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PNF Manual Techniques:

Therapeutic Effects & Clinical Applications

Chao-Chung Lee, MS, PT
Orthopedic Physical Therapy,
Taipei Veterans General Hospital

Introduction

- Type of muscle contraction
 - Concentric, Eccentric, Isometric...
- Promote the stages of movement control

Rationale

- Neurophysiology
- Human Demand

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Proprioceptor

- Body Information provided
 - In position change
 - Movement process
 - Deeper pressure

--Muscle Spindle (Intrafusal fiber)
--Golgi tendon Organs (GTO)

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Spindle -- Reflect to rapid muscle lengthening

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Golgi Tendon Organs

-- Reflect to excessive m. contraction

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Stage of Movement Control

Mobility	Controlled Mobility
Stability	Skill

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Mobility Stage

- Presence of FUNCTIONAL ROM
 - Pain relief
 - Tissue extensibility
- Ability to initiate and sustain ACTIVE movement
 - firing from lengthened range
 - Keep the strength through the range

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Mobility Stage

- Hold Relax
- Contrast Relax
- Hold Relax Active Movement
- Repeated Contraction

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Mobility Stage

HR (agonist/ antagonist)	Pain relief
CR (antagonist)	Tissue extensibility
HRAM (agonist)	Firing from lengthened range
RC (agonist)	Keep the strength through the range

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Stability Stage

Stabilize joints in controlling movement

- **Proximal Stability:**
 - sustained isometrics in shortened range
- **Dynamic Stability:**
 - coordinated isometric contractions in midline/ weight bearing position
 - perform functional movement

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Stability Stage

- **Proximal Stability:**
 - Short Hold Resisted Contraction
- **Dynamic Stability:**
 - Alternating Initiation
 - Rhythmic Stabilization

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Controlled Mobility Stage

- Movement in weight bearing postures
 - Closed-chain exercise
- Reversal of antagonists
 - Strengthen m. concentrically & eccentrically
- Rotation around longitudinal axis
 - Trunk segmental & total rolling

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Controlled Mobility Stage

- Slow Reversal (Hold)
 - Alternating concentric contraction
 - No relaxation between reversals
 - Isometric contraction in the end range
- Agonistic Reversals
 - Contract eccentrically for performance of functional activities

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Skill Stage

- Perform functional tasks with economy of effort
 - U/E: move freely in space
 - L/E: coordinate open/ close chain for ambulation
 - Trunk: proximal dynamic stability

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Skill Stage

- Normal Timing
 - Open-chain task
 - Distal-to-Proximal timing sequence
- Resisted Progression
 - Close-chain task
 - Coordination of pelvis, hip and knee musculature during ambulation

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Therapeutic Effects

- HR/CR effects
 - For hamstring flexibility
 - For shoulder external rotation
- AI effects
 - For lower back pain

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Therapeutic Effects

- Benefits
 - For m. endurance
 - Type IIB → Type IIA
 - For femoral bone amputee
 - For GH joint rotation – D1F/E
 - For vertical Jump – D1F/E
- No significant effect
 - For patellafemoral pain, compared with knee brace

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Clinical Practice (1)

- For patients with hemiplegia
 - Ambulation –RC on pelvis
 - Balance – Ankle dorsiflexion and Trunk extension

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Clinical Practice (2)

- For Shoulder (Frozen Shoulder)
 - Stage: mobility
 - A: supine; D1F with elbow flexing
 - T: HR→ Massage→ HRAM;
MC arm & hand

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Clinical Practice (3)

- For Arm (BPI with Upper Trunk axonotmesis)
 - Stage: Mobility→ Controlled Mobility
 - A: Supine;D2F with elbow extended
 - T: RC→SR→SRH; MC elbow & hand

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Clinical Practice (4)

- For Knee (ACL reconstruction)
 - Stage: Stability
 - A: Modified plantigrade→ standing;
knee slight flexion
 - T: SHRC→ AI→ RS;
MC ant & poster knee joint

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Clinical Practice (5)

- For Lumbar (Low Back Pain)
 - Stage: Stability
 - A: sitting; without hand support
 - T: AI; MC unilateral shoulder

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