Sports medical problems in female top athletes – an update

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The presentation will focus on two main problems in the field of sports medicine in female top athletes: the female athletes triad and iron deficiency anaemia.

Over the last thirty years, participation by girls and women in organized athletics has increased dramatically. This presents unique challenges in the area of sports medicine. The female athlete triad describes the coexistence of 3 distinct medical conditions that may occur in athletic girls and women (Papanek 2003). Its interrelated components are disordered eating, amenorrhea, and osteoporosis. Pressure placed on young women to achieve or maintain unrealistically low body weight underlies development of the triad. Adolescents and women training in sports in which low body weight is emphasized for athletic activity or appearance are at greatest risk. Briefly, when coupled with inadequate nutrition, the high caloric expenditure of exercise training results in a sustained negative caloric balance or low energy availability, which is exquisitely sensed by the hypothalamus, initiating a complex neuroendocrine adaptive cascade. This cascade is associated with changes in the hypothalamic-pituitary-ovarian axis, such that estrogen levels are decreased, resulting in reproductive dysfunction that may include amenorrhea, oligomenorrhea, or anovulation. Low estrogen in otherwise young healthy women, like menopause, is associated with decreased bone mineral density and increased risk of fractures. The triad is not an inevitable consequence of participation in sports or physical activity at any level, however, exercise may contribute to the disruption of caloric balance. The triad is a complex disorder that requires intervention by a multidisciplinary team. Girls and women with one component of the triad should be screened for the others. Alone or in combination, female athlete triad disorders can decrease physical performance and cause morbidity and mortality. More research is needed on its causes, prevalence, treatment, and consequences. All individuals working with physically active girls and women should be educated about the female athlete triad and develop plans to prevent, recognize, treat, and reduce its risks (Otis et al. 1997, Papanek 2003, Lebenstedt et al. 2004)).

While the crucial role of haemoglobin in aerobic exercise has been well accepted, there is still a great deal of controversy about the optimal haematological parameters in the athletic population. The most common finding in athletes is a dilutional pseudoanaemia that is caused by a plasma volume expansion. It is not a pathological state and normalises with training cessation in 3 to 5 days. This entity should be distinguished from conditions associated with lowered blood counts, such as intravascular haemolysis or iron deficiency anaemia. The evaluation of true anaemia states in the athlete must take into account not only blood losses secondary to exercise, such as foot strike haemolysis or iron losses through sweat, but non-athletic causes as well. Depending on the age and sex of the athlete, consideration must be given to evaluation of the gastrointestinal or genitourinary systems for blood loss. Finally, a comprehensive nutritional history must be taken, as athletes, especially women, are frequently not consuming adequate dietary iron (Shaskey 2000). Total iron losses in feces, urine and sweat in endurance-trained athletes are approximately 1.75 mg/d (compared with the reference value of 1 mg/d) in males and approximately 2.3 mg/d (compared with the reference value of 1.4 mg/d) in females because of the additional iron losses with menses. Therefore, it is not surprising that many investigators report that iron deficiency is a common problem in athletes who do not increase their iron intake above that of the general population. Because compromised iron status can affect athletic performance as well as general health, including immune functions, cognitive development and ability to thermoregulate, it is advisable to emphasize meeting the recommended dietary allowances for iron during exercise training (Weaver et al. 1992). In a recent study the transferrin receptor-ferritin index (sTfR/logFerr) was determined in 131 male and 121 female athletes in order to assess the frequency of iron deficiency (threshold value of that index taken as 1.8). A significantly higher incidence of iron deficiency was observed in women (26%) than in men (11%). The iron deficiency was latent, since no subject was found to be anemic. The plasma iron was significantly lower and total iron binding capacity (TIBC) higher in iron-deficient subgroups compared to non-deficient ones. This confirmed the latent character of iron deficiency. Some hematological indices (Hb, MCH, MCHC, MCV) were significantly lower in iron-deficient female athletes than in male athletes, which suggested a more profound iron deficiency in the former. The sTfR/logFerr index might thus be useful in detecting iron deficiency in athletes, especially in those with erythropoiesis disorders, since physical loads may affect the widely used ferritin levels (Malczewska et al. 2001).

References