

Children and Adolescents Exercise

Prescription

- Children and adolescents should be encouraged to participate in various physical activities that are enjoyable and age appropriate.
- PA in young children should include unstructured active play, which typically consists of sporadic bursts of moderate- and vigorous-intensity PA alternating with brief periods of rest.
 - These small bouts of PA, however brief, count toward FITT recommendations.

■ **FITT RECOMMENDATIONS FOR CHILDREN AND ADOLESCENTS** (119)

FITT

	Aerobic	Resistance	Bone Strengthening
Frequency	Daily	$\geq 3 \text{ d} \cdot \text{wk}^{-1}$	$\geq 3 \text{ d} \cdot \text{wk}^{-1}$
Intensity	Most should be moderate (noticeable increase in HR and breathing) to vigorous intensity (substantial increases in HR and breathing). Include vigorous intensity at least $3 \text{ d} \cdot \text{wk}^{-1}$.	Use of body weight as resistance or 8–15 submaximal repetitions of an exercise to the point of moderate fatigue with good mechanical form	N/A
Time	As part of $\geq 60 \text{ min} \cdot \text{d}^{-1}$ of exercise	As part of $\geq 60 \text{ min} \cdot \text{d}^{-1}$ of exercise	As part of $\geq 60 \text{ min} \cdot \text{d}^{-1}$ of exercise
Type	Enjoyable and developmentally appropriate activities, including running, brisk walking, swimming, dancing, bicycling, and sports such as soccer, basketball, or tennis	Muscle strengthening physical activities can be unstructured (e.g., playing on playground equipment, climbing trees, tug-of-war) or structured (e.g., lifting weights, working with resistance bands).	Bone strengthening activities include running, jump rope, basketball, tennis, resistance training, and hopscotch.

HR, heart rate

Children and Adolescents Special Considerations

- Children and adolescents may safely participate in strength training activities provided they receive proper instruction and supervision. Generally, adult guidelines for resistance training may be applied.
- Because of immature thermoregulatory systems, youth should avoid exercise in hot humid environments, be properly hydrated, and appropriately modify activities.
- Efforts should be made to decrease sedentary activities (*i.e.*, television watching, surfing the Internet, and playing video games) and increase activities that promote lifelong activity and fitness (*i.e.*, walking and cycling).

Low Back Pain

- Low back pain (LBP) is defined as pain, muscle tension, or stiffness localized below the rib margin and above the inferior gluteal folds, with or without leg pain.
- Anywhere between 4% and 33% of the adult population experience LBP at any given point in time, and recurrent episodes of LBP can occur in over 70% of cases.
 - Approximately 20% of cases become chronic and about 10% of the cases progress to a disability

Low Back Pain (cont.)

- Individuals with LBP can be classified into one of three broad categories:
 - LBP associated with another specific spinal cause (*e.g.*, cancer or fracture)
 - LBP associated with radiculopathy or spinal stenosis
 - Nonspecific LBP, which encompass over 85% of cases

Low Back Pain (cont.)

- For prognosis and outcome purposes, LBP can be described as:
 - Acute (< 6 wk)
 - Subacute (6-12 wk)
 - Chronic (> 12 wk)

Low Back Pain (cont.)

- Approximately 90% of acute low back episodes resolve within 6 weeks, regardless of treatment.
- To reduce the probability of disability, individuals with LBP should stay active, continue ordinary activity within pain limits, avoid bed rest, and return to work as soon as possible.
- Many individuals with LBP have fear, anxiety, or misinformation regarding their LBP, exacerbating a persistent pain state. A combination of therapeutic and aerobic exercise, and pain education, improves individual attitudes, outcomes, perceptions, and pain thresholds.

Box 7.1

Psychosocial Factors for Long-Term Disability and Work Loss Associated with Low Back Pain (103)

- A negative attitude that back pain is harmful or potentially severely disabling
- Fear avoidance behavior and reduced activity levels
- An expectation that passive, rather than active, treatment will be beneficial
- A tendency to depression, low morale, and social withdrawal
- Social or financial problems

Low Back Pain (cont.)

- Current literature does not support a definitive cause for initial bouts of LBP, however, previous LBP is one of the strongest predictors for future back pain episodes.
- Current guidelines place a heavy emphasis on preventive measures and early interventions to minimize the risk of an acute LBP episode from becoming chronic and/or disabling.
- Current best evidence guidelines for treating LBP indicate PA as a key component in managing the condition

Low Back Pain (cont.)

- When LBP is a symptom of another serious pathology (e.g., cancer), exercise testing and Ex R_x should be guided by considerations related to the primary condition.
- For all other causes, and in the absence of a comorbid condition (e.g., CVD with its associated risk factors), recommendations for exercise testing and Ex R_x are similar as for healthy individuals.

Low Back Pain - Exercise Testing

- Cardiorespiratory fitness
 - Few studies have subjected individuals with LBP to exercise tests to exhaustion.
 - Submaximal exercise tests are considered reliable and valid for individuals with LBP.
 - Actual or anticipated pain may limit submaximal testing as often as maximal testing. Therefore, the choice of maximal versus submaximal testing in individuals with LBP should be guided by the same considerations as for the general population.

Low Back Pain Exercise Testing (cont.)

- Muscular strength and endurance
 - Individuals with LBP frequently have deficits in trunk muscle strength and endurance and neuromuscular imbalance.
 - The role these play in the development and progression of LBP remains unclear
 - Decreases in muscular strength and endurance may be independent of the period and intensity of LBP

Low Back Pain Exercise Testing (cont.)

- Muscular Strength and Endurance
 - General testing of muscular strength and endurance in individuals with LBP should be guided by the same considerations as for the general population.
 - Tests of the strength and endurance of the trunk musculature (e.g., isokinetic dynamometers with back attachments, selectorized machines, and back hyperextension benches) are commonly assessed in individuals with LBP.
 - Performance of muscular strength and endurance assessments is often limited by actual or anticipated fear of reinjury in individuals with LBP.

Low Back Pain Exercise Testing (cont.)

- Flexibility
 - There is no clear relationship between gross spinal flexibility and LBP or associated disability. A range of studies have shown associations between measures of spine flexibility, hip flexibility, and LBP but further study needed.
 - Flexibility testing in individuals with LBP should be guided by the same considerations as for the general population.
 - It is essential to identify whether the assessment is limited by stretch tolerance of the target structures or exacerbation of LBP symptoms.

Low Back Pain - Exercise Prescription

- Clinical practice guidelines for the management of LBP consistently recommend staying physically active and avoiding bed rest.
- Individuals with subacute and chronic LBP as well as recurrent LBP are encouraged to be physically active.
- When recommendations are provided, they should follow very closely the recommendations for the general population combining resistance, aerobic, and flexibility exercise.

Low Back Pain - Exercise Prescription (cont.)

- In chronic LBP, exercise programs that incorporate individual tailoring, supervision, stretching, and strengthening are associated with the best outcomes.
- For the most favorable outcomes, use an individualized approach that addresses psychological distress, fear avoidance beliefs, self-efficacy in controlling pain, and coping strategies.

Low Back Pain Special Considerations

- Trunk coordination, strengthening, and endurance exercises can be used to reduce LBP and disability in individuals with subacute and chronic LBP with movement coordination impairments.
 - However, there is insufficient evidence for any benefit of emphasizing single-dimension therapies such as abdominal strengthening.
- There is a lack of agreement on the definition, components, and assessment techniques related to core stability.
 - The majority of tests used to assess core stability have not demonstrated validity

Low Back Pain - Special Considerations (cont.)

- Abdominal bracing should be used with extreme caution, as the increases in spinal compression that occur with abdominal bracing may cause further harm to the individual.
- Certain exercises or positions may aggravate symptoms of LBP. Walking, especially downhill, may aggravate symptoms in individuals with spinal stenosis.
- Limit any activity that causes a peripheralization of symptoms (spread of pain into lower limbs)

Low Back Pain - Special Considerations

(cont.)

- Repeated movements and exercises such as prone pushups that promote centralization (*i.e.*, a reduction of pain in the lower limb from distal to proximal), are encouraged to reduce symptoms in patients with acute LBP with related lower extremity pain
- Flexibility exercises are generally encouraged as part of an overall exercise program.
 - Hip and lower limb flexibility should be promoted, although no stretching intervention studies have shown efficacy in treating or preventing LBP.

Low Back Pain - Special Considerations (cont.)

- Consider progressive, low-intensity aerobic exercise for individuals with chronic LBP with generalized pain (pain in more than one body area); and moderate- to high-intensity aerobic exercise for individuals with chronic LBP without generalized pain.

Older Adults

- The term *older adult* (defined as individuals ≥ 65 yr and individuals 50–64 yr with clinically significant conditions or physical limitations that affect movement, physical fitness, or physical activity) represents a diverse spectrum of ages and physiologic capabilities.
- Health and functional status are often better indicators of ability to engage in PA than chronological age.

Older Adults (cont.)

- Overwhelming evidence exists that supports the benefits of physical activity in
 - slowing physiologic changes of aging that impair exercise capacity,
 - optimizing age-related changes in body composition,
 - promoting psychological and cognitive well-being,
 - managing chronic diseases,
 - reducing the risks of physical disability, and
 - increasing longevity.

Older Adults (cont.)

- Older adults are the least physically active of all age groups.
- Only 11% of individuals aged ≥ 65 yr engage in regular aerobic and muscle strengthening activities.
- Less than 5% of individuals aged >85 yr engaging in regular aerobic and muscle strengthening activities.