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AUTHOR	Bunker, Linda K
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ABSTRACT

Sport and physical activity contribute to the physical movement capabilities of girls, the health status of their bodies, the values and ethical behaviors they develop, and their personal development of a unique identity. This paper offers an overview of contributions and potential challenges related to physiological dimensions and psychosocial development. Childhood activities related to sport and physical activity should include opportunities for girls to develop fundamental skills and to acquire motor skills necessary for lifelong learning and leisure activities. Girls need reasonable levels of motor skill to participate in activities that facilitate good immune system functioning, build physical fitness, and maintain appropriate body weight. Exercise uniquely affects female reproductive functioning, menarche, and bone density. Girls' involvement in sports is largely impacted by the attitudes of parents and other role models. If parents support their involvement, then girls can benefit in many positive ways, including self-esteem, emotional well-being, and social competence. Recommendations include the following: (1) children should participate in regular physical activity and sports experiences; (2) children need opportunities for health-related fitness activities and skill building; (3) children need a wide range of activities; (4) excessive exercise and training should be carefully monitored; (5)moderate and regular physical activity can promote psychological and emotional wellbeing; (6) and both sexes need equal opportunities for a full range of physical fitness and sport activities. (Contains 48 reference.) (SM)

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Psycho-Physiological Contributions of Physical Activity and Sports for Girls

Dr. Linda K. Bunker

President's Council on Physical Fitness and Sports

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A Note From the Editors

Participation in sport and exercise contributes not only to the physical development of children, but also to their social and emotional development. There is a great deal of information available about the importance of sport experiences for males, but far less research and even fewer advocates for parallel experiences for girls (Berryman, 1996). In an effort to synthesize what we know about the benefits of physical activity, the President's Council on Physical Fitness and Sports (1997a) issued a report entitled *Physical Activity and Sport in the Lives of Girls: Physical and Mental Health Dimensions from an Interdisciplinary Approach.* Linda Bunker, a well-known researcher, author and advocate of sports and physical activity for girls and women served as the content editor for this report. We asked Linda to summarize some of the contributions of physical activity and sports for girls in this issue of the *PCPFS Research Digest.* We encourage you to seek additional information in the special President's Council on Physical Fitness and Sports volume noted above and cited in the references.

Introduction

Maintaining physical fitness and developing good fundamental movement skills by actively participating in daily activity contributes to happier and healthier lives by facilitating both physical and emotional health. Since the passing of Title IX of the Educational Amendments Act in 1972, appropriately more emphasis has been placed on providing opportunities for both girls and boys to participate in physical activities and youth sport. There are now over 2.25 million young women participating in sport at the high school level, with one in three now participating compared to one in 27 in 1972. Today, girls comprise almost 37 percent of all high school athletes (National Federation of State High Schools Association, 1995-1996).

In the Executive Summary of the recent monograph entitled "*Physical Activity and Sport in the Lives of Girls*," the President's Council of Physical Fitness and Sport (1997b) suggested that

> "Physical activity and sport are not simply things young girls do *in addition* to the rest of their lives, but rather, they comprise an interdependent set of physiological, psychological and social processes that can influence, and, in varying degrees, sustain girls' growth and development." (pg. 18)

Involvement in sport and physical activity contributes to the physical movement capacities of girls, the health status of their bodies, the values and ethical behaviors they develop and their personal development of a unique identity. Though it would be impossible to cover all of these aspects in this volume of the *PCPFS Research Digest*, an overview of contributions and issues (potential challenges) related to physiological dimensions, and psycho-social development.

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Guest Author
Dr. Linda K. Bunker
Curry School of Education
University of Virginia
Charlottesville, VA

Co-edited by
Drs. Chuck Corbin and Bob Pangrazi
Arizona State University

Physiological Dimensions

Childhood activities related to sport and physical activity should include opportunities for girls to develop fundamental fitness, and to acquire the motor skills necessary for life long learning and leisure time activities. All children need a reasonable level of motor skill in order to participate in activities that facilitate good immune system functioning, build physical fitness, and maintain appropriate body weight.

Motor Skill Development.

One of the most basic benefits of physical activity is the development of motor skills. Once acquired, motor skills enhance one's abilities to perform leisure activities and to function effectively in movement situations. As noted above, an indirect benefit of learning motor skills is that skilled people are more likely to be active and fit than those who lack confidence in their abilities in sports and recreational activities. It is through regular involvement in regular physical activities that allow practice that motor skills are learned. Providing these opportunities to learn these skills is important for all people, including *all* girls and women.

Physical Fitness.

Though maturation and heredity have considerable effect on the fitness of youth, regular physical activity can contribute significantly in this area. All areas of fitness are effected by regular exercise but three that seem to be especially impacted by regular physical activity are muscular fitness, cardiovascular fitness (aerobic fitness) and anaerobic power. Benefits in muscular fitness including muscle strength and endurance as a result of physical activity and sport are well documented for both girls and boys. For most girls, muscular fitness increases at a linear rate until about age 14, but for sedentary girls it may slow more rapidly or even decrease (Blimkie, 1989). However, systematic physical activity including both short term training programs (Sale, 1989) and regular physical activity programs can produce marked improvement in strength for girls, generally thought to be due to improved motor unit activation (Sewall & Micheli, 1986).

Cardiovascular fitness and anaerobic power influence the ability of the body to do work in a specific amount of time. Cardiovascular or aerobic performances (which occur over longer periods of time) and anaerobic performances (which occur over shorter bursts such as sprinting) are both enhanced by regular physical activity. In general, aerobic power impacts one's ability to do endurance or repeated activities, and increases with growth prior to adolescence, but seems to decline for girls (relative to body mass) while it is maintained in boys (Armstrong & Weisman, 1994). This may be a function of both less physical activity and the increase in body fat, but fortunately, both short term and long term training programs have been shown to be beneficial in reversing this trend in both anaerobic and aerobic power (Bar-Or & Malina, 1995). It appears that the primary advantage of training is an increase in oxygen uptake (aerobic fitness) and improved efficiency of movement (e.g. running , jumping).

Body Composition.

One of the primary advantages of active physical participation for children seems to be directly linked to lower body fat and a better ratio of lean to fat mass. Children with above average levels of body fat generally have higher total cholesterol, and LDL cholesterol and often-associated elevated blood pressure (Williams, et al., 1992). Elevated levels of cholesterol in children are very important because children who have higher levels of cholesterol are almost three times more likely than older children to have high cholesterol levels as adults (National Cholesterol Education Program, 1991). The best strategy for lowering cholesterol in children is a combination of exercise and diet which may also lead to lowered blood pressure, and other benefits thought to be brought about because of decreased cardiac output, decreased peripheral resistance, and reduced risk of blood clotting (Blair, et al., 1996).

Exercise and sport experiences can also be beneficial in maintaining appropriate body weight, or the balance between energy expenditure and caloric intake (especially the relative proportion of fat intake in terms of the percent of total calories. The problem of juvenile obesity is twice as great today as it was in the 1960's (Blair et al., 1996), and a particular problem for juvenile girls. For most young girls, normal daily activity provides an adequate balance of intake and expenditures, but for females with weight problems, maintaining regular exercise levels is an important adjunct in weight control because of its role in facilitating fat-free

mass and promoting the loss of fat (Wells, 1991). It is also thought to be important in reducing the risk of noninsulin dependent diabetes which is one of the ten most prevalent causes of death in the United States (Blair, et al., 1996).

Reproductive Functioning and Increased Bone Density.

Another impact of exercise unique to females is the impact of exercise on reproductive functioning and menarche. There are many anecdotal reports of more regular menstrual cycles and less physical distress associated with moderate physical activity. However, there are also reports of delayed onset of the menstrual cycle (menarche) in athletes that may be either a cause or effect of athletic participation. For example, it is possible that young girls who mature earlier are socialized away from sport, and that girls who have less body fat and longer limb to trunk ratios (characterized by pre-pubescence) may have an advantage in sport and therefore self-select (Stager, Wigglesworth & Hatler, 1990; Wells, 1991).

Extremely high levels of training/exercise or other physiological stressors have been associated with the absence of regular menstrual cycles (amenorrhea) and parallel reduction in circulating levels of estrogen. This reduction in estrogen can be a factor in reduced bone density (osteoporosis) which could negatively impact skeletal development and maintenance (Fehily, Coles, Evans & Elwood, 1992). On the other hand, the increased levels of exercise which may reduce obesity and delay the onset of menarche have also been shown to be an advantage in reducing the risk for estrogen dependent cancers (primarily breast and ovarian cancer) (Kramer & Wells, 1996).

In later life women are especially at risk of osteoporosis (low bone density). One major advantage of physical activity for girls is that it increases "peak bone mass." Peak bone mass is the level of bone mass at its highest point–usually occurring in the teens or early 20s. High peak bone mass can be viewed much as a bank savings account where withdrawals can be made later in life when needed. The higher the peak mass, the less likely that losses later in life will result in low bone mass or osteoporosis.

Recent popular literature has contained reference to the "Female Athlete Triad" which seems to impact girls who are training at high levels. The triad refers to three areas of behavior that may be deleterious to female athletes: osteoporosis, amenorrhea and disordered eating. The foundation of these problems is thought to be a preoccupation with body weight and maintaining an "ideal body physique" or body composition (ratio of lean to fat body weight). This preoccupation can affect many female athletes, especially those participating in "style" athletics such as gymnastics, diving, ice skating, cheerleading or other sports where they are either formally or informally judged on how they look (Gill, 1995; Plaisted, 1995; Reel & Gill, 1996). When children practice behaviors of undereating, underconsumption of calories and overexercise it may produce undesirable effects – whether related to sport and exercise or acting in school plays or singing.

Immune System Functioning.

Extensive research has emerged in the last ten years which supports the contention that regular exercise (at a moderate level) facilitates the bodies ability to fight infection (e.g. upper respiratory infection (Nieman, 1994)) and disease through increased immune system function (Freedson & Bunker, 1997). This increased ability to maintain health appears to be related to increases in levels of interleukin-1 and interferon and increased numbers of natural killer cells, circulating lymphocytes, granulocytes, and other protective bodies (Kramer & Wells, 1996). It appears that increases in monocyte and macrophage function helps to retard diseases caused by viruses such as common colds and influenza and may even serve to help retard aberrant cells such as cancer (Newsholme & Parry-Billings, 1994). It may be necessary to temper enthusiasm about reducing the chances of illness due to regular exercise. There is some evidence that children who participate in group activities (such as sport, band, church) or strenuous exercise have decreased NK cell activity at rest and some immune suppression (Nieman, 1994) and may acquire more infections perhaps due to increased exposure rates (Shephard, 1984).

Psycho-Social Dimensions

The involvement of girls in sport is largely impacted by the attitudes of parents and other role models (teachers, family). Unlike the involvement of boys that is largely impacted by their peer role models and social pressure, girls are subject to many influences both positive and negative. If parents support their involvement and encourage it rather than

dampening it because of inappropriate cultural stereotypes (e.g. "tomboy") then girls can benefit in many positive ways from sport and physical activity.

Self-Concept.

Involvement in sport and physical activity directly affects the development of a child's self-concept and perception of self-esteem and competence. Physical activities provide a wonderful arena for girls to test their abilities to solve problems, learn new skills, and find ways to account for success and failure. They are a fundamental source of opportunities to challenge oneself, take risks and develop skills that may lead to higher self-esteem (Jaffee & Wu, 1996).

Most girls participate in sport to have fun, improve skills, be with friends and become physically fit while enjoying the challenges and being successful (Weiss & Petlichkoff, 1989). In particular, when motivation to participate in sport was examined, Gill (1992) found three different reasons: competitiveness, win orientation and goal orientation. Girls seem to be higher in goal orientation or the desire to achieve personal goals while boys seem to be more motivated by winning. Girls accomplish these goals by learning to cooperate with one another (Garcia, 1994) and therefore probably continue to foster an intrinsic motivation toward participation (Gill, 1992).

The motivation to cooperate in learning skills and developing physical fitness presents an interesting challenge to organized sport and physical education. Many girls prefer activities which allow them to work together to improve, or to function cooperatively to accomplish goals (Jaffee & Manzer, 1992), rather than competitive activities such as physical fitness testing (Wiese-Bjornstal, 1997). It is therefore important to structure daily physical education experiences to provide motivation for children who have both goal and win orientations.

There appears to be a strong interaction between how girls perceive their success in sport, and how others influence that perception. During early years, both boys and girls are about equal in terms of physical skills and rely on adult comments (especially parents) to help them judge their competency until about age 10 (Weiss & Ebbeck, 1996).

Between 10-14 years of age peers become the primary source of validation for their perception of personal skill. During adolescence there appears to emerge a gender difference such that girls rely on adults and their own self-comparisons, while boys seem to rely more on competitive outcomes, their ability to learn new skills and their own ego-centric judgments of physical competence (Weiss & Ebbeck, 1996). These differences suggest the important role of parents, teachers and coaches in influencing girls attitudes toward participation, and the concomitant psychological benefits they receive from participation in sport and physical activity.

Emotional Wellbeing.

Participation in sport and physical exercise has a positive effect on emotional well-being. Children who are depressed or having emotional problems benefit from increased levels of physical activity (Biddle, 1995), with benefits reported to lower levels of depression (Morgan, 1994) and general anxiety (Landers & Petruzzello, 1994). The effects of participation in an active life style may have both a beneficial treatment effect, and also a palliative or buffering effect prior to any onset of emotional problems (Wiese-Bjornstal, 1997).

We know that most children are healthiest and happiest when they have a sense of optimism and self control. Sport and physical activity provide one medium for enhancing positive feelings about oneself, reducing depression (Biddle, 1995), increasing alertness, and decreasing tension and anxiety (Singer, 1992). The following are among the conclusions of the International Society of Sport Psychology and are based on examining the research literature regarding the influence of exercise on depression and anxiety (Singer, 1992):

- Exercise can help reduce anxiety
- Exercise can help decrease mild to moderate depression
- Long-term exercise can help reduce neuroticism and anxiety
- Exercise can help reduce various types of stress
- Exercise can have a beneficial emotional effect

The reasons for these benefits are very complex and may include both psycho-social effects (North, McCullogh & Tran, 1990) and biochemical mechanisms such as increased norepinephrine, serotonin or endogenous opiods (Greenberg & Oglesby, 1997), or the simple movement of large muscles

which may be inconsistent with depression (Greist & Jefferson, 1992). In addition, regular exercise and its body composition benefits, may also result in increased energy and improved sleep patterns (Martinsen & Stephens, 1994) and a general feeling of self-accomplishment for sticking to goals and developing new skills (Koniak-Griffin, 1994) which would reduce the sense of loss of control (often linked to depression). It has also been found that athletic participation in females reduces "some high-risk behaviors in adolescents, particularly suicide ideation" (Oler, et al., 1994; pg 784).

Caution should be taken if a "more is better" attitude is employed and involvement in physical activity is at an extreme. The incidence of burn-out in young athletes who participate in sport and physical activity to the exclusion of other aspects of their lives is alarming. When children are very competitively oriented, and place excess stress on themselves relative to winning or being successful (in other people's eyes), the stress and anxiety may rise to the point of withdrawal from the activity. This often happens when children feel that the demands are too great, and they loose the joy of participation which was their initial motivation. Gould (1993) has suggested that this may occur when there is constant or intense competition, too much adult pressure, high training demands (time and intensity) and competitive pressure, and the loss of personal control in making decisions about participation or training. In addition, children often place undue pressures on themselves and may become perfectionistic or overly concerned about pleasing others.

Social Competence.

For children, understanding the social nature of life, learning to balance "pleasing others" with acting in your own best interests and respecting the rights of others are important aspect of maturing. Sport and exercise can provide a great venue for exploring strategies to resolve conflicts, act fairly, plan proactively, and to generally develop a moral code of behavior. Opportunities exist for children to experience their own decision-making and to observe other role models such as parents, coaches and other athletes and to get feedback about their own ethical behaviors (Martens, 1993). There are many opportunities for good moral development through sport and physical activity, especially when these opportunities are provided under adult guidance and structured to support positive growth and avoid the potential negative impact of anti-social behaviors (cheating, aggression and intimidation) that accompany some inappropriately competitive activities (Gibbons, Ebbeck & Weiss, 1995). Sport can be a great avenue for developing more mature moral reasoning skills that are characterized by more assertion and less aggression, and more compliance with rules and fair play (Stephens & Bredemeier, 1996). Some children love low levels of competition while others are psychologically ready for higher levels of competition when they want to compare their skills with others and when they can understand the competitive process (Passer, 1988).

In a thoughtful review of social development issues related to sport and physical activity (Wiese-Bjornstal, 1996) emphasized that one key to positive experiences for children is "the provision of quality, adult leadership that places high priority on the development of prosocial or ethical behavior in sport and physical activity settings" (pg 24) and develops reasonable expectations for children which leads to appropriate levels of challenge (and sometimes frustration) while building self-esteem and the capacity to meet new challenges (Brustad, 1993). Such leadership not only reinforces the positive benefits of sport participation, but can also reduce the negative influences which girls often feel toward their emerging gender identity.

As both girls and boys enter adolescence, they struggle with their own personal self-concept and gender identity. Most children are given social status by their peers by virtue of their skills (at sport, music, academics) but girls have historically also been subjected to social criteria related to physical appearance and their ability to interact with boys (Thorne, 1993). There is some hope that this is changing as all children learn to accept one another for their unique talents and as parents and other adults understand the important role of physical fitness and motor skills in the development of children. For example, high school girls who are athletes are beginning to perceive themselves as equally as popular as non-athletes in 83% of the cases (Women's Sports Foundation, 1989) and 87% of the parents are shifting to recognize the equal importance of sport participation for both girls and boys.

Summary

Physical activity and sports involvement are important developmental opportunities for both boys and girls as they "learn to move and move to learn" about themselves, their bodies and their social contexts. Contributions include increased strength and power, better cardiovascular functioning, enhanced immune system responses, opportunities to develop moral reasoning, positive self-concepts and social interaction skills. There are however unique dimensions of the sport experience for girls in terms of physiological and psychological/emotional development and the challenges which sometimes exist between socially influenced expectations (i.e. idealized body physque) and the health benefits of regular exercise (body composition, body weight, menstrual functioning, etc.).

Recommendations and Conclusions

- Children should participate in regular physical activity and sport experiences, especially in quality, adult supervised activities and daily physical education in schools.
- Opportunities should be provided which include both health-related fitness activities and skill building to enhance physical competence and life-long participation.
- A wide range of activities should be available, including both individual and group experiences and cooperative vs. competitive ones.
- Excessive exercise and training should be carefully monitored because it may be linked to amenorrhea, while excess emphasis on body physique may lead to disordered eating – the signs of these problems should be carefully attended to by adults.
- Moderate and regular physical activity can promote psychological and emotional well being, including reduced depression.
- Equal and safe opportunities should be provided for both boys and girls to participate in a full range of physical fitness and sport activities.

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Physical Activity and Fitness Quote

Involvement in sport and physical activity contributes to the physical movement capacities of girls, the health status of their bodies, the values and ethical behaviors they develop and their personal, unique identity. Physical activity must be an integral part of everyday life, not an "add-on!"

Dr. Linda K. Bunker
Curry School Of Education
University of Virginia
Charlottesville, VA

Please Post

President's Council on Physical Fitness & Sports
200 Independence Avenue, S.W., Washington, DC 20201
(202) 690-9000 • FAX (202) 690-5211

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DEPARTMENT OF HEALTH & HUMAN SERVICES

The President's Council on
Physical Fitness and Sports
HHH Building, Room 738H
200 Independence Avenue, S.W.
Washington DC 20201

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