Key Concepts of Motor Development

7 Concepts that every one should know about motor development
Concept 1: Developmental appropriate practices or programs

Development has become associated with the changes type and quality of experience we pass through in life. If these experiences are developmentally appropriate in early childhood, exercise programming, rehab, or learning of motor or sport skills it will assure that the student or client will develop normally or rehab properly.
Developmentally Appropriate Perspective

- Age appropriate
  - Predictable sequences of growth and development through which most children pass.
  - Knowledge of these sequences provides a basis from which we provide the best instructional experiences for student and/or client.

- Individual appropriate
  - Children nor clients pass through sequences of growth and development in the same manner or within the same time period.
  - Each client or child has individual needs.
How does one know if the activities they provide in a clinical or educational setting is developmentally appropriate?

- **Observation**
  - What activities can the client perform at their stage of rehab? Exercise?
  - What activities can the student perform at their age level?

- **Assessment (Only way to know for sure)**

- **Degree of failure and success**
  - If the client or student experiences a high degree of failure then you know it is not developmentally appropriate.
Concept 2: Maturation & Growth

Development

Growth

Structural aspects of development

Maturation

Functional changes of development
Application

• Use the qualitative and quantitative concepts in answering this issue.

  – Should children should play organized sport before the age of 10? Agree or not agree!
Maturation & Growth

Qualitative functional changes that occur with age is known as maturation.
* i.e., as the brain matures, children’s higher order cognitive abilities change (e.g. some say that children below the age of 10 have difficult with playing sports that have complex plays and rules, such as baseball, soccer, & football)

Quantitative structural changes that occur with age is growth.
* Increase in physical size (i.e., height, weight)
* Most noticeable growth changes occur during adolescence -height, weight, muscle adaptation, hormonal changes, and body fat differ by gender
Concept 3: Developmental Direction

1. Cephalocaudal – we develop from the top of the body (head) to the tail (feet).
2. Proximodistal- we develop from points close to the center of the body to points close to the periphery.
3. Differentiation- we progress from gross, immature movement to precise, well-controlled, intended movement.
4. Integration- we become more capable of integrating the various systems, especially the muscular system, to produce a well-controlled, intended movement.
Application

If you were working with a recovering stroke patients what motor skills will development sooner:

– Gross motor skills or fine motor skills?
– Strength or accuracy in moving?
Concept 4.0: Early stimulation

Normal development is associated to the type of environment where we learn or relearn motor or sport skills.
Brain Research

Recent scientific discoveries have expanded our understanding of the importance of experience (stimulation) in early brain development (Begley, 1996, 1997; Nash, 1997).

With this news, "head-start" programs and early positive experiences for all children have gained considerable support, and interest by parents, schools, & minorities.
Which environment best describes how you were raised?

No-programming
- Parents withheld instruction until the child learned to control their body
- Avoided systematic practice of specific skills
- Avoided assisting devices and techniques to acquire motor skills
- Let the child explore their environment unassisted

Program
- Parents took an active role
- Create a home environment that facilitates the child development
- Followed a systematic program
- Uses assisting devices
- Prescribed activities that are observed
Effects of No-program versus Program

- Neither program has shown to have any detrimental effects.
- Gains in motor development seem to be contributed to exposure to *normal stimulated home environment* whether it be no-program or program environment.
- As concept apply in learning and relearning motor skills & sport skills in teaching, exercise, and physical therapy.
Deprived Environment

Which statement below best describes a deprived environment:

A. Environment where one is given little or no performance feedback, little opportunity to demonstrate what they can do, provided little or no instruction, lacks in number of places on can be active, the quality of instruction is low, and there is little access to places where one can be active.

B. Environment where one for long periods of time is engaged in little or no activity, the child care givers does not engage with the child, child activity is restricted, the child care givers are not active, opportunities during the day to be active are limited, and child engages is sedentary activity during most days.

C. Both these environments equally describe a deprived environment.
Concept 5: Critical periods

- Critical periods
  - Times when specific conditions or stimuli are required for optimal development (Cammeron & Demerath, 2002)
  - 4 critical elements of critical periods
    - Student or client has reached a state of readiness
    - There is specific time limit to be exposed to skill
    - Effects of stimulation or lack of stimulation during this period of exposure is permanent or long lasting
    - Critical periods exist for all of human behavior just not motor (cognitive, social, psychological, emotional)
Stages or Phases

- Stages, phases, critical time period or levels implies similar meaning.
- Implies that there is particular time in the life of a human being that is characterized by unique behaviors and experiences where they are the most sensitive to developing.
Critical Period Examples

• The best athlete’s studied by Kalinowski (1985) and Monsaas (1985) started their involvement in sport by “trying out” different sports in a playful and fun environment. Then these athletes in the middle and later years, specialization in a one main sport with more practice time.

• According to Cote (1999) and Bloom’s (1985) research with elite athletes passed through 3 critical periods
  – sampling years (ages 6-12)**
    • Make sport fun and exciting
  – specialization years (ages 13-15)
    • Child focused on one or two sports
  – investment years (16+)
    – The strategic, competitive, and skill development dominated the investment years.

• Had there been no excitement during the early years, and no sense that the athlete was very successful, there would never be a middle or latter period of success.
Critical Period Examples

• If children do not play by the rules during their early development; they will have difficulty in playing by the rules later (Cote & Hay, 2002).

• Research with figure skaters indicates that one must begin skating during their early childhood period or they will never make good skaters (Starkes & Ericsson, 2003).

• It is well documented that period of time to learn a second language is between the ages of birth to 7 years of age.
Critical Periods

• [http://www.youtube.com/watch?v=Fcb8nT0QC6o](http://www.youtube.com/watch?v=Fcb8nT0QC6o)
Does stages or critical time period really exist?

- Existence versus non-existence remains an ongoing controversy
- To be true, each stage must be unique, distinct, flow from one stage to another, and each stage must be linked to the preceding stage.
  - At the present time this question is inconclusive but recent Brain research does indicate the existence of critical periods for such things as language.
Concept 6: Readiness

- Readiness
  - Associated with critical periods
  - There is need to establish minimum characteristics necessary for a particular movement skill...before addition instruction or practice can be worthwhile, the prerequisite skills must be acquired!!
  - The movement specialist (teacher, coach, exercise leader, PT) needs to recognize the signs or states of readiness in their client, student, or athlete for instruction and/or practice to be effective.
Readiness to Walk

- Fetal posture (0 months)
- Chin up (1 month)
- Chest up (2 months)
- Reach and miss (3 months)
- Sit with support (4 months)
- Sit on lap grasp object (5 months)

- Walk when led (11 months)
- Creep (10 months)
- Stand holding furniture (9 months)
- Stand with help (8 months)
- Sit alone (7 months)
- Sit on highchair grasp dangling object (6 months)

- Pull to stand by furniture (12 months)
- Climb stair steps (13 months)
- Stand alone (14 months)
- Walk alone (15 months)
Concept 7: Catch-up

- Catch-up
  - Power of the human to be able to “return to a genetically determined growth path (Berk, 2004)”
  - Catch-up does occur in physical growth if it occurs during childhood.
  - Catch-up in terms intellect, social abilities, and motor abilities depends on severity, length, and time of deprivations.
  - Most children or clients in a deprived environment never fully realize their genetic potential in the above areas (Prader, Tranner, & Von Harnack, 1963; Berk, 2004).
The End