Understanding the USOPC American Development Model as a Pathway for a Safe and Healthy Youth Sport Experience and Lifelong Physical Activity

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About me...

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USA
LACROSSE

Problems for Sport Systems

- Experienced coaches only work with higher-level athletes; Most coaches in the U.S. are volunteers.
- Parents are not educated about athlete development for children. Coach education in general is poor.
- Needs of athletes of every ability are not fully understood.
- No talent development system, selection is by competition.
- No system coordination (schools, community and private clubs).

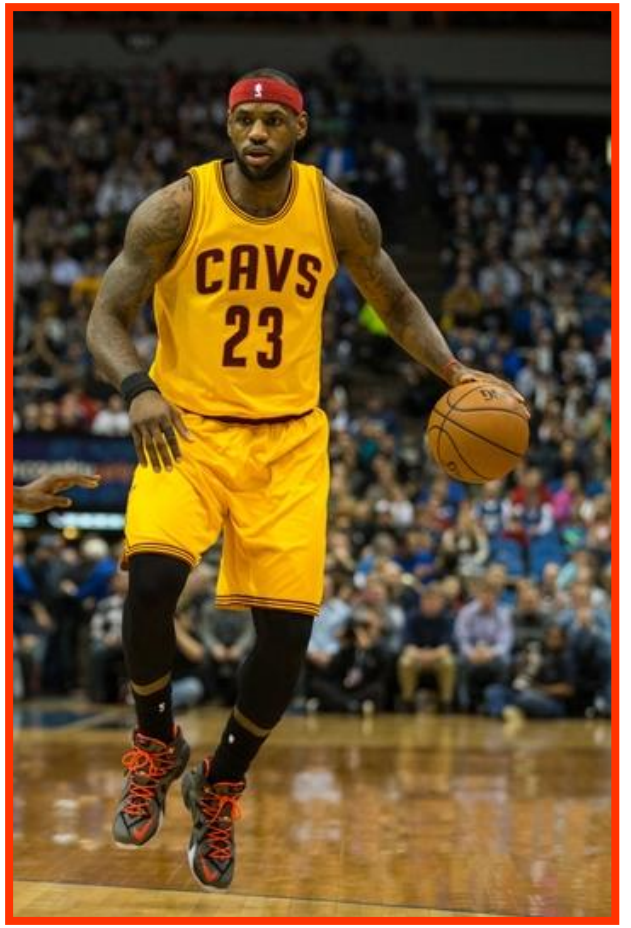
Problems for Sport Systems

- Too much competition, not enough physical development.
- Adult-imposed training and competition programs for children.
- Chronological (years) age versus developmental (biological) age.
- Cannot identify optimal ‘opportunities for movement/skill adaptation.
- Physical literacy/sport sampling – only single sporting activities are encouraged.

Questions to Consider:

1. What is athleticism?
2. What is athlete development?
3. What is the difference between a bio-motor ability and a skill?
4. How does the young child/athlete acquire a sport skill?
5. What is physical literacy and how does this concept relate to athlete development?
6. How does the process of growth and maturation influence athlete development?
7. Should young athletes specialize in only one sport?

Who is more athletic? Why?



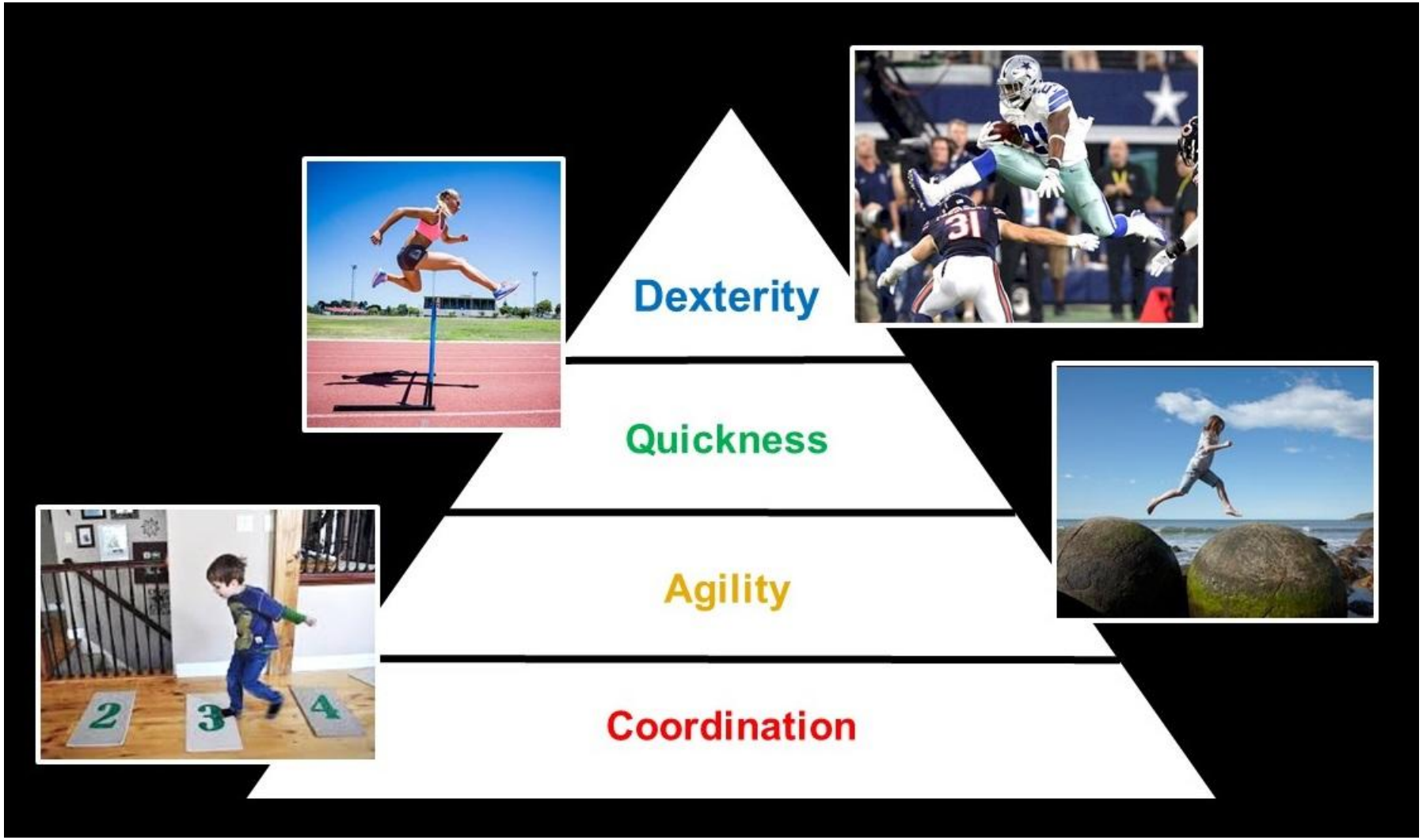
What is Athleticism?

Ability to repeatedly perform a range of movements with precision and confidence in a variety of environments, which require competent levels of motor skills, strength, power, speed, agility, balance, coordination, and endurance (**NSCA**).

Movement problems are created when performing physical actions as part of a specific technical or tactical outcome in sport.

“Dexterity” – a motor trait where one is capable of creating a movement solution to a specific movement problem

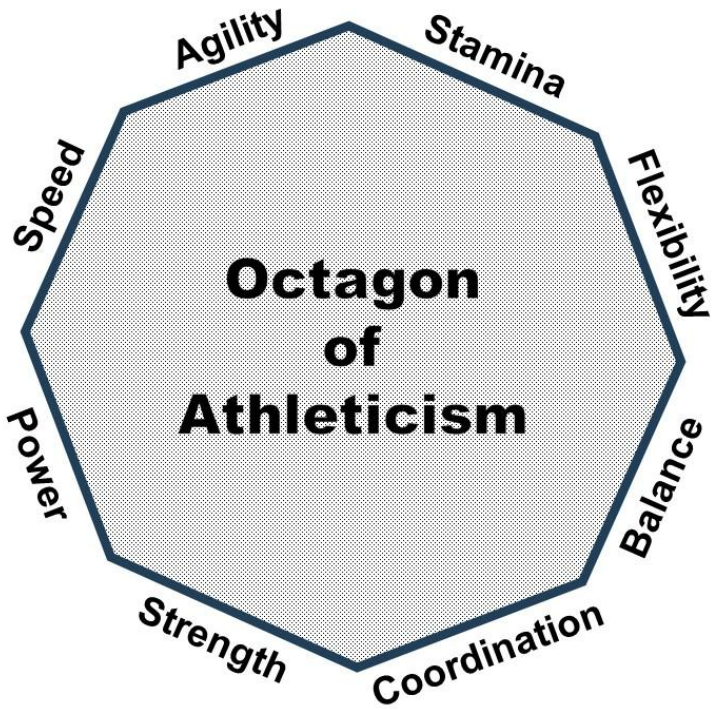
Derived from Nikolai Berstein “On Dexterity and it’s Development” (Latash and Turvey, 1996)


Dexterity
Quickness
Agility
Coordination
2
3
4

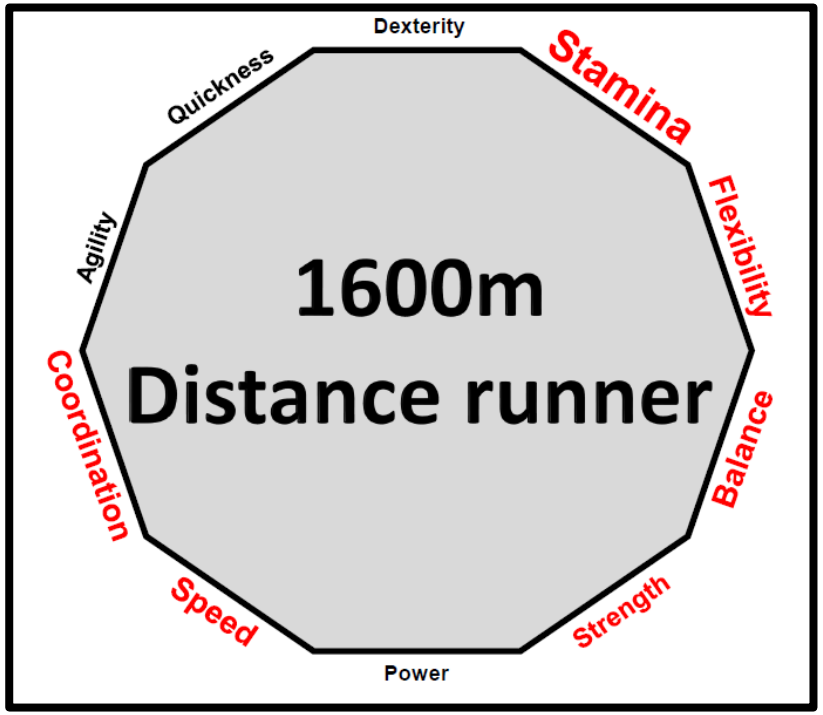
Bio-motor abilities versus Skills

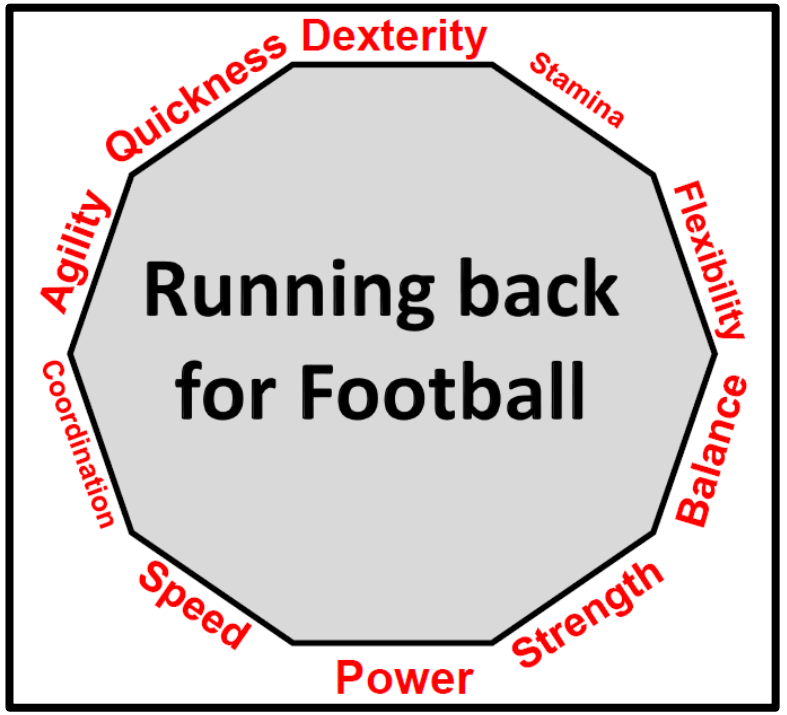
- **Bio-motor abilities** - Inheritable traits (capacities) that become stable and enduring with training.

- **Skills** - Developed and modified with practice (general/specific to sport).
  - FMS underlie the performance of many skills



Bio- motor ability	Property	Examples
Aerobic or Anaerobic Stamina	The ability to sustain submaximal aerobic or repetitive high intensity anaerobic activity.	Running a 5K race; basketball; soccer; a no-huddle offense in football
Flexibility	The ability for limbs or segments of the body to exhibit suitable ranges of motion (ROM).	Sprinting; swinging a golf club, tennis racquet, or baseball bat; throwing a baseball
Balance	The ability for the body to maintain stability under both static and dynamic movement conditions.	Gymnast on the beam; a running back maintaining stability while cutting and evading a tackler.
Strength	The ability for a muscle or muscle group to produce force.	Holds in wrestling; offensive linemen blocking on the line of scrimmage; “boxing” out in basketball
Power	The rate at which muscular force is produced.	Jumping skills; sprinting; acceleration from a start in track; change of direction and reactive agility.
Speed	The rate at which the body and/or limbs change position.	Achieving a change in position over a brief period of time (velocity); sprints.
Coordination	Technical mastery of foundational/fundamental movements and their patterns.	Running a cross-country course; throwing a football; dribbling a basketball; catching a fly ball.
Agility	Movement that demonstrates a rapid change in direction or an action in response to an unpredictable stimulus.	The football receiver runs a set route (change of direction) as the defender has to rapidly react and adjust to the movements of the receiver (agility).


Dexterity
Stamina
Flexibility
Balance
Strength
Power
Speed
Coordination
Agility
Quickness
1600m
Distance runner


Dexterity
Stamina
Flexibility
Balance
Strength
Power
Speed
Coordination
Agility
Quickness
Running back
for Football

- Bio-motor abilities are “tools”…
- Must be acquired and refined…
- Integrated to solve movement problems…

Same sport, but different positions have different demands upon the bio-motor abilities.

15

Can you think of an example where limited bio-motor ability can affect the ability of an athlete to play their position or perform an activity?

Affect team tactics?

Athlete Development

Development of general physical attributes that will provide a foundation for the expression of specific and special physical characteristics for sport success.

Harre, 1969

Matveyev, 1977

Acquisition, Development, and Refinement of Bio-motor Abilities (e.g., agility, strength, power, speed, etc.)

Acquisition, Development, and Refinement of Specific Sport Skills (e.g., shoot, dribble, pass, catch, etc.)

Athleticism!

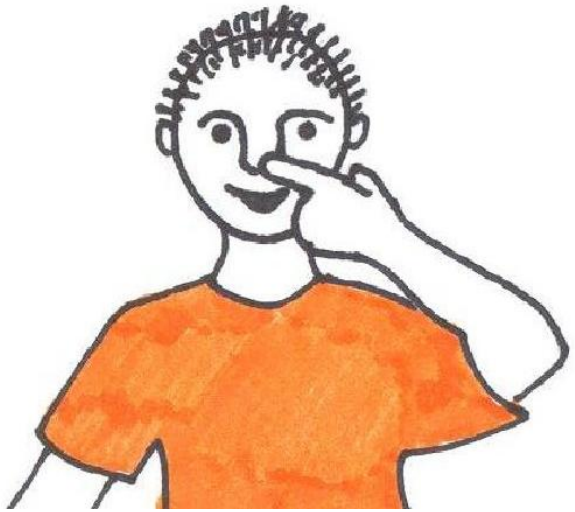
On the command “go”, take your hand and touch the tip of your nose as quickly as possible:

Which finger did you use? Why?

Can you see the tip of your nose?

Were you able to touch the tip?

When did you start to decelerate your hand?



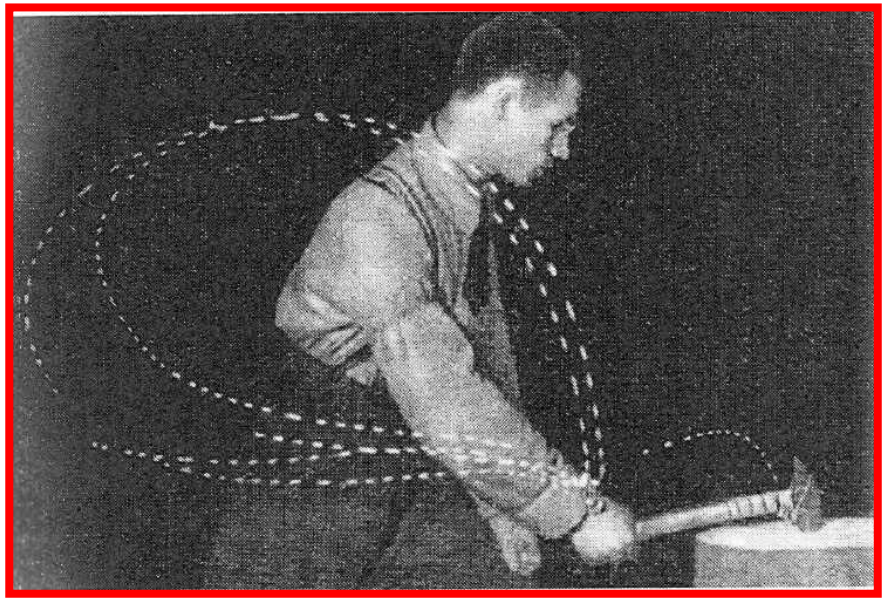
Solving the “degrees of freedom” problem

Limbs

Joints

Muscles

Motor Units

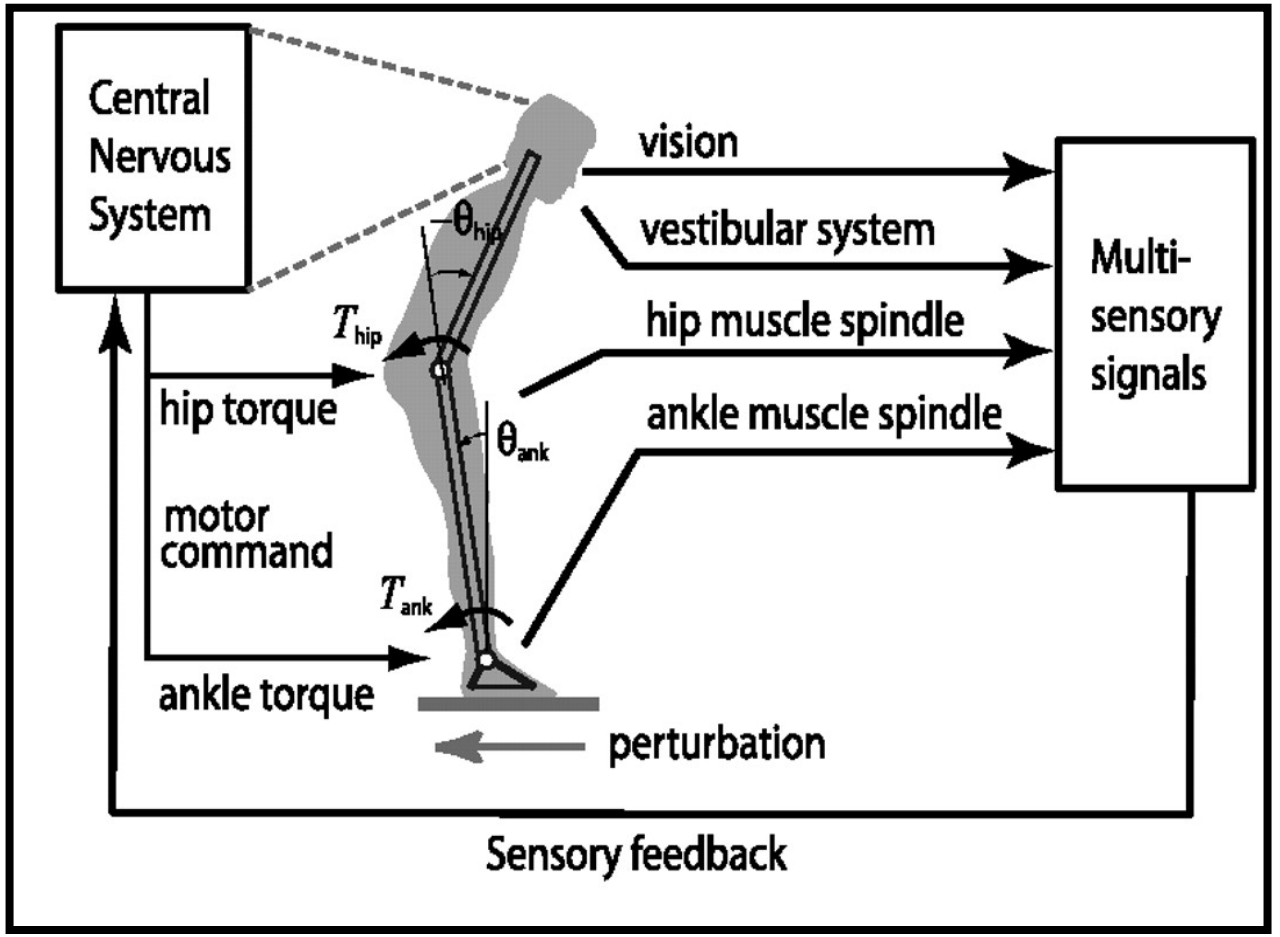


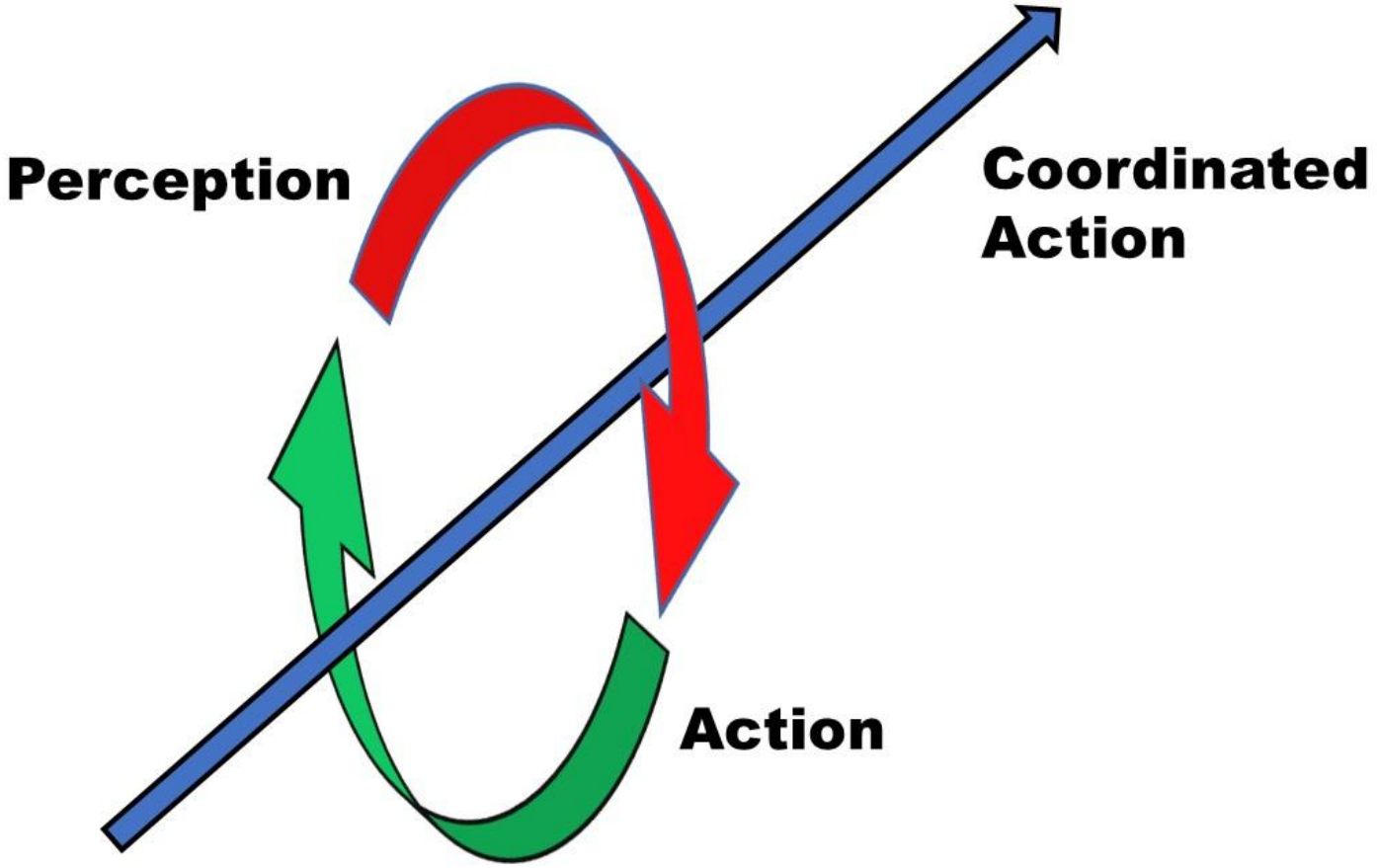
The CNS “functionally freezes” the degrees of freedom

Proprioception and **kinesthesia** enable feedback and feed-forward mechanisms to control muscle force and torque, tendon, and the bony levers of the body.

Primary Information Sources

- Visual
- Vestibular
- Proprioceptive
- Haptic



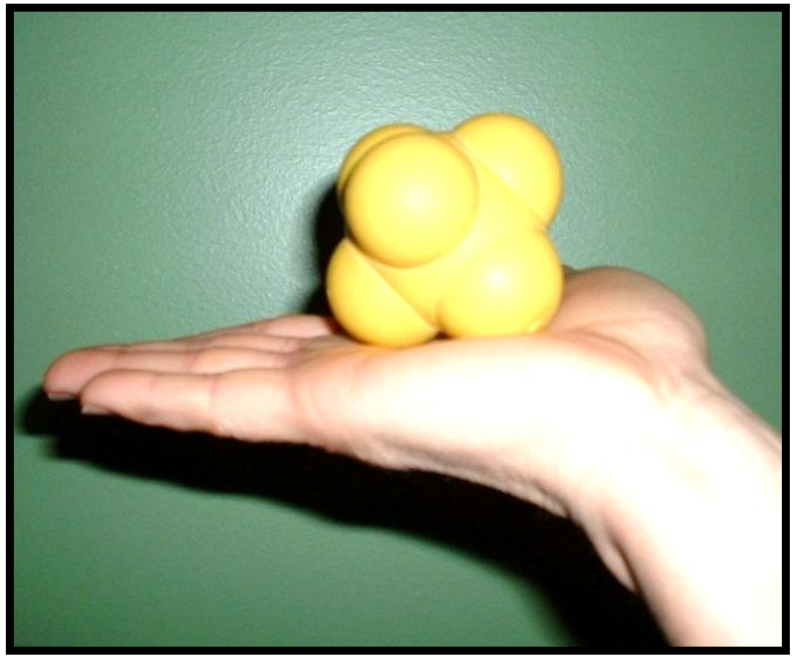


Movement in general:

Perceive, act, perceive, act again…etc,

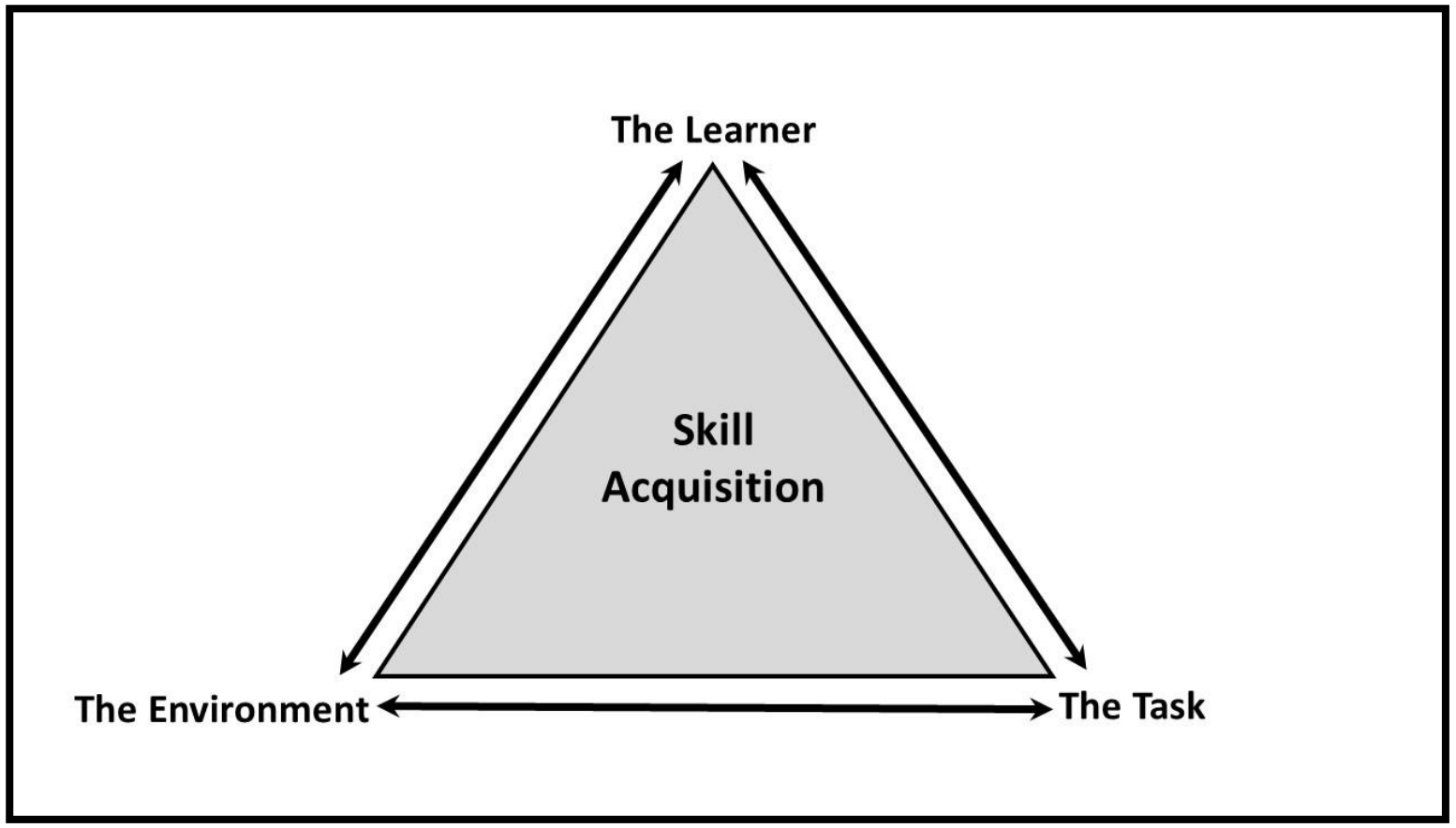
Adaptive Reciprocation

Develop complex movement problem-solving situations…because the movement answers are only as effective as their knowledge.



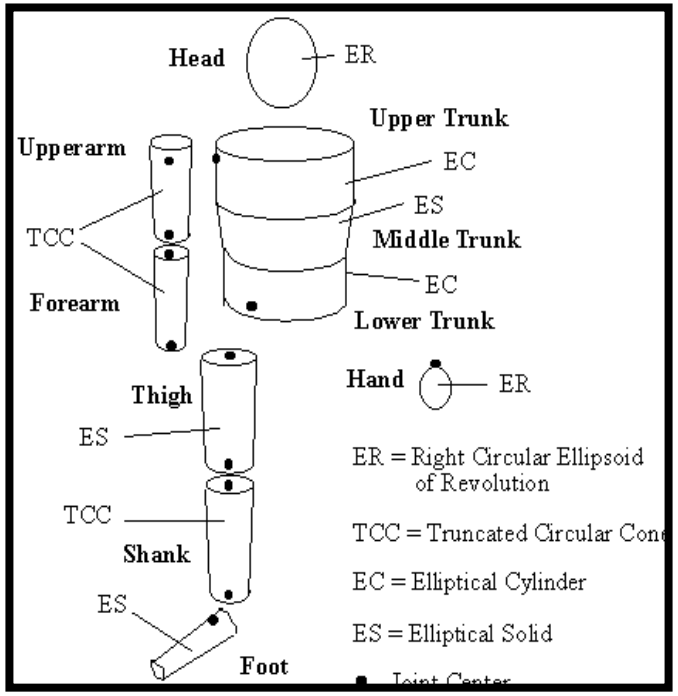
Movements, drills, or games that occur with regularity enable a feedback/feed-forward mechanism where the central nervous system is capable of generating an “engram” or “reference coordinates” for various sport actions.

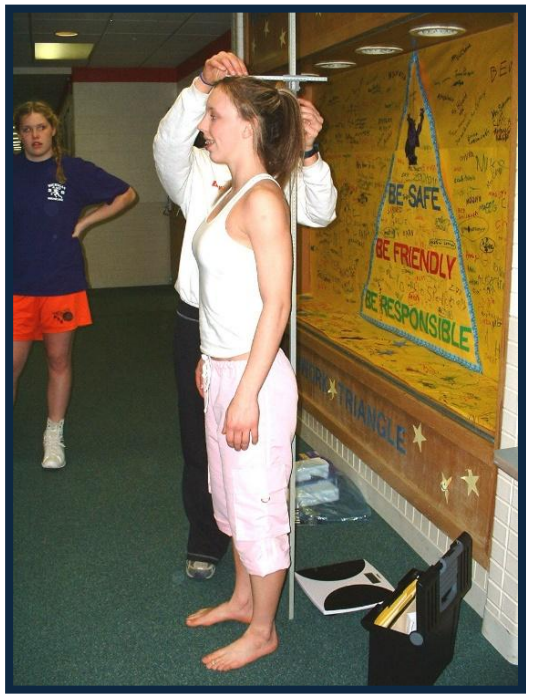
Dynamical Systems – Interactions among and between the task, the environment, and the individual.



How do you influence the learning of a sport skill by addressing the individual? The environment? The skill?

The Learner (Organism)

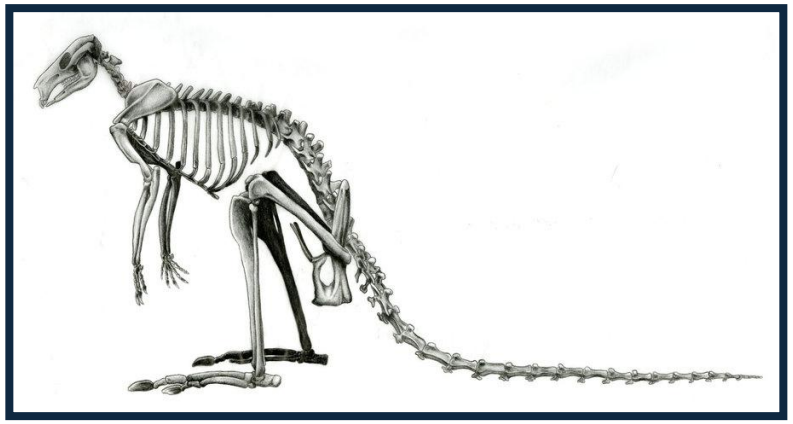


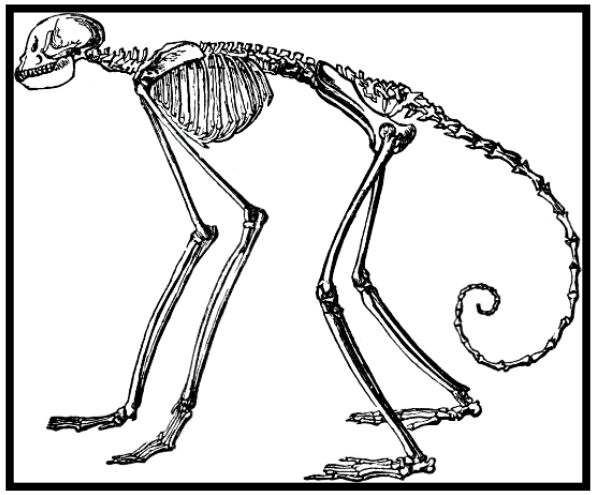


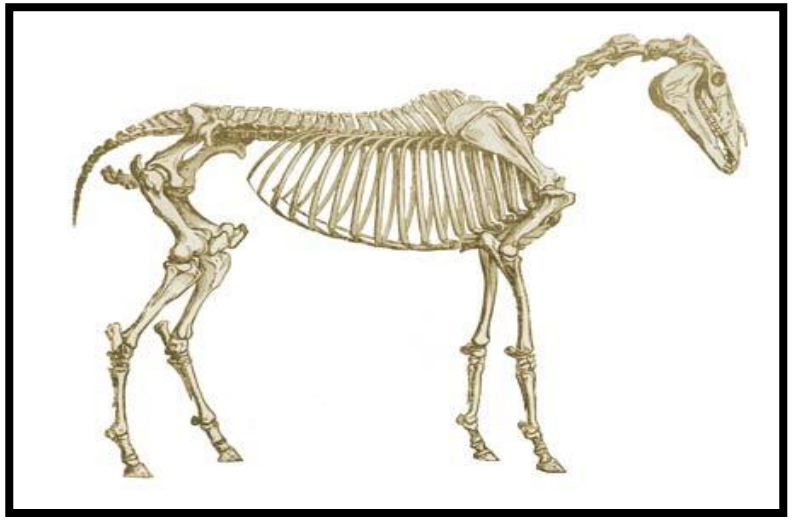
Anthropometry – mass; height; density, inertia

Experience – Training age; sport experiences

Form and Function





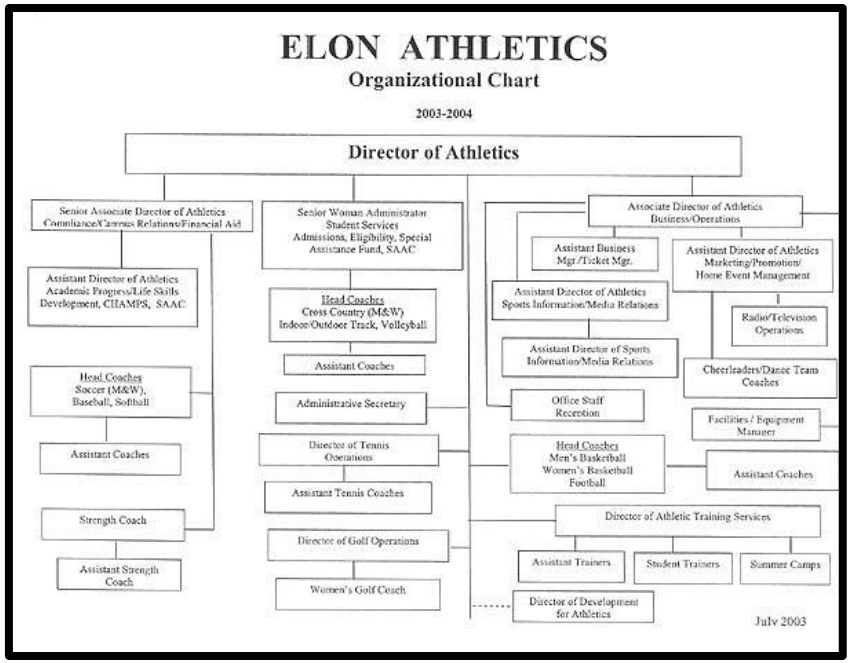


The Environment

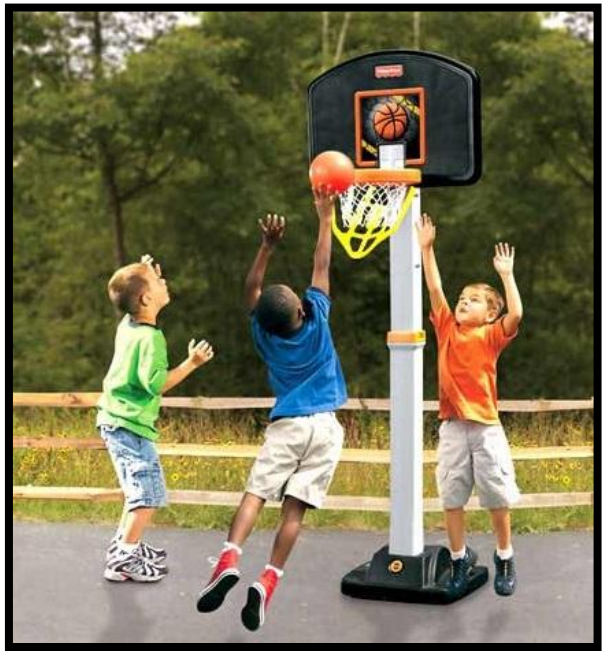
Weather and Geography

Ecological Dynamics – Behavior is shaped by the environment

Money, Personnel, Resources, Equipment, and Facilities



The Task



- Small-sided games enable greater contact time with implements, objects, technique, tactics.
- Equipment and field/court dimensions can be adapted for age group or complexity.
- Rules and regulations can be modified.

Play and small – sided games

- Changes of direction
- Acceleration/deceleration
- Larger base of support/lowered center of gravity
- Encourages more decision making
- Use fundamental and complex skills
- Changing environment
- Brain and body enrichment (nervous system – feedback and feedforward)

For desirable movement to emerge from the environment, constraint (limits) management is important to create affordances (opportunities).

- **Space and volume**
- **Characteristics of the task**
- **Rules and regulations**
- **Team/individual environment**
- **Coaching effects**

- Create changes in the task/environmental framework.

- Create environments that enable *accidental/deliberate* discovery of important actions.

- With practice young athletes become “attuned” to critical action characteristics for their sport

Agility

Refinement

Exploration

Acquisition

Agility

Refinement

Exploration

Acquisition

2024 United States Report Card on Physical Activity for Children and Youth

PHYSICAL ACTIVITY ALLIANCE
MOVE WITH US

Grade	Interpretation	Benchmark
A	We are succeeding with a large majority of children and youth (≥80%)	A+ = 94-100% A = 87-93% A- = 80-86%
B	We are succeeding with well over half of children and youth (60-79%)	B+ = 74-79% B = 67-73% B- = 60-66%
C	We are succeeding with about half of children and youth (40-59%)	C+ = 54-59% C = 47-53% C- = 40-46%
D	We are succeeding with less than half but some children and youth (20-39%)	D+ = 34-39% D = 27-33% D- = 20-26%
F	We are succeeding with very few children and youth (<20%)	F = 0-19%
INC	Incomplete—insufficient or inadequate information to assign a grade	

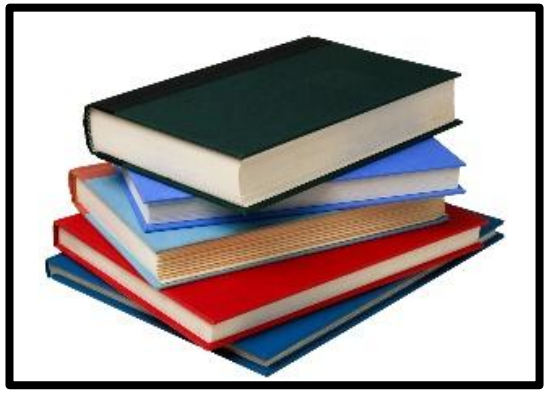
OVERALL PHYSICAL ACTIVITY

Authored by:
***Paul R. Hibbing, PhD**, Assistant Professor, Department of Kinesiology and Nutrition, University of Illinois Chicago*

Year	2014	2016	2018	2022	2024
Grade	D-	D-	D-	D-	D-

Indicator	Grade
Overall Physical Activity	D-
Active Transportation	D-
Organized Sport Participation	C-
Active Play	INC
Sedentary Behaviors	D-

Literacy



Motivation to Move

Numeracy

$$\frac{1}{5}x + \frac{1}{3} = \frac{4}{3}$$

Physical Literacy

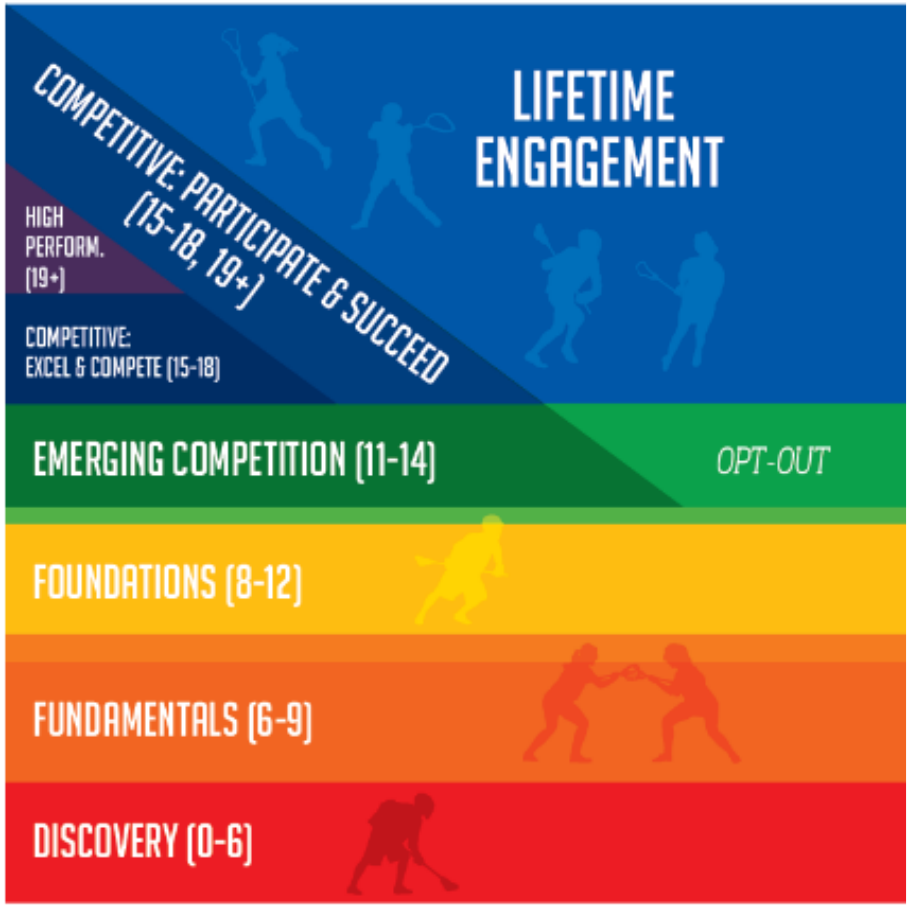
Confidence to Move

Competence to Move

"...the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for maintaining purposeful physical activity throughout the lifespan (Whitehead, 2010)

“Square the pyramid….”

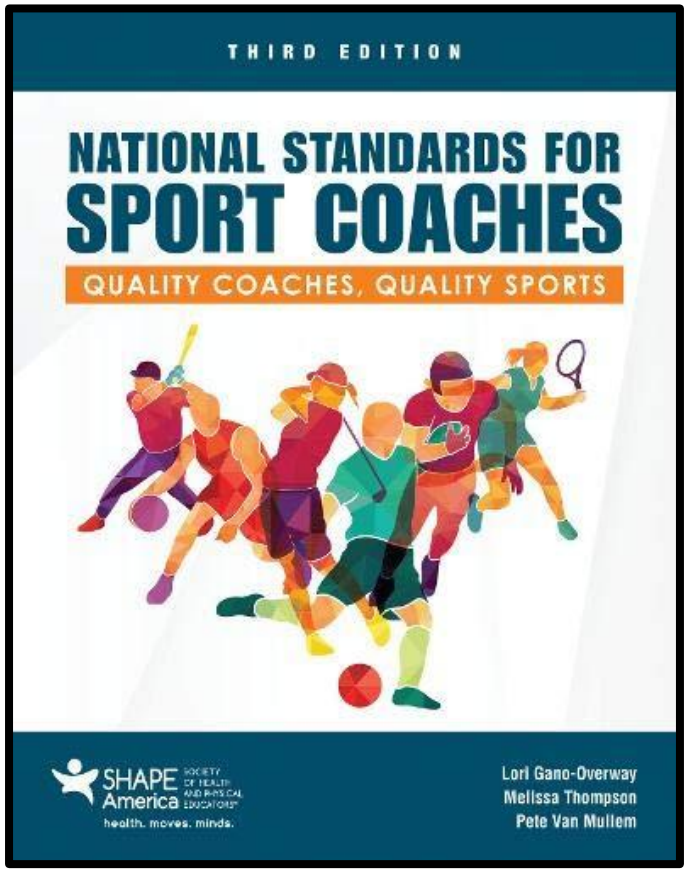
Training concepts are important to understand and follow.



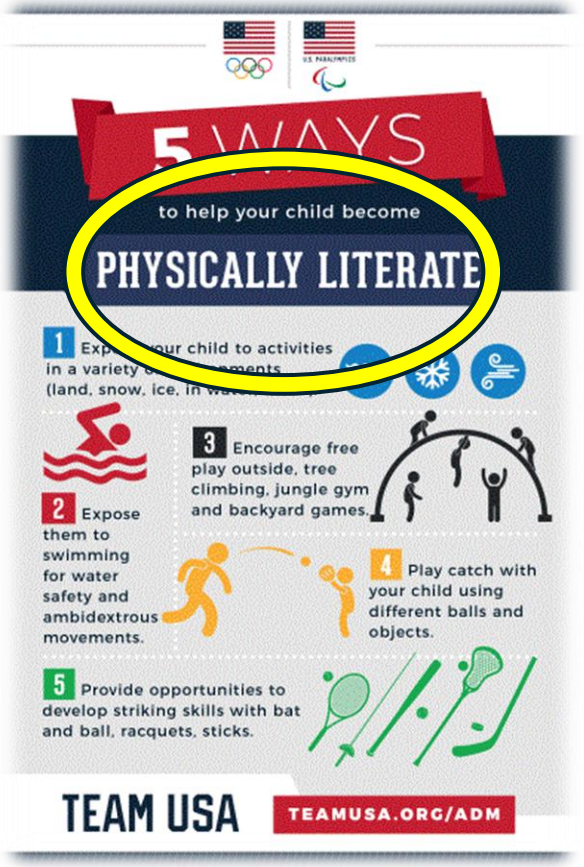
What is Long Term Athlete Development?

- It is a cradle to grave framework to enhance movement ability and opportunities for physical activity.
- "Athletic development" refers to the physical development of youth that encompasses the training of health-, skill-, and performance-related components of fitness.
- Not exclusive for the small minority of youth and adolescents that exhibit exceptional talent for a particular sport or activity.
- LTAD is a framework with the intent to create a participation pathway for all youth, of all abilities, and enable a physically literate culture.

42 Standards to help sport coaches establish a clearly defined quality coaching philosophy and vision for their program.



***Standard 2*: *Use long-term athlete development*…to develop athletic potential, enhance physical literacy, and encourage lifelong physical activity.**



ADM
AMERICAN DEVELOPMENT MODEL

The USOPC American Development Model can help enable Americans to realize their full athletic potential and utilize sport as a path toward an active and healthy lifestyle.

5 STAGES TO A BETTER SPORT EXPERIENCE

The American Development Model

STAGE 5
Thrive & Mentor
Age: For Life
(Being Active for Life)
5

STAGE 4
Excel for High Performance
Age: 15+
Athletic Experience: 10+ yrs

STAGE 4
Participate & Succeed
Age: 15+
Athletic Experience: 10+ yrs
4

STAGE 3
Train & Compete
Age: 13 - 19
Athletic Experience: 6 - 10 yrs
3

STAGE 2
Develop & Challenge
Age: 10 - 16
Athletic Experience: 3 - 6 yrs
2

STAGE 1
Discover, Learn & Play
Age: 0 - 12
Athletic Experience: 1 - 3 yrs
1

ADM AMERICAN DEVELOPMENT MODEL GROWING SPORT EXCELLENCE

Adult

High School +

Grades 6 - 8

Grades 4 - 6

Grades K - 4

Fundamental Motor Skills

Locomotor	Manipulative	Stabilizing
Walk	Throw	Balance
Run	Catch	Twist
Jump	Kick	Turn
Hop	Strike	Bend
Skip	Trap	Stretch
Roll	Bounce	
Leap		
Dodge		
Slide		
Crawl		
March		

p. 26

If you can't

- Catch
- Jump
- **Run**
- Swim
- Throw

You won't take part in

- Soccer
- Basketball
- Volleyball
- Track and Field
- Squash
- Badminton
- Rugby
- Tennis

If you can't

- Catch
- Jump
- **Throw**
- Swim
- Run

You won't take part in

- Baseball
- Softball
- Bowling
- Soccer
- Goalball
- Football
- Rugby

If you can't

- Throw
- Jump
- **Swim**
- Catch
- Run

You won't take part in

- Swimming
- Diving
- Water Polo
- Scuba
- Kayaking
- Sailing
- Surfing

Community Sport and Physical Activity Development Model

Fundamental motor ability is a pathway to movement competence and confidence

Regular Physical Activity throughout the Lifespan

Positive Physiological and Psychological Change

Movement Competence and Confidence

Opportunities to Participate in Play, Games, and Sport

Fundamental/Foundational Motor Skill Acquisition

Early sport and recreational activity are pathways to physical activity throughout the lifespan

Growth, Maturation and Athletic Development

- Understand the impact of growth and maturation on bio-motor development and skill acquisition.
- Biological variability within and among genders is certain.
- Recognize “windows of opportunity” or “sensitive periods” to optimize the integration of physical and skill training.

Peak Height, Weight and Strength Velocity

	Definition	Males	Females
Peak Height Velocity (PHV)	Maximal rate of change in stature	13.9 – 14.2yrs ± 1yr.	11.7 – 12 yrs. ± 1yr.
Peak Weight Velocity (PWV)	Maximal rate of change in body mass	14.2 – 14.6yrs ± 2yrs.	12.2 – 12.9yrs ± 1 to 2yr.
Peak Strength Velocity (PSW)	Rate of change in strength.	Typically occurs within one year of PWV, but expect variability within and between genders.	

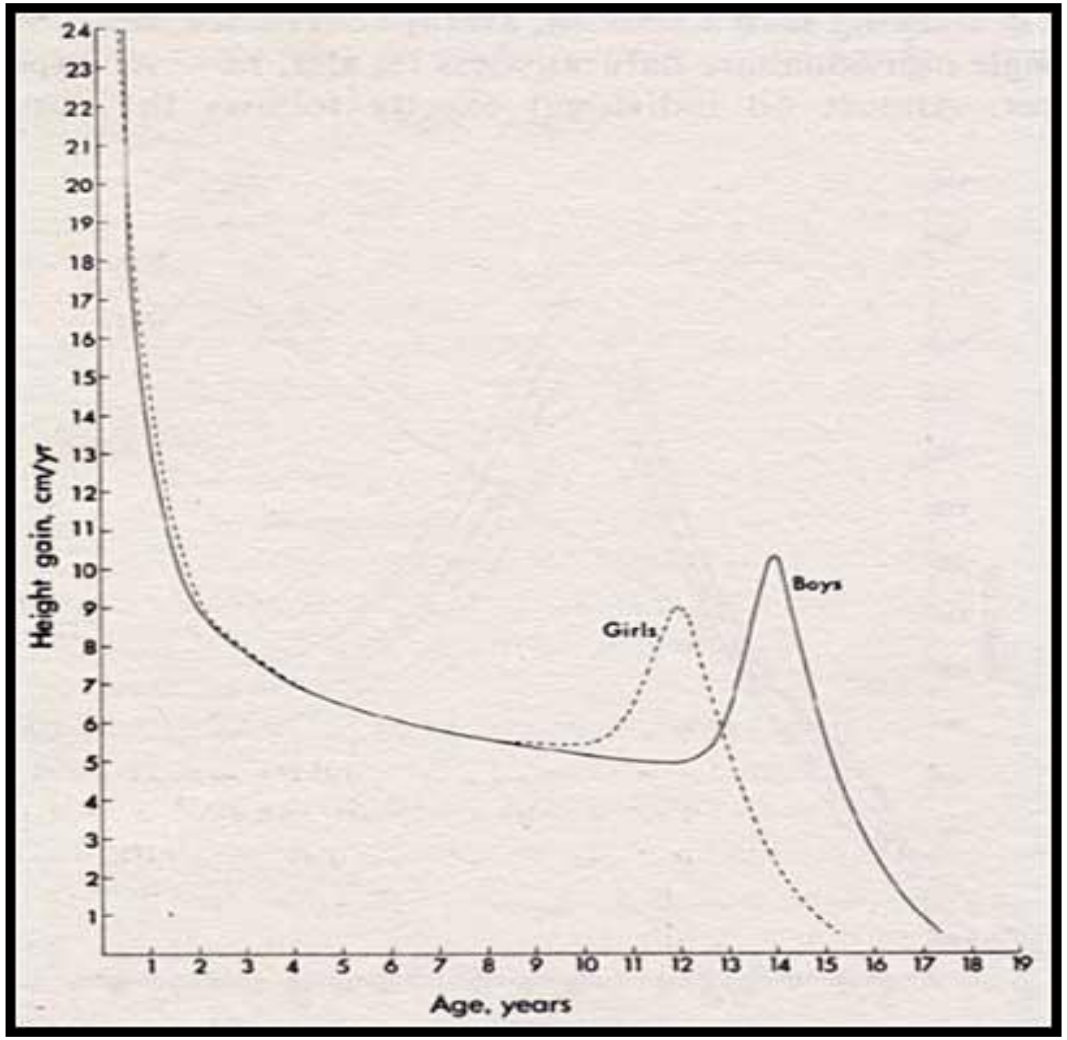
Malina, 2004

Predicting Adult Height (Age of PHV)

	Early Maturing	Average or On Time	Late Maturing
Boys	Before age 13.0	13.0-15.0	After 15.0
Girls	Before age 11.0	11.0-13.0	After 13.0

Female athletes on average attain peak height velocity (PHV) two years earlier than males.

Does timing of PHV, PWV, and PSV have an impact on physical training? Sport specialization?



<table>
<tr><th colspan="20">YOUTH PHYSICAL DEVELOPMENT (YPD) MODEL FOR FEMALES</th></tr>
<tr><td>CHRONOLOGICAL AGE (YEARS)</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21+</td></tr>
<tr><td>AGE PERIODS</td><td colspan="3">EARLY CHILDHOOD</td><td colspan="5">MIDDLE CHILDHOOD</td><td colspan="10">ADOLESCENCE</td><td colspan="2">ADULTHOOD</td></tr>
<tr><td>GROWTH RATE</td><td colspan="20">RAPID GROWTH ↔ STEADY GROWTH ↔ ADOLESCENT SPURT ↔ DECLINE IN GROWTH RATE</td></tr>
<tr><td>MATURATIONAL STATUS</td><td colspan="20">YEARS PRE-PHV ← PHV → YEARS POST-PHV</td></tr>
<tr><td>TRAINING ADAPTATION</td><td colspan="20">PREDOMINANTLY NEURAL (AGE-RELATED) ↔ COMBINATION OF NEURAL AND HORMONAL (MATURITY-RELATED)</td></tr>
<tr><td rowspan="10">PHYSICAL QUALITIES</td><td colspan="3">FMS</td><td colspan="4">FMS</td><td>FMS</td><td colspan="11">FMS</td></tr>
<tr><td colspan="3">SSS</td><td colspan="4">SSS</td><td>SSS</td><td colspan="11">SSS</td></tr>
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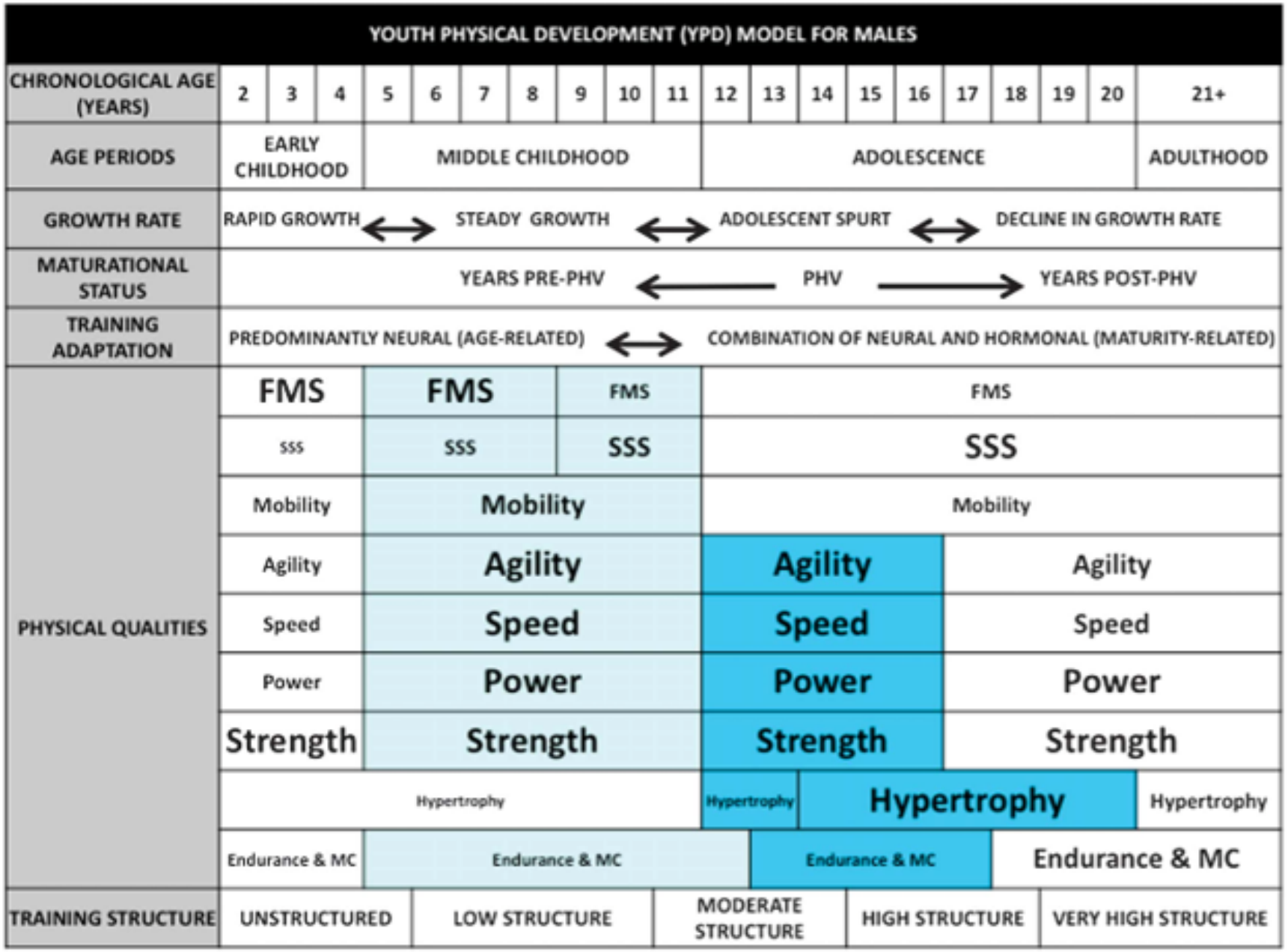
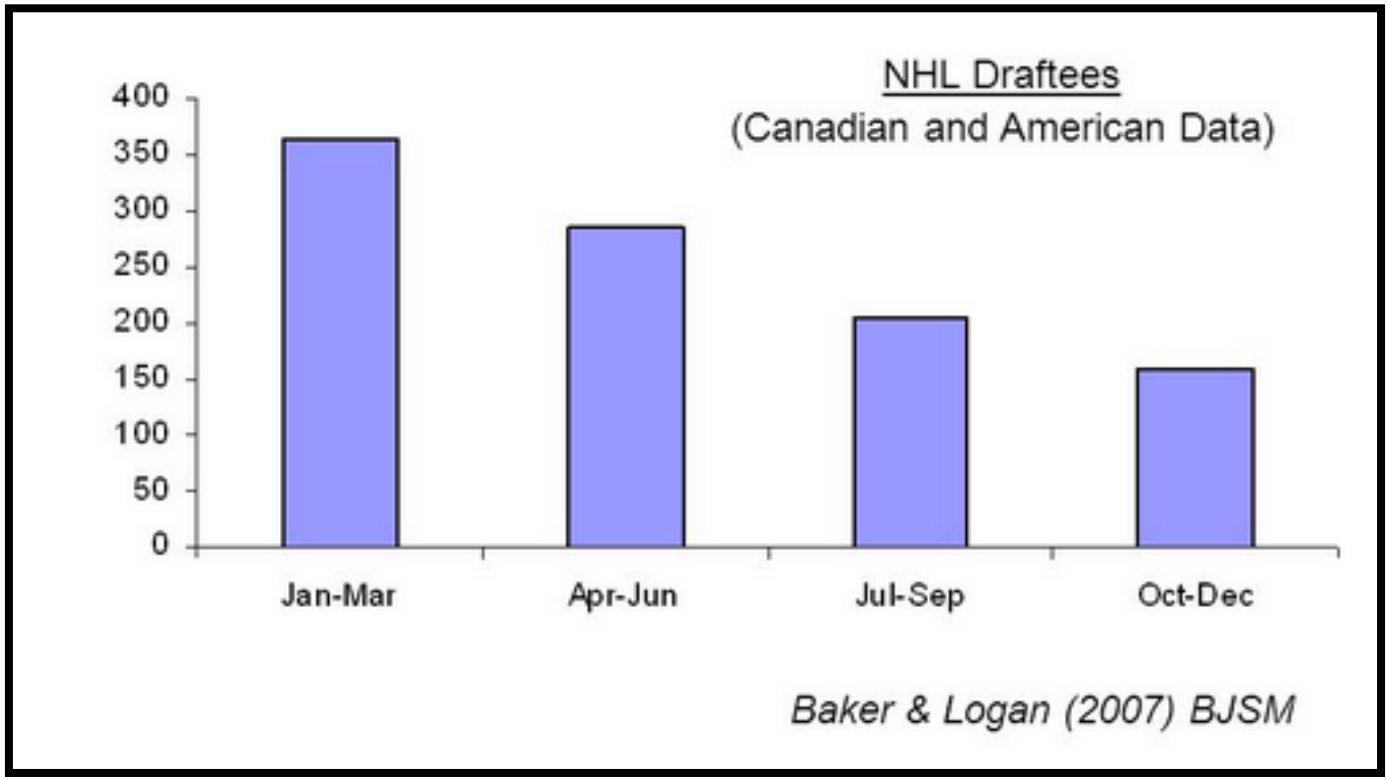

YOUTH PHYSICAL DEVELOPMENT (YPD) MODEL FOR MALES
CHRONOLOGICAL AGE (YEARS)
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21+
AGE PERIODS
EARLY CHILDHOOD
MIDDLE CHILDHOOD
ADOLESCENCE
ADULTHOOD
GROWTH RATE
RAPID GROWTH
STEADY GROWTH
ADOLESCENT SPURT
DECLINE IN GROWTH RATE
MATURATIONAL STATUS
YEARS PRE-PHV
PHV
YEARS POST-PHV
TRAINING ADAPTATION
PREDOMINANTLY NEURAL (AGE-RELATED)
COMBINATION OF NEURAL AND HORMONAL (MATURITY-RELATED)
PHYSICAL QUALITIES
FMS
SSS
Mobility
Agility
Speed
Power
Strength
Hypertrophy
Endurance & MC
TRAINING STRUCTURE
UNSTRUCTURED
LOW STRUCTURE
MODERATE STRUCTURE
HIGH STRUCTURE
VERY HIGH STRUCTURE

Relative Age Effect



Most successful junior athletes do not maintain success at high levels. Most successful high level athletes were not successful junior athletes…Late developers (Gullich et al. 2023).

Early Maturation vs Late Maturation

- Maturation will **alter body dimensions, movement ability, and ultimately may have an impact on the assignment of position** of the early and late maturing female.
- The early maturing male will typically have a **force advantage** when compared to the late maturing male.
- Early maturation places the early maturing male in a **favorable position for talent identification, position assignment, preferable coaching, instruction, and physical training**.
- Coaches **must be considerate of all athletes** and ensure skill and technical abilities are rehearsed and refined regardless of maturational status.

What effect does sport specialization have on the development of the youth athlete?

	High School Participants	NCAA Participants	Overall % HS to NCAA	% HS to NCAA Division I	% HS to NCAA Division II	% HS to NCAA Division III
MEN						
Baseball	482,740	36,011	7.5%	2.2%	2.3%	2.9%
Basketball	540,769	18,816	3.5%	1.0%	1.0%	1.4%
Cross Country	269,295	14,303	5.3%	1.8%	1.4%	2.1%
Football	1,006,013	73,712	7.3%	2.9%	1.9%	2.5%
Golf	143,200	8,485	5.9%	2.0%	1.6%	2.2%
Ice Hockey	35,283	4,323	12.3%	4.8%	0.6%	6.8%
Lacrosse	113,702	14,603	12.8%	3.1%	2.5%	7.3%
Soccer	459,077	25,499	5.6%	1.3%	1.5%	2.7%
Swimming	136,638	9,799	7.2%	2.8%	1.2%	3.2%
Tennis	159,314	7,785	4.9%	1.6%	1.0%	2.3%
Track & Field	605,354	28,914	4.8%	1.9%	1.2%	1.7%
Volleyball	63,563	2,355	3.7%	0.7%	0.7%	2.3%
Water Polo	22,475	1,072	4.8%	2.7%	0.8%	1.3%
Wrestling	247,441	7,300	3.0%	1.0%	0.8%	1.2%
WOMEN						
Basketball	399,067	16,509	4.1%	1.3%	1.2%	1.7%
Cross Country	219,345	15,624	7.1%	2.7%	1.7%	2.7%
Field Hockey	60,824	6,119	10.1%	2.9%	1.4%	5.8%
Golf	79,821	5,436	6.8%	2.8%	1.9%	2.1%
Ice Hockey	9,650	2,531	26.2%	8.9%	1.1%	16.2%
Lacrosse	99,750	12,452	12.5%	3.7%	2.6%	6.2%
Soccer	394,105	28,310	7.2%	2.4%	1.9%	2.9%
Softball	362,038	20,419	5.6%	1.8%	1.7%	2.2%
Swimming	173,088	12,980	7.5%	3.3%	1.2%	3.0%
Tennis	189,436	8,596	4.5%	1.5%	1.0%	2.0%
Track & Field	488,267	30,326	6.2%	2.8%	1.5%	1.9%
Volleyball	452,808	17,780	3.9%	1.2%	1.1%	1.6%
Water Polo	21,735	1,217	5.6%	3.3%	1.1%	1.2%

Only 7% of HS Athletes will compete at the intercollegiate level (1% elite). What about the other 93%? (NCAA 2020)

Sport Specialization

	Early Specialization Sports	Late Specialization Sports
Characteristics	Artistic and Acrobatic Sports	Team sports; Combatives; Racquet Sports
Examples	• Gymnastics • Figure skating • Diving	• Soccer • Baseball • Wrestling • Tennis

Sport Specialization

Overtraining and Overuse Injury

- Shin splints, compartment syndromes, etc.
- Ulnar collateral ligament (UCL) injuries
- Practitioner’s need to be mindful of growth-related conditions such as Osgood-Schlatters and Sever’s Disease

Sport Specialization

Burnout

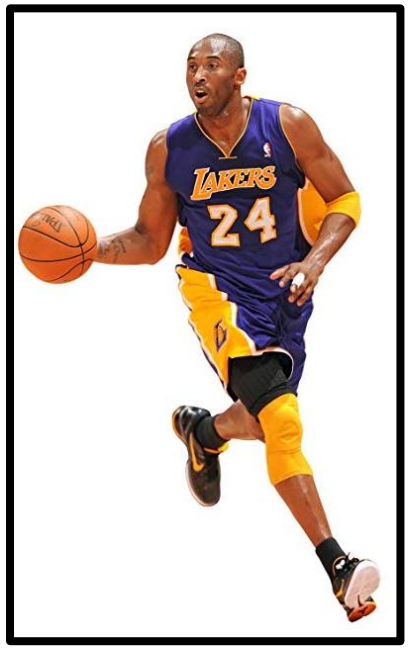
Factors Related to Athlete Burnout	Symptoms related to Athlete Burnout
• High training volumes • High time demands • Little personal control in decision making • Demanding performance expectations	• Loss of interest/motivation • Fatigue • Irritable • Restless • Soreness

Multi-sport Experience

- Exposure to multiple movement experiences in a variety of environments IS movement education.
- Multiple experiences enrich proprioception and kinethesis.
- Unstable environments enable athletic development. Good athletes learn to deal with unpredictable actions and make corrections.
- General movement patterns can transfer from activity to activity.
- Variability throughout the year helps prevent burnout. Keep it Fun!


Sport sampling: An implicit approach to sensory-motor integration

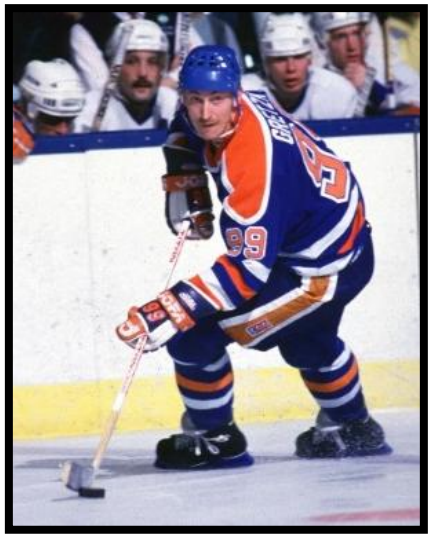

Participation in multiple sports offers the young athlete the opportunity to acquire and refine developing movement patterns, proprioception, and kinesthesia with similar characteristics.[p. 6]



Accomplished athletes are capable of generating more **efficient and effective solutions** for movement problems

Expression of the *bio-motor abilities* depend upon an accomplished physiological foundation and a **well-rehearsed neuro-mechanical feedback/feed-forward system**.

Great athletes do not necessarily have to exhibit **peak** *bio-motor abilities* because athleticism **requires an integration** of these capacities.



Summary of Athlete Development

- Fundamental motor attributes must be acquired and developed in order to trigger motor competence and confidence.
- Emphasize and organize physical and skill training in a progression from fundamental to complex.
- Must be considerate of the biological and behavioral variability that exists among youth with typical growth and maturation.
- Encourage multi-sport participation until high school. After that let kids decide what they want to play…Parents and coaches need to leave them alone!
- Appropriate (ancillary) nutritional and psychological aspects of training should compliment physical and skill development.

Why ADM?

- LTAD is a framework used in the development of *athleticism* **<u>over time. It's a process!</u>**

  - Considerate of physical and emotional growth and maturation
  - Enhanced bio-motor and physical abilities
  - Improved health and fitness
  - Increased physical performance
  - Injury prevention
  - Movement competence and confidence for all

Thank You!!!

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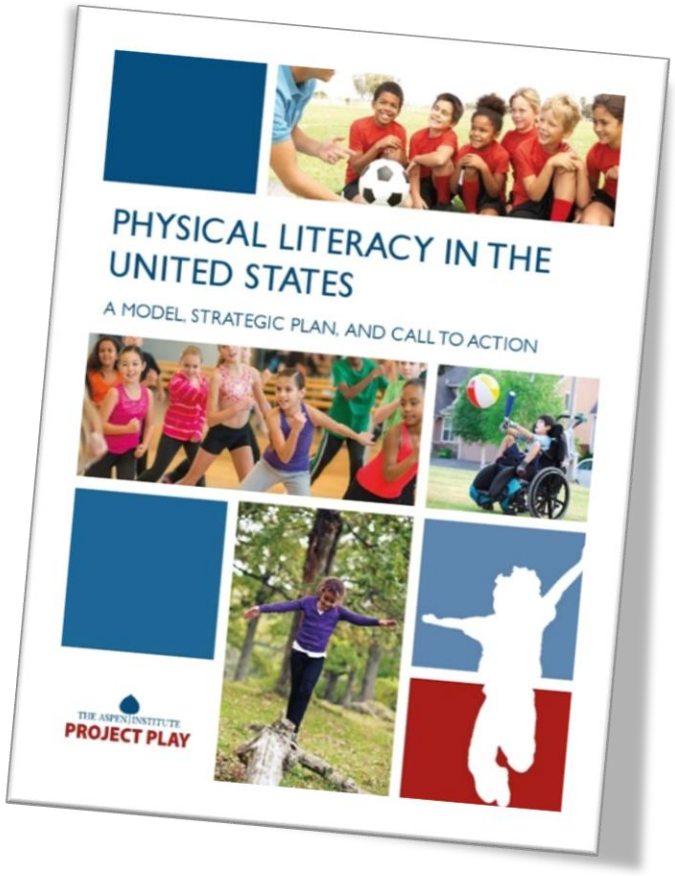

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