INTRODUCTION

Stroke is a major cause of disability in Britain and rehabilitation is generally thought desirable (Effective Health Care 1992).

The role of the physiotherapist in stroke rehabilitation:

1. Assessment as a basis for treatment after stroke onset to determine:
   - levels of motor and sensory impairment
   - deviations from normal movements and posture
   - level of functional disability
2. Early correction of positioning and functional movement
3. Therapeutic programme based on a variety of concepts of treatment including Propioceptive Neuromuscular Facilitation and Bobath which is the most commonly used in Britain
4. Use of physical agents such as ice and heat to relieve secondary symptoms such as pain or muscle spasm
5. Provision of aids when appropriate
6. Educating patients, family, carers and professionals
7. Psychological support for patients, family and carers

REFERRAL

All patients admitted to hospital following stroke will be assessed and treated by the physiotherapist covering the ward. On discharge further treatment can be arranged, dependent upon the patient’s needs, through the Day Hospital, the Physiotherapy Outpatient Department or the Domiciliary Service.

In the primary care setting referrals for physiotherapy should be addressed to the Community Physiotherapy Department, Cassidy House, Lancaster Moor Hospital, Lancaster.

TREATMENT CONCEPT – THE BOBATH APPROACH

In general, treatment regimens are founded on empirical clinical knowledge, and range from the Conductive Education approach of Peto to the Bobath concept used by most physiotherapists in Great Britain.

The Bobath approach to rehabilitation is concerned with the inhibition of abnormal mass movement patterns and the facilitation of normal fractionated movement patterns. It was observed by Bobath that there are “key points of control” by which muscle tone and performance in the whole of the limb can be controlled or altered. These key points are mainly proximal, i.e. the hip joint, the shoulder joint, the pelvis and the scapulae. In the stroke patient, if the spastic pattern is reversed at the hip and pelvic region by extension of the hip and protraction of the pelvis, the tone in the spastic limb is reduced, as is evident on passive movement. The patient may then be able to perform a fractionated movement e.g. flexion of the knee while the hip is extended. These fractionated movement patterns, performed while muscle tone is being controlled through the “key points”, are known as reflex inhibiting patterns.

PRELIMINARY CONSIDERATIONS

Rehabilitation should begin as soon as is practically possible. The sudden devastating loss of independence gives neither the patient nor relatives time to adjust. Early intervention with advice on positioning and handling helps to reassure both parties that an organised therapeutic programme directed towards recovery has begun. Although the initial stage of hemiplegia may be one of flaccidity, it should be remembered that hypertonicity may develop and when movement occurs it will be in abnormal patterns. Many of the accepted problems which result can be minimised or eliminated by diligent positioning and movement in the early stages. It is essential for the patient to be given the opportunity to achieve maximum potential by preventing abnormal postures which could lead to increased spasticity, contractures and pressure sores.

REHABILITATION

For the purpose of clarity five aspects of the rehabilitation process are mentioned below. These are not listed in chronological order, as aspects from each will be worked on simultaneously.

1. Positioning/Transfers
2. Normalising postural tone
3. Retraining balance reactions in sitting and standing
4. The upper limb
5. Re-education of functional walking

Positioning

Successful rehabilitation depends not only on the various therapy sessions but very much on what happens to the patient during the remaining hours of the day and night. It is
more satisfactory and easier for all concerned if a consistent approach to positioning is adopted from the beginning.

**General points to note when positioning the patient**

- The bed should be placed so that the table, food, TV, visitors or objects of interest are on the patient’s affected side. Nursing and other medical procedures should be carried out from the same side to reinforce treatment objectives.

- Nothing should be placed in the hand in an attempt to counteract flexor spasticity. The effect will be the opposite, as the influence of the grasp reflex causes the hand to close on an object placed in the palm.

- Nothing should be placed against the balls of the feet in an attempt to avoid a dropped foot. Firm pressure against the ball of the foot increases unwanted reflex activity in the extension pattern.

The typical postures which should be prevented are:-

a) Side flexion of the trunk to the affected side.

b) Side flexion of the head to the affected side and rotation to the opposite.

c) Depression and retraction of the shoulder, medial rotation and adduction of the arm, flexion and pronation of the forearm and wrist and finger flexion.

d) Pulling upwards and retraction of the pelvis with lateral rotation of the hip. The leg may be either in flexion and abduction or extension with adduction and the foot in plantar flexion.

Positioning sheets are readily available from the physiotherapy department. In practice they should be placed close to the patient’s bed for easy reference.

**Lying on the hemiplegic side**

There is a popular misconception that stroke patients should not lie on the affected side. This is, in fact, the preferable position and should be introduced from the beginning. Spasticity is reduced by elongation of the trunk, and the awareness of the side raised due to the sensory input. Another obvious advantage is that the more skilled hand is free to carry out tasks such as pulling up the bedclothes or arranging the pillow. Care must be taken to ensure that the affected shoulder is well protracted.

**Lying supine**

The supine position should be used as little as possible, because in this position abnormal reflex activity is at its greatest due to the influence of the tonic neck and labyrinthine reflexes. For hemiplegic patients it also involves the highest risk of pressure sores developing on the sacrum and, even more commonly, on the outside of the heel and on the lateral malleolus.

**Transferring from bed to chair**

Transferring correctly and without undue effort will later enable the patient to stand up easily, and will assist in achieving weight-bearing through the hemiplegic leg without using the total pattern of extension. The chair should be placed so that the patient transfers towards his hemiplegic side. As soon as the patient is able to help at all, the transfer becomes more active.

**Sitting in a chair**

Sitting in a chair is preferable to sitting in bed as a far more upright and symmetrical posture can be achieved and maintained by the use of pillows and foam wedges. The upper limb should be placed on a table in front or supported on pillows.
Normalising postural tone

Perhaps the most important and difficult aspect for the therapist is the normalisation of tone, which is necessary before the patient can be expected to move easily in a normal pattern. When the tone is too low, the patient will be unable to support himself or parts of his body against gravity. When the tone is too high and spasticity is a problem, the patient will only be able to move with great effort in stereotyped patterns against resistance. How the patient moves or is positioned throughout the day will influence tone considerably. He should never struggle to perform a movement which is too advanced because excessive effort leads to an increase of tone and unwanted associated reactions. The trunk dictates the posture of the limbs and therefore should be carefully positioned during any activity. One of the most potent influences on tone is that of weight-bearing. When used on the low tone patient in conjunction with icing and tapping over muscle groups, tone may be increased. Conversely it can be used to decrease tone in the spastic patient e.g. it is helpful to weight-bear through an extended arm with full finger and wrist extension, taking care that the trunk on the affected side is elongated as the body weight is moved over the arm. This uses the valuable principle of inhibiting hypertonicity by moving the proximal parts of the body against the distal spastic components. Once tone has been made as normal as possible, facilitation should follow. Treatment is not a series of isolated exercises but a sequence of activities to achieve a specific aim.

The medical management of increased tone

The use of drugs such as Baclofen should be considered where excessive tone is interfering with the rehabilitation process or causing painful spasms. Many drug doses for adults are standardised and usually only need to be changed in circumstances that lead to alterations in drug metabolism. However when treating spasticity the end point is physiological rather than pharmacological: achieving balanced relief of spasticity so that the patient is made better rather than worse. Careful titration of dose is important and is achieved through close liaison between the doctor and therapist – the latter monitoring the results of any change in dose. The recommended starting dose when using Baclofen is 2.5 mg twice or three times daily increasing by 5-10 mg per week, usually to a maximum of 60 mg per day.

Retraining balance reactions in sitting and standing

Adequate balance is necessary not only for walking but also for every activity the patient carries out during his waking hours. The ability to maintain equilibrium in a great variety of positions provides the basis for all skilled movements that are required for self-care (washing, dressing, feeding) and social interaction. The typical sitting posture of a hemiplegic patient is an asymmetrical one with a relatively small base of support. Side flexion to the affected side in combination with retraction of the pelvic girdle prevents weight from being taken through the affected buttock. Normal balance reactions are compromised and the patient attempts to stabilise himself by fixating around his good hip and holding on to some support with his good hand. A degree of stability has been achieved but at the expense of function. Objects placed on a table in front of the patient or to the side are “out of reach” as he is unable to make the necessary postural adjustments to lean forwards or to the side without falling over.

Initial activities to facilitate balance reactions are carried out in sitting e.g. the therapist passively moves the patient
from side to side ensuring that the trunk and neck react correctly. The movement is repeated and the patient participates more and more actively until the therapist can withdraw her support.

The patient must be able to reach his feet and return to the upright position without pushing with his good hand. One way of achieving this is by asking him to interlock the fingers of both hands and then with extended arms move forwards and down; then return to the upright position, offering less support as his ability improves.

Once sitting balance is achieved the patient is brought up into standing. The patient tends to stand up thrusting back into total extension. This is neither safe nor therapeutically desirable.

He must be encouraged to lean forwards so that his head is vertically in front of his feet and weight equally distributed over both. Placing the affected foot a little behind the other encourages weight bearing through the affected side as he stands. Preparatory to standing, the patient can be taught to raise his bottom a few inches off the bed or chair and to place it to the left and to the right. Once he has the idea of taking weight through his feet he is drawn further forward and up into the standing position. If the trunk and arm retract too much at first the patient can assist standing by pushing his arms out in front of him with the hands clasped together.

A high table with which to begin standing balance work is useful but is somewhat static and a large therapy ball can be substituted in order to promote more dynamic balance reactions. As ability and confidence increase, the use of poles and tilt boards can be incorporated into the therapy programme.

The upper limb

Because rehabilitation strives to teach the patient to walk again and be independent in ADL (activities of daily living), his arm and hand tend to be neglected. The patient becomes more and more skilled in managing all activities with one hand and the full potential in the affected side may never be fully realised. This is particularly so in the left-sided stroke patient who exhibits sensory inattention. Even if no activity appears in the arm and hand it is important to treat them as a spastic arm pulling strongly into flexion adversely affects the patient’s balance and thus his walking. When treating the upper limb the therapist reduces spasticity in the trunk in order to allow the scapula to move freely. She then mobilises the shoulder girdle before attempting to move the arm. Once tone allows, the patient is asked to perform auto assisted arm movements to maintain soft tissue extensibility and promote sensory awareness.

In our daily life we use our hands mainly when we are sitting or standing therefore the patient is preferably treated in these positions when attempting to move actively with facilitation.

The painful shoulder

Shoulder pain is probably the most frequent complication of hemiplegia. It can delay rehabilitation and functional recovery as the painful joint may mask improvement of motor function.

The flaccid shoulder

During the flaccid stage of hemiplegia, subluxation may
occur and care must be taken when handling the patient and attention given to correct positioning so that excessive capsular and cuff stretch is prevented.

Slings have not been shown to reduce subluxation but may serve the purpose, if worn externally over clothing, to alert all members of the team to the vulnerability of the shoulder.

Spastic subluxation

There is a close correlation between the genesis of shoulder pain and spasticity. Where spasticity develops the normal activity of the rotator cuff is disturbed. An inequality of forces pulls the scapula downwards and posteriorly while the humerus is held forward, thus stretching joint tissues.

A number of treatment techniques may be used to overcome spasticity but all passive movements of the arm must be preceded by full mobilisation of the scapula, and then the scapula supported in such a way that the glenoid fossa continues to face upwards and forwards during movements of the arm distally.

Re-education of walking

The patient's greatest hope and expectation following stroke is to walk again. Some studies have estimated that 60-75% achieve this; others put the figure higher at 85%. In order to be truly functional, walking must be safe, relatively effortless and carried out at an automatic level.

Some of the common difficulties encountered with stroke patients are:

1. A tendency to walk with the centre of gravity well behind the normal line due to the forces of the spastic extensor muscles which cause difficulty transferring weight over the standing leg and to the fear of falling forwards.
2. An asymmetry of gait with respect to time and distance. The patient takes a short quick step with the sound leg to avoid standing and balancing on the affected. Because of the decrease in walking speed and hypertonus in the trunk, rotation of the pelvis ceases and arm swing no longer occurs. Spasticity in the arm itself also prevents the arm from swinging freely.

3. Hyperextension of the knee during the stance phase of gait.

4. Inadequate dorsiflexion of the foot or dangerous inversion during walking.

In order to prepare for a reasonably normal gait, balance, stance and weight transfer should be practised. For the swing-phase the patient needs release of spasticity at hip, knee and ankle to lift his leg and make a step. He also needs control of the extending leg when putting his foot down to the ground. If all this is first practised while in the standing position, the patient will develop a better walking pattern than if he is made to walk immediately without the necessary control of his leg.

Calipers

The decision to order a caliper or orthoses should not be taken lightly because most patients will find it difficult to manage without it at a later stage once they have become used to total support. What type to order depends on the patient's needs e.g.:

A polythene drop foot splint that slips into the patient's shoe will correct plantar flexion but not inversion.

A Rizzoli caliper achieves the same but may be more appropriate if circulation is impaired, skin integrity poor or oedema is a problem causing shoes to be tight.

For a problem of inversion, a below knee caliper with inside iron and outside T strap is needed. It has the advantage of reducing spasticity by preventing supination through direct pressure over the neck of the talus.
These are supplied by a visiting orthotist, ordered through the hospital’s Appliance Department and require an AF 08 form to be signed by a consultant.

**Using a stick**

Patients requiring a walking aid are supplied with a high stick rather than a tripod. This gives support but does not encourage him to lean away from the affected side. Relatives and members of the healthcare team are encouraged to walk on the affected side.

**SUMMARY**

In the United Kingdom there is a high incidence of stroke, and moderate to severe disability is the expected outcome for up to 50% of the survivors. Treatment must be directed towards using the affected side rather than ignoring it so that a whole symmetrical man evolves. This approach must be used by everyone involved as all can help to reinforce the concept of orientating the patient towards the affected side.

**REFERENCES**

1. Effective Health Care Stroke Rehabilitation. March 1992