Rhythmic Stabilisation — a new approach

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The technique of rhythmic stabilization as described by Knott "employs isometric contraction of antagonistic and agonistic patterns, which results in co-contraction of antagonists if the isometric contraction is not broken by the physical therapist". (1) In order to obtain the desired co-contraction the therapist must be extremely skilled and the patient must exert considerable voluntary effort. It is generally found that there is a considerable time lag between the demand for effort and the achievement of a co-contraction.

According to Stockmeyer, co-contractions are "reciprocal contractions alternating so rapidly that the shift of facilitating influences is not visible and therefore flexors and extensors in terms of observable function are contracting together". (2) If this definition is accepted, it is doubtful whether a true co-contraction can ever be obtained with rhythmic stabilization. The key words in the above definition are 'alternating so rapidly' and Knott does not alternate her isometric contractions very rapidly. Also, the degree of contraction required by the patient precludes a natural stabilization. Voluntary control is unnatural in the maintenance or achievement of postural tone.

Joint stability, especially proximal stability, is essential for skilled movement and the therapist needs to facilitate this before progressing to distal skills. A method which is far less demanding of both therapist and patient, has been devised to obtain a co-contraction in the extended position (in which co-contraction is functional). It can also be used to facilitate any muscle group depending on the position of the joint and the point of application of the facilitation.

The joint is placed in the desired position and quick, alternate, small-range rotations are applied to any part of the limb distal to the muscles which are to contract. The patient is requested to hold the part still i.e. to prevent any rotation from taking place. It may be found necessary to perform the manoeuver slowly and in a larger range than used to facilitate, in order to explain to the patient what is required of him. Once the patient understands, it will be found that a co-contraction can be elicited without the time lag and the intense voluntary effort so commonly experienced with rhythmic stabilizations. It has been ound that the finer and the more rapid rotations, the greater the facilitation.

It is thought that co-contraction is initiated by means of stimulation of secondary afferents of single joint extensor muscles. (3, 4) The optimum position for this is the extended position of the joint i.e. the normal weight-bearing position.

In Fig. 1 the elbow was held in an extended position. Rotation of the shoulder was applied using the hand as the point of application. The upper reading is the e.m.g. recording of the triceps muscle, the lower is that of the biceps.

The paper speed was 25 mm/sec. The calibration was 1 cm/m volt. In this simultaneous recording it can be seen that the amplitude and frequency of the action potential spikes are almost equal — a true co-contraction.

A similar technique was applied with the elbow held at 30° (Fig. 2) and 90° (Fig. 3) flexion respectively. The joint angle was measured and kept constant by use of a Leighton Flexometer. The upper reading is the triceps and the lower one, the biceps.

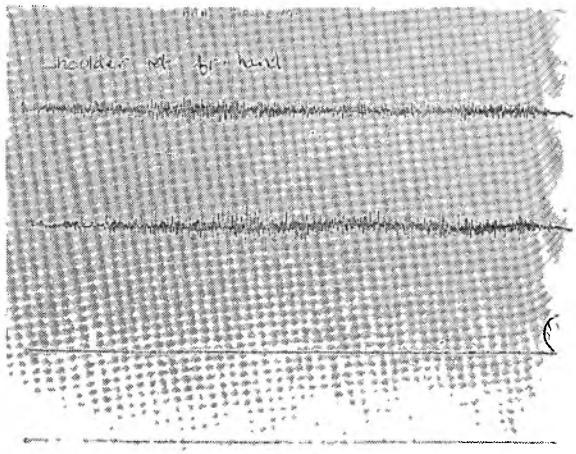

Fig. 1

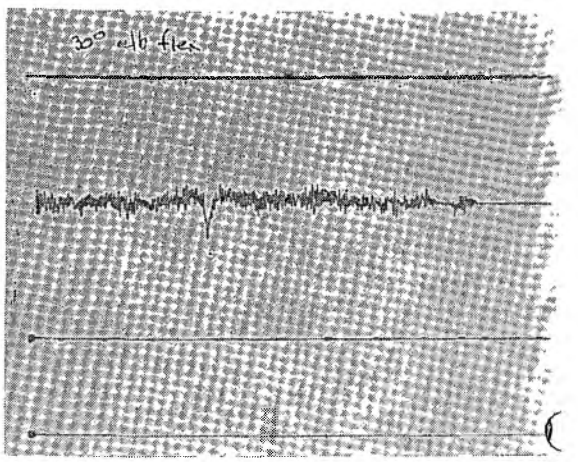

Fig. 2

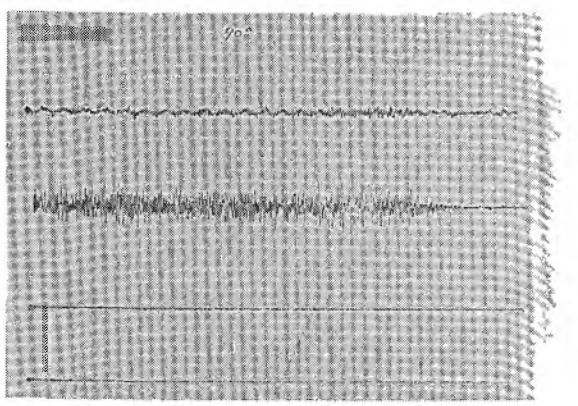

Fig. 3

It can be seen that with an increase in flexion there is far greater activity in the biceps, while activity in the triceps is minimal. Thus this technique can be used to facilitate any muscle group depending on the position of the joints and the point of application of the rotations.

The uses to which this technique can be put are legion, so long as the joints are carefully positioned to obtain the optimal response. Since the contraction obtained is isometric, there is no danger of moving joints which must be kept immoblie. The one contra-indication to this technique is the patient with a heart complaint. Isometric contractions, particular of the upper limbs, are known to cause an increase in heart rate and blood pressure. (2)

A few examples of the uses of quick rotations now follow:—

(a) For facilitation of head control in forearm rest prone lying, rotation of the shoulders can be given This causes a co-contraction of the neck muscles — as added facilitation to that of the starting position.

(b) In order to facilitate action of the rotator cuff and the scapular rotators, quick rotations can be applied in the forearm rest position, to the shoulders (weak facilitation) or to the forearms (used as levers to cause rotation at the shoulders) or to the hands which are gripping cones. for even greater facilition. If weight-bearing is not allowed, the arms can be placed in the bend position and quick rotations applied. Once the rotator cuff muscles are active, it is possible in the latter position, to superimpose an isotanic deltoid contraction with a resultant elimination of a reversed scapulo-humeral rhythm.

(c) In lying, quick rotations applied to the hip joint using the dorsiflexed foot as the point of application, facilitate hamstring and quadriceps activity (particularly vastus medialis activity).

(d) Quick rotations applied to the big toe held in the neutral position facilitate contraction of the abductor hallucis. If the toe is held in the dorsiflexed position, the quadriceps is facilitated. This is particularly useful for patients immobilized in P.O.P.

(e) Trunk stabilization is obtained by quick rotation of the pelvis and later the shoulders in either sitting or standing. Pelvis rotation can also be applied in the bridging position which causes a very strong trunk co-contraction.

It can thus be seen that this technique offers endless possibilities. One must bear in mind that the position of the joint alters the degree of facilitation in the desired muscle. The point of application of the rotations also alters the facilitation, the more distal the application the greater the facilitation. The technique is simple, but shaking of the part must be avoided. Quick alternate **rotation** of the part is required, not flexion and extension or ab- and adduction. The movement applied should be so fine as to be almost imperceptible to the patient. With this technique it is possible to elicit a co-contraction of any part as well as to facilitate any weak or inhibited muscle group. It has also been successfully applied in the early rehabilitation of peripheral nerve lesions and with care, can be used in spastic conditions where stability is desired.

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