Cognitive Approach to Corrective Exercise

Kyle Stull, MS, LMT, NASM-CPT, PES, CES

NASM Faculty Instructor

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- □ 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





Learning movements





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
 - Uncontrollable
 - Genetics
 - Controllable
 - Environment/society



Stages of Motor Learning





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









Quadruped Movements

• Arm Raise



Opposite arm/leg raise





1/2 Kneeling

Static hold









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?



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



Contact Information

- Kyle Stull
 - Kyle.stull@nasm.org
 - www.faceboook.com/kyle.stull1
- NASM
 - www.nasm.org
 - -800.460.6276



Thank You! For Your Commitment to Excellence

