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Learning Outcomes

The Participant Will be able to:

1. Describe the concept of forced use.
2. Describe preparation activities that may enhance the effectiveness of forced use.

The Concept of Forced Use as an Element of Therapy Handling

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The idea of “forcing” or requiring the use of a less active limb occurs readily as a solution to strengthen the response of the weaker and slower arm or leg. This has a strong basis in the fact that reduced use over time results in further weakening, lack of awareness and even more reduced frequency of use. This phenomenon is observed clearly in acquired trauma due to stroke or head trauma. It is also seen in some children who have not been exposed to active therapy handling at an early age. With current knowledge there are some preparation techniques that can supplement forced use. Vision plays a role in this gradually decreasing awareness of one side of the body and visual intervention has the potential to support more active physical responses. There is often a greater lack of active hand use due to the more active weight loading of the lower limb. When the hand is not moving within the field of visual awareness it is ignored and, over time, moves further away from the visual and structural vertical midline of the body. A wide variety of soft tissue techniques may also be useful in returning active function to inactive limb.

Dr. Winthrop Phelps in the 1950s noticed some of the negative functional changes in children with cerebral palsy and had his occupational therapist physically restrain the more competent hand of the child during hand activities at a table. With sufficient motivation to participate in the presented activity the child would attempt use of the more involved hand, and was assisted as necessary by the therapist. External bracing that was used at the time also forced the needed alignment of the lower limbs for standing and walking, while eliminating the extraneous or non-functional movement that interfered with balance. The limitations were that external bracing did not permit exact monitoring of the synergic movement being used and there was no activation of a more ample range of movement to perfect the smaller range needed for function.

If we think of the concept of “forced use” as a continuum we will recognize that the active handling that includes the concept of “inhibition” as it was introduced by Dr. Karel and Berta Bobath was a form of stopping the abnormal reactions in order to permit or require a more active response toward the normal. There is emphasis placed on moving the body weight

over the more affected hemiplegic side. Dr. Kabat interrupted the customary response of the patient to introduce a more functional movement pattern that keyed in to the proprioceptive information necessary for the learning of new movement patterns. Current advances in the monitoring of brain activity have permitted confirmation of increases of activity in the neural circuitry as the use of the impaired limb increases.



Any time that the habitual postural pattern is not allowed full expression the input to the brain in the form of feedback is modified so that new sensorimotor learning has an opportunity to begin. When the postural set is unknown the appropriate movement cannot be initiated. The fear of these unknowns limits the child's ability to try the new adaptation without both emotional and physical support.

The success of facilitated movement experience lies in the therapist's ability to vary the point of physical control so that the challenge for the individual changes. Let's review a common example of limited learning. A child who has one side of the body more competent than the other, will tend to train family members to hold the hand of the more coordinated side to walk. Why? The firm contact on the hand of the child translates to peripheral stability that then permits the shoulder to have sufficient mobility to balance over the base of support. The shoulder of the more affected side is not able to respond in this way. As the child walks more successfully with this contact his body is learning a constellation of interrelated postural reactions and developing a stronger habit pattern. When the adult tries to take the opposite hand the child rebels and insists on his familiar support. The firm pressure on the hand of the less organized side of the body results in excessive undirected mobility or stiffness of the shoulder girdle, and dissociation between upper and lower body has not had the opportunity to develop. The child feels out of control, not only physically, but also perceptually as the postural base for visual and vestibular function has been altered. Anticipatory control is diminished by these changes and the child becomes fearful that he is going to fall.

By changing the control contact even slightly the therapist is enlarging the repertoire of active postural adaptation in the client through acceptance of the new sensorimotor input. By increasing the range of adaptation the island of security grows larger. Once the therapist has guided the client into a new range of sensorimotor security with assistance, the individual is safe to venture a little outside of his or her habitual pattern of movement. In this ongoing process we are "forcing" the use of new synergies of muscle action and establishing new visual-motor matches for moving in space. The brain recognizes the constellation of input that is identified as "normal", which might also be identified as that which is useful for successful or efficient sensorimotor function.



When working with adults there is often peripheral tension associated with chronic disuse of the upper extremity. The gentleman shown had a left hemiplegia from birth, without receiving organized therapy intervention. It was helpful to organize a functional alignment of the hand before requesting small range specific movements. Soft tissue mobilization preceded the voluntary activity. Once the movement could be initiated some muscle energy techniques were helpful to increase the range of pronation and supination while avoiding the habitual wrist flexion. If a mitt is to be used to restrain the more competent hand the therapist will need to be very alert to tension increases in the forearm and shoulder, as the associated tension increases indicate that the movement of the more affected side is done with increased stress to the entire organism. By involving both upper extremities in coordinated activities during part of the session the necessary timing is established for bilateral coordination.

Thus we arrive to the conclusion that to force one reaction or response implies that another response is inhibited, limited or refused expression in the individual with a neurological impairment. These are two sides of the same coin, so to speak, and cannot be totally separated. By physically limiting use of the sound limb, with the cooperation of the client or patient, it is possible to extend this experience to the home setting. Changes may also be made in the security of taking weight on the less competent leg by temporarily using a splint that maintains knee alignment. To use Constraint-Induced Movement Therapy the therapist would restrict the more competent leg to restrict the more rapid step response, which then requires the less used leg to bear weight longer. This gives more security to child while activating balance in the upright alignment, resulting in a positive change in the gait pattern. A member of the family or a caregiver may supervise the new movement experience, which permits successful use of new movement patterns and makes the sensorimotor learning more efficient



In some cases the therapist wants to change the postural interference of a limb, as in the static forward alignment of the right arm of this boy. It is possible to focus therapy handling on the organization of the postural components in order to change the timing of the active motor response of the upper limb. Assisting motion of the superficial tissues over the rib cage, while the child is speaking, challenges respiratory activity needed for speech.

The initial decision to force the use of a previously dormant movement pattern requires analysis of the body's preparation to tolerate the components of that movement pattern. The therapist will question whether there is joint range of motion for the action and whether the limb can be taken through the entire movement passively. For most limb responses there is need for a postural displacement of some kind over the base of support. The proximal joint of the affected limb has often become stiff and is habitually held in one alignment. This adaptation most often is subtle in nature, but without the ability to make this automatic postural adjustment the body feels out of control and the visual-vestibular interaction that is needed to maintain balance fails to function at an optimal level.

Fascial restrictions that limit free head movement at the level of the neck are prominent in persons who have suffered head trauma. These restrictions may create an asymmetry in the alignment of the head, which then tends to distort sensory feedback. The individual may have re-learned standing and walking patterns in spite of the inadequate head alignment. This means that he or she has learned a "mismatch" between the visual and postural feedback, with a compensatory vestibular adaptation. The balance demonstrated by the person with this type of experience is generally precarious at best. There is a poorly coordinated interaction between visual, vestibular, kinesthetic and somatic information, all of which is needed for automatic functional movement initiation.

The characteristics of fascia must be brought into the discussion of functional movement preparation. Our primary reference to appreciate the organization of fascia as it is related to body structure is Thomas Myer's book, *Anatomy Trains*. Fascia not only provides a protective envelope for individual muscles that permits effortless gliding of one muscle against another during synergic action, but it also guides the flow of coordinated movement. By following the fascial planes as described in this excellent reference the therapist will appreciate the way in which fascia itself guides the continuity of body movement. These soft tissues are significant in establishing habitual postural alignments and require change before quality change can be expected with a forced use orientation. Without real change at this more basic level there is a response during the therapy session that is not repeated in the

more familiar environment. Some researchers even consider the fascial system to be an extension of the central nervous system. By preparing the tissues before activation of the limb the therapist is improving the rate of success by increasing the coherent sensorimotor feedback needed for new learning.

The concept of 'forced use' that is used in Constraint-Induced therapy has an important role in therapy intervention as it represents a process of activating dormant motor patterns that are needed for more optimal function. The bilateral activation of the brain increases the individual awareness of the sensorimotor input from the two sides of the body and increases the chance for carry-over. Any voluntary action that can be established and used in daily life increases the level of automatic postural adaptation that provides a background for successful action.

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The Concept of Forced Use as an Element of Therapy Handling

Verification Exam

1. Any time that the habitual postural pattern is not allowed full expression the input to the brain in the form of feedback is modified so that new sensorimotor learning has an opportunity to begin.
 - a. True
 - b. False

2. The success of facilitated movement experience lies in the therapist's ability to vary the point of physical control so that the challenge for the individual changes.
 - a. True
 - b. False

3. By changing the control contact even slightly the therapist is enlarging the repertoire of active postural adaptation in the client through acceptance of the new sensorimotor input.
 - a. True
 - b. False

4. When working with adults there is often peripheral tension associated with chronic disuse of the upper extremity.
 - a. True
 - b. False

5. Fascial restrictions that limit free head movement at the level of the neck are prominent in persons who have suffered head trauma.
 - a. True
 - b. False

6. The characteristics of fascia are not important to functional movement preparation.
 - a. True
 - b. False

7. By preparing the tissues before activation of the limb the therapist is improving the rate of success by increasing the coherent sensorimotor feedback needed for new learning.
- a. True
 - b. False