WHOLE AND PART PRACTICE
THIS CHAPTER’S CONCEPT

Base decisions about practicing skills as wholes or in parts on the complexity and organization characteristics of the skills
INTRODUCTION

- Which is better, practice the skill in parts or in its entirety?
- Practical application in teaching, and rehabilitation.
  - Should one teach and practice the tennis serve in parts? Or entirety?
  - Should the patient be taught how to get out of bed in parts? Or entirety?
Answer depends

- How complex the skill is?
- How organized the skill is?
SKILL COMPLEXITY AND ORGANIZATION

- The organization and complexity characteristics of skill provides the basis of using whole or part practice (Naylor & Briggs)
  - Skill Complexity is how many part or components are in the task
    ★ Level of complexity relates to level of processing demands on the human performer
  - Skill Organization refers to how spatially and temporally the components are interrelated
    ★ High organization = high inter-dependency
    ★ Low organization = low inter-dependency
Classify the following skills

- American Crawl stroke in swimming
- Swing dance
- Tennis serve
- Free throw in basketball
- Floor routine in gymnastics

Highly complex…………………………….Lowly Complex
Highly organized………………………….Lowly organized
DECISION TO USE WHOLE OR PART PRACTICE

- **Skills low in complexity and high in organization**
  - One should practice the skill as a whole

- **Skills high in complexity and low in organization**
  - One should practice the skill using some type of practice part strategy
Orthopedic Surgical Task Study

- Attaching a metal plate to a fractured bone is a serial skill performed in specific order.

- Which is better:
  - Have the surgeons watch the entire procedure then perform all the parts in a practice condition
  - Have the surgeons practice each part 3 times in a 12 min. session before practicing the next part (blocked)
  - Have the surgeon practice each part randomly.

- Results
  - Whole practice is better
Steps to determine if one uses whole or part method?

1. Analysis of skill
   - How many part are their?
   - Are these part dependent upon each other or independent?

2. Evaluate the skill on a continuum of skill complexity from high to low and organization from high to low
   - Most motor skills and sport skills are closer to complex
   - Group parts into natural part to evaluate organization.
Learning How to Juggling

- http://www.youtube.com/watch?v=kCt1bmSASCI
VARIOUS PART TASK TRAINING APPROACHES

- Fractionalization
- Segmentation
- Simplification
FRACTIONALIZATION APPROACH

- Related to bimanual skills where one practices each arm separately before performing with the arms together (asymmetric)
  - Most skills require simultaneously move their arms and legs to achieve a goal.
  - Remember that limbs like to work together (heavily linked)
  - When ever you have a skill where the each arm (leg) does something different from the other arm(leg) one needs to consider fractionalization part approach.
  - For skills where one hand has a more difficult movement pattern over the other (asymmetrical):
    * Practice should begin with the limb that has the more difficult task
SEGMEN TATION APPROACH

- Involves separating the skill into parts and then practicing one part.
  - Problem is putting the practice parts back together to perform the skill
- Progressive Part is strategy used to prevent this problem
  - Practice part A then AB then ABC then entire skill
Progressive Part

- Client needs to perform a procedural skill such as going from lying to standing.
  - Part 1: Shifting & turning the body
  - Part 2: Arm under the trunk
  - Part 3: Lifting the trunk with arm
  - Part 4: Leg under the hip
  - Part 5: Arm and leg lift the body to standing position
SIMPLIFICATION APPROACH

- Involves reducing difficulty of the whole skill or specific parts of a skill
  - Reduce the difficulty of the objects
  - Reduce the attention demands of the skill without changing the action goal
  - Provide auditory accompaniment for skills having a rhythmical pattern
  - Reducing speed
  - Sequencing of task progression
  - Simulators and virtual reality environments
  - Do not use miming as a simplification method
PROFESSIONAL IMPLICATION

- Determine if the performer should practice the skill as a whole or in parts
  - Whole practice for skills low in complexity and high in organization
  - Part practice for skill high in complexity and low in organization
- Use the various part training approaches in the practice of the skill
- Have the student/client perform the skill then attend to one aspect of the skill that they are having difficulty with.
Practice Organization
Rehabilitation Example
Patient

- Male
- 45
- Automobile injury (Femur & Lumbar Fractures)
- Closed Head Injury (3 months – Coma)
Assessment

- Rivenead & Gait Assessment
  - Gait
  - Transfer skills
Gait

- **Regulatory**
  - Heel to toe
  - Narrow base of support
  - Arms in opposition
  - Toe straight and forward (not in or outward)

- **Non regulatory**
  - Walking surface (carpet, hardwood floor)
  - Weight bearing (treadmill, full weight bearing)
  - Obstacles (around objects of different sizes)
  - Carrying objects while walking
  - Walking paths
  - Assisted or non assisted
Transfer Skills

- Up and down stairs
- Sit to Standing
- Stand to Sit
- Out of bed to standing
- Prone position to standing
How are these skills performed in real life?

In what ways? (practice variability)

In what environmental situations? (context specificity)
Practice Variability

- **Walking (Closed)**
  - Long Pole (assisted)
  - Walking on treadmill at the same speed
  - Floor grid walking
  - Walking on the same surface in the clinic
  - Walking path the same
  - Walk while carrying a 5 lbs bag

- **Walking (Open)**
  - Walking at different speeds
  - Walking on different surfaces
  - Walking around objects of different sizes
  - Walking paths vary
  - Walking carrying different weighted objects
  - Unassisted walking
Practice Variability

- Transition Skills (closed)
  - Same surface
  - Same chair height
  - Chair with arm rests
  - 3 step stair
  - Steps the same height
  - Same bed

- Transition Skills (Open)
  - Vary surfaces
  - Vary chair heights
  - Chairs with or without arm rests
  - Stair in hallway and outside
  - Vary softness of bed
Practice Specificity

Gait Situations
- Alone
- Among a crowd
- When it is dark?
- Across a busy intersection?
- At home? Work?

Transitions Situations
- Early in the morning after sleep
- Eating/dining
## Contextual Interference

<table>
<thead>
<tr>
<th>Blocked</th>
<th>Serial</th>
<th>Random</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gait (15 minutes)</td>
<td>Walking on treadmill</td>
<td>Stand to Sit</td>
</tr>
<tr>
<td>Transition (15 minutes)</td>
<td>Walking with poles</td>
<td>Walk with Poles</td>
</tr>
<tr>
<td></td>
<td>Walking unassisted</td>
<td>Walk Stairs</td>
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<tr>
<td></td>
<td>Walking Stairs</td>
<td>Pone to Stand</td>
</tr>
<tr>
<td></td>
<td>Sit to stand</td>
<td>Bed to Stand</td>
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Overlearning

- Walking
  - If the client has poor balance
  - If the client has good balance will not

- Transitional Skills
  - All are procedural
  - Will overlearn these skills with the client
Mass Versus Distributive

- **Gait**
  - Continuous skills will practice in distributive fashion.
    - Rest to work

- **Transition Skills**
  - Discrete skills will practice in mass fashion
    - Work to rest
Part or Whole Method

- **Gait**
  - Gross In nature
  - Skill is very highly organized but not very complex
  - Will develop in a whole method

- **Transitional**
  - Stair (whole)
  - Others (Part)
    - Progressive part
Practice Organization
Physical Education Example
8th Grade Baseball/Softball Unit

- Middle School
- Co-ed Population
- 8th Graders (14-15 years of age)
- Physical Education Teacher
  - Introduce the situations of play
    - Stealing a base
    - Situations (runners on 1 & 3 with 1 out, bases loaded with no outs, runner on first with no outs, runner on 3rd base with 0 or 1 out)
  - Assess Hitting and Fielding*
Hitting

Regulatory Conditions
   Stance
   Weight Shift
   Hips then Shoulder then arm extension
   Timing

Non Regulatory Condition
   # of balls hit
   Type of pitcher
   Speed of the pitch
   Color of the ball
   Bat length
   Weather
   Location of ball
   Players on based or not on based
   Count
Fielding

- Regulatory
  - Ready position
  - Seeing the ball come off the bat
  - Transportation of limb
  - Retraction of the glove prior to ball contact
  - Grasp (catch)
  - Look & Set then throw

- Non regulatory
  - Player on based
  - Number of grounders or fly balls
  - Weather
  - Eyewear
  - Location of ball
  - Speed of ball
Situations

- Regulatory conditions
  - Throwing
  - Fielding

- Non regulatory conditions
  - Stealing a base
  - Runners on 1 & 3 based on number of outs
  - Runners on 3 based on number of outs
  - Runner on 1\textsuperscript{st} based on number of outs
  - Type of field
Practice Variability

Hitting Closed
- Same speed
- Same location
- Same delivery
- Same Environment
- Same swing

Hitting Open
- Vary location of ball
- Vary speed of the ball
- Different pitchers
- Practice under the lights or during the day
Practice Variability

Fielding (Closed)
- Same type of grounder or fly ball
- Same location
- Same Speed
- Same type of catch

Fielding (open)
- Different grounders or fly balls
- Different locations
- Different speeds
- Different type of catch
  - One handed
  - Two handed
  - Underhanded
  - Overhanded
Practice Variability

Situation (closed)
- Same situation over and over with
  - Same speed
  - Same locations
  - Same strategy
  - Same number of outs

Situation (Open)
- Different situations involving
  - vary locations
  - vary speed
  - vary the strategy
  - vary the outs
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<tr>
<td>Hitting (15 minutes)</td>
<td>Hitting off a lefty</td>
<td>Day 1 Situations</td>
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<tr>
<td>Catching (15 minutes)</td>
<td>Hitting off a righty</td>
<td>Hitting (lefty)</td>
</tr>
<tr>
<td>Situation (15 minutes)</td>
<td>Fielding a grounder</td>
<td>Fielding (grounders &amp; fly)</td>
</tr>
<tr>
<td></td>
<td>Fielding a Fly</td>
<td>Hitting (righty)</td>
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<td></td>
<td>Situations</td>
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Overlearning

Hitting & Catching
- Discrete skills
- Overlearning has little effect

Situations
- Procedural
- Overlearning would be effective
# Mass or Distributive

## Hitting & Catching
- Discrete skills
- Use Mass practice

## Situations
- Discrete in nature
- Use mass practice
Part or Whole Practice

Hitting or Catching
- Hitting is a highly complex skill that is also highly organized.
  - Progressive
- Catching is highly organized
  - Whole

Situations
- Procedural in nature
- Complex
- Use part methods
  - Progressive part
  - Pure part (problems arise)
  - Simplification
    - Easy to difficult
The End