The purpose of this article is to describe modifications to physical activity assessments for individuals with disabilities. The National Center on Physical Activity and Disability’s slogan is “Exercise is for every body.” It is important to be aware that physical activity is extremely important for individuals with disabilities as they tend to lead less active lifestyles (National Center on Physical Activity and Disability, 2004). The health benefits from physical activity include improved psychological well-being; improved stamina and muscle strength; decreased risk of premature mortality and diseases such as heart disease, types of cancers, diabetes, hypertension, obesity; and overall well-being by increasing the ability to perform activities of daily life (President’s Council, 2001, 2003; National Center for Chronic Disease Prevention and Health Promotion, 2005). According to the Surgeon General’s report, anyone over the age of two years should participate in at least 30 minutes or more of moderate activity most days of the week to maintain a healthy life (USDHHS, 2002). Opportunities to improve health can be provided in quality and accessible physical education classes while also exposing students with and without disabilities to lifelong activities (Auxter, Pyfer, & Huettig, 2005; National Center for Chronic Disease Prevention and Health Promotion, 2005; Sherrill, 2004; Staveren & Dale, 2004). Physical educators can demonstrate that students are becoming more active due to their physical education programs by documenting students’ physical activity levels and changes they have made to those levels (Short, 2005).

According to the American College of Sports Medicine (2000), a systematic routine should be established for each individual when designing a fitness program. To safely apply the principles of training to any fitness program, the FITT guidelines should be followed. According to the National Association for Sport and Physical Education (2005), guidelines for the FITT principle are the following:

- **Frequency**: How often a person participates in physical activity (up to all or most days of the week).
- **Intensity**: How hard a person exercises during a physical activity, which may vary from light, moderate, or vigorous. This is monitored by the increase of a person’s heart rate.
- **Time**: How many minutes a person participates in physical activity.
- **Type**: What is the physical activity (e.g., walking, running, cycling, swimming, resistance training, or any other activity in which energy is expended).

Measuring and changing the frequency, intensity, time, and type of an activity can increase individuals’ physical activity and fitness. Due to medical concerns and various abilities, modifications to the FITT principle may be needed to meet the unique needs of students with disabilities. Examples of how the FITT principle can be modified for students with disabilities are as follows:

- Frequency of physical activity may need to gradually progress from 1 day a week to 3 or more days a week.
- Intensity of physical activities should begin by increasing resting heart rate by 10 beats per minute and progressing to 20 – 30 beats per minute above their resting heart rate.
- Time will depend on current levels of physical activity. Individuals that are more sedentary will require short bouts (5 to 10 minutes) of low intensity physical activities. Short breaks interspersed between intervals may be required, with a continued increase in time until the desired time is achieved.
- Type of activity is dependent on the student’s ability (see Table 1).
Scenario: Jimmy is a 13-year-old boy in an inclusive physical education class that meets three days per week for 45 minutes. Due to a spinal cord injury, Jimmy does not have mobility from his waist down, however he has upper limb mobility. His physical education class is starting an aerobic fitness unit. How would the F.I.T.T. principle be applied for Jimmy?

- **Frequency of physical activity**—Jimmy will participate in physical education all 3 days a week.
- **Intensity of physical activity**—Jimmy’s THRZ will be 103–176 beats/minute (arms only, see Table 3).
- **Time of physical activity**—Jimmy will participate in 20 minutes of low intensity physical activities. Jimmy is allowed to take short breaks between activities.
- **Type of activity**—Jimmy will participate in the aerobic fitness unit. While his peers are performing leg activities, Jimmy will maneuver through a wheelchair slalom.

### Physical Activity Assessment Techniques

Assessments provide a basis for instruction such as determining curriculum goals and objectives while also aiding in providing information regarding the unique needs of students with disabilities [Lieberman & Houston-Wilson, 2002; Short, 2005]. Assessment is a critical part of an ongoing education program for all students and is particularly essential for students with disabilities [Auxter et al., 2005; Lieberman & Houston-Wilson, 2002]. Techniques used to assess physical activity are heart rate monitors, pedometers, and self-reporting assessments (see Table 2).

### Heart Rate Monitors

Heart rate monitors provide a highly accurate determination of exercise intensity while tracking and recording data over extended periods of time [Welk & Wood,
Advantages of heart rate monitors include providing students the opportunity to make the correlation between various physical activities and the effects on the cardiovascular system. Heart rate monitors provide immediate feedback on changes to students’ heart rate and the length of time they are in their target heart rate zone (Tipton & Sander, 2004). A typical target heart rate zone for children 10-12 years of age is 55-70% of a maximal predicted heart rate, which calculates to approximately 115-145 beats per minute (Winnick & Short, 1999a). However, it must be kept in mind that other factors can influence an increased heart rate such as stress, nervousness, or dehydration (Sirard & Pate, 2001).

Modifications for using heart rate monitors for students with disabilities. Considerations need to be taken when measuring students with disabilities physical activity through the use of heart rate monitors because the intensity of physical activity may vary based on their disability and may not be the same as their non-disabled peers. For example, a student with a spinal cord injury or a student in a wheelchair should have a target heart rate approximately 20 to 30 beats per minutes higher than their resting heart rate (Winnick & Short, 1999b). It is important to be aware of the differences in the expected target heart rate zone for individuals with specific disabilities (see Table 3).

Pedometers

Pedometers are small electronic devices worn at the waist that provide continuous feedback by measuring physical activity through tracking the number of steps an individual takes (Beighle, Pangrazi, & Vincent 2001; Sirard & Pate, 2001; Tudor-Locke & Bassett, 2004). Pedometers allow students to immediately observe an increase or decrease in their physical activity by having a visual display of the number of steps taken, calories burned, and distance walked or jogged. Even though the validity of pedometers is in question, they do provide students with feedback of their physical activity throughout a day or during a physical education class and are reasonably priced (Cuddihy, Pangrazi, & Tomson, 2005). Students can maintain a record of the number of steps they have taken in the ACTIVITYGRAM and The Presidents Challenge programs. Also, The Presidents Challenge program (President’s Council, 2002) rewards students for specific increases in physical activity [the number of steps per day for children 6–17 years or age ranges from 11,000 for girls and 13,000 for boys].

Modifications to using pedometers for students with disabilities. Pedometers can be used by any student that has the ability to walk with or without assistance (e.g., walkers, canes, orthodics). Talking pedometers have been developed for individuals with visual impairments. Due to the varying abilities of individuals with disabilities, it is important to assess students’ current level of physical activity to determine instructional goals (Short, 2005; Auxter et al., 2005). First, assess how many steps the student takes in a day. This will aid in determining developmentally appropriate modifications needed for each individual student. An example of modifications for students with disabilities would be to consider Jimmy’s friend, Teddy, who is also included in physical education. Teddy has cerebral palsy. When assessed for one week, Teddy’s average steps per day were 150. Therefore, Teddy’s daily goals are to increase his steps by 15 per day. Examples of programs that monitor students’ physical activity levels using pedometers are The Presidents Challenge and

<table>
<thead>
<tr>
<th>Type of Activity Measure</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
</table>
| Heart Rate Monitor       | • Accurate indicator of physical activity  
                           • Good educational potential to teach about the cardiovascular system | • High cost  
                           • Time-intensive to download  
                           • Difficult to assess large numbers of children  
                           • Relevant only to aerobic activity  
                           • Other factors affect heart rate (e.g., illness, anxiety, possible interference resulting in artifacts recorded, etc.)  
                           • Monitor may not fit properly due to body size. |
| Pedometer                | • Easy to use  
                           • Records distance | • Records “quantity” of movement but not intensity of movement. |
| Self-Report              | • Low-cost  
                           • Easy to administer to large groups  
                           • Good educational potential for use in curriculum | • Potential problems with validity and reliability  
                           • The respondent must have the cognitive ability to self-report activity for a segmented day or across days. |

Note. Adapted from Welk and Wood (2000)
Walk Across America. A modification for students with disabilities participating in The Presidents Challenge program would be to change the number of steps taken to receive an award. The Presidents Challenge program allows teachers to decide the activity levels their students with disabilities need to reach to receive an award. In the Walk Across America program, assess students’ average daily steps before determining the number of steps needed to move from state to state. Students who use a wheelchair, but at times walk with assistance, can receive double the amount of steps on their pedometer when walking. There are also pedometers specifically designed for use on bikes that can be placed on wheelchairs.

**Self-Reporting**

A self-report assessment is an easier assessment to administer because it can be administered to large groups of students while providing detailed or general

---

<table>
<thead>
<tr>
<th>Disability</th>
<th>Target Heart Rate Zone (THRZ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Down Syndrome</td>
<td>Possible damage to heart valves causes a decrease in cardiac output, and therefore may not reach THRZ.</td>
</tr>
<tr>
<td>Marfan Syndrome</td>
<td>Workload should be 50% of capacity due to damage to heart valves. If taking a beta blocker, pulse should be under 100 beats per minute. Not taking a beta-blocker, keep pulse less than 110. Low intensity, noncontact activities</td>
</tr>
<tr>
<td>Paraplegic</td>
<td>220 – age = Heart Rate max Multiply the HR max by 55 – 90% (adolescents ages 13-17). Multiply the HR max by 55– 70% (children 10-12). Subtract 10 beats per minute from the THRZ.</td>
</tr>
<tr>
<td>Paraplegic Use of arms-only exercise</td>
<td></td>
</tr>
<tr>
<td>Individuals with prosthetics or progressive neuromuscular disorders such as multiple sclerosis</td>
<td>Fatigue easily, therefore may not reach their THRZ.</td>
</tr>
<tr>
<td>Quadriplegic</td>
<td>Impairment in sympathetic nervous system; unlikely to sustain maximum heart rate higher than 120-130.</td>
</tr>
<tr>
<td>Quadriplegic spinal cord injury C6 - C8</td>
<td>Resting Heart Rate less 65 beats/minute, therefore THRZ = 85 to 100 beats/minute Resting Heart Rate 65 beats / minute or more, therefore THRZ = 20 to 30 beats above resting heart rate</td>
</tr>
</tbody>
</table>

---

**Frequently Asked Questions (FAQs)**

I’m doing a jump rope lesson. What modifications can be made for students . . .

**. . . who use a wheelchair?**
- Lay the jump rope on the ground and ask the student to wheel back and forth over the jump rope.
- Have them bring the jump rope over their head and then back, using arms-only motion.
- Have them turn the jump rope over their head, wheel over the jump rope and repeat.

**. . . who have mobility limitations?**
- Lay the jump rope on the ground and ask the student to jump or step over it.
- Use a hula hoop as the jump rope.
- Jump or step in and out of the hula hoop.
- My physical education class is using heart rate monitors. What modifications can be made for students . . .
- . . . who use a wheelchair?
- Check Table 3 for target heart rate zones.
- During warm up, my class does jumping jacks. What modifications can be made for students . . .
- . . . who have mobility limitations?
- . . . who use a wheelchair?
- . . . who have limited range of motion?
- Break down jumping jack doing only arm or leg motions.
- Perform the arm motions of jumping jacks.
- . . . who have limited range of motion?
- Decrease the total number of steps to walk to reach a specific goal.
- . . . who have a visual impairment?
- Use talking pedometers.
- Have a peer tutor tell them the number of steps taken on the pedometer.

My physical education class is using pedometers. What modifications can be made for students . . .

**. . . who use a wheelchair (but at times use a walker or other aid)?**
- Use bike pedometers.
- Award them double the amount of steps walked.

. . . with limited range of motion?
- Remember, for someone who is inactive, any amount of physical activity is beneficial in progressions. Keep the focus on the student’s abilities.
physical activity information (Welk & Wood, 2000; Welk, Corbin, & Dale, 2000). However, a limitation to be considered when using this assessment is student bias (Welk & Wood, 2000; Sirard & Pate, 2001). An example of a self-reporting instrument is through The Presidents Challenge, which, in addition to its traditional emphasis on physical fitness testing in schools, is now accompanied by materials that promote physical activity in everyday life (President’s Council, 2005). The Active Lifestyle portion of the program is designed for children under 18 years of age, who should be physically active for 60 minutes a day. It focuses on setting realistic activity goals to promote and encourage lifetime fitness. Participants maintain a daily activity log online that tracks time and progress of activities and provides rewards when goals are achieved.

Modifications to self-reporting for students with disabilities. To meet the unique needs of students, modifications can be made to self-reporting. A developmentally appropriate modification is creating a self-reporting worksheet that uses pictures for students to circle activities they enjoy or by asking students to draw pictures of their favorite physical activities. For example, Jenny is an 8-year-old student with intellectual disabilities. On Monday morning in her inclusive physical education class, Jenny’s teacher gives the class a self-reporting worksheet that includes the names and pictures of recreational activities. All students are given time in class to circle the pictures and/or names of the activities they participated in during the previous weekend. Another modification is to have peer tutors help input daily activities into the ACTIVITYGRAM (i.e., a detailed recording of daily activity patterns).

Physical activity is important in maintaining and improving overall health for all (National Center for Chronic Disease Prevention and Health Promotion, 1999). Students with disabilities tend to have lower fitness levels due to the lack of participation in physical activities; therefore, progressions and modifications to physical activities are needed (National Center on Physical Activity and Disability, 2004). Also, due to the tendency of children with disabilities to lead less active lifestyles for a variety of reasons, being physically active makes an important contribution to increasing their quality of life (Ryan, 2000).

Assessing the physical activity levels of students with disabilities provides information regarding their unique needs that aids in determining developmentally appropriate yearly goals and objectives (Lieberman & Houston-Wilson, 2002; Short, 2005). Physical education provides an opportunity for students to experience a variety of physical activities. Therefore, it is important for physical educators to provide developmentally appropriate activities and assessments that meet the unique needs of all students to promote and assess life-long physical activity.

References


