The Science Behind Functional Training:
Proprioceptive Neuromuscular Facilitation (PNF)

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Functional Movement Systems
What is PNF?

- Method of Promoting or Hastening the response of the neuromuscular mechanism through the stimulation of proprioceptors

Dorothy Voss
Background of PNF

• Developed by Herman Kabat a physician and neurologist

• Built on Sherrington’s principles of irradiation, reciprocal innervation and inhibition

• Became successful by working with patients with Cerebral Palsy and Polio
PNF Principles

• Use the body’s proprioceptive system to inhibit or facilitate muscle contraction

• Patterns of Movement: Spiral and Diagonal

• Muscles work synergistically to provide movement

• Versatility of muscles progress proximal to distal
PNF and Function

*Function* is a miraculous and complex combination of systems that are linked and react with each other. In order to understand function as a whole, the parts and components of function must be appreciated.”

- Gary Gray
PNF and Function

has also been recognized that the dysfunction's of muscles and joints are so closely related that the two would be considered a single inseparable functional unit.

- Vladimir Janda
PNF Fundamentals

- Establish Proper Goals and Application: Stretch and/or Strengthen
- Proper Communication with individual: concentrate on visual and verbal cues
- Proper Positioning and Mechanics from clinician and/or trainer
- Distal Movements Should Occur First: Irradiation
Rationale for PNF

- Decrease deficiencies in Strength and Flexibility
- Improve Neuromuscular Coordination
- Improve Functional(Gross
PNF Techniques: Stretch/Strengthen

- Rhythmic Initiation
- Repeated Contraction
- Slow Reversal
- Slow-Reversal-Hold
- Rhythmic Stabilization
Focus is placed on Gross Movements not specific muscles.

Multi-planar movements: Rotation and Diagonally

Broken Down into UE/LE Flexion and Extension Movements

Movements include: Flex/Ext., Adb/Add, Int.Rot/Ext. Rot.

Human Movement mostly diagonal
PNF Patterns: D1 UE

D1 Flexion of Upper Extremity

Taken from Prentice, Rehabilitation Techniques in Sports Medicine, 3rd ed
PNF Patterns: D2 UE

D2 Flexion of Upper Extremity

Taken from Prentice, Rehabilitation Techniques in Sports Medicine, 3rd ed
PNF Patterns: D2 LE

D2 Flexion of Lower Extremity

Taken from Prentice, Rehabilitation Techniques in Sports Medicine, 3rd ed
PNF Patterns: D2 LE

D2 Flexion of Lower Extremity

Taken from Prentice, Rehabilitation Techniques in Sports Medicine, 3rd ed
PNF Patterns are Functional Movement
PNF Techniques: Stretch/Strengthen

Slow Reversal

Slow-Reversal-Hold

Rhythmic Initiation
PNF Techniques: Stretch/Strengthen

Slow Reversal

Slow-Reversal-Hold

Rhythmic Initiation
Training PNF Techniques

- Primitive Patterns
Training PNF Techniques

• Primitive Patterns
Training PNF Techniques

• Upper Extremity Patterns
Training PNF Techniques

- Functional Movements: Cross-Over Step
Training PNF Techniques

Chopping Patterns
Training PNF Techniques

Chopping Patterns
Training PNF Techniques

• Lifting Patterns
Training PNF Techniques

- Lifting Patterns
Training PNF Techniques

• Squatting and Lunging Patterns
Thank You very Much

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