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A CRUSADE AGAINST ACUTE RHEUMATISM*

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Rheumatism may be defined as a disease probably infective, at times acute, at others latent, quiescent, subacute, or chronic, of which the chief manifestations are carditis and chorea in children of school age, acute polyarthritis and carditis in adolescents and young adults, and subacute and chronic inflammatory heart disease, fibrositis, and chronic arthritis in later adult life. The term "acute rheumatism" is not synonymous with, and is not restricted to, rheumatic fever, but includes other acute manifestations such as chorea and carditis. Rheumatic fever in itself is seldom a cause of death. In England and Wales during 1933 the crude death rate from this disease was thirty-two per million living; in Scotland during the same year only 171 deaths were registered as due to rheumatic fever.

Acute Rheumatic Carditis

Acute rheumatic carditis is a frequent but not inevitable manifestation of acute rheumatism. It occurred in 46 per cent. of 244 cases of acute rheumatism coming under my observation; acute pericarditis, the least serious form of rheumatic heart disease, developed in 14 per cent., acute endocarditis in 44 per cent.

The immediate prognosis in acute and subacute rheumatic carditis is usually favourable. The illness may be protracted for months, fever and arthritis may recur, and the aortic as well as the mitral valve may become incompetent. Nevertheless the patient may be expected to recover from the acute illness. Virulent cases simulating subacute bacterial endocarditis, running a speedily fatal course, and developing in some instances a terminal haemorrhagic eruption, are rare. Only thirteen of the 244 cases—that is, 5 per cent. of my series—ultimately developed a terminal streptococcal endocarditis. In many patients who are apparently making a satisfactory recovery from uncomplicated rheumatic fever a latent carditis is slowly developing, and may not be detected until months or years later. Moreover, rheumatic carditis developing insidiously and slowly in childhood or adolescence may be a complication and sequel of an apparently trivial rheumatic illness, such as "growing pains" or a mild febrile disorder which was thought to be influenza. Rheumatism often sails under an influenzal flag.

Chronic Mitral Disease

If the patient survives the acute stage he gradually passes into the third phase of the disease, that of chronic mitral stenosis and incompetence without myocardial

failure. A school child who is affected with rheumatic heart disease is in a particularly unfortunate state on reaching the gap between the ages of 14 and 16, for he is not yet able to obtain any benefit under the National Health Insurance Act. Moreover these patients are now faced for the first time with the difficulty of obtaining suitable employment. Many of them, says the school medical officer for Bristol, are perfectly fit for work in factories, but are debarred from this by the stringent medical examination imposed by employers. The result is that unless great care is exercised they drift into more easily obtained but more laborious work.¹

Even although the heart may have remained efficient for ten or even twenty years after having been damaged by acute rheumatism, it often begins to fail at about the age of 40. Approximately one-half or two-thirds of those who have suffered from acute rheumatism become cardiac cripples before the age of 50. Like a tuberculous focus in the lung or elsewhere a rheumatic cardiac lesion may have been "quiescent," and not "healed." In the course of years it "flares up" every now and then, and ultimately kills. The final failure may be brought about by excessive physical stress, intercurrent infections, either acute or chronic, reinfection of the heart, or the development of auricular fibrillation. It is usually mitral valvular disease of rheumatic origin which slowly converts a healthy child or adolescent into a chronic cardiac cripple who drifts in and out of the medical wards again and again. During the last phase of his illness, when the sufferings of the cardiac cripple call for alleviation, digitalis, strophanthus, theobromine, theocine, urea, organic mercurial compounds, and other remedies are often of the greatest benefit. All efforts, however, to cure rheumatic heart disease are foredoomed to failure; our aim should be to prevent the disease.

Early Manifestations

The first manifestations of acute rheumatism do not usually appear in infancy nor in pre-school life. Thus in that section of the report of the medical officer of health to the city of Birmingham for the year 1933 which deals with physical defects in pre-school children neither rheumatism nor heart disease is mentioned.¹² Acute rheumatism as a rule first shows itself in school children and adolescents. In my series of 244 cases the first clinical manifestations of acute rheumatism usually developed between the ages of 5 and 15, most often during the third quinquennium, and seldom after the age of 20. The age incidence in relation to admission to hospital is, as might be expected, somewhat later.¹³

* Portion of an address given to the Forfarshire Medical Association in November, 1935.

The gravity of acute rheumatism as a scourge in school children is disclosed in the annual reports of school medical officers. The table shows the total number of school children in Glasgow and elsewhere who, during the course of one year, were found to be suffering from acquired organic heart disease, this being doubtless, with few exceptions, of rheumatic origin, and from all forms of tuberculosis. The ratio of heart disease to tuberculosis is nearly 5 to 1 in Glasgow, and 5.4 to 1 in Edinburgh. The report of the school medical officer of

School Medical Service

	Number of Children Examined	Heart Disease, "organic" and "acquired"	Rheumatism and Chorea	Tuberculosis, Pulmonary and Non-pulmonary
Glasgow, 1934 ...	52,949	440 (0.83 %)		90
Liverpool, 1934 ...	46,359	156 (0.34 %)		182
Sheffield, 1934 ...	22,395	262 (1.16 %)	162	
Bristol, 1934 ...	16,274	164 (1.0 %)	33	53
Fife, 1934 ...	15,606	33 (0.21 %)		
Edinburgh, 1934...	11,321	82 (0.72 %)		15
Leicester, 1934 ...	10,216	99 (0.97 %)	61	55
Aberdeen, year ending July 31st, 1935	8,922	47 (0.5 %)		2
Dundee, 1934 ...	8,467	36 (0.72 %)		13 and 2 Tb of lungs 47

the London County Council for the year 1934 shows that of the 7,844 physically defective children attending special schools and classes 26 per cent. had heart disease; in Edinburgh 20 per cent. of such children had "heart affections." The incidence of acquired organic heart disease in Glasgow school children during 1934 is greater at 9 years than at 5, and at 13 years than at 9.¹¹

The great frequency of acquired organic heart disease, its greater incidence in girls, and the comparative rarity of all forms of tuberculosis in the same section of the

community is depicted in the figure. In the L.C.C. schools in November, 1933, there were 1,820 children who were chronic invalids, of whom one-third were suffering from rheumatism, heart disease, and chorea, whereas only 11.5 per cent. were disabled by all forms of tuberculosis.⁷ In the returns of November, 1934, the total number of invalids had fallen to 888, and the number of rheumatic, cardiac, and choreic children to 320, because the majority of children who are ill for long

periods are now dealt with at the Council's special children's hospitals. The report goes on to say that the number of children absent on account of rheumatism, chorea, and heart disease still forms a very considerable proportion of the total, and proves how largely this group of diseases is responsible for ill-health in childhood, especially among girls, who account for nearly twice as many cases as boys.⁸

Incidence in Adults

It is not only in children that rheumatic heart disease is frequent. Early last year one in eight of all medical patients in four of the principal hospitals in Edinburgh was suffering from rheumatic heart disease. During the year 1932 in thirteen hospitals in Great Britain, from Aberdeen in the north to Bristol in the south, 38.4 per cent. of all cardiac cases were of rheumatic origin.¹⁰ In the Royal Infirmary of Edinburgh the corresponding figure was 52.8 per cent.

Rheumatism is not only a crippling disease. It starts morbid processes which often lead to death. Carey Coombs estimated that 12,000 persons per annum die of rheumatic heart disease in Great Britain.³ In England and Wales during 1933 the total number of deaths from chronic endocarditis (valvular disease) was 24,919. Mitral valve disease, which is usually due to acute rheumatism, killed 9,673 persons, whereas aortic valve disease, which occurs mainly in syphilitic and senile patients, killed only 3,288. In England and Wales the ratio of deaths from rheumatic heart disease to deaths from all forms of tuberculosis (33,259) is therefore approximately 1 to 3.5. During 1934 in Scotland 1,884 children died between the ages of 5 and 15; 248 died of tuberculosis; 131 of heart disease—that is, the ratio of deaths from heart disease to deaths from tuberculosis was 1 to 1.8.

Causes of Death

Acute rheumatism kills, and its victims are often young. According to Leonard Findlay acute rheumatism contracted in childhood fails to cause heart disease in one-third of the patients, another third die of rheumatic heart disease within ten years, the remaining third become cardiac cripples who ultimately "swell the death rate from rheumatic heart disease, which reaches its maximum incidence during the age period 34 to 45 years."³ Among the chief causes of death the sequelae of acute rheumatism are fast usurping the place held in the past by tuberculosis. Nevertheless, little official cognizance is taken of rheumatic heart disease. For example, the sixth annual report of the Department of Health for Scotland, published in 1934, considers the health of the school child under the headings of nutritional, dental, and other defects, but does not mention rheumatism. Five pages are devoted to tuberculosis, one page is allotted to venereal diseases; scarlet fever, diphtheria, measles, and infective jaundice receive due recognition, but there is no reference to rheumatism. Similarly in the Registrar-General's Statistical Review of England and Wales published in 1935 acute rheumatism as a cause of death from heart disease is entirely ignored.

Against tuberculosis there is an active national crusade, and there is a comparable campaign against venereal diseases. Much is being done to protect the community from tuberculosis and to lessen the death rate not only from that disease, from cancer, and from syphilis, but also from industrial diseases, which do not cause such widespread disability and severe economic loss and so heavy a death rate as does acute rheumatism. It is therefore right and proper that an active crusade against acute rheumatism should begin. The campaign is bound to be long and difficult, because the whole problem con-

cerning acute rheumatism, its nature, origin, prevention, and cure, is far more complex than that of many other diseases. The fundamental difficulty is that we do not know what acute rheumatism is, nor why it arises in one person and leaves another unscathed.

Problem of Causation

Many of the manifestations of acute rheumatism point to its being an infective disease. According to one school of thought, embracing Coburn,² Swift,¹³ and Klinge,⁶ an acute rheumatic illness is a reaction to an antigen-antibody complex in a hypersensitive individual. The alleged hypersensitivity is not an inborn error, but, like an undue susceptibility to tuberculosis, is acquired, and is the expression of faulty reaction to environmental factors, the precise nature of which is still unknown. According to another theory the subject of acute rheumatism is either highly susceptible to a specific virus or has received a massive infection with that virus. A modification of this theory presupposes symbiosis of a specific virus with streptococci.

We no longer live in dread of an epidemic of small-pox, typhus fever, or enteric fever; tuberculosis is steadily being robbed of its terrors. Acute rheumatism, which has been aptly likened to a scourge, continues to take its heavy toll. The time has come for a crusade, active, vigorous, collective, and sustained, against this disease. The general principles to be followed in a campaign against acute rheumatism should be similar to those now being employed successfully against tuberculosis.

The two diseases resemble each other in several respects. Bad environment and malnutrition are important factors in the causation of both diseases. In both the upper respiratory tract is probably the chief portal of infection, whence it becomes disseminated. In both diseases there are exudative processes, and also cellular reactions within connective tissue which eventually heal.

The problem may be considered under three aspects: first, the cardiac cripple; secondly, the rheumatic subject who is not yet affected with heart disease; and thirdly, the pre-rheumatic subject.

Cardiac Cripples

All the measures now employed to alleviate the sufferings of those who are crippled by rheumatic heart disease must be maintained and their scope extended. These patients need more frequent and closer supervision by the family doctor or through the agency of heart clinics. In every part of the country there are voluntary agencies helping to promote the welfare of children who are suffering from rheumatic heart disease. There are convalescent homes where a child may stay for several weeks. In a few centres there is a convalescent hospital in which a patient may reside for months. There are cripples' homes and cripples' aid societies, designed specially for orthopaedic cases, into which a few children suffering from heart disease may be admitted. Neither cripples' homes nor orthopaedic hospitals, however, are the best places for children suffering from rheumatic heart disease; children suffering from orthopaedic defects are often encouraged to take exercise, whereas those suffering from rheumatic heart disease must be encouraged to rest. Further, there are institutions in which a few patients suffering from incurable heart disease may find some relief. But cripples' homes, cripples' aid societies, and hospitals for incurables cannot deal with more than a fraction of the rheumatic cases, and the responsibility for treating most of those patients must fall upon the local authorities. They should provide residential hospital accommodation for cardiac cripples.

Children who are suffering from rheumatic heart disease, but are not yet cardiac cripples, may be able to attend the special schools for physically defective children. For a number of years before the cardiac patient becomes completely crippled he may still be able to undertake light work, whether skilled or unskilled, without suffering any discomfort or harm. Because of his cardiac disability, however, he finds it difficult to obtain suitable employment. There is room in this country for benevolent organizations similar to the "Aide aux Cardiaques" in Paris, and the Heart Association in Philadelphia, which helps to train such disabled persons and to find employment for them in light, sheltered occupations.¹⁴

Rest and Residential Treatment

Those who are suffering, or have recently suffered, from acute rheumatism, but who are not yet affected with rheumatic heart disease, need a long course of treatment. It is doubtful whether uncomplicated cases of acute rheumatism are always given a sufficiently long period of rest. Every frank case of acute polyarthritis should have three months' complete rest under skilled nursing, in the hope of thereby lessening the risk of carditis. Other rheumatic manifestations, such as erythema nodosum and chorea, which are apparently trivial but in reality serious, need a similar period of rest. Convalescence should last for perhaps six months, during which time the patient, if a child or adolescent, should reside in a convalescent home or hospital, where the environment is of the best and where he can obtain not only the physical rest of which he is in need, but also a measure of education tempered to his capacity.

The residential home should be in the vicinity of the city rather than far from it, in order that no undue difficulty may be placed in the way of parents visiting their children. But while the provision of residential homes for convalescent rheumatic patients is clearly necessary the benefit conferred thereby is admittedly not lasting.

It has even been thought that by living in healthier surroundings rheumatic children lose some degree of immunity and become more susceptible to the disease.⁴ In the U.S.A. rheumatic children who had benefited greatly after their transfer from comparatively cold northern States to warmer and sunnier southern States relapsed after their return home.⁹ The school medical officer to the London County Council, however, considers that residential hospital treatment is of distinct value, and according to him, the belief that "the prevention of cardiac crippling depends on early and prolonged treatment of juvenile rheumatism becomes even stronger as information about this obscure disease accumulates." "Rheumatism," he writes, "cannot be prevented until more has been discovered about its aetiology, but there is good hope that its devastating effects on the heart can be minimized or avoided altogether by early and prolonged rest."⁸

After the acute phase of the rheumatic illness has passed an attempt should be made to eliminate infective and toxic foci in mouth, nasal sinuses, and elsewhere, in order that the risk of reinfecting a damaged valve may be lessened.

Necessity for After-care

Like the tuberculous or syphilitic subject the rheumatic patient should remain under medical observation for several years. Having once been frankly rheumatic he may, indeed often does, suffer from time to time from further rheumatic manifestations needing prompt treatment. The rheumatic child who does not continue under medical care is just the type of case in which, some years later, gross mitral valvular disease and a failing heart are discovered. The child ought to have been under the supervision of

the school medical service and attending a "rheumatic clinic," "heart clinic," or "supervisory centre"—namely, an out-patient clinic where children suffering from rheumatic heart disease receive supervision, care, and advice. In some cities the clinic is housed in, and maintained by, a voluntary hospital, and the scope of its work is limited to children who have been in-patients in the hospital. In other cities the cardiac or rheumatic clinic is partly or wholly under the control of the municipality, and deals with a large number of cases. In Bristol, for example, the clinic co-operates closely with family doctors and with school medical officers, who refer to the clinic all children with a history of heart trouble or in whom suspicious signs are found. If out-patient treatment is desirable the child is either referred to its family doctor or to the out-patient department of a hospital. If institutional treatment is necessary the child is recommended for admission to hospital.¹ Rheumatic clinics are dealing essentially with children in whom there is evidence of cardiac involvement. An attempt to study and follow up every case of vague joint pains might render the present clinics unworkable.

Supervisory Centres

One of the great benefits conferred on the community by the Local Government Act of 1929 has been the transfer of Poor Law hospitals to local authorities, who are now providing more hospital accommodation for those, *inter alia*, who are suffering from acute rheumatism and rheumatic heart disease. The "rheumatism scheme" of the London County Council affords a good illustration. Under this scheme, in close co-operation with the voluntary hospitals, 5,466 children were observed at the seventeen supervisory centres of the London County Council during 1934; the figure for the total attendances was 15,340, this being more than twice that of 1930; 1,571 children were nominated for residential treatment, and 1,096 were admitted to special hospitals. The close co-operation which the London County Council maintains with voluntary agencies, including all voluntary hospitals in London, permits of the latter working "not in isolation, but as a comprehensive unit of children's care." But unfortunately the useful work done by rheumatic or heart clinics and supervisory centres—whether they are voluntary agencies or administered by local authorities—does not extend to patients after school age.

Rheumatic Clinics

In every city or county town there should be one or more rheumatic clinics to which there may be referred for advice and supervision pre-school children, rheumatic and cardiac children attending ordinary and special schools, and other rheumatic patients, whether children, adolescents, or adults, who have been discharged from voluntary and local authority hospitals. The clinic should be held within a hospital or dispensary in order that a thorough examination—clinical, radiological, and electrocardiographic—may be made of each patient. As the after-care of the patients at a clinic implies a comprehensive "follow-up" department, the problem is too large for any voluntary organization, and the clinic or supervisory centre and the "follow-up" department ought to be under the direction of the medical officer of health. The rheumatic clinic should receive the same meed of recognition from the public and from the local authority as does the tuberculosis dispensary and, like the latter, should be the agency whereby inquiry can be made into the patient's environment and the health of other members of the family, particular search being made in them for the earliest manifestations of rheumatism.

The problem in respect of these two groups of cases—namely, the cardiac cripple and the patient who is frankly rheumatic but not suffering from rheumatic heart disease—is admittedly a large one, but is even now being faced, and in some measure met. A general adoption by local authorities of rheumatic organizations similar to those of the London County Council is imperatively needed.

Prevention

It is not enough to care for cardiac cripples and treat patients suffering from acute rheumatism. We must try to prevent the occurrence of these conditions. The pre-rheumatic subject presents a most difficult problem. Better personal and social hygiene has lessened the ravages of tuberculosis, but has not yet had any appreciable influence upon rheumatism. The family doctor, child welfare schemes, school medical service, and voluntary agencies are striving to promote the well-being of children, and thus incidentally to prevent acute rheumatism and its dreaded sequelae. The doctors and nurses who are working under a child welfare scheme, which is essentially preventive and consultative, exercise some supervision over the health of children until they attain school age. Thereafter they come under the supervision of the school medical service, and, together with other defective children, enjoy the benefit of periodic medical examinations. Among auxiliary organizations for the promotion of health are holiday homes, where numbers of children receive the benefit of a country holiday. None of these agencies are obviously lessening the frequency of acute rheumatism. Further preventive measures will have to be taken, and they should begin early in life. The Educational Institute of Scotland rightly advocates the medical inspection of pre-school children, the development of nursery schools, and the better education of parents in matters of child life and health.

Scheme for Notification

In starting any preventive scheme local authorities must have the support of public opinion. The people of this country are now alive to the dangers of tuberculosis, but are not yet aware of the rheumatic scourge in their midst. One definite forward step would be the notification of acute rheumatism. As a sudden reform is apt to excite resentment, the voluntary notification of acute rheumatism would be a useful precursor of compulsory notification. If the disease were notifiable, important information would become available regarding the seasonal prevalence of the disease, as well as its general and local incidence. By its house incidence we should learn whether the slums are, in respect of acute rheumatism, Public Enemy Number 1. A new impetus would be given to the slum-clearance movement. Notwithstanding demolition orders or closing orders many of our townfolk still dwell in houses which are dark, damp, overcrowded, and insanitary. If the infective agent of acute rheumatism is transmitted by droplet infection from sick persons or carriers, overcrowding cannot fail to spread the disease. Its prevalence will lessen after the poorer classes of the community have been provided with healthier homes.

It should, however, be borne in mind that acute rheumatism is not confined to the poorer nor even to the well-to-do artisan classes living in large industrial centres. The disease occurs in all sections of the community, although, as might be expected, it is comparatively rare in the children of the wealthier classes, in whom apparently trivial illnesses such as tonsillitis, coryza, and other infections of the respiratory tract are less apt to be neglected, who are better housed, fed, and clothed, and have fuller opportunities for open-air recreation and

country holidays. A child's mode of life, however, may be unphysiological, even although the economic and social circumstances in which it is living are of the best. Although the value of day nurseries, open-air schools, playgrounds, and playing-fields for our city children is being increasingly recognized, our town-bred children are still in need of more fresh air and sunshine.

The frequency with which acute rheumatism is preceded by acute tonsillitis indicates the great importance of preventing tonsillar infection, while chronic nasal and nasopharyngeal catarrh and mouth-breathing should not be neglected.

Co-ordination

At present a rheumatic child may be under the care or supervision successively of a child welfare scheme, children's hospital, family doctor, school medical service, national health insurance practitioner, and general hospital—none working in collaboration with another. The activities of all agencies engaged in the prevention and treatment of rheumatism, whether they are voluntary or civic, whether they are dealing with clinical, laboratory, or administrative matters, ought to be co-ordinated under one head, a rheumatism medical officer, whose functions would be comparable to those of a tuberculosis officer or V.D. officer, and who would likewise be responsible to the medical officer of health.

The Government is now awaking to the fact that measures ought to be taken to lessen the ravages of acute rheumatism. The Board of Education has issued a circular indicating the means whereby effect may be given to that part of the Government's educational programme which does not require legislation. The circular draws attention to the "need for increased provision for the special institutional treatment of children suffering or convalescent from acute rheumatism, since that condition, if not suitably treated, may lead to heart disease." It is suggested that this important problem may be met by using existing voluntary agencies or by co-operation in establishing the necessary residential schools. The Scottish Education Department has issued a similar circular drawing attention to the fact that "children who are ailing, debilitated, or in any way handicapped by their physical condition need special care." The department indicates that "it will be for authorities to review the provision of day open-air schools, residential schools, and holiday homes" and "to extend the accommodation where it is inadequate."

The onus of instructing the people, local authorities, and the State regarding health measures rests upon the medical profession, which has therefore the bounden duty of advising the community regarding the measures that ought to be taken to curtail the scourge of acute rheumatism. Now is a propitious time for that advice to be given.

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THORACOPLASTY IN THE TREATMENT OF PULMONARY TUBERCULOSIS

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During recent years the number of thoracoplasty operations performed in the treatment of pulmonary tuberculosis has steadily increased. In England the operations have been performed mainly by a few surgeons who have specialized in thoracic surgery, and who have by experience learnt which cases are suitable; but judging by the number of surgeons who have been attending operations at the Brompton Hospital it is probable that the operation will in the future be performed more frequently by general surgeons. These, however good their technique, will have had much less experience in the selection of cases. The increasing interest in thoracoplasty as a method of treatment is not confined to surgeons; many more doctors are sending up patients for operation, but often they are entirely unsuitable. There is thus some danger that unsuitable cases will be chosen for operation and, as improvements in technique are always occurring, that some patients will be rejected who would be suitable in the hands of the skilled surgeon.

In considering what type of cases are likely to be benefited by thoracoplasty it is necessary to emphasize the fundamental fact that thoracoplasty affects directly only a local area of the lung, whereas pulmonary tuberculosis affects the whole body. In every case of active pulmonary tuberculosis, in addition to the obvious diseased areas, tubercle bacilli are present in apparently healthy areas of the lung, in mediastinal glands, and intermittently in the blood stream.

Selection of Cases

The patient suffering from pulmonary tuberculosis is menaced in two ways: by (1) the spread of, and poisoning from, obvious lesions in the lungs, and (2) the appearance of new areas of disease by haematogenous or bronchogenous seeding. His need, therefore, is not only to win a local victory by healing a specific lesion, although this may be essential, but to regain his sovereignty over the tubercle bacilli in his body. The immediate effect of thoracoplasty can only be local, though secondary general results may and do occur; lesions in other areas may improve as the result of favourable changes in the immunological process produced by the improvement in the main lesion, but the changes are not uniformly beneficial, especially during the period immediately following the operation. Even locally thoracoplasty can only be a therapeutic success if healing was previously prevented by the mechanical causes which have been removed.

Thoracoplasty should be considered in all cases of pulmonary tuberculosis which have not achieved arrest of the disease by other means, but before recommending a thoracoplasty in any case the following conditions must be satisfied:

1. The lesion for which it is proposed must be the type which will heal if mechanical impediments are removed, and the thoracoplasty must be likely to remove them.
2. If lesions are present in the other lung they must be "inactive."
3. Fresh "flares" in apparently healthy areas must be improbable.
4. The patient must be fit for the operation.
5. The patient must have reached the most favourable moment for the operation.