Body Composition and Menstrual Irregularities of Female Athletes
Are They Precursors of Anorexia?

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Participation of women in distance running and gymnastics has increased in the 1980s and 1990s. During this period, anorexia nervosa has increased in incidence (De Souza & Metzer 1991; Hsu 1990; Jobling 1985; Leon 1991). Female athletes and anorexics are similar in that they have a greater incidence of menstrual irregularities such as delayed menarche and, in those girls who have started menstruation, a higher incidence of amenorrhea than in girls of a similar age (Bemink et al. 1983; Bonen & Keizer 1984; Brooks et al. 1984; Brooks-Gunn et al. 1987; Calabrese 1985; Calabrese et al. 1983; Caldrone et al. 1986; Claessens et al. 1992; Cohen et al. 1982; Frisch et al. 1980; Haywood et al. 1986; Russell 1983; Sinning 1978).

Within the last 5 years, more female distance runners, ballet dancers and gymnasts have been found to have an eating disorder or have been diagnosed as anorexic (Calabrese 1985; Calabrese et al. 1983; Rosen 1991; Temple 1993). Female athletes with such problems do not form one homogenous group. Not only is there considerable inter- and intrasport variability, but elite level athletes training full time experience different pressures associated with bodyweight control and menstrual difficulties than do recreational athletes who train less. The definition of the term ‘eating disorder’ in the literature for example varies considerably, and can lead to differing evaluations of the problem amongst the athletic population. Although many of the studies reviewed by Brownell and Rodin (1992) had insufficient sample sizes, questionable validity and reliability, or lacked correct controls, the authors concluded that there was a higher incidence of such problems in athletes than in the general population, especially in sports in which weight is important. Thus, the incidence of anorexia in women is highest in those sports that emphasise the importance of thinness and low bodyweight, such as distance running, ballet and gymnastics (Borgen & Corbin 1987; Calabrese 1985; Clark et al. 1988; Rosen et al. 1986; Schnitt et al. 1986; Zucker et al. 1985). Blue (1987) estimates that 20 to 25% of gymnasts have become bulimic to prevent themselves from gaining weight and Rosen et al. (1986), stated that 74% of the college gymnasts in their study used pathogenic weight control methods. Gymnasts especially are susceptible to using eating disorder weight loss methods (Blue 1987; Borgen & Corbin 1987; Calabrese 1985; Diddle 1983; Rosen et al. 1986).

1. Physique, Body Composition, Personality and Performance

Top class female distance runners, ballerinas and gymnasts consume low calorie diets even though the energy expenditure of training for these sports requires many more calories (Benardot et al. 1989; Borgen & Corbin 1987; Calabrese 1985; Calabrese et al. 1983; Diddle 1983; Erosy 1991; Loosli et al. 1986; Owens & Slade 1987; Parizkova et al. 1987; Puglise et al. 1983; Rosen 1991; Schnitt et al. 1986).
Yates (1991) stated that female gymnasts fashion a slim prepubertal shape through intensive training and through maintaining a low level of body fat.

Yates (1991) suggests that the personalities of sportswomen, such as gymnasts and distance runners, interact with the characteristics of their sport, for example the emphasis upon competition, the degree of stress placed upon the body, and the reliance upon individual excellence rather than on team performance. This places the individual at greater risk for development of an eating disorder (Black & Burckes-Miller 1988; Calabrese 1985; Calabrese et al. 1983; Crisp 1980; Diddle 1983; Piearce 1993; Rosen 1991; Sours 1980; Temple 1993; Wilson & Eldredge 1992; Zucker et al. 1985).

Performance in both runners and gymnasts may become so important that it becomes a consuming goal that suppresses other interests. Such obligatory runners and gymnasts experience depression and anxiety when unable to train: they have become addicted to exercise (Chan & Grossman 1988; Crisp 1980; Dishman 1985; Gadpaille et al. 1987; Sachs & Sacks 1981; Veale 1993). However, in their review of addiction in athletes, Hauck and Blumenthal (1992) again comment that there is also a lack of methodological scientific rigour in this aspect of research, and much more research is needed. A lighter, shorter, slim physique in female gymnastics, for example, is most suitable for performance of the high risk acrobatic skills common in contemporary gymnastics (Bale & Goodway 1990; Claessens et al. 1992; Caldrone et al. 1986; Benardot & Czerwinski 1991). In the distance runner a low bodyweight and fat weight are an advantage since the female runner carries her body over a long distance at high speed (Wilmore et al. 1977).

These attitudes to exercise, i.e. concentration on a low bodyweight and concern for a slimmer physique, are similar to those of females with anorexia. As Thornton (1990) comments, ‘You’ve got the athletic personality itself, which is almost a textbook definition of an eating disorder personality, very compulsive, driven and self motivated’. Thus, some athletes and anorexics represent the same goal characteristics – to develop a low weight-for-height, a low fat weight and low percentage body fat. However, an athlete, although diet conscious, uses exercise training to improve performance while an anorexic uses exercise and diet to change their body image and become even slimmer.

It has been estimated that between one- and three-quarters of anorexics increase their interest in sport and take up exercise to reduce bodyweight (Blumenthal et al. 1985; Bruch 1978; Crisp et al. 1985; Crisp et al. 1980; Epling & Pierce 1988; Gardner & Garfinkel 1980; Sours 1980; Yates 1991). Whereas an athlete, has a greater exercise tolerance and increased aerobic capacity, and trains for an athletic goal, an anorexic has a lower work capacity and exercise is solely directed to losing weight (Blumenthal et al. 1985; Einerson et al. 1988; Moodie & Salcedo 1983).

An increase in the incidence of anorexia in younger girls and children with eating disorders has been reported (Lask & Brynat-Waugh 1992). However, it is not clear whether this represents a true increase or an increase in the number of cases reported (Szmuckler et al. 1986).

Studies of young women indicate that body fat levels are inversely related to the ability to move bodyweight (Bale et al. 1985; Graves et al. 1987; Hensley et al. 1982). Body fat adds to mass without adding power, and is thus considered detrimental in sport (especially endurance sports). Females with low fat levels are often more successful in sports such as distance running (Bruch 1978; Wilmore 1977). As previously stated, because a shorter, slim physique is an advantage in gymnastics, a gymnast is lighter and shorter than females of a similar age who are not gymnasts and may even have a lower bodyweight and percentage fat levels than found in female runners (Bernink et al. 1983; Caldrone et al. 1986; Claessens et al. 1992; Clark et al. 1988; Loosli et al. 1986; Parizkova et al. 1987; Sinning 1978; Zonderland et al. 1985).

2. Delayed Menarche and Menstrual Irregularities

Although the reproductive mechanisms related to delayed menarche and amenorrhoea are not yet