Chapter 9
SKILL FITNESS AND FITNESS PROGRAMMING

Chapter 9 Objectives

- Learn the benefits of good skill-related fitness
- Identify and define the six components of skill-related fitness
- Dispel common misconceptions related to physical fitness and wellness
- Become aware of safety considerations for exercising
- Learn the concepts for preventing and treating injuries
- Describe relationship between fitness and aging
- Be able to write a comprehensive fitness program

Skill-related fitness

- Fitness components important for success in skillful activities and athletic events
- Encompasses agility, balance, coordination, power, reaction time and speed
- Beneficial for non-athletes as well
  - contributes to health-related fitness
  - enhances quality of life
  - helps cope more effectively in emergency situations
Skill-related fitness

- Skill-related fitness components seem to be determined to a large extent by genetics.
- Everyone should attempt to develop and maintain better-than-average skill fitness.
- Participation in health-related fitness can heighten skill-related fitness.

Performance tests for skill-related fitness

- Agility
  - the ability to quickly and efficiently change body position and direction
- SEMO Agility Test
  - Measures general body agility
  - Involves side-stepping, backpedalling and sprinting

Performance tests for skill-related fitness

- Balance
  - the ability to maintain the body in proper equilibrium
- Balance Test: One-Foot Stand Test
  - Measures static balance
  - Involves standing on the ball of one foot with the other foot on the inside of the support knee
  - Test ends when the foot moves, heel touches the ground, hands are moved from hips or 1-minute has passed
Performance tests for skill-related fitness

- **Coordination**
  - The integration of the nervous and the muscular systems to produce correct, graceful, and harmonious body movements.

- **Soda Test**
  - Assesses overall motor or muscular control and movement time.
  - One hand is used to pick up, move, and turn-over soda cans in a specified pattern as fast as possible.

Performance tests for skill-related fitness

- **Power**
  - The ability to produce maximum force in the shortest time.

- **Standing Long Jump Test**
  - Measures leg power.
  - Participant jumps as far forward as possible with two feet.

Performance tests for skill-related fitness

- **Reaction Time**
  - The time required to initiate a response to a given stimulus.

- **Yardstick Test**
  - Measures hand reaction time.
  - Yard stick is dropped and person stops it as quickly as possible.
Performance tests for skill-related fitness

- Speed
  - the ability to rapidly propel the body or a part of the body from one point to another

- 50-yard Dash
  - Measures speed
  - Participant scored based on time it takes to complete 50-yards at maximal speed

Performance tests for skill-related fitness

<table>
<thead>
<tr>
<th>TABLE 9.1</th>
<th>Percentile Rank and Fitness Category for the Skill-Related Fitness Components: Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Time (Seconds)</td>
</tr>
<tr>
<td>Agility</td>
<td>Balance</td>
</tr>
<tr>
<td>90</td>
<td>5.0</td>
</tr>
<tr>
<td>95</td>
<td>10.0</td>
</tr>
<tr>
<td>90</td>
<td>16.0</td>
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<td>95</td>
<td>22.0</td>
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<td>90</td>
<td>30.0</td>
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<td>95</td>
<td>38.0</td>
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<td>90</td>
<td>46.0</td>
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<tr>
<td>95</td>
<td>54.0</td>
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</tbody>
</table>

*Scores developed at Boise State University, Division of Kinesiology. | TABLE 9.2 | Percentile Rank and Fitness Category for the Skill-Related Fitness Components: Women |
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Description</td>
<td>Time (Seconds)</td>
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<tr>
<td>Agility</td>
<td>Balance</td>
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<td>90</td>
<td>11.1</td>
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<td>95</td>
<td>54.0</td>
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</tbody>
</table>

*Scores developed at Boise State University, Department of Kinesiology. *Values developed at Boise State University, Department of Kinesiology. *Values developed at Boise State University, Department of Kinesiology.

Performance tests for skill-related fitness

<table>
<thead>
<tr>
<th>TABLE 9.3</th>
<th>Skill-Fitness Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentile Rank</td>
<td>Fitness Category</td>
</tr>
<tr>
<td>≥81</td>
<td>Excellent</td>
</tr>
<tr>
<td>61–80</td>
<td>Good</td>
</tr>
<tr>
<td>41–60</td>
<td>Average</td>
</tr>
<tr>
<td>21–40</td>
<td>Fair</td>
</tr>
<tr>
<td>≤20</td>
<td>Poor</td>
</tr>
</tbody>
</table>

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Aerobic exercise can increase feelings of happiness

“Physical High”
- May occur when endorphins are released from the pituitary gland during vigorous exercise
- Feeling can remain for 30-60 minutes after exercise

Can people with asthma exercise?
- Obtain permission and medication from a medical professional
- Recommendations for exercising with asthma
  - Exercise regularly
  - Gradual warm-up and cool-down reduce the risk of an acute attack
  - Drinking water keeps airways moist and decreases risk of an attack
  - In cold weather, wear a mask to keep air warm and moist
  - Don’t exercise alone and carry your medication

Activity recommendations for arthritis
- Combined stretching, aerobic and a full strength-training program
- Perform mild stretching before aerobic activities
- Avoid high-impact activities
- Low impact activities include
  - Swimming
  - Water aerobics
  - Cycling
Diabetes and exercise

- Exercise lowers blood sugar and is beneficial for both Type 1 and Type 2 diabetes
- Consult a physician prior to beginning an exercise program
  - Insulin and/or oral medications made need to be reduced
  - Increased carbohydrates may be needed to avoid hypoglycemia
- Never exercise alone
- Stay well hydrated

Type 2 Diabetes aerobic exercise guidelines

- Intensity
  - More important than volume of exercise for blood sugar control
- Duration
  - At least 150 minutes/week
- Mode
  - Aerobic activities that involve large muscle groups
- Frequency
  - At least 3 times/week and maximum of 2 consecutive days between exercise sessions
- Rate of progression
  - Gradual progression in intensity and volume

Type 2 Diabetes strength training guidelines

- Resistance
  - Between 50 and 80 percent of 1 RM
- Sets
  - One set to near fatigue of 5 – 10 exercises
- Frequency
  - Two to three times per week
- Rate of progression
  - Gradual progression in intensity, then sets and finally, frequency
Additional Type 2 Diabetes training guidelines

- Check your blood glucose levels before and after exercise.
- To prevent hypoglycemia, consume between .15 and .20 gram of carbohydrates per pound of body weight for each hour of moderate-intensity activity.
- Be ready to treat low blood sugar with a fast-acting source of sugar (juice, raisins, etc.)
- Stay well-hydrated

Pregnancy and exercise

- Exercise is beneficial during pregnancy
- Consult your physician to ensure there are no contraindications to exercise
- Accumulate 30 minutes of moderate-intensity exercise most days of the week
- Avoid exercising above 6000 feet and scuba diving
- As pregnancy advances, switch to less weight-bearing, less-impact activities
- Use precaution when stretching as hormones of pregnancy causes laxity of muscles/tissues

Menstruation and exercise

- Exercise can relieve menstrual cramps
  - Helps relieve dysmenorrhea
    - Increases uterus blood flow and reduces cramping.
    - It might reduce pain through endorphin release
  - Highly trained athletes may develop amenorrhea
    - Cessation of regular menstrual flow
    - Causes are not clear, but it’s reversible
- Menstruation should not keep women from exercising
Smoking and exercise

- Exercise does not offset negative effects of smoking
  - Decreased oxygen carrying capacity of the blood
  - Increased airway resistance
- Exercise does provide incentive to stop smoking

Clothing for exercise

- Clothing should be
  - Light-weight
  - Light-colored
  - Loose-fitting
  - Airy
  - Absorbent
- Shoes
  - Purchase later in the day when feet have expanded
  - Use caution when transitioning to barefoot running shoes

Best time for exercise

Exercise can be performed at any time of day

Avoid exercise in extreme heat and humidity
  - Body cannot dissipate heat produced during exercise in these conditions

Vigorous exercise
  - Avoid within 2 hours of a heavy meal

Moderate exercise
  - Shortly after a meal enhances thermogenic response, the amount of energy used to digest food
Recognize the symptoms of heat illness

<table>
<thead>
<tr>
<th>Signs and symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Heat cramps – cramps, spasms and muscle twitching in legs, arms and abdomen</td>
</tr>
<tr>
<td>• Heat exhaustion – fainting, dizziness, profuse sweating, cold and clammy skin, weakness, headache and a rapid, weak pulse</td>
</tr>
<tr>
<td>• Heat stroke – immediate medical attention required</td>
</tr>
<tr>
<td>• serious disorientation, unconsciousness</td>
</tr>
<tr>
<td>• warm, dry skin, no sweating</td>
</tr>
<tr>
<td>• rapid, full pulse</td>
</tr>
<tr>
<td>• vomiting, diarrhea</td>
</tr>
<tr>
<td>• high body temperature</td>
</tr>
</tbody>
</table>

Replace the fluid lost during exercise

- Drink 6-8 ounces of cool water every 15-20 minutes during exercise
- Use sports drinks when strenuous exercise will be performed for more than an hour
  - Replaces electrolytes lost with sweat
- Drinks with glucose over 8 percent should be avoided

Exercising in cold weather

- Exercise increases body temperature 20 to 30 degrees Fahrenheit
- Risk of hypothermia increases when person is wet after exercise
- Wind influences chill factor more than air temperature
- Lungs are protected from cold air because air is warmed in airways before reaching the lungs
- Dress in layers
- Cover extremities to avoid frostbite
Most exercise-related injuries are preventable

- Four common causes of injury
  1. High-impact activities
  2. Rapid conditioning programs
  3. Improper shoes or training surfaces
  4. Anatomical predisposition
- Gradual and correct conditioning minimize the risk of injury

Acute Sports Injuries

- Prevention is the best treatment.
- If an activity causes unusual discomfort or chronic irritation:
  - Decrease the intensity.
  - Switch to another activity.
  - Substitute equipment or upgrade clothing
- If acute injury occurs, apply RICE therapy to minimize swelling and hasten recovery time:
  - Rest
  - Ice application – 3-5 times each day for 15-20 mins each time.
  - Compression – elastic bandage or wrap around the body part.
  - Elevation
  - Heat after the initial 36-48 hours if swelling has not occurred.
  - Table 9.5

Exercise within your functional limitations

- Exercise within your target zones
- Check your heart rate after exercise
  - HR should return to below 120 bpm in 5 minutes
- Recognize signs of exercise intolerance – seek medical attention if you experience:
  - Irregular heart rate
  - Difficult breathing, nausea, vomiting
  - Lightheadedness, headache, dizziness
  - Unusually flushed or pale skin
  - Extreme weakness, lack of energy, shakiness
  - Sore muscles, cramps and tightness in chest
### Issues during or after exercise

- **Side stitch** – Cramp like pain in ribcage
  - *Cause:* Result from lack of blood to the respiratory muscles, or result from improper food or drink practices
  - *Response:* Slow down, if persists, lay down and bring knees to chest

- **Muscle cramps**
  - *Cause:* Depletion of essential electrolytes or breakdown in communication between muscle groups
  - *Response:* Stretch the muscles involved, then rub muscle and do mild exercises with the muscle

### Shin Splints

- Avoid by gradually increasing training, overtraining, exercise on hard surfaces
- **Management:**
  1. Remove or reduce cause
  2. Stretch before and after activity
  3. Use ice massage 10—20 minutes before and after exercise
  4. Apply active heat for 15-minutes two to three times/day
  5. Use supportive taping

### Exercise is beneficial for older adults

- Decreases risk for disease, some types of cancer, anxiety and depression
- Increases life expectancy
- Older adults who exercise regularly have dramatically higher VO$_{2\max}$ than those who do not exercise
- Strength gains are possible and increase functional independence
- Older people should avoid isometric and very high-intensity weight training
Preparing for Sports Participation

- Have a pre-activity screening with a sport-specific health history questionnaire and/or a medical examination.
- Begin conditioning with a 6-8 week period of training the health-related fitness components: cardiorespiratory endurance, muscular strength and endurance, flexibility
- Use general FITT principles

Begin sport-specific training after base fitness conditioning

- Perform 4 weeks of sport-specific training before beginning sport
- Incorporate 2 high-intensity interval training (HIIT) sessions per week.

**HIIT Training Variables**

1. **D** = distance of each speed interval
2. **I** = interval between speed intervals
3. **R** = repetitions of speed intervals to be performed
4. **T** = time of each speed interval

- See examples on page 352

Use variables to design unlimited HIIT sessions

- Anaerobic interval training work-to-recovery ratios vary from 1:1 to 1:4.
- Aerobic interval training once a week (usually more work than recovery time) improves performance for aerobic sports.
- Consider sport-specific strength requirements.
- Make sure your equipment is in proper working condition.
- Proper conditioning allows for a more enjoyable and healthier season.
Rest is important in fitness training programs

- Overtraining
  Emotional, behavioral, and physical condition marked by increased fatigue, decreased performance, persistent muscle soreness, mood disturbances and feeling of ‘staleness’ or ‘burnout’
- Physiological improvements happen during rest periods
- Avoidance of overtraining
  - Alternate hard training days with light training
  - Increased training volume weeks should be followed by several days of rest

Periodization training uses variation to enhance performance

- Periodization
  1. Macrocycles – overall training period
  2. Mesocycles – weekly or monthly phases of base fitness, preseason or sport-specific condition etc.
  3. Microcycles – weekly or daily phased workouts planned to avoid boredom and fatigue
- Periodization can be used for cardiorespiratory endurance and strength training
## Sample Periodization Program

### TABLE 9.7 Periodization Program for Strength

<table>
<thead>
<tr>
<th>One Microcycle</th>
<th>Month 1</th>
<th>Month 2</th>
<th>Month 3</th>
<th>Month 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertrophy</td>
<td>3-5</td>
<td>3-5</td>
<td>3-5</td>
<td>1-2</td>
</tr>
<tr>
<td>Strength &amp; Hypertrophy</td>
<td>6-8</td>
<td>3-5</td>
<td>3-5</td>
<td>1-2</td>
</tr>
<tr>
<td>Power &amp; Strength &amp; Power</td>
<td>6-8</td>
<td>3-5</td>
<td>1-2</td>
<td>2-4</td>
</tr>
<tr>
<td>Peak Performance</td>
<td>6-8</td>
<td>3-5</td>
<td>1-2</td>
<td>2-4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Days per session</th>
<th>3-5</th>
<th>3-5</th>
<th>3-5</th>
<th>1-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rest days</td>
<td>3-5</td>
<td>3-5</td>
<td>3-5</td>
<td>1-2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intensity (mountain)</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Very High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximal intensity</td>
<td>High</td>
<td>Moderate</td>
<td>Low</td>
<td>Very Low</td>
</tr>
<tr>
<td>Weeks (microcycles)</td>
<td>6-8</td>
<td>6-8</td>
<td>3-5</td>
<td>1-2</td>
</tr>
</tbody>
</table>

*Each microcycle is followed by several days of rest training.*
*All training intensity.*