positioned

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that it should inhibit unnecessary flexor and extensor tone in upper and lower extremity respectively. Patients are trained to turn on their affected and normal side. Being able to use the bedpan is the next goal of treatment. This is followed by making the patient to sit up at the edge of bed from normal as well as affected side. Once the patient is able to sit, he is taught to balance himself in sitting position.

Stage of Spasticity

There is always some overlap between acute stage and second stage. In this stage, most of the treatment would be done in sitting and standing. breaking up of all the patterns is now needed for better adaptation of movements to functional 7 selective skills. No separation of arm or leg activity should be made permanantly. Lack of balance and difficulty in moving the affected leg in walking will increase the flexor spasticity in the arm and hand. Also effort and abnormal walking will prevent any potential use of the arm. Decrease in spasticity of the trunk and arm will decrease the extensor spasticity of the leg and make easier. This also allows more normal movements of the leg is possible in standing and walking.

Stage of Relative Recovery

The patients, who reach the third stage of relative recovery will be those who were not severely affected at the beginning and who have made a good spontaneous recovery, or who have done well in the treatment. These patients now will be able to walk unaided, i.e. may be without using a stick. They may, however, be unable to use the hand for manipulation or have difficulty in doing so. It is desirable that these patients, who are able to work and to lead an independent life in the community, should be further helped by improving the quality of their gait and by obtaining a better use of their affected hands.

Spasticity is minimal at this stage and does not therefore prevent movement. Transient increase of spasticity, however still occurs when the patient uses effort, walks fast, or gets excited; coordination then deteriorates.

Treatment to Improve Patient's Gait

If further improvement in the patient's gait is to be achieved, it is necessary to obtain still more selective movement of his knee and of

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dorsiflexion and plantar flexion of ankle and toes, independent of the position and movement of the hip. Full dorsiflexion of ankle and toes is essential for normal walking and for heel toe strike.

Crossed standing and walking is another way of improving, his balance and control of his hips, and is a preparation for rotation of the pelvis in walking. It also helps turning round toward the sound side, which the patient finds difficult as he cannot bring the affected side sufficiently forward.

When walking the therapist is at the patient's affected side. His arm is held in external rotation and extended by his side slightly diagonally backwards. His wrist and fingers should be extended and his thumb abducted. Walking can also be practiced with the therapist behind the patient, holding both arms backwards as described when sitting on a stool. Rotation of the shoulder girdle should also be practiced in standing. He swing arms from side-to-side rotating his trunk and touching the opposite thigh with one hand. To practice the same movement when walking the therapist stands in front of the patient and holds him by both hands while she walks backward. Another, and even better, way of introducing rotation into the patient's walking pattern can be done by the therapist standing behinx d him and rotating his hips and shoulder girdle.

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