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The Performance of Visually Impaired Youngsters in Physical Education Activities: Implications for Mainstreaming

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The relative performance of individuals with visual handicapping conditions in physical education is directly or indirectly associated with severity of visual impairment, gender, age, activity type, method of ambulation, and parental attitudes. Each of these influences success, extent, and/or nature of participation in physical activity, which in turn results in characteristics, limitations, abilities, and needs that must be considered in order to effectively implement physical education programs in mainstreamed settings. Several implications for mainstreaming based on research pertaining to these factors are presented.

With increased attention on education in the least restrictive environment, a greater percentage of individuals with visual impairments are being integrated into local community schools with normally sighted youngsters. Teachers in these schools must be prepared for mainstreaming if these youngsters are to receive a quality education. This paper is written to convey research findings and applications relevant to the provision of mainstreamed physical education programs so that teachers will be better prepared for their responsibility.

The Research

Physical Fitness Performance

The few studies that have investigated physical fitness of youngsters with visual impairments have been quite comprehensive and useful. It has been found that, as a group, individuals with visual impairments perform below the physical fitness levels of their sighted peers (Buell, 1950a, 1950b; Jankowski & Evans, 1981; Winnick & Short, 1982). Three variables found to affect the physical fitness performance of visually impaired youngsters are the severity of visual impairment, gender, and age. Available data indicate that the physical fitness performance of visually handicapped youngsters decreases as the severity of visual impairment increases (Buell, 1966; Winnick & Short, 1982).

With the exception of performance on measures of flexibility, the physical fitness performance (skinfolds excluded) scores of boys generally exceed those of girls of the

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same age (Winnick & Short, 1982). The performance gap between visually impaired girls and sighted girls is generally greater than the discrepancy between sighted and visually impaired boys (see Table 1).

Visually impaired boys show a constant improvement in their physical fitness performance between the ages of 6 and 17. Visually impaired girls show an improvement in measures of physical proficiency between the ages of 6 and 13 or 14, but little difference in performance for the next 3 or 4 years (Buell, 1966, 1982; Winnick & Short, 1982).

### Table 1

<table>
<thead>
<tr>
<th>Magnitude of Difference Between Visually Impaired and Sighted Subjects and % of the Former with Scores Higher than Median Values of the Latter on Selected Test Items</th>
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<tr>
<td>Triceps skinfold&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>Abdominal skinfold&lt;sup&gt;a&lt;/sup&gt;</td>
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<tr>
<td>Subscapular skinfold&lt;sup&gt;a&lt;/sup&gt;</td>
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<tr>
<td>Sit-ups</td>
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<tr>
<td>Leg raise</td>
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<td>Trunk raise</td>
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<tr>
<td>Mat creep&lt;sup&gt;b&lt;/sup&gt;</td>
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<tr>
<td>Shuttle run&lt;sup&gt;a, b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Sit and reach</td>
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<tr>
<td>Right grip</td>
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<tr>
<td>Left grip</td>
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<tr>
<td>Arm hang</td>
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<tr>
<td>Pull-ups</td>
</tr>
<tr>
<td>50-yard dash&lt;sup&gt;a, b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Standing broad jump</td>
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<tr>
<td>Softball throw</td>
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<tr>
<td>Long-distance run&lt;sup&gt;b&lt;/sup&gt;</td>
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<sup>a</sup>Except for skinfold measures, low scores (negative SD units) on items denote superior performance. The percentages presented above relative to mat creep, shuttle run, and dash indicate percentage of subjects scoring above the median point relative to raw score but below median performance level. Generally, skinfold measures below the mean (negative sign) are desirable, but extreme positive or negative skinfold scores are undesirable.

<sup>b</sup>Visually handicapped subjects ran alone or with partner or guidewire assistance.

*Significant differences (p < .01) between sighted and visually impaired subjects of the same sex were found on this item on at least one age between ages 10-17.
Figure 1 — Gender by age interactions (means plotted with 99% confidence intervals), for visually impaired and sighted subjects on softball distance throw (Winnick & Short, 1982).

The relative performance of visually impaired youngsters on physical fitness test items varies according to the nature of particular test items (Buell, 1950a, 1950b, 1966, 1982; Winnick & Short, 1982). Winnick and Short (1982) found that differences between sighted and visually impaired boys was least in items measuring flexibility, certain muscular strength/endurance items, and skinfold measures. Differences between sighted and visually impaired girls was least in items measuring arm strength and muscular endurance. The reason for the latter observation is apparently related to the fact that neither group performed well on this test item. Although the performance of sighted persons generally exceeds that of youngsters with visual impairments on measures of physical fitness, some persons with visual impairments approach and even exceed performance levels of their sighted peers. Winnick and Short (1982) found that the percent of visually handicapped boys and girls with scores higher than median values of sighted boys and girls, respectively, exceeded 25% on physical fitness test items that do not involve mobility. Evidently, the performance of individuals who are visually impaired is closer to the mean of sighted peers for stationary activities. Blind youngsters have particular difficulty in activities that involve throwing (see Figure 1). Concerning physical fitness, one must be cautious in interpreting results about throwing since differences in throwing could be due more to coordination and learning than to real differences in physical fitness.

Parental attitudes have also been found to be important factors in the performance of blind and partially sighted boys and girls. As a result of his research, Buell (1950a, 1950b) reported that overprotected blind and partially sighted youngsters performed below sighted peers in running, jumping, and throwing on the Iowa Brace Test. Little difference was found between the performance of visually handicapped children who were neglected compared to those who were not neglected. Buell indicated that overprotection was such an obstacle to performance that parental neglect is preferred to overprotection insofar as motor performance is concerned.
The factor structure of physical fitness of sighted and visually handicapped groups is similar, with visually impaired youngsters showing greater variability in physical fitness performance. The variability is apparently due to variation in vision, physical fitness, attitudes toward physical activity, and how activities are performed. Winnick and Short (1982) indicate that attention must be given to body composition, muscular strength/endurance, cardiorespiratory endurance, and flexibility when planning programs to enhance the physical fitness of both visually handicapped and sighted youngsters.

Motor and Perceptual Development

Individuals who are visually impaired follow an orderly progression of development which differs from that of the sighted only in timing. Visually handicapped individuals tend to lag in motor milestones characterized by mobility and locomotion, as opposed to muscular maturation and postural achievement (Adelson & Fraiberg, 1974; Fraiberg, Smith, & Adelson, 1969; Norris, Spaulding, & Brodie, 1957; Wilson & Halverson, 1947). In a study of a blind boy whose vision was far below normal, Wilson and Halverson (1947) found retardation in creeping, standing, and walking. Norris et al. (1957) found that the 66 blind subjects in her study were significantly later than their sighted peers in learning to stand alone, walk, and jump. Fraiberg et al. (1969) reported a marked delay in the onset of creeping and independent walking among totally blind infants in spite of their demonstrated maturational readiness for these activities. Adelson and Fraiberg (1974) studied the gross motor development of blind infants and found adequate neuromuscular maturation and postural achievement but a considerable delay in self-initiated mobility and locomotion. Delays were noted in activities such as elevating the self by the arms in the prone position, raising the self to a sitting position, pulling up to a stand, and walking.

There is considerable agreement that delayed motor development in the blind is due to lack of mobility, which is attributed to the lack of vision. Lack of vision decreases stimulation to move and makes movement more difficult (Winnick, 1979). Accordingly, Adelson and Fraiberg (1974) attributed the delay in self-initiated mobility and locomotion found in their study to the lack of visual incentive for movement. Wilson and Halverson (1947) attributed the retardation in motor development of their subjects to inadequate perception of space. Norris et al. (1957) reported that children who received high ratings on a mobility scale were also those who had been permitted to explore their environment more freely than were those with low ratings. Fraiberg et al. (1969) reported that no infant in their study was able to creep until a “reach on sound cue alone” was demonstrated.

The lack of sight influences perceptual abilities. Concepts of laterality, body image, and spatial relationships are below par in blind youngsters and may need particular attention in habilitation and remediation (Cratty & Sams, 1968; Hanninen, 1975). However, Cratty (1971) notes that some blind children are as proficient as sighted youngsters of the same age in the verbal identification of body parts, left-right dimensions of their bodies, and similar judgments.

Other Factors

Poor posture of visually handicapped youngsters has been noted by several authors (Cratty, 1971; Hanninen, 1975; Johansen, 1971; Oliver, 1970; Resnick, 1973). The lack of sight contributes to poor posture in the following ways: by reducing or eliminating the visual stimulation that maintains an erect head position, resulting in habitual flexing of the head on the chest; inhibiting the movement and physical activity that helps in muscular develop-
ment; inhibiting the development of a visual concept of correct posture; and affecting visual reference points that help maintain proper body alignment and balance.

There are several additional facts with implications for mainstreaming the visually handicapped youngster in physical education. First, only a small percentage of visually handicapped persons have eye conditions that might be aggravated by vigorous activity (Buell, 1970). Second, many youngsters classified as blind do have some useful vision. Third, many persons with visual handicaps have demonstrated outstanding performance in physical education/athletic endeavors (Buell, 1982). Finally, blind youngsters in physical education do not have any more accidents than their sighted peers (Buell, 1970, 1982).

**The Implications**

Vision influences the incentive and ability to move. The lack of vision therefore limits optimal physical and motor development. Thus, the foremost implications relative to mainstreaming visually handicapped youngsters in physical education are to provide opportunities for physical activity, encourage vigorous participation, help youngsters develop and use residual vision and other remaining perceptual and cognitive abilities to enhance mobility, and help eliminate barriers to participation in vigorous activity. Instead of relegating visually handicapped youngsters to sedentary roles such as scorekeepers, equipment managers, referees, or doorkeepers, an effort must be made to provide vigorous physical activities. Overprotection, a preconceived notion that the visually handicapped youngster lacks the ability to successfully participate in an integrated class, and the belief that blind youngsters require inordinate supervision, are obstacles that Buell (1972) and others have said must be overcome if vigorous and effective participation in a mainstreamed setting is to become a reality.

It is likely that initial performance in physical and motor activities of the visually handicapped will be slightly below that of sighted peers, particularly at early ages. Where this occurs, it may be necessary at first to involve them in activities of lesser duration, intensity, or psychomotor demand. They may need to learn basic skills such as skipping, hopping, and galloping. As these children progress, their level of programming may be increased to and beyond that typical of the sighted. In this regard, physical fitness is particularly important for the visually handicapped since they need greater than normal stamina to reach the same daily levels of performance as the sighted. However, placement in a mainstreamed class may not be appropriate if the visually handicapped youngster has a unique physical or motor need. In such an instance, a specially designed program that is implemented in a more restrictive environment may be appropriate. Ideally, such a program is provided as an extension of the mainstreamed class.

Related research clearly indicates that the relative performance of the visually handicapped varies with activity type and/or program area. For example, in the early years visually handicapped youngsters exhibit a delay in activities associated with self-initiated mobility and locomotion. Later they have difficulty in activities involving throwing, balance, catching, striking moving objects, body and spatial awareness, and mobility. Poor posture and coordination, and inadequate development of fundamental movements and patterns, are characteristic of many youngsters. On the other hand, relative performance is best in activities performed in place and those permitting close contact with persons or objects. Where successful performance in activities is important to the present or future functioning of the individual, emphasis must be given to improving performance in these activities.
Extra attention must be given to the development of proper body alignment, physical fitness, basic motor development, balance, body and spatial awareness, coordination, and development of fundamental movements and patterns. Certainly, continued attention must be given to the development of mobility skills. But there is little reason to spend much time on activities involving the visual tracking of objects because the visually handicapped will make little use of them in adulthood. Blind youngsters will have difficulty in activities such as tennis, baseball, basketball, and volleyball since these activities involve visual tracking. Although blind youngsters should learn about these activities for social reasons, may perform certain skills associated with these games, may be involved in special modified games with other visually handicapped youngsters, and may participate (with modification) in regular games from time to time, they ordinarily should not spend much time in these activities in a mainstreamed setting. The final decision about participation should strongly consider input from parents and the youngster involved.

In addition to the variability between the sighted and visually handicapped, program leaders must be aware of the wide variation within the visually handicapped group. Age, gender, and method of performing activities are factors to consider in placing youngsters and in planning, implementing, and evaluating programs. For example, teachers in mainstreamed classes may use regular norms and testing procedures when administering certain test items of physical fitness to visually handicapped youngsters. However, they also need to consult special norms based upon sight and method of ambulation (Buell, 1982; Winnick & Short, 1985) for other test items. In view of significant differences between boys and girls and between older and younger school-age participants on physical fitness performance, age and gender should be considered in placing visually handicapped youngsters in the appropriate setting. Because the gap in physical fitness between visually handicapped girls and sighted girls is greater than the gap between sighted and blind boys, and because girls show little improvement in physical fitness between ages 13-17, more emphasis must be given to physical fitness development for girls at these ages. In short, great variations in performance exhibited by the visually handicapped means that programs need to be personalized and individualized as much as possible.

The visual limitations of youngsters with handicapping conditions require that teachers modify methods and activities in a way that maximizes auditory, haptic, and residual visual abilities. Kinesthetic perception is effectively employed as teachers move parts of the body so that youngsters “feel” the correctness of movement. Examples of the use of tactual cues include (a) having youngsters feel movements of others as they perform activities, (b) pairing youngsters for running activities, relays, hiking, and other activities, (c) using different textures to define play areas and goals, (d) using guidewires (dashes) or rails (bowling) to enhance orientation and mobility, (e) including youngsters in activities involving close contact such as tug-o-war, wrestling, and square dancing, (f) using tactual aids for support surfaces to steer youngsters (i.e., moving along a floor marked with tape, raised edges for boundaries, moving on mats placed on a gymnasium floor).

By using larger, brighter, contrasting balls, goals, lines, and other objects, teachers enhance the use of residual vision. This is important, given that only a very small percentage of visually handicapped youngsters are totally blind. Finally, auditory cues must be employed to enhance the mainstreaming of visually handicapped and normally sighted youngsters. Particularly important are balls with bells or other audible sounds, as well as audible goal locators. Auditory cues are effectively employed as teachers ask youngsters to run to sounds in relays, shoot arrows at a target located by listening to a radio placed behind the target, or strike or stop a beeping ball. Modification in methods and activities are based upon maximizing the use of the visually handicapped youngsters’ abilities.
Available research supports the contention that participation in physical fitness activities is both beneficial and safe and that blind individuals have performed extraordinary feats in physical education and athletic activities. Due to danger of retinal detachment or concern about loss of sight in a remaining functional eye, participation in contact or collision sports or other activities that could create undue pressure on the eyeball may be contraindicated. By keeping in touch with medical personnel, the teacher will know the limitations and abilities of youngsters and be confident that the appropriate program is being provided.

When integrating the visually handicapped youngster in physical education, teachers must realize that blind and partially sighted youngsters are more like their sighted peers than they are different. Certainly the disadvantage of the lack of sight will require adaptations and accommodations in a mainstreamed classroom, but these can and should be made by an accepting, caring, and trusting teacher who provides the proper example to the entire class.

References


