Muscular Fitness & Flexibility


Lesson Goal & Objectives

- **Lesson Goal:** To summarize the key research pertaining to children’s strength training.
- **Lesson Objectives:** Following the completion of this lecture the student will be able to discuss the:
  - major controversies in youth strength training.
  - importance of adequate strength & endurance.
  - factors influencing strength development.
  - related professional guidelines and recommendations for children’s strength training.
  - role of flexibility in health-related fitness.
  - guidelines for including flexibility in a fitness program.

Muscular Strength and Endurance Defined

- **Muscular strength**
  - “The ability of a muscle or group of muscles to exert maximal force against a resistance” (AAHPERD, 1999)
  - One repetition maximum (1RM)
- **Muscular endurance**
  - “The ability of a muscle or muscle group to exert force over a period of time against a resistance less than the maximum an individual can move” (AAHPERD, 1999)
  - Submaximal muscle contractions over a high number of repetitions with little rest/recovery
- Often difficult to separate the two in physical education

Factors Influencing Children’s Strength Development

(Kramer, Fry, Frykman, Conroy & Hoffman, 1996)

- **Hormonal Influence**
  - Increase in circulating androgens
  - Increase in lean body mass
- **Neurological Influence**
  - Increased motor unit activation
  - Neural myelination development
- **Fiber Type Differentiation**
  - Significant increase in muscle fiber size

Injuries Related to Children’s Participation in Strength Training

- **Historical Perspective**
  - Growth plate injuries in adolescent children following strength training (Gumps, Segal, Halligan, & Lower, 1982; Risser, Risser, & Preston, 1990; Ryan & Salsiccioli, 1976).
  - Recommendation that children avoid formal strength training
- **Contemporary Perspective**
  - More recent studies have suggested strength training is safe in properly supervised programs (Ramsay, Blimke, Smith, Garner, Macdougall, & Salt, 1990; Wellman, Janney, Rians, Strand, Berg, Tippett, Wise, Cahill, & Katch, 1986).
  - Serious injuries related to “excessive” overhead lifts & improper supervision
Benefits of Strength Training

- **Health-Related Benefits**
  - Prevention of CVD
  - Reduction and control of obesity & hypertension
  - Improved self-confidence & self-image
  - Development of good posture
  - Improved body comp
  - Improved flexibility
  - Establishment of lifetime interest in fitness

- **Skill-Related Benefits**
  - Improved ability to perform basic motor skills
  - Possible prevention of injuries
  - Greater ease & efficiency of sport skill performance
  - Early development of coordination & balance
  - Better performance on nationwide fitness tests

Professional Guidelines & Recommendations

  - Proper supervision & technique instruction are critical
  - Focus on technique development & affective domain
  - Emphasize a variety of activities & skill development
  - Avoid the use of maximal lifts with children & adolescents
  - Sample training protocol:
    - Initial focus on lifting technique
    - High reps & light weight
    - 1-3 sets x 6-15 reps
    - 6-10 different exercises
    - 2-3 nonconsecutive days per week

Flexibility Defined

- **Flexibility**
  - “The range of motion (ROM) available in a joint or group of joints” (Alter, 1996)

- **Types of stretching**
  - Static: using the ROM of a joint slowly & steadily in a held position
  - Dynamic: moving in a ROM necessary for a sport
  - Ballistic: quickly and briefly bouncing, rebounding or using rhythmic motion in a joint’s ROM (mimics sport movements)
  - PNF (proprioceptive neuromuscular facilitation): using the body’s reflexes to relax a muscle before stretching it

- **Laxity**
  - “The degree of abnormal motion of a given joint” (Alter, 1996)
  - Also referred to as “double-jointedness”

Teaching and Training Guidelines for Flexibility

- **Teaching**
  - Never make stretching competitive
  - Emphasize correct technique and personal bests

- **Training principles**
  - Intensity: How the stretch feels
  - Time: Length of stretch x number of time each stretch is done
  - Type: Specific muscles stretched

  - A static stretch beyond the point of mild discomfort to pain merely increases the likelihood of injury

Stretching Controversies (Alter, 1996)

- **Static**
  - Most appropriate for physical education
  - Proven effectiveness
  - Ease of implementation

- **Ballistic (dynamic, fast, isotonic, kinetic)**
  - Often maligned as dangerous
  - Develops dynamic flexibility
  - Generally more interesting
  - Inadequate time for tissues to adapt to the movement
  - Increased likelihood of soreness
  - Inadequate time for neurological adaptation to the movements

Factors Limiting Flexibility (Alter, 1996)

- Connective tissues in joints/muscles lacking elasticity

- Muscle tension

- Poor coordination and strength during active movements

- Limitations caused by bone & joint structures

- Pain
Professional Guidelines & Recommendations

- Warm-up with whole-body activity first
- Use slow, controlled movements
- Hold each stretch 10-15, 15-30, OR 30-60 seconds
- Encourage individualization
- Excess body fat does NOT impede flexibility
- More flexible groups:
  - Females
  - Individuals under 6 and between 12 and young adulthood

Lesson Preview

- Muscular fitness scaffolding:
  - Review pp. 97-120
  - Read WV Content Standards
  - Develop some global ideas for K-2 and 3-6 SPARK concepts