Physical Activity:
A Prescription for Health

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Disclosures

- I disclose the following relationships with commercial interests: None
- I do not intend to reference unlabeled or unapproved uses of drugs or products in my presentation.
Objectives

- Discuss the health benefits of physical activity
- Provide guidelines for activity
- Explore activities for all levels of ability
- Identify common barriers to activity
Individuals with CP have:

- Reduced cardiorespiratory endurance
  - Use 2-3 times more energy than peers without disability = tire more easily
- Muscular weakness
- Increased risk of hypertension, high cholesterol, obesity
- Loss of independence earlier than age-matched peers
Health benefits of physical activity:

- ↓ Risk of developing functional limitations
- ↓ Cardiovascular disease
- ↓ Pain
- ↓ Obesity
- ↑ Bone health
- ↑ Participation
- ↑ Self-worth
- ↑ Functional competence
- ↑ Endurance, agility, strength

Unger et al 2006
Chad et al 1999
Darrah et al. 1999
Self-Worth

- Children with CP asked to list aspects they didn’t like:
  - Arms, legs, surgical scars, excess adipose tissue

- Participated in exercise intervention then asked again:
  - Listed behaviors rather than appearance (nail biting, unhealthy beverages, smoking)

Unger et al 2006
Components of Fitness

Health-Related

- Strength
- Flexibility

- Cardiovascular Endurance

- Muscular Endurance
- Body Composition

Skill-Related

- Agility
- Speed

- Reaction Time
- Balance
- Power
- Coordination
Strengthening

- Children with CP are weak, can get stronger with exercise
  - Leads to improved function
    • Damiano et al 1998

- Strength influences gait more than spasticity
  • Ross and Engsberd 2007
Percentage of time spent in sedentary, light, and moderate to vigorous physical activities across all GMFCS levels

Verschuren et al 2016
Motor Function in Cerebral Palsy

- Gross Motor Function Classification System (GMFCS)

LEVEL I - Walks without Limitations

GMFCS Level I

Children walk at home, school, outdoors and in the community. They can climb stairs without the use of a railing. Children perform gross motor skills such as running and jumping, but speed, balance and coordination are limited.
LEVEL II - Walks with Limitations

GMFCS Level II

Children walk in most settings and climb stairs holding onto a railing. They may experience difficulty walking long distances and balancing on uneven terrain, inclines, in crowded areas or confined spaces. Children may walk with physical assistance, a hand-held mobility device or used wheeled mobility over long distances. Children have only minimal ability to perform gross motor skills such as running and jumping.
LEVEL III - Walks Using a Hand-Held Mobility Device

GMFCS Level III
Childen walk using a hand-held mobility device in most indoor settings. They may climb stairs holding onto a railing with supervision or assistance. Children use wheeled mobility when traveling long distances and may self-propel for shorter distances.
LEVEL IV - Self-Mobility with Limitations; May Use Powered Mobility

**GMFCS Level IV**

Children use methods of mobility that require physical assistance or powered mobility in most settings. They may walk for short distances at home with physical assistance or use powered mobility or a body support walker when positioned. At school, outdoors and in the community children are transported in a manual wheelchair or use powered mobility.
LEVEL V - Transported in a Manual Wheelchair

GMFCS Level V
Children are transported in a manual wheelchair in all settings. Children are limited in their ability to maintain antigravity head and trunk postures and control leg and arm movements.
- Children with CP often get physical activity through formal PT sessions or organized sports events for children with disabilities
- Activity can eventually replace the formal therapies when transitioning to adulthood
- Need to have a healthy lifestyle – limit sedentary activity, increase general activity

Verschuren et al 2016
Exercise recommendations

- Cardiorespiratory exercise
  - Start 1-2 sessions per week
  - >60% of peak heart rate
  - 20 minutes per session for 8-16 weeks
  - Use major muscle groups in continuous and rhythmic nature
- Example: swimming, cycling, walk/run, propelling wheelchair, arm cycling, stairs

Verschuren et al 2016
Exercise recommendations

– Resistance Exercise
  • 2-4 time per week
  • 1-3 sets of 6-15 repetitions
  • 50%-85% repetition maximum
  • 12-16 weeks
– Start with single joint movement
  • Knee extension, machines
– Later include multi-joint activity
  • Step-ups, sit-to-stand, squatting
General Activity Guidelines

- Daily activity
  - 5+ days per week
  - 60 minutes
  - Moderate-Vigorous activity
  - Vary the activities
General Activity Guidelines

- Sedentary time
  - Less than 2 hours per day (outside of school)
  - May be difficult to achieve in GMFCS IV and V
    - Alternative: break up sitting for 2 minutes every 30-60 minutes

Verschuren et al 2016
Activities
- Cycling/ Arm Cycling
- Walking, Jogging
- Wheelchair propulsion
- Stair climbing
Activities

- Dance
- Yoga or Tai Chi
Activities

Swimming
– Warm water has relaxing effect, can help decrease muscle tone

– Potential exercises
  • Length swimming
  • Shallow water tuck jumps
  • Running/walking
  • Stride jumps, jumping jacks
  • Wall and sit kicking
Activities

- Active standing/ use of stander with arm activity
- Chair aerobics
Prescription for Health

- Baseline activities help build a lifestyle in which physical activity is the social norm and where excessive sedentary lifestyles are discouraged
Prescription for Health

- Improved muscle strength reverses quickly with cessation of exercise
- Harder to build than to maintain strength
- Even small activity increase can lead to profound health gains

ACSM 2009
Verschuren et al 2016
Prescription for Health

Increased baseline activity

→ Increased energy expenditure

→ Healthy body weight

Verschuren et al 2016
• Physical activity should start in childhood
• Level of physical activity in adolescence stays stable into adulthood
Barriers to activity

- Time
- Transportation
- Equipment
- Cost
- Support/Aides
- Available opportunities
- Pain
- Level of ability, vision
- Acute injuries, health
- Fear of Injury
- Weather
- Motivation
Pain during activity

- **Muscle fatigue**
  - Start slow, build up activity

- **Poor-fitting equipment**
  - Borrowed, old, new
  - Height, growth

- **Excessive stretch**
  - Watch contractures or dislocated hips
Pain during activity

- **Blisters, pressure**
  - Check and adjust equipment
  - Padding
  - Position

- **Overuse injury**
  - Adapt the activity, adjust equipment

- **Acute injuries/Fractures**
  - Medical evaluation
  - Change activity while recovering
Activity should be:

- Enjoyable
- Developmentally appropriate
- Include a variety of activities
Staying motivated

- Short-term goals
- Long-term achievements
- Track progress on a chart
- Pick enjoyable activities
- Include family and friends
- Partner with others/join a group

- If you fall off the wagon, just start again
  - short lapses happen
Is physical activity right for me?

- YES!
References