Physical Education for Students with Fetal Alcohol Syndrome

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Students with mental retardation comprise approximately 3% of the school age population in the United States, with almost 600,000 children in the age range of 6 to 21 years receiving services (Sherrill, 1993; US. Department of Education, 1991). Within the broad category of mental retardation, Fetal Alcohol Syndrome (FAS) has emerged as the leading known cause of mental retardation affecting one out of every 500-600 births (Batshaw & Perrot, 1993; Burgess, 1994; Williams, Howard, & McLaughlin, 1994). As such, more and more students with FAS are seen in public schools across America.

While mental retardation is perhaps the most noteworthy effect of FAS, the syndrome is characterized by a cluster of effects that include health, gross and perceptual motor, learning, and behavioral problems. For example, as many as 50% of students with FAS will have congenital heart problems; an even greater percentage will have visual and hearing problems. Obviously, students with FAS present more concerns beyond just mental retardation. Therefore, both regular and adapted physical educators who work with students with FAS must make themselves aware of the cluster of effects that characterizes the disorder.

While there is an emerging body of literature on FAS, to date no comprehensive review of FAS with specific implications for physical education teachers has been conducted. Thus, the purpose of this paper is to (a) introduce readers to FAS, (b) describe common motor, physical, learning, and behavioral characteristics of children with FAS, and (c) outline specific suggestions for planning and implementing individualized physical education programs for children with FAS.

Etiology

Background

FAS is caused by mothers consuming alcohol during pregnancy. The American Association of Mental Retardation (AAMR) classifies FAS as an environmentally-influenced cause of mental retardation within the category of "prenatal onset" (AAMR, 1992). Studies documenting the harmful effects of prenatal alcohol consumption have been reported since the 1800s (Abel, 1987). However, it was not until 1973 that Jones, Smith, Ulleland, and Streissguth termed the pattern of effects seen in newborns of alcoholic mothers as Fetal Alcohol Syndrome (Streissguth, Bookstein, Sampson, & Barr, 1993; Streissguth & LaDue, 1987).

FAS encompasses a cluster of abnormalities, with the following comprising the most prevalent effects: (a) growth deficiency before and after birth resulting in short stature ($\geq$ 2 SD for length and weight); (b) abnormalities within the central nervous system (CNS) including mental retardation and attention deficits; (c) increased risk of common birth defects such as congenital heart defects and failure to thrive; and (d) distinct facial abnormalities, including microcephaly, almond shaped or slanted eyes, droopy eyelids, low nasal bridge, and small

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flattened face (Aase, 1994; Abel, 1987; Cicero, 1994; Coles, 1994; Hall, Peltier, & Noonan, 1994; Streissguth & LaDue, 1987).

The amount of alcohol ingested, the period of time during pregnancy that the mother consumed alcohol, the nutritional status of the mother, the possible interaction with other drugs, and the individual differences in sensitivity to alcohol influence the effects alcohol will have on the fetus (Abel, 1987; Coles, 1994; Williams, Howard, & McLaughlin, 1994). Generally speaking, FAS is most likely to appear in woman who ingested at least 30-60ml of pure alcohol a day (approximately 24 drinks a week) during their pregnancy (Streissguth & LaDue, 1987). However, not all pregnant women who are heavy drinkers will have children with FAS. In fact, the incidence of FAS is only 35% among women who report heavy drinking during their pregnancy (Abel, 1987).

On the other hand, effects of FAS can be seen in newborns even when mothers ingest a much lower amount of alcohol, and some reports demonstrate a link between even small doses of alcohol consumed during pregnancy and deficiencies in mental development (Williams, Howard, & McLaughlin, 1994). Since the CNS develops throughout the pregnancy, there is no amount of alcohol that can be safely consumed at any time during the pregnancy.

Fetal Alcohol Syndrome and Fetal Alcohol Effects

No definite classification system exits for FAS. However, a separation has been made between FAS and Fetal Alcohol Effects (FAE). FAE (which also has been called "possible fetal alcohol syndrome", "partial fetal alcohol syndrome", or "alcohol-related birth defects") affects one out of every 350 births (Abel, 1987; Burgess & Steissguth, 1992). It is defined as the presence of some of the features of FAS but in a milder form. These effects are normally limited to intellectual and behavioral problems without the facial and physical abnormalities (Batshaw & Perret, 1993).

Determining the exact number of children born with FAS or FAE is difficult since recognition is based on the neonatalogist's ability to see the cluster of effects at birth. No single physical marker at birth or objective test exists to determine if an infant has FAS or FAE. To complicate matters, FAS features tend to be subtle at birth making confirmed diagnosis in the delivery room extremely difficult. A diagnosis of FAS or FAE at birth can be aided by the knowledge of the mother's record of consuming alcohol during pregnancy. Unfortunately, many mothers are hesitant to share such information with their physicians. The most accurate diagnosis of FAS is made during childhood when facial features and developmental characteristics are prominent (Aase, 1994; Abel, 1987; Cordero, Floyd, Martin, Davis, & Hymbaugh, 1994).

Characteristics of Children with FAS

Sensory and Motor Characteristics

Children with FAS can suffer from a range of sensory and motor problems. Children may exhibit all, none, or a combination of these problems. The most common sensory condition is increased nearsightedness throughout adolescence and difficulties with visual perception which are associated with problems in development of the optic nerve. Hearing loss and problems with auditory perception also may be present, and, as was the case with visual problems, tends to increase through adolescence (Becker, Randall, Salo, Saulnier & Weathersby, 1994; Cicero, 1994). Related to these sensory problems is a tendency for children with FAS to be hypersensitive to some types of sensory stimulation (Weiner & Morse, 1994). Some children with FAS resort to unique coping behaviors to deal with these sensory difficulties. For example, a child with FAS who is hypersensitive to noise may

become aggitated, extremely hyperactive, or even self-abusive during a warm-up activity in which music is being played in the background. Such behaviors may be perceived as socially inappropriate by the teacher and peers, yet the child is merely trying to cope with the noise. The teacher can help the child deal with the noise in a more socially acceptable way by turning down the volume, encouraging the child to put his/her hands over his/her ears when the noise becomes intolerable, or allowing the child to wear earplugs during warm-ups.

The most common motor disorders associated with FAS involve balance and coordination including walking gait (Becker et al., 1994). In general, many children with FAS appear to be more "clumsy" than typically developing children. No doubt this clumsiness is due to a combination of specific motor delays interacting with sensory disorders as previously described. The result is a lack of precision or smoothness in performance in locomotor, nonlocomotor, and manipulative skills. There also have been reports of muscle tremors and difficulties with grip strength (Becker et al., 1994). These sensory and motor disorders, coupled with mental retardation, attention deficit, and behavior abnormalities, can present a real challenge to physical educators.

Physical Characteristics and Medical Problems

Many physical characteristics and medical problems are associated with FAS and FAE. As noted earlier, facial features resulting from FAS comprise one of the key characteristics for identifying the condition. Some of the more typical facial features include: indistinct-to-absent philtrum (vertical groove just above upper lip), epicanthic folds (vertical fold of skin on either side of nose), thin upper lip, short nasal bridge, underdeveloped jaw, high arched palate, low set, unparalled ears, and ptosis (droopy eyelids) (Abel, 1987; Cicero, 1994; Hall, Peltier, & Noonan, 1994 Steissguth, 1994).

Another common characteristic is intrauterine growth retardation and subsequent post natal growth retardation (Abel, 1987). Intrauterine growth retardation including microcephaly (small head and brain) can be detected in utero with a sonogram. At birth, the newborn with FAS usually is "small for date" (small in size given the number of weeks the baby was in utero). In addition, children with FAS do not experience a "catch up" period in growth during infancy and childhood (Abel, 1987; Streissguth, 1994; Streissguth & LaDue, 1987). Thus, most children with FAS will be significantly smaller than their same-age peers. Research suggests that intrauterine growth retardation is caused by drinking during the last trimester of pregnancy while facial features are affected by drinking in the first trimester (Abel, 1987).

Medical conditions associated with FAS include cardiac defects, kidney and urogenital tract disorders, and liver anomolies as well as problems with sensory organs (Abel, 1987). Heart defects affect approximately half of all children with FAS, with ventricular septal defect being the most common. Cardiac defects tend not to be life-threatening and often repair themselves, but a physical educator should check with the child's pediatrician before developing a program.

Learning Characteristics

As noted earlier, FAS is one of the leading causes of mental retardation (Williams, Howard, & McLaughlin, 1994). Children with FAS have average IQ scores of 68, but IQ can range from 45 to 100. Thus, most children with FAS would be classified as having mild mental retardation or "a person with mental retardation who needs limited support in functional academics and social skills" (AAMR, 1993). The diagnosis of

mental retardation usually is not made until a child is approximately eight-years-old.

Even when mental retardation is not diagnosed, most children with FAS still have learning disabilities that require support in academics. For example, Weiner and Morse (1994) reported that on average adolescents with FAS read at approximately a fourth grade level, spell at approximately a third grade level, and compute math at approximately a second grade level. In addition, many children with FAS have attention deficits that affect their ability to focus on academic material. Thus, it may be difficult for children with FAS to understand complex directions and to focus for a long period of time in physical education classes.

Behavioral Characteristics

Individuals with FAS often exhibit abnormal social behaviors. These abnormal behaviors are a result of delayed or improper neurological and psychological development of the child (Jacobson & Jacobson, 1994). As the individual with FAS increases in age, the abnormal behaviors increase in severity. In addition, as age increases, behavior problems tend to compound, causing additional difficulties in all areas of life. According to Weiner and Morse (1994), the majority of individuals with FAS have relatively mild to moderate behavioral disorders, and individuals with IQ's below 50 usually suffer from severe behavior problems.

The most common behavioral problem associated with FAS is attention deficit hyperactive disorder (ADHD) (Gold & Sherry, 1984; Weiner & Morse, 1994). Children with FAS seem to have a tremendous amount of energy and are extremely active. Related to this is an inability to focus their attention for any length of time. For example, a student with FAS may come "bounding" in to physical education and then have trouble sitting and paying attention while the teacher takes roll and introduces the class activity. Similarly, a student with FAS may participate in the first few repetitions of a warm-up activity before he/she loses focus and begins to talk with peers or wander off.

Another common characteristic is lack of social skills. Initially, students with FAS may seem somewhat "obnoxious" to peers because they always want to talk with and touch their peers. These students do not know how to interact appropriately, and they have difficulty remembering and applying common social rules with their peers. In addition, it has been noted that students with FAS are more prone to drug usage and misconduct such as stealing and lying (Aase, 1994). As the student reaches late adolescence and early adulthood, lack of social skills affects the student's ability to find and keep a job, make long-term social contact, and live independently (Streissguth & LaDue, 1987).

Early intervention seems to be critical in curbing some of the more severe behavior charactertistics associated with FAS. For example, Weiner and Morse (1994) noted that students with FAS who did not receive early intervention did not show an increase in appropriate behaviors over time. On the other hand, those who did receive early intervention, both at home and in school, demonstrated an increase in their ability to cope with and overcome many of the behavioral difficulties associated with FAS (Weiner & Morse, 1994).

Implications for Physical Education Teachers

Given the previous discussion of characteristics of students with FAS, the following provides specific suggestions for instructional, behavioral, and environment/equipment modifications that can promote success for these students in physical education:

Lesson Content

As with all children with disabilities, the development of specific goals and objec-

tives should be individually determined and based on factors such as a student's motor and physical skills, behavior and social skills, student and parent interests, activities that take place in regular physical education, and recreation activities that are available in the community (Block, 1994; Sherrill, 1993). While individualization in content selection is paramount, there are some general guidelines to consider when making curricular decisions.

First, students with FAS who are close to age level in gross motor development probably can follow the regular physical education curriculum (Sherrill, 1993). While they may not master all of the skills that their peers master, they should be able to learn the majority of skills needed to participate successfully in regular physical education as well as later in life in community recreation programs. For example, a high school student with relatively mild motor and behavior problems could learn the skills necessary to be successful in a variety of individual and team sports typically offered in high school physical education. With the basic background skills and knowledge received in physical education, the student then can decide which sports he/she wishes to pursue.

This developmental approach is not appropriate for students with FAS who have greater delays in gross motor development and who will likely fall further and further behind their peers as activities become more complex. In such cases, the physical educator should follow a functional or top-down approach to program planning (Block, 1994; Sherrill, 1993; Wessel & Kelly, 1986). With the functional approach, two or three specific lifetime leisure goals are selected for the student based on the students abilities, discussions with the student and his/her parents, and an analysis of what recreation activities are available in the community. Once activities are selected, they are broken down into teachable components (Wessel & Kelly, 1986).

For example, if softball is chosen as one lifetime leisure goal, then skills needed to play softball are delineated such as locomotor skills (running, sliding), manipulative skills (throwing, catching, striking), body/space management skills (personal space, directions, levels, pathways, speeds, relationships), affective skills (sportsmanship, working cooperatively, following directions, keeping under control), and cognitive skills (strategies, rules of the game). These skills can then be placed in a developmentally appropriate hierarchy so that fundamental skills such as locomotor, manipulative, and body/space management skills as well as following directions are taught in the younger grades and more complex skills such as combing running with striking (batting then running to first base), throwing with different speeds depending on the situation, affective skills such as sportsmanship, and rules and strategies of the game are taught in middle and high school. The ultimate goal is that the child graduates from physical education with the skills needed to successfully participate in selected lifetime recreation skills. Note how some skills are not taught in this model. With the softball example, locomotor skills such as skipping and hopping and manipulative skills such as punting and kicking do not have to be taught since these skills are not related to the goal of playing softball. Thus, more time can be spent on learning and mastering critical softball skills (see Wessel & Kelly, 1986, for more detail).

A second content consideration is teaching appropriate behavior and social skills. While appropriate behavior and social skills should be embedded throughout the school day and taught by all of the student's teachers, physical education is an ideal place to work on these skills. Students can learn how to be a good teammate, how to cooperate, how to win and lose gracefully, how to ask

for help, how to remain calm and under control in stimulating situations, and generally how to interact and behave appropriately in a large group setting. By identifying behavioral and social goals along with motor and fitness goals, the physical educator will be more likely to address these skills in physical education (see below for more examples of how to teach appropriate behavior and social skills).

Instructional Modifications

Since attention deficit and distractability seem to be two of the greatest challenges confronting children with FAS, the learning environment should be highly structured (Burgess & Streissguth, 1992; Jones, 1991). Structure includes providing consistent cueing, practicing proper behavior, and using a direct teaching approach. When teaching children with FAS, it is important to use verbal cues, demonstrations, and even physical assistance to make sure the child understands directions and stays on task. This is particularly important when introducing new concepts. For example, place the student close to the instructor or leader and ask the student to repeat directions to confirm that he/she fully understands them. Provide gentle reminders (as opposed to reprimanding the student) to pay attention to directions. Recall that students with FAS often have hearing and vision problems along with their distractability, so it will be difficult for students with FAS to develop good listening and observing skills. However, it is important to help the student focus and to encourage them to listen to instruction. Activities that require listening such as freezing on a signal, following the movement commands to a dance or jump rope routine, or traveling to the beat in music will help develop listening skills. Similarly, helping the child focus on key parts of demonstrations (e.g., "watch my arms when I jump" or "see how I bend my knees when I shoot the ball") will enhance observation skills. Peers can help assist the student with FAS to focus on critical verbal and visual cues.

A direct style of teaching (Mosston & Ashworth, 1990), which is very structured, is best for students with FAS. This approach allows the teacher to provide direct cues to the student with expectations for certain behaviors clearly set. For example, giving an indirect cue such as: "show me how you can travel at different levels and different speeds," might be confusing to the child with FAS and might result in an inappropriate solution to the movement problem (e.g., running and pushing children, bouncing into the wall). On the other hand, using a more direct cue such as: "show me how you can gallop at a medium speed following the black line on the floor," provides specific cues that the student with FAS can understand with less room for misbehavior. You can even provide indirect cues to the class and then provide specific direct cues to the student with FAS (Block, 1994).

Regardless of the teaching style or system you choose, it will be crucial that you be as consistent as possible. Stop or freeze signals should be kept constant, and consequences for not following signals should be clearly explained and carried out consistently. It may be unfair to expect students with FAS to stop immediately upon hearing a cue, so a 2-3 second grace period should be allowed. You also may need to use extra verbal cues for the student with FAS. One technique that may be helpful is locating the student with FAS during an activity and then telling him that you will be blowing your whistle to stop the group in about 10 seconds. Preparing the student ahead of time will help the child focus on the stop signal and in turn help him stop when the signal is given.

Behavioral Modifications

Many students with FAS have behavior disorders with the most notable being hy-

peractivity and difficulties paying attention (Burgess, 1994). These behavioral problems often can be prevented and controlled through various behavior management techniques. Most importantly, do not assume that the student with FAS understands the rules of the gymnasium or proper social behavior. Plan on teaching and reviewing rules and proper behavior as often as possible. Set up situations in which the student with FAS can practice complying with various rules, social structures, and routines used in physical education (Henderson & French, 1993). For example, appropriate behaviors such as sitting and listening when instructions are given, interacting appropriately with peers during group games, and stopping when hearing a whistle can be practiced and reinforced either during physical education or for a few minutes just prior to physical education. Try to "catch the student being good" and reinforce appropriate behavior ("good stopping on the whistle Kevin!") rather than always scolding inappropriate behavior (Rhode, Jenson, & Reavis, 1993). In fact, students with FAS probably need more praise than typical students in order to stay in control, stay on task, and to comply to directions.

Teach the student how to track (either by himself or with your help) how many times he complies with your rules. For example, help the student track how many time during the course of a lesson he stops immediately at the sound of a whistle. If the student stops a predetermined number of times, then present a reinforcer such as a minute or two of shooting baskets or riding scooterboards (Henderson & French, 1993). By highlighting the behavior and then pairing it with a reinforcer, the student is more likely to follow your directions (Henderson & French, 1993). While some of the hyperactive and distractable behaviors will be difficult to prevent, practice and extra cues coupled with positive reinforcement will help most students with FAS demonstrate more control.

If a student with FAS (or any other student for that matter) does not follow a rule, consistently provide a predetermined consequence. Students with FAS need to learn that their behaviors lead to certain consequences such as losing a turn or sitting in time-out (Henderson & French, 1993; Rhode, Jenson, & Reavis, 1993). Again, take time to review rules and consequences, and practice consequences so students with FAS understand what happens when they do not follow rules. Because students with FAS are impulsive and lack control, it is important to teach them how to regain and maintain control. One way to do this is to give a warning before carrying out a consequence (Rhode, Jenson, & Reavis, 1993). The warning should explain to the student what he/she did wrong, describe what the consequence will be if the student does the behavior again, and offer a strategy to help the student calm down. For example if a student breaks into an uncontrolled run during a movement exploration activity, ask the student to stop, explain that he/she was moving too fast and too out of control, remind him/her of the consequences for not following directions, and then encourage the student to calm down to a walk or slow gallop.

Finally, increasing on-task time may be achieved by providing activities that are stimulating and interesting to the students. Avoid activities with a lot of down-time or long transitions that result in waiting (Bishop & Beyer, 1995; Rhode, Jenson, & Reavis, 1993). Also, activities that have challenges for all levels of abilities and interests will promote more success and time-on-task. For example, set up a basketball dribbling station that has the following challenges: standing and dribbling, walking and dribbling, jogging and dribbling, jogging and dribbling in and out of cones, and jogging and dribbling in and out of cones with nondominant hand (see Block, Provis, & Nel-

son, 1994, for more detail). By offering a variety of challenges, the student with FAS has a greater chance to find a level that is challenging yet allows him to be successful. In turn, there will be less need to cope with failure by displaying inappropriate behaviors.

Environmental and Equipment Modifications

Children with FAS often are hypersensitive to physical stimuli, light, and sound (Weiner & Morse, 1994). A child with FAS who is overstimulated may become overactive, throw a tantrum, or even become self-abusive. Structuring the environment and the activities to decrease that amount of stimulation will be beneficial to children with FAS. For example, equipment should be stored away or at least kept in a confined area until the items will be used. Equipment that is left lying around the gymnasium is too stimulating and tempting for children with FAS to avoid (Jones, 1991). Noise levels can be a problem for students with FAS. While many students with FAS have hearing problems, they may still be sensitive to loud noises such as loud music or other students yelling. While music can be used, keep the volume at a level that does not agitate students with FAS.

Equipment should be used that will promote success in whatever activity you are teaching. For example, allowing the student the opportunity to choose from a variety of appropriate equipment for each activity may be beneficial. Allow the students to choose any ball from the bin. The bin should have many different types of balls in varying sizes, shapes, and textures. Since many students with FAS will have coordination difficulties, encourage the use of larger, softer balls such as a beach ball or nerf ball and suggest lighter striking implements such as oversized plastic bats. Suspended balls, balls on tees, and larger targets also can provide success in promoting improved coordination and accuracy (Block, 1994; Sherrill, 1993).

Summary

As the new leading known cause of mental retardation in the United States, students with FAS will be seen in greater numbers in public schools across the country. Are physical educators prepared to develop individualized programs and provide meaningful instruction to students with FAS? In order to provide an appropriate, individualized program for students with FAS, the physical educator must have a thorough understanding of general physical, medical, motor, social, and behavioral characteristics of these students. In addition, physical educators should understand strategies that can be used to improve motor and fitness abilities, reduce behavior disruptions, and enhance social development. The purpose of this paper was to review the nature and characteristics of FAS and outline a variety of strategies that physical educators can use when working with students with FAS. With the information presented in this paper plus more specific information that can be supplied by key team members, students with FAS can receive an appropriate physical education program.

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