THE EFFECT OF PSYCHOLOGICAL AND MOTOR CHANGES DURING THE MENSTRUAL CYCLE ON WOMEN ATHLETES

by

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Many normal women experience variations in mood, of small amplitude, throughout the menstrual cycle. These changes may be exaggerated particularly in response to a difficult environmental situation. (1). Various workers have attempted to assess the prevalence of these mood changes and symptoms related to menstruation, usually by means of a questionnaire directed at different groups of women.

In 1963 Kessel and Coppen reported the results of one such study. (2)(3). They questioned a sample of 500 women between the ages of 18 and 45 and found a high incidence of symptoms associated with menstruation. 1 in 9 complained of severe pain, irritability or headache; 1 in 16 depression and tension; 4-5 swelling of the body. The 1 in 4 who suffered moderate or severe pre-menstrual tension were more likely to suffer from dysmenorrhoea (painful menstruation). Using the Maudsley Personality Inventory it was possible to correlate symptoms with personality type. Psychological symptoms such as irritability, depression and tension, which were most predominantly in the premenstrual period were very significantly correlated with neuroticism. Headaches and sensations of swelling were also associated with neuroticism, whereas actual dysmenorrhoea showed no such correlation. All these symptoms decreased with increasing age and parity. They concluded that premenstrual symptoms are an exaggeration of personality traits which in turn are related to neuroticism.

Other authors have pointed out that premenstrual tension and dysmenorrhoea are more frequent and severe in women with a background of childhood maladjustment.

Yet a large series of American schoolgirls showed no relation between the incidence of symptoms and social and psychological adjustment. (4)(5).

Katharina Dalton has studied the effects of menstruation on various groups of women. She investigated the effects on work and behaviour in schoolgirls (6) and found that in 1 in 4 there was a deterioration in school work during the

premenstrual period followed by improvement after menstruation. There was also a significant increase in misbehaviour during menstruation, especially among "naughty" girls. (7). She differentiated 2 categories of naughtiness. The first occurred predominantly during menstruation in girls free from psychological stress who also tended to be the more intelligent. The other type of naughtiness occurred evenly throughout the cycles in girls with recognised psychological problems. In other words, she found that the maladjusted were less affected by cyclical variations in direct contradiction to the previous authors. However, she herself demonstrated in a further study (8) of a group of women prisoners (whom one might describe as socially maladjusted) that bad behaviour was usually associated with menstruation. In this same enquiry she was able to demonstrate that among newly convicted prisoners 49% of all crimes had been committed during the 4 days immediately preceding menstruation and the 4 days of the menstrual period, whereas if there had been an even scatter throughout the cycle, the expected incidence would have been only 29%. She speculates whether hormonal changes drive women to commit crimes during this period, or whether lethargy, slow reaction time and mental dullness during the premenstrual period might lead to easier detection, especially among habitual offenders such as shoplifters.

Irritability and depression might lead to loss of temper, violence and assault. Lethargy and depression might lead to child neglect and depression to suicide - all of which crimes do occur more frequently during this period.

Dalton (9) also demonstrated that women are more accident prone during the 8 days of the premenstruum and menstrual period. She interviewed women admitted to hospital following accidents and found that more than 50% had occurred during this period. She suggests that premenstrual lethargy and irritability lead to slowing of reaction time and loss of judgment.

What is the physiological explanation of these changes? It is generally accepted that the premenstrual syndrome is related to the rising level of oestrogen and/or progesterone in the second half of the menstrual cycle with resultant retention of fluid and electrolytes by the body. There is some evidence that mood change and psychiatric illness are related to alterations in fluid and electrolyte balance between the intra cellular and extra cellular compartments of the body.

Confirming this theory, Abramson and Torghele (10) found that symptoms increased parallel with weight gain and temperature but that this occurred in 3 peaks throughout the cycle. The first during the regenerative phase (i.e. after the onset of menstruation), the second at midcycle and corresponding to ovulation and the third and greatest during the immediate premenstrual phase. The minimal weight, temperature and symptoms occurred in the post-menstrual

phase during which time the subjects showed an increase in activity and vitality.

By contrast, Appelby (11), who studied premenstrual tension in his general practice, could not demonstrate any direct relation between weight gain and presumed fluid retention and the severity of premenstrual symptoms. He was able to relieve feelings of body swelling by the administration of diuretics, but this did not influence the headache, irritability and depression.

Russell and Bruce (12) studied premenstrual tension in a group of psychiatric patients who had been admitted with premenstrual symptoms. They followed the weight of 10 patients through 3 cycles and in another 5 they made detailed studies of weight and fluid and electrolyte balance in a controlled environment. In these, increase in weight was accompanied by retention of sodium and water. 5 of their group showed small premenstrual weight gain but more frequently there was a greater increase at midcycle, at the time of ovulation as judged by a rise in temperature. Only 3 of the patients developed premenstrual symptoms and their weight gain was no greater than those without symptoms. They concluded that premenstrual symptoms are not necessarily accompanied by a significant increase in body weight and retention of water and that these changes at ovulation and premenstrually do not inevitably give rise to symptoms.

Thus we have conflicting evidence of the existence of physical and mental changes during the menstrual cycle which may be largely psychologically determined, particularly in neurotic maladjusted women or which may be influenced by biochemical changes within the body as a result of the cyclical variations in hormone secretion and balance.

Dalton and others maintain that there is a loss of physical efficiency and mental drive and stability associated with the premenstrual and menstrual phases of the cycle. This could be expected to have considerable repercussions on the woman athlete.

It is of sufficient interest and importance for the B. M. J. to discuss the problem in a recent annotation. (13). They posed the questions-

1. What is the influence of menstruation on performance?
2. What handicap does it impose?
3. Should women avoid competitive sport during menstruation?

They point out that performers may tend to minimise adverse symptoms because absence from the sport owing to a constantly recurring disability would

diminish their chances of success in a highly competitive field. They also quote the tradition that exercise is a "good thing" for dysmenorrhoea and the belief inculcated by their probably male trainers that anyway the whole thing is psychological and best ignored.

There is very little information in the English literature about the relation of menstruation and sport. The continental literature is extensive but expresses conflicting opinions and is obviously influenced by age old beliefs and superstitions.

It has been claimed by Dalton and others that there is a slowing of reaction time and efficiency during the premenstrual period.

In 1927 Bilhuber (14) reported the results of a longitudinal study on 14 women aged 17-22 at Michigan University. He concluded that the functional periodicity of the menstrual cycle did not affect the motor ability of women in sports.

In 1956 Youngen (15), in a further study at the University of Michigan found no change in the speed of arm movement or simple reaction time of 122 college women as a result of menstruation.

Pierson and Lockhart in Los Angeles (16) found no change in the simple reaction and movement time of 25 women during the menstrual cycle.

In 1960 Bausenwein (17) pointed out that many female athletes have achieved their best performances during menstruation, when records have been made and Olympic medals won.

By contrast, Noack (18) reported a loss of efficiency in the premenstrual compared with the post-menstrual period in German sportswomen.

In 1963 Doring (19) assessed the muscle power co-ordination quotient of athletic effort in different phases of the menstrual cycle, together with the relevant associated psychological factors using the O'Connor psychomotor co-ordination scale and McCance's euphoric index. (20). He found an impairment of athletic performance during menstrual flow, but an even more notable reduction in the premenstruum. He also wondered how much was due to the psychological depression of this phase and how much to the retention of water. As in the study of Abramson et al. he found that the optimum time of the cycle is the immediate post-menstrual phase when performance of individual muscles and neuromuscular co-ordination are at their maximum efficiency.

From Bordeaux comes the result of a massive questionnaire by Rougier and Linquette. (21). They compared a group of 553 students of physical education who indulged in regular prolonged intensive physical exercise with a group of 309 students who undertook 2-4 hours physical activity weekly with a third group of 573 students who did not participate in sport. They found little difference in the incidence of menstrual symptoms within the groups. They could not demonstrate any consistent effect of exercise on menstruation, although there appeared to be some effect on certain individuals in whom exercise increased or diminished their symptoms. Among the physical education students there was evidence of impairment of physical performance related to menstruation.

59% suffered premenstrual tension with a corresponding fall off in performance. Interestingly, a further 11% who suffered no recognisable premenstrual symptoms showed definite fall off in performance, as regards speed, accuracy, strength and fatigability in the premenstrual and menstrual periods.

Thus we have evidence both for and against interference with athletic performance during the menstrual cycle, and no agreement as to whether this is largely psychological or determined by physiological changes within the body.

In considering the position of a woman athlete one must consider the detrimental effect of training or competition on her health and the effect of menstrual changes on her performance. There is no evidence of any permanent harmful physical effect but it is interesting to speculate upon the possible psychological repercussions. If, as suggested, symptoms during the premenstrual and menstrual phases are largely determined by underlying neurotic traits and increased by tension and other traumatic situations, it may well be that in a susceptible woman the strain of competition might increase symptoms to a degree where performance suffered.

As Dalton says - "While zealots campaign assiduously for equality of the sexes, nature refuses to grant equality even in one sex". In any contest 1/6th women could be expected to be at the pre or menstrual phase of the cycle when her performance might suffer. Some gynaecologists are prepared to postpone deliberately a menstrual period if this were due to coincide with an important competition. Although this is usually easily accomplished, the side-effects of the oestrogenic drugs used (nausea) may offset the advantages of delaying menstruation. To this may be added the probable discomfort of prolonging the premenstrual period with its symptoms of tension, etc. An alternative is to alter completely the cycle by inhibiting ovulation and allowing either a painless menstrual period or indefinitely delaying flow. This method requires continuous

hormonal therapy throughout the cycle and would have to be planned well in advance.

At this stage one becomes involved in the inevitable controversy over the administration of drugs to athletes. Certainly, one could not claim that these drugs have direct stimulant or tranquillising effect, although the eventual result may be similar. On the other hand, many of the preparations prescribed for treatment of premenstrual and menstrual symptoms contain either sedative or stimulant drugs in combination with analgesics. One of the most commonly used preparations contains dexedrine or amphetamine - a drug whose use by athletes has been universally condemned.

In summary, medical opinion is divided about the incidence and causation of the cyclical changes associated with menstruation. There is similar lack of agreement about the effect on athletic performance, although there is no question of exercise being harmful to the woman even during her menstrual period.

Finally, I raise the question of therapy for menstrual symptoms and invite discussion on the possible implications of the use of sedative or stimulant drugs during competition.

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