

Exercise Therapy

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Principles of PNF and PNF Patterns for Upper and Lower limb

Definition of PNF: Proprioceptive neuromuscular facilitation (PNF) is an approach to therapeutic exercise that combines functionally based diagonal patterns of movement with techniques of neuromuscular facilitation to evoke motor responses and improve neuromuscular control and function.

Principles of PNF

Manual Contact

The term manual contact refers to how and where the therapist's hands are placed on the patient. Whenever possible, manual contacts are placed over the agonist muscle groups or their tendinous insertions. These contacts allow the therapist to apply resistance to the appropriate muscle groups and cue the patient as to the desired direction of movement.

Maximal Resistance

The amount of resistance applied during dynamic concentric muscle contractions is the greatest amount possible that still allows the patient to move smoothly and without pain through the available range. Resistance should be adjusted throughout the pattern to accommodate to strong and weak components of the pattern.

Position and Movement of the Therapist

The therapist remains positioned and aligned along the diagonal planes of movement with shoulders and trunk facing in the direction of the moving limb. Use of effective body mechanics is essential. Resistance should be applied through body weight, not only through the upper extremities. The therapist must use a wide base of support, move with the patient, and pivot over the base of support to allow rotation to occur in the diagonal pattern.

Stretch

Stretch stimulus. The stretch stimulus is the placing of body segments in positions that lengthen the muscles that are to contract during the diagonal movement pattern.

For example, prior to initiating DIFlexion of the lower extremity, the lower limb is placed in DIExtension. Rotation is of utmost consideration because it is the rotational component that elongates the muscle fibers and spindles of the agonist muscles of a given pattern and increases the excitability and responsiveness of those muscles. The stretch stimulus is sometimes described as "winding up the part" or "taking up the slack."

Normal Timing

A sequence of distal to proximal, coordinated muscle contractions occurs during the diagonal movement patterns. The distal component motions of the pattern should be completed halfway through the pattern. Correct sequencing of movements promotes neuromuscular control and coordinated movement.

Traction

Traction is the slight separation of joint surfaces theoretically to inhibit pain and facilitate movement during execution of the movement patterns.

Traction is most often applied during flexion (antigravity) patterns.

Approximation

The gentle compression of joint surfaces by means of manual compression or weight bearing stimulates co-contraction of agonists and antagonists to enhance dynamic stability and postural control via joint and muscle mechanoreceptors.

Verbal Commands

Auditory cues are given to enhance motor output. The tone and volume of the verbal commands are varied to help maintain the patient's attention. A sharp verbal command is given simultaneously with the application of the stretch reflex to synchronize the phasic, reflexive motor response with a sustained volitional effort by the patient. Verbal cues then direct the patient throughout the movement patterns. As the patient learns the sequence of movements, verbal cues can be more succinct.

Visual Cues

The patient is asked to follow the movement of a limb to further enhance control of movement throughout the ROM.

Click here for Upper Extremity Diagonal Patterns

Click here for Lower Extremity Diagonal Patterns

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