



System of Progressive Exercise

The Athletic Shoulder

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The Thera-Band® System of Progressive Exercise: The Athletic Shoulder

OBJECTIVES

- To demonstrate the influence of shoulder anatomy on function and rehabilitation
- To understand the biomechanics and pathomechanics of the athletic shoulder
- To describe neurophysiological concepts and principles as they relate to rehabilitation
- To describe the biomechanical considerations of rehabilitation
- To understand the principles of therapeutic exercise progression
- To describe the basis, principles, techniques, and patterns of a PNF approach
- To develop a rehabilitation program using an evidence-based system
- To implement a progressive shoulder athletic rehabilitation program

I. The Thera-Band System of Progressive Exercise

A. The Rehabilitation Continuum

Phase	Development
I. Protection & Motion	Mobility
II. Strength & Balance	Stability
III. Coordination & Endurance	Controlled Mobility
IV. Sport-Specific Function	Skill

B. Principles of Progression

1. Symptoms-limited progression : **INFLAMMATION**

2. Tissue Healing / Wolff's Law

- Inflammation
- Repair
- Remodeling
- Maintenance

3. Exercise Parameters

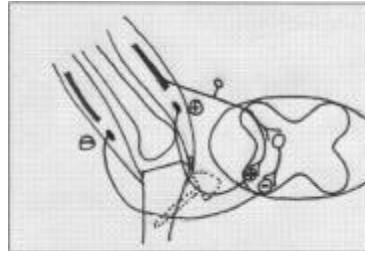
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|--|
| <ul style="list-style-type: none"> • REDNESS • WARMTH • SWELLING • PAIN • SPASM |
|--|

Classification	Parameter	Classification	Parameter
Dosage	Volume, Intensity, Frequency, Duration	Support	Static→Dynamic
Motor Control	Mobility→Skill	Cues	Dependent→Independent
Stability	Proximal→Distal	External Forces	Controlled→Uncontrolled
Motion	Planar→Functional		

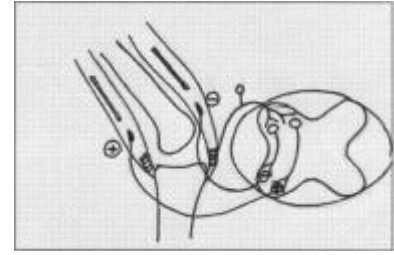
C. Neurophysiological Concepts

AFFERENCE

Muscle spindle	Length & Speed
GTO	Stretch
Mechanoreceptor	Range of Motion



Muscle Spindle Reflex



GTO Reflex

EFFERENCE

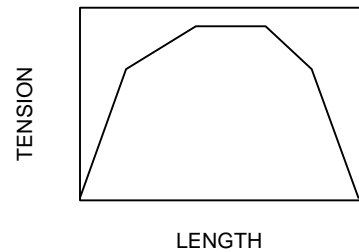
Alpha (α) Motor Neuron	Conscious	Active Contraction
Gamma (δ) Motor Neuron	Unconscious	Resting Tone

- *Dynamic Stability*
- *Postural Stability*

Type	Awareness	Definition	Level	Outcome
Reflex	Unconscious	Primitive spinal level reflex	Spinal	Reflex Joint Stabilization
Proprioception	Unconscious	Cumulative afferent input	Brain Stem	Balance/Posture
Kinesthesia	Conscious	direction, amplitude, speed	Cortex	Coordinated Movement

D. Biomechanical Considerations

- Length-Tension Curve



- Biomechanics of **Stability**

Newton's First Law (Inertia)

Bodies at rest tend to stay at rest until acted upon by external forces

- Biomechanics of **Mobility**

Newton's Second Law (acceleration)

Bodies accelerate when unbalanced forces applied to it

Newton's Third Law (reaction)

For every action, there is an equal and opposite reaction

II. PNF Theory and Application

A. Neurophysiologic Basis

Contract	Facilitate	Strengthen	Muscle Spindle
Relax	Inhibit	Stretch	GTO

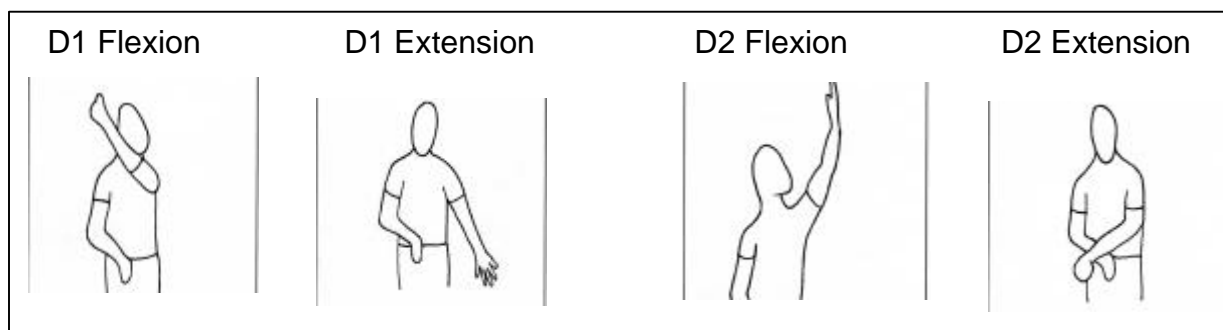
B. Principles

1. Eval → treat
2. patterns / positions
3. manual contact
4. quick stretch
5. visual/ verbal cues
6. accommodating variable resistance
7. rotation

C. Techniques

PURPOSE	TARGET	TECHNIQUE	APPLICATION
Facilitation	Agonist	Rhythmic Initiation (RI)	ROM, teach pattern
		Repeated Contraction (RC)	targets specific weakness
	Antagonist	Slow Reversal (SR)	coordinated movement
		Rhythmic Stabilization (RS)	co-contraction/stability
Inhibition	Agonist or Antagonist	Contract Relax (CR)	autogenic or reciprocal inhibition
		Hold Relax (HR)	

D. Upper Extremity Patterns



III. The Athletic Shoulder

A. Functional Anatomy

1. Static Stability
2. Dynamic Stability

Rotator cuff	Fine-tuner	tonic
Scapulothoracic	Proximal stability	tonic
Primary Movers	Distal mobility	phasic

3. Safe-Zone

- 0-90° abduction
- 0-90° flexion
- neutral rotation
- 30-90° horizontal adduction

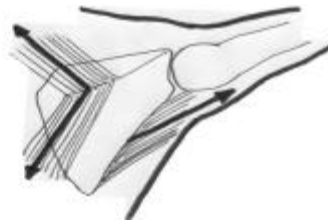


B. Biomechanics

1. Force Couples



Rotator Cuff / Deltoid



Trapezius / Serratus Anterior

2. Muscle Balance

Anterior	Acceleration	Concentric
Posterior	Deceleration	Eccentric

3. Trunk Control & Rotation

C. Pathomechanics

1. Tensile Overload / Fatigue / Overuse
2. Trauma
3. Muscle Imbalance

IV. Shoulder Rehabilitation

A. Shoulder Exercise Research

Shoulder Exercises
STANDING
<ul style="list-style-type: none">• Flexion• Scaption with internal rotation• Horizontal abduction w/ Ext Rot.• Forward punch• Shoulder shrug• Internal / External Rotation
SITTING
<ul style="list-style-type: none">• Press up• Narrow grip seated row• Middle grip seated row• Wide grip seated row
PRONE
<ul style="list-style-type: none">• Push up plus• Prone extension• Prone horizontal abd. 90° w/ Ext Rot• Prone flexion at 100° w/ Ext Rot.• Prone external rotation at 90°/90°• Rowing

Hintermeister, et al. *AJSM* 26(2):215, 1998

Blackburn TA, et al. *Athl Train* 25:40, 1990

Townsend H, et al. *AJSM* 19:264, 1991

Mosely BJ, et al. *AJSM* 20:128, 1992

B. Clinical Keys

1. Normalize arthrokinematics FIRST
2. Dynamic Stability of scapula
3. Core/Trunk stability
4. Rotation
5. Posterior -Eccentric Bias
6. Functional Speeds
7. Plyometric
8. "Safe Zone"
9. Re-entry Program

C. Lab

Proximal → Distal

Dependent → Independent

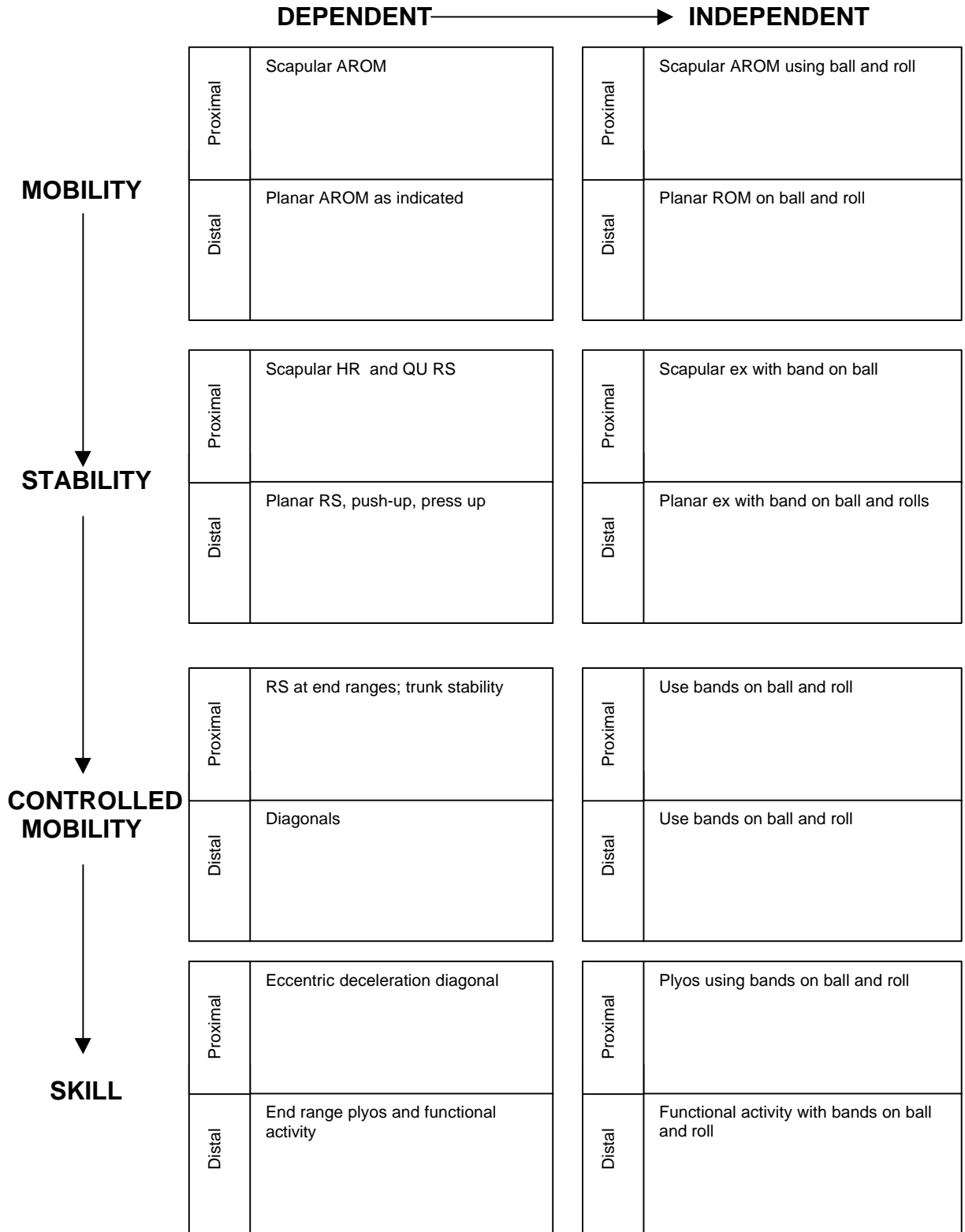
Mobility → Skill

RI rhythmic initiation
 RC repeated contraction
 CR contract-relax
 HR hold-relax

SR slow reversal
 SRH slow reversal hold
 RS rhythmic stabilization

SU supine
 PR prone
 KN kneeling
 ST standing
 BR bridge
 SL sidelying
 QU quadruped
 ½ Half-kneeling
 SI sitting

SHOULDER REHABILITATION LAB



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