Dysmenorroea and sports activities in adolescents

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Summary: Primary or essential dysmenorrhoea is a panful syndrome which preceeds by a few hours or accompanies the menstrual flow, present above all in adolescents.

The aim of the present work is to evaluate the incidence of dysmenorrhoea in adolescents who practice sports. We examined two groups of athletes who practised sport in their adolescent period: 1) first population of athletes (483 subjects): women who had begun their activity before menarche (*Group A*: 261 subjects) and athletes who had started some years after the menarche (222 subjects); and in this latter group before (*Group* B_1) and after (*Group* B_2) the beginning of sports activity. 2) Second population (281 subjects) comprising: *Group C* (169 adolescents) comprised women who took part in sport only now and then; *Group D* (112 women) whose activity was of an athletic type.

Comparing the percentage of dysmenorrhoea it emerges: 1) that dysmenorrhoea is present in a lower percentage in subjects in Group A (68.19%) in respect to women in Group B; 2) that in a considerable number of girls in Group B it was observed that there was a regression or an improvement in the pain symptomatology after the beginning in athletic activity; 3) dysmenorrhoea was much less in the more intense the sports activity (Groups C and D).

From these data it can therefore be seen that athletic activity of almost any type or level has a positive influence on the dysmenorrhoea symptom, while it does not produce the same effect on other characteristics of the cycle, indeed, in some cases they were worsened.

Key words: dysmenorrhoea; sports activities; adolescents.

Primary or essential dysmenorrhea is a painful paroxysmal syndrome which preceeds by a few hours or accompanies the menstrual flow. Its clinical importance derives not only from the fact that it is a syndrome present above all in adolescents, but also that it is a limiting factor in the scholastic, working and sporting activites of these young patients.

For a long time considered an epiphenomenon, dysmenorrhoea, for the reasons already mentioned, has recently been assumed as a clinical entity in itself even if the pathogenesis in many cases is not easily definable. Various pathogenetic biological factors have been called in question, among them oxytocin, vasopressin, altered estrogen/progesterone relation, endogenous opiods [1, 2].

Now a fundamental role is attributed to uterine hypercontractility associated with raised levels of prostglandin; in particular in dysmenorrhoic cases an endouterine pressure >150 mm of Hg has been reported. The factor responsable for the raised tone and the frequency and width of the contractility may be the increase of

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prostglandin demonstrated in diverse studies concerning cases of dysmenorrhoea ([3, 4, 5]).

The role of prostglandin has been confirmed by the appearance of dysmenorrhoea after the administration of PGF and, indirectly, by the incontestable effectiveness of prostglandin inhibitors on the painful symptomatology during the menstrual flow ([1, 2, 6]). The origin of the higher concentration of prostglandin is still the subject of debate ([7]).

According to the most recent convictions the fall of progesterone in the premenstrual phase determines the destabilisation of the endometrial cell lysomes, with consequent release of the phospholipase which initiates the synthesis mechanism of the prostglandin by the phospholipids of the membrane. Conditions of annovulation or of luteinization defect are also responsable for the same mechanism of prostglandin hyperproduction, on account of the low titres of progesterone ([8]).

On the other hand a defect in the degradation of PG may be realised secondary to an insufficient function of the enzyme degrading PG, PG-dehydrogenase ([2, 5]).

It may be hypothesized that the ADH hormone also plays a part which has a miocontractile and vasoconstrictive action whose increase is often encountered in dysmenorrhoea ([8]).

Other factors might be the variations of the substances which modulate the pain response, first of all, endorphin.

Haemodynamic variations in the blood flow at the pelvic level may also influence the synthesis or removal of PG.

The clinical picture of dysmenorrhoea is essentially constituted by the pain symptomatology, which varies in intensity from a simple feeling of unease to cramping pains.

Usually pain is felt in the pelvic site radiating outwards to the hips, lumbus and crural and inguinal areas. Systemic troubles such as nausea, vomiting and headache are variously present ([9, 10]).

The aim of the present work is to evaluate the incidence of dysmenorrhoea in adolescents who practise sports, and consequently to study and see if sports activity influences the syndrome, and in what ways.

MATERIALS AND METHODS

We examined two groups of athletes (respectively 483 and 281 subjects) who practised sport in their adolescent period, homogenous for age (between 16 and 23 years) race and socio-cultural extraction (students from the various schools in Campania).

They were evaluated as to certain general parameters, such as weight, height, age at menarch, such clinical signs as hypertrichosis, acne, obesity or excessive leanness. Information was required on the characteristics of the sport practised, whether regular athletics or only occasional, the hours of weekly training, frequency of athletic engagements, type of sport (if requiring prolonged effort such as marching, football, volley ball, or shorter but more intense effort such as competitions in speed, high jump etc.) as well as whether they took part in team or individual sports. Anamnestic data were also collected in reference to smoking, use of drugs, hormone treatment including contraceptives, eventual pregnancies or changes in the genital sphere.

Attention was concentrated on the menstrual pain syndrome, in particular on the days it lasted and the moment of its appearance in respect to the flow, on the type and frequency of clinical signs of dysmenorrhoea.

Comparison and collation were made in the characteristics of the menstrual cycle (above all as to rhythm), with the characteristics of the sport practised, referring particularly to the moment of initiation of sporting activity and the degree of intensity with which it was practised.

Therefore in the first population of athletes examined (483 subjects) we evaluated the dysmenorrhoea and the menstrual rhythm in reference of the moment when sports activity started, distinguishing athletes who had begun their activity before menarche (Group A, 261 subjects) and athletes who had started some years after the menarche (222 subjects): among the girls of this latter group we considered dysmenorrhoea and the characteristics of the cycle be-

fore (Group B_1) and after (Group B_2) the beginning of sports activity.

In the second population comprising 281 adolescents we evaluated dysmenorrhoea and characteristics of the menstrual cycle with reference to the intensity of their sports activity, therefore Group C comprised young women (169 subjects) who took part in sports only now and then, while in Group D those (112 women) whose activity was of an athletic type.

CONSIDERATION AND RESULTS

The results are displayed in the Tables included.

The population examined represented a very homogeneous group as to age, ethnic and socio-cultural extraction, the fundamental requisite for our enquiry was that this population undertook, apart from studies, sports activities, sometimes intense and even of an agonistic type.

Dysmenorrhoea resulted present in a very high percentage of the adolescents who had not yet practised sports (80.6%: Group B_1).

Comparing the percentage of dysmenorrhoea in Group A (that is , of athletes who had begun their sports activities before menarche, who could not therefore evince what influence the activity itself had had on the menstrual cycle), with those in Group B (comprosing subjects in whom the menarche had shown before the beginning of sports activity), there emerge two elements of outstanding importance:

1) that dysmenorrohea is present in a lower percentage in subjects in Group A (68.19%) in respect to women in Group B, comprising girls who had not yet started any sports activity;

2) that in a considerable number of girls in Group B it was observed that there was a regression or an improvement of the pain symptomatology after the beginning of athletic activity, without any case of worsening (in fact, comprising Groups B_1 and B_2 it was noted that the "dysmenorrhoea" symptom was absent in

Table 1. – *Dysmenorrhoea.*

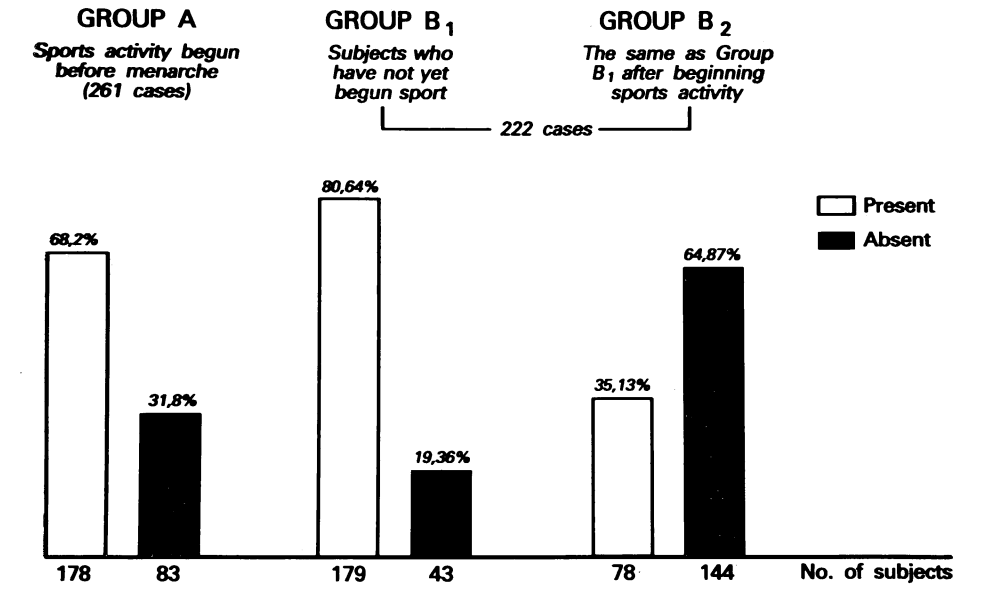
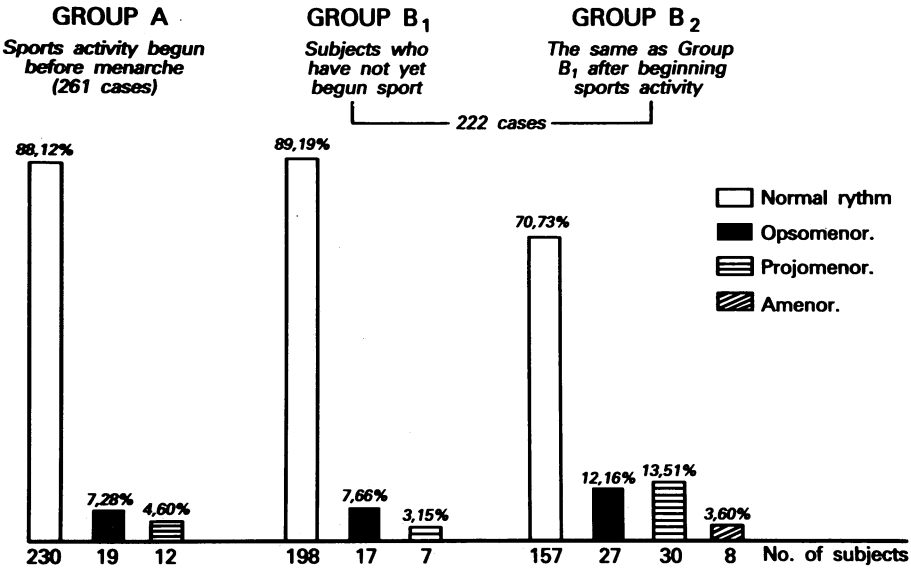


Table 2. – *Rhythm.*



64.86% after the beginning of sports activity). Instead, the comparisons among the other characteristics of the cycle, that is, the rhythm, quantity and duration, showed no significant difference between the two groups of girls (Group A and B_1), (Table 2).

Besides this comparison is was found that in Group B_1 there was a variation in a pejorative sense of the characteristics of the cycle before and after the initiation of sports activity (18.46% of normal rythms became irregular) in contrast to what was happened iinstead for dysmenorrohea (Table 2).

In the second population of students divided into two groups Groups (Group C and Group D) we tried to examine more in depth some aspects of the influence, on the characteristics of the cycle and on dysmenorrhoea, of the sports activity in relation to the intensity with which it is practised.

Group C, students who did not practice sport intensively, just now and then, and who did not take part in competitions of an athletic type;

Group D, students who did engage in sports activities of athletic type.

With regard to the rythm we noted that the percentage of normality was higher in the first group (approaching the percentage of those women who had not yet begun any type of sports activity of the proceeding case series: Group B_1). Instead in the young women who practised athletic types of sport the percentage of subjects with regular rythm was notably reduced (63%: Table 5).

Dysmenorrhoea, on the other hand, was much less the more intense the the sports activity (see Table 7).

We also examined the time of the onset of pain, and found that it was uniformly distributed over the day before the beginning of the cycle, the first day of flow and during the flow, and in the last days was minimal among women who practised sport non-intensively. Instead it as concentrated almost exclusively in the

Table 3. – *Rhythm.*

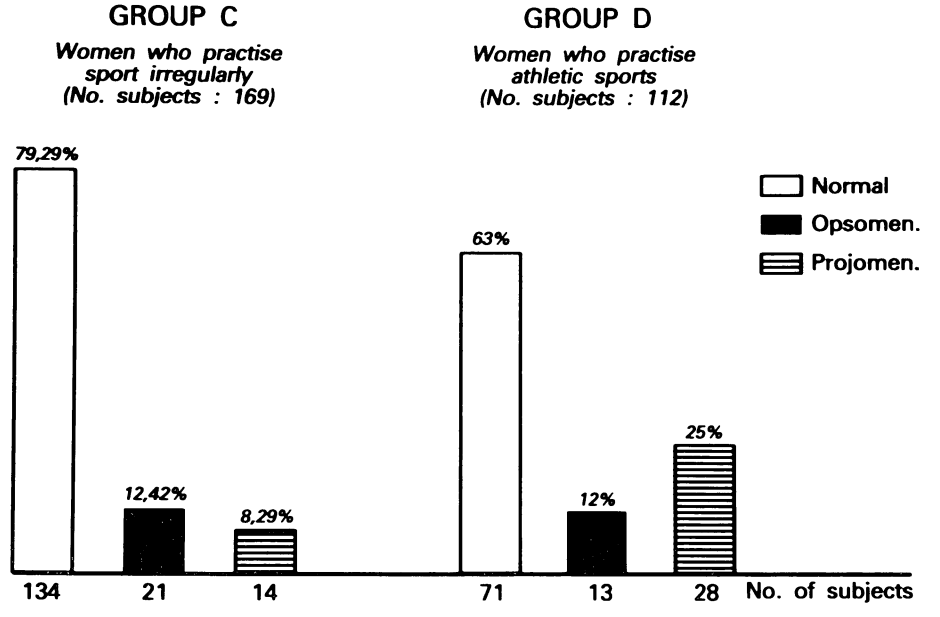


Table 4. – *Dysmenorrhoea.*

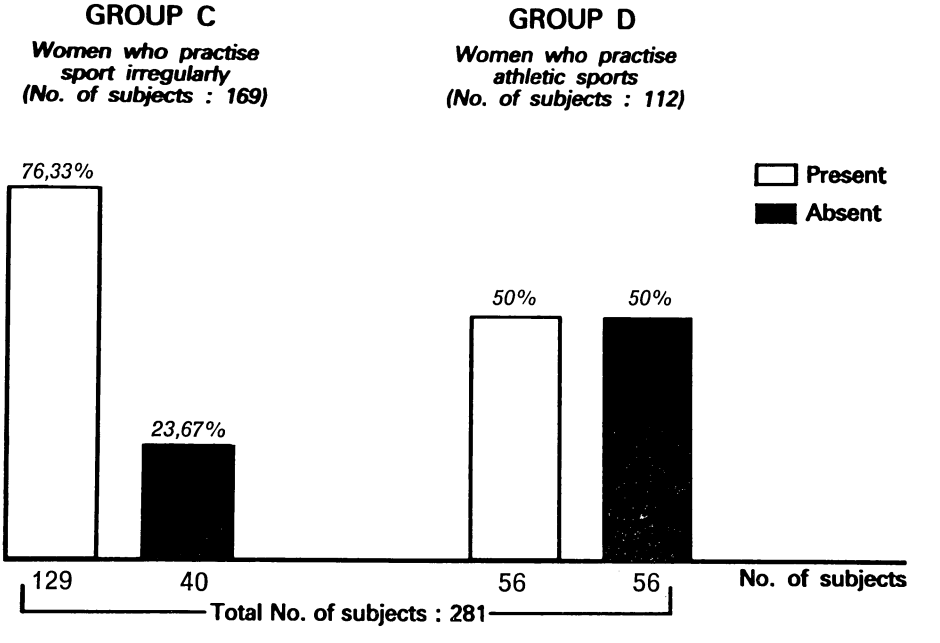


Table 5. – *Moment of appearance of pain.*

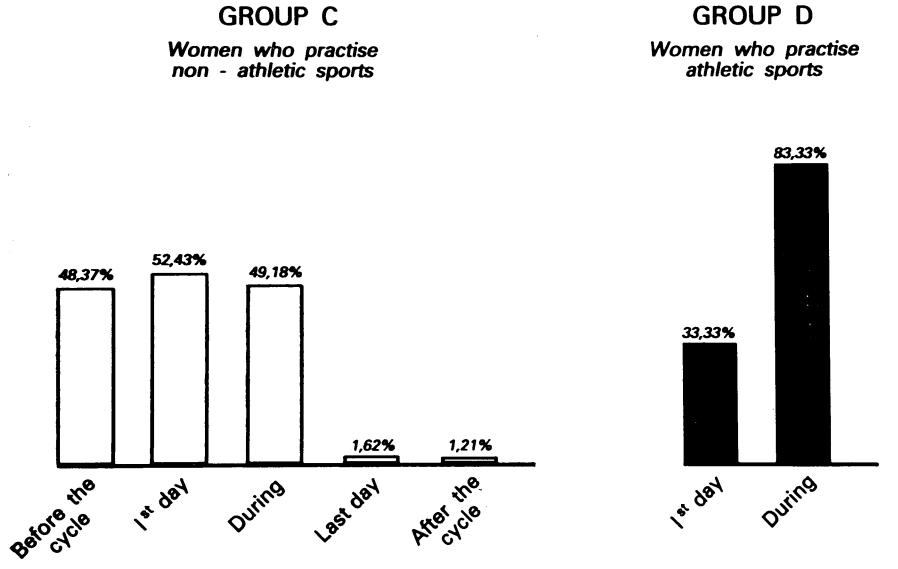


Table 6. – *Characteristics of pelvic pain.*

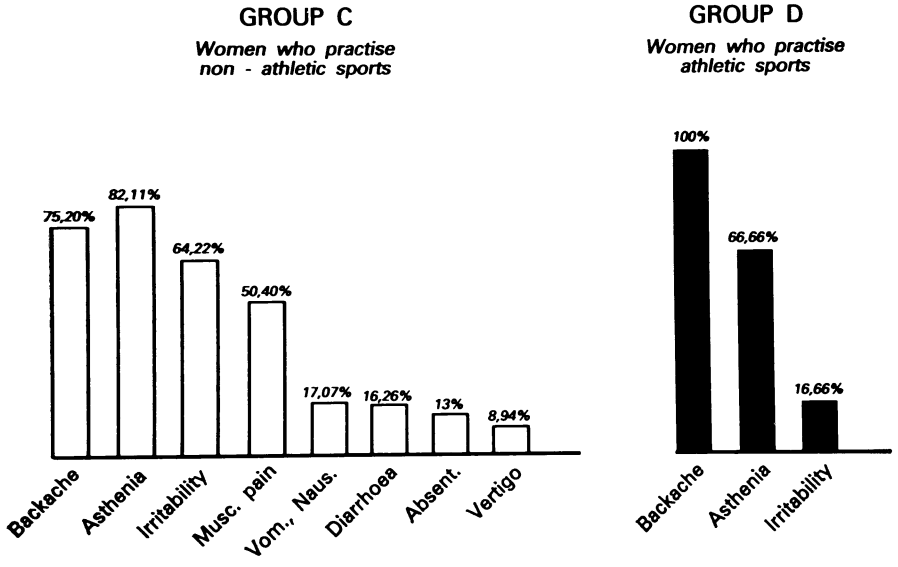
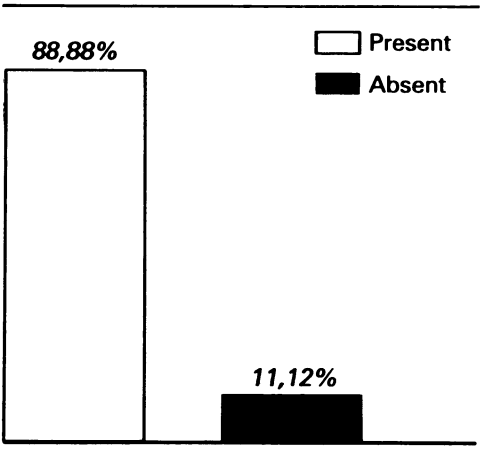


Table 7. – *Association pelvic pain. Smoking ⩾10 cigarettes a day.*



intermediate period of flow among women who practised athletic types of sport (Table 7).

We also examined the characteristic of pelvic pain, finding that in Group C (subjects practising sport non-intensively) there was a greater variability of symptoms in respect to Group D (athletes practising athletic activity), where the symptomatology was characterised almost exclusively by backache and asthenia (Table 8).

With regard to the association between pelvic pain and smoking the high percentage of association between the two parameters was striking (we considered as habitual smokers those who consumed at least 10 cigarettes a day).

From these data it can therefore be seen that athletic activity of almost any type or level has a positive influence on the dysmenorrhoea symptom, while it does not produce the same effect on other characteristics of the cycle, indeed, in some cases they were worsened.

It is therefore likely that dysmenorrhoea does not depend only on the endocrine factors which regulate the menstrual cycle (see estrogen/progesterone relation, also the local synthesis of PG) since otherwise the course of all the other menstrual parameters would follow pari passu.

While it is possible that in some subjects sports activity brings about disequilibrium of the hormones of the hypothalamo-hypophyseal ovarian axis, consequent to the high psycho-physical stress, but also to excessive thinness, vice versa there may be an anatomical and functional maturation of the pelvic organs and of other organs (in particular the liver and the heart) with consequently improved metabolism, perfect hydro-electrolytic equilibrium and perfect haemodynamic conditions which might lead to an improvement of the pain symtomatology.

Among the biological factors that influence dysmenorrhoea in athletes in a positive sense, a very important part might be played by the improvement of the blood flow at a pelvic level.

Also the flow of calcium ions and the number of "gap-junctions" responsable for the excitability and transmission of nerve impulses at the myocele level could vary the uterine musculature of an athlete. Finally, it is also possible that a favourable part is played by the stress hormones themselves and by the opioid system which results in the exaltation of an athlete.

We could also, in concluding, consider that dysmenorrhoea might be improved simply because, as the age of the woman examined advanced a greater maturity in the menstrual function was obtained, though this does not explain why the lowest percentage of dysmenorrhoea in our group of women should have been found among those who practised athletic sport before the menarche.

The conclusion is that sport, if practised without exaggeration, that is, without excessive psycho-physical engagement, can be very helpful to adolescents with dysmenorrhoea: we never encountered an increase in the pain symptomato-

logy, rather, in a number of cases we recorded a net improvement.

The positive influence of sports activities on dysmenorrhoea was met not only when it had been taken up after the menarche in adolescent age, but most markedly if it had begun at a pre-puberal age.

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