Cognitive Approach to Corrective Exercise

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Objectives

- 3 Phases of motor learning
- Define aspects of motor behavior
- Understand Demonstration VS Verbalization
- Understand how learning influences corrective exercise
- Apply techniques to corrective exercise
What is Corrective Exercise?

- Identifying dysfunction
- Developing a plan of action
- Implementing and integrative a corrective strategy
Corrective Exercise Continuum

- **Inhibit**
  - Inhibitory Techniques
  - Self-Myofascial Release

- **Lengthen**
  - Lengthening Techniques
  - Static Stretching
  - Neuromuscular Stretching

- **Activate**
  - Activation Techniques
  - Isolated Strengthening
  - Positional Isometrics

- **Integrate**
  - Integration Techniques
  - Integrated Dynamic Movement
Learning movements

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  - Activation Techniques
    - Isolated Strengthening
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- **Integrate**
  - Integration Techniques
    - Integrated Dynamic Movement
Implementing and Integrating a Corrective Strategy

- Executing with perfect form
- Proper input = Proper output
- Must take into account the learning process
How do we learn?

• Development of motor skills
  – Uncontrollable
    • Genetics
  – Controllable
    • Environment/society
Negative influences

• Development of motor skills
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Stages of Motor Learning

MOTOR LEARNING GRADIENT

Cognitive
Slow & Conscious

Associative
More Economical

Autonomous
Effortless
Cognitive Phase

• Requires concentration
• New movements
• Neural fatigue
• Repetition overtime
Associative Phase

- Effective patterns have been learned
- Subtle adjustments
- Consistent Movements
- Gradual improvements
Autonomous Phase

• Automatic, little thought on execution
• Depending on the skill, may take years to reach
Which phase is:

- Pro athlete?
- The average gym goer?
- Client with non-specific low back pain?
Motor Behavior

- Motor Control
- Motor Learning
- Motor Development
Motor Control

- Muscle Synergies
- Proprioception
- Sensorimotor Integration
Proprioception

• Mechanoreceptors
  – Muscle Spindle
  – GTO
  – Joint Receptor
Vestibular System

- Works with visual change and receptors to judge and rate overall movement
Motor Learning

- Practice and experience
  - No blank slate
  - Can grasp and lift arm but can we throw?
- Feedback
  - Internal
  - External
External Feedback

- Knowledge of Results
  - Indicates the success of actions
  - Verbal
- Transient Goals
  1. Motivation
  2. Associative Function
  3. Guidance
External Feedback

• Knowledge of Performance
  – Feedback indicating the quality of the movement pattern
  – More useful in real-world tasks
  – Used by coaches and trainers
Learning How to Move

1. Does learning by watching provide benefit?
2. Can imagining the movement provide benefit?
3. Can verbalizing a new motor skill help learn effectively?
Demonstration

- Client can learn characteristics of a movement pattern
- More effective for new movement patterns
- The more demonstration the more retention of a skill
Two explanations

- Cognitive Mediation Theory
- Dynamic View
Verbalization

- Beneficial as a skill is being developed
  - Zumba?
  - Yoga?
- Attention-capacity limitations
- Speeds up learning process
- Action effect Hypothesis
Action Effect Hypothesis

- Focus attention to movement outcomes
- External VS Internal focus
Verbal Cues

• Short, concise phrases that serve to:
  1. Directs attention to regulatory conditions in the environmental context
  2. Prompt key movement components while performing a skill
Practice

• How long to learn how to balance?
Open Environment

• “The quick brown fox jumped over the lazy dog”
• All key strokes, but not a very good typist
Closed Environment

• Dancing
• Bowling
• Goal is to always perform the same movement
Application

- Exercise selection
- Progressions
- Demonstrations and Cueing
Activation Techniques

• Isolated Strengthening
Floor Based Movements

- Bridge
- Cobra
- Heel Slide
Quadruped Movements

• Arm Raise

• Opposite arm/leg raise
½ Kneeling

- Static hold
- Chop
Standing

• Hip abduction

• Hip Extension
Integration Techniques

• Integrated Dynamic Movement
Single Leg

- Single leg balance reach
- Single leg RDL
Double Leg

• Squat to press
Double Leg

• Squat to Row
Asymmetrical

- Reverse lunge to Press
Reactive Neuromuscular Training

- Squat w/RNT
- Tube Walking
- SL DL w/RNT
Program Design

• Case Study 1
  – New client
  – No exercise history, not an athlete
  – excessive knee valgus
• Which activation exercises would be best?
• What integration exercises would be best?
Program Design

• Case Study 2
  – New client
  – Current athlete
  – Shoulder protraction

• Which activation exercises would be best?
• What integration exercises would be best?
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