

CHAPTER 11

Development of Fundamental Movement: Manipulation Skills

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Key Concept

- *The childhood years should be focused on developing basic motor competence and efficient body mechanics in a wide variety of movement skills and situations.*
 - *Throw*
 - *Catch*
 - *Kick/Punt*
 - *Strike*

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Throwing

- **A critical skill that is used in many sports.**
- ***Proficient Overhand Throwers:***
 - Long contralateral step
 - Segmental rotation of the trunk where the hip rotates first, followed by the spine, shoulder, humerus and forearm
 - Humerus lags behind trunk
 - Forearm lags behind humerus
 - Throwing arm follows-through across body upon ball release

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Throwing Development

- ***Total Body***
 - 1- Chop
 - 2 - Sling Shot
 - 3 - Ipsilateral step
 - 4 - Contralateral step
 - 5 - Wind up

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Throwing Constraints

Individual	Task	Environmental
Gender	Accuracy	Size of Target
Age	Force	Distance from target
Biological		Instruction

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Throwing Constraints

- Throwing is a projection skill. The development of throwing is not linear or prescriptive, rather dynamic & variable in nature.
- Teachers can often elicit a more advanced pattern of throwing by considering individual constraints, & changing the task & environmental constraints to demand such a performance.

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Summary of Throwing Research

- Gender differences - boys better than girls - even after throwing intervention.
- Children exhibit variable, non-linear and context sensitive emergence of throwing behaviors.
- Throwing instruction (models, critical cues, biomechanical) positively impacts throwing performance.

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Summary of Throwing Research

- Process measures of throwing are more sensitive to instruction than product measures such as velocity.
- Long contralateral step is important in order to begin rotating the trunk on the legs.
- During initial instruction of the overarm throw; the focus should be on throwing for force to evoke the most efficient pattern.

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Proficient Catchers:

- Catching is a critical reception skill used in many sports.

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Proficient Catchers:

- **Preparation for Catching**
 - Track the ball with the eyes
 - Align body with incoming flight characteristics of object
 - Feet are placed slightly apart
 - Prior to catch, arms relaxed at side or slightly in front
- **Reception of the Object**
 - Hands move to intercept the object - fingers adjust to precise spatial characteristics of the object (fingers up for high ball, down for low ball)
 - Arms "give" on contact to absorb the force of the ball
 - Fingers grasp object in well-timed simultaneous action
 - Body weight transferred from front to back as arms give

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Catching Development

- ***Total Body***
 - 1- Delayed reaction
 - 2 - Hugging
 - 3 - Scooping
 - 4 - Hand catch
 - 5 - Move to ball & hand catch

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Catching Constraints

Individual	Task	Environmental
Gender	Ball location & flight trajectory	Size of ball
Age	Distance & height	Ball color & background
Experience	Ball speed	Viewing time
Body parameters		Instruction

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Catching Constraints

- Catching is a reception skill & a hard skill to research as the nature of the catching task used in research is so variable, thus task & environmental variables impact the pattern of catching resulting in contradictory findings.
- Researchers have used both product & process approaches to researching catching.

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Summary of Catching Research

- Valid developmental sequences exist for catching.
- Gender differences are present in stages of catching with girls better than boys in the early years.

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Summary of Catching Research

- Individual, task and environmental constraints influence catching performance.
- Instruction positively impacts the performance of catching with the emergence of catching development shaped by the nature of the instruction provided.

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Proficient Kickers

Preparatory Action

- Continuous motion into ball
- Long last step (or leap) before ball
- Stabilizing foot beside /behind ball
- Trunk slightly leaned back

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Proficient Kickers

- Manipulative leg starts back with knee flexed
- Forceful forward swing of leg with sequential inertia – thigh rotates first followed by lower leg
- Leg straightens as it makes contact with ball
- Trunk leans back at contact

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Proficient Kickers

Follow Through

- Manipulative leg moves vigorously forward & upward often causing the stability leg to come off the ground & perform a hopping pattern
- Trunk leans backward
- Arms in opposition to legs to counter the rotatory forces of the leg

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Kicking Development

- **Total Body**

- 1- Stationary push kick - no rear leg swing
- 2 - Stationary kick - with rear leg swing
- 3 - Moving approach - step/s & kick
- 4 - Leap-kick-hop - Long last step before forceful kick & hop after

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Kicking Constraints

Individual	Task	Environmental
Gender		Instruction
Footedness		Experience/Skill
Biomechanical limb velocities		
Age		

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Proficient Sidearm Strikers

Preparatory Action

- Swinging bat back in horizontal plane
- Body oriented sideways

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Proficient Sidearm Strikers

Force Production

- Long contralateral step into hit
- Swing through full range of motion
- Differentiated trunk & hip rotation to contribute rotary forces
- Extend arms just before contact
- Combine sequence of movements (backswing, step, pelvic rotation, trunk rotation, arm swing, ball contact, follow through) to maximize forces

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Proficient Sidearm Strikers

Follow Through

- Arms comes across body
- Body moves across base leg

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Proficient Batters

Preparatory Action

- Body oriented sideways with weight on back leg
- Step & weight shifts forward as hands go back

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Proficient Batters

Force Production

- Contralateral step into hit
- Swing through full range of motion
- Differentiated rotation to contribute rotary forces
- Extend arms just before contact
- Combine sequence of movements (backswing, step, pelvic rotation, trunk rotation, arm swing, ball contact, follow through) to maximize forces

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Proficient Batters

Follow Through

- Wrist roll
- Bat swings across body
- Weight shifts to front foot

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Striking Development

• *Total Body*

- 1- Chop strike - with bat going from high to low
- 2 - Push strike - sideways orientation, bat pushes across the midline with block rotation of trunk
- 3 - Ipsilateral step - (back foot steps across the front foot) as bat swings down diagonally
- 4 - Contralateral step - starts with arm/bat wind up - contralateral step as bat swings - wrist roll & follow through

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Striking Constraints

Individual	Task	Environmental
Gender		Nature of practice
Age		Peer tutoring
Proximo-distal		Nature of feedback
Haptic (touch)		Prior experience/ expertise

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5 Step Process to Track & Utilize Fundamental Motor Skill Development

- Observe & evaluate developmental level of child
- Identify desired performance for child to perform
- Consider individual factors influencing child
- Manipulate environment & task factors to promote success
- Watch child perform skill & modify it to make more difficult or easier

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Concluding Concept

Concept 11.4 – Developmental sequences can be identified for many FMS. These common patterns of movement are behavioral attractors that represent movement options from which a child can choose in a given movement context.

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