CHAPTER 11

Development of Fundamental Movement: Manipulation Skills


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.

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
Throwing Development

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

Throwing Constraints

<table>
<thead>
<tr>
<th>Individual</th>
<th>Task</th>
<th>Environmental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Accuracy</td>
<td>Size of Target</td>
</tr>
<tr>
<td>Age</td>
<td>Force</td>
<td>Distance from target</td>
</tr>
<tr>
<td>Biological</td>
<td>Instruction</td>
<td></td>
</tr>
</tbody>
</table>

Throwing is a projection skill. The development of throwing is not linear or prescriptive, rather dynamic and 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.
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.

- 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.

Proficient Catchers:

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

Catching Development

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

Catching Constraints

<table>
<thead>
<tr>
<th>Individual</th>
<th>Task</th>
<th>Environmental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Ball location &amp; flight trajectory</td>
<td>Size of ball</td>
</tr>
<tr>
<td>Age</td>
<td>Distance &amp; height</td>
<td>Ball color &amp; background</td>
</tr>
<tr>
<td>Experience</td>
<td>Ball speed</td>
<td>Viewing time</td>
</tr>
<tr>
<td>Body parameters</td>
<td></td>
<td>Instruction</td>
</tr>
</tbody>
</table>
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.

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.

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.
Proficient Kickers

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

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

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
Kicking Development

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

Kicking Constraints

<table>
<thead>
<tr>
<th>Individual</th>
<th>Task</th>
<th>Environmental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td>Instruction</td>
</tr>
<tr>
<td>Footedness</td>
<td></td>
<td>Experience/Skill</td>
</tr>
<tr>
<td>Biomechanical</td>
<td></td>
<td>lim velocities</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Proficient Sidearm Strikers

Preparatory Action
  ➢ Swinging bat back in horizontal plane
  ➢ Body oriented sideways
### 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

---

### Proficient Sidearm Strikers

**Follow Through**
- Arms comes across body
- Body moves across base leg

---

### Proficient Batters

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

Proficient Batters

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

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
Striking Constraints

<table>
<thead>
<tr>
<th>Individual</th>
<th>Task</th>
<th>Environmental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td>Nature of practice</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td>Peer tutoring</td>
</tr>
<tr>
<td>Proximo-distal</td>
<td>Nature of feedback</td>
<td></td>
</tr>
<tr>
<td>Haptic (touch)</td>
<td>Prior experience/expertise</td>
<td></td>
</tr>
</tbody>
</table>

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

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 chose in a given movement context.