Contemporary Themes

Exercise: cult or cure-all?

TONY SMITH

Many doctors seem still to have a dogmatic irrational belief in the virtues of rest as a treatment for any condition for which they have nothing more specific to offer. All too often they see vigorous activity as potentially dangerous and to be discouraged.

Within the past 10 years or so, however, medicine has begun one of its most spectacular volte-faces on this issue; early mobilisation and exercise have become the accepted management for a whole range of common disorders which used to be treated by prolonged bed rest—myocardial infarction being the prime example. British doctors have been slow to join this movement, spearheaded in Scandinavia and the United States, probably because those countries have also been in the forefront of the mass popularity of running and more recently marathon running. Indeed much of the current research on exercise is being done by epidemiologists, physiologists, and clinicians who are personally committed to regular exercise.

London Marathon 1983—start.

Morning joggers

This conviction by medical scientists in the value of their own prescriptions was very evident at a symposium on exercise, health, and medicine held earlier this month at Lilleshall National Sports Centre, Shropshire (organised by the Sports Council, the Medical Research Society, and the Health Education Council). Each morning saw figures wearing their university sweat shirts pounding round the grounds of the ex-stately home before mounting the speakers' rostrum. Between runs, the participants looked both at the physiology of exercise and its more clinical aspects—the gains and the alleged dangers.

Physical activity has dramatic, almost spectacular effects on body function. Physiologists are much concerned with work capacity, which they measure by techniques such as the uptake of oxygen and the production of heat as well as by the physical work actually done. Measurements of this kind show that if any physical task is repeated on a daily basis the body quickly works more efficiently. The individual cannot fail to notice that a task that made him hot and sweaty on his first attempt can soon be achieved easily and without obvious breathlessness. What actually happens in these circumstances was explained by Professor Bengt Saltin (Copenhagen). Training affects both the heart and the muscles. The stroke volume of the heart is increased—so that a fit man has a much slower pulse than an unfit one at the same cardiac output. At the same time increases occur both in the vascularity of the muscles and in the number and size of their enzyme containing mitochondria. Furthermore, trained muscles use more lipids and less glycogen as their source of energy—a change which probably underlies the known effect of regular exercise on the ratio of high and low density lipoproteins.

Age and inactivity

Perhaps the physiologists' most important messages for the clinician were, firstly, that these effects of physical training can be observed at all ages—middle aged and older men and women adapt to training in the same way as young adults—and, secondly, that the changes are reversed within 40 to 45 days of a return to a sedentary life. Furthermore, prolonged bed rest has effects opposite to those of training—so that someone who has been confined to bed will become breathless and fatigued far more quickly than before at the same level of activity.

Clinical implications

How should clinicians respond to the growing body of evidence on the physiological effects of exercise? Professor R H T Edwards (University College London) urged them to consider using exercise both in diagnosis and in treatment. That advice has certainly been followed by cardiologists. Professor Natalie Wenger (Emory University, United States) reviewed the dramatic decline in the past decade in the time spent by patients in hospital after myocardial infarction and made the

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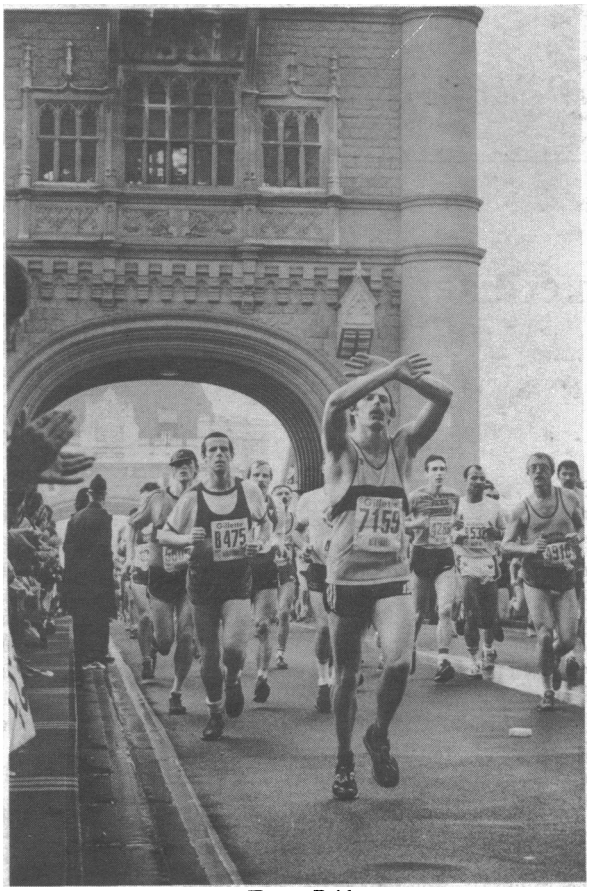
point that a fit man may be damaged more than a sedentary worker by a period of imposed bed rest. Conversely, even taking a patient out of bed and sitting him up in a chair was enough to reverse the hypovolaemia of inactivity.

She went on to explain how physical training could benefit patients after recovery from their infarcts. By improving the efficiency of the heart and the peripheral muscles training increased the distance between the demands of usual physical activity and the threshold of myocardial ischaemia. This training effect was, said Professor Wenger, the only proved physiological benefit of exercise. There was no evidence that exercise improved the collateral coronary circulation. Fortunately the public (in the United States) was now aware that doctors (in the United States) no longer invariably restricted activity for their patients with coronary disease, and this made exercise programmes more acceptable.

As for the psychological effects of exercise: the man in the street knew that exercise made him feel better, said Professor W P Morgan (Wisconsin), and who would want to deny it? Indeed many American runners believed that running was potentially addictive, possibly through the release of endorphins during runners' "highs." Exercise might, he suggested, have a place in therapeutics too: patients with mild to moderate depression often responded poorly to drugs and might well do better with the mood enhancing effects of an exercise programme.

Patients with chest disease might also benefit from physical training—and for the same reasons as those with heart disease, said Professor G Grimby (Gothenburg). By improving the efficiency of the heart and the muscles a trained patient could achieve the same level of physical activity with less breathlessness. A more specific gain might be seen in patients with asthma induced by exercise, in whom a training programme often reduced the severity of this response. Exercise also helped patients to breathe more deeply, so helping the elimination of secretions.



London Marathon 1983—Tower Bridge.

Claudication and diabetes

If the last two speakers had been somewhat tentative, there was no equivocation from Professor T Schersten (Gothenburg): exercise is a proved, effective treatment for patients with peripheral vascular disease causing intermittent claudication. Within two to three months of the start of training most patients would double their walking distance. This effect was not, he said, due to any improvement in blood flow or change in gait; the key seemed to lie in an increased metabolic capacity in the muscles, probably induced by the hypoxia that occurred regularly during exercise. Professor Schersten's message for other clinicians was plain: all patients with intermittent claudication should have physical training, since it would improve their symptoms with no risk of complications and might give results as good as if not better than reconstructive surgery.

Exercise might also be the treatment of choice for type II diabetics, said Professor M Berger (Dusseldorf) but they were difficult to motivate. Type I diabetics could take vigorous exercise safely if they had been taught how to modify their insulin dosage—and doctors should accept that diabetics had a right to expect appropriate advice rather than restrictions.

Exercise as prophylaxis

The man in the street knows that exercise makes him feel good: he also believes that it protects him against coronary disease. Professor R S Paffenbarger and Dr W L Haskell (Stanford University, United States) reviewed the evidence accumulated over the past 30 years in support of that belief and discussed the possible mechanisms. Exercise had to be a lifelong activity if it was to be beneficial, said Professor Paffenbarger. Indeed young men who had been athletes at university and then stopped taking exercise seemed at greater risk of heart disease than men who had never been athletic. The unanswered and crucial question was the nature of the exercise needed to give the most useful protection against sudden death as well as other features of coronary heart disease. Some studies suggested that repeated, really vigorous exercise was required (heavy work by longshoremen, hobbies such as gardening requiring heavy digging), while other work suggested that even moderate amounts of habitual exercise gave real benefit to most people.

What people needed to remember, said Dr Haskell, was that the epidemiological evidence was based on individuals who walked a lot, climbed stairs rather than using lifts, dug their gardens regularly, and used their muscles around the house for regular chores. The epidemiologists had not studied runners —and certainly not marathon runners.

How did regular, moderate exercise protect against coronary disease? Experiments in animals showed that exercise could delay or reverse the progress of atherosclerosis or improve the coronary collateral circulation, but these results had not been duplicated in man. Nor had clinical studies confirmed in man the finding in animals that exercise raised the threshold for ventricular fibrillation. On the other hand, exercise had clearly been shown to decrease the myocardial oxygen demand—hence its benefits for patients who had had infarcts—and to produce a less atherogenic profile of lipids in the circulation.

Hazards

If, then, doctors are to encourage their patients, fit and not so fit, to take regular exercise, what are the risks? Do many joggers drop dead?

The only specific data on that question came from a study described by Professor P D Thompson (Rhode Island, United States). In the six years between 1975 and 1981, 12 men had died while running or jogging in Rhode Island. Calculations gave a death rate of one per 396 000 miles of jogging. The death rate was seven times that of non-vigorous activity. With such a low rate and risk Professor Thompson did not believe there was any value in routine medical examination of asymptomatic subjects intending to take up running or jogging.

In Canada, where the government had tried to encourage the population to take up exercise, efforts had been made to teach people to assess their own health and fitness. Professor R J Shephard showed the meeting the working of the Canadian home fitness test, administered by the subject himself using his staircase and a gramophone record. He agreed with Professor Thompson that medical examinations were not cost effective.

What about the patient with symptoms of coronary heart disease? Would he be likely to drop dead in the exercise laboratory? The answer was no, said Dr R W P Campbell (Newcastle upon Tyne). The cardiologist conducting an exercise test would usually see signs of ischaemia well ahead of any risk of arrhythmia—and resuscitative facilities were always available. The reported mortality rate of 0·01% was attributable largely to massive myocardial infarction.

Tests in an exercise laboratory could be of great value for individual patients, since these could identify those with severe underlying coronary disease and those for whom regular exercise could be recommended as both safe and desirable. The patient at most risk was the one undertaking sudden, severe, unexpected exercise—typically, said the North Americans, the man shovelling snow in the first blizzard of winter.

By contrast the marathon runner was unlikely to do himself serious harm—provided the organisers knew what they were doing and, firstly, made sure runners knew about the practical aspects of thermoregulation and, secondly, were prepared to call off a race in conditions of unacceptably high humidity and heat combined. Dr J R Sutton (McMaster University, Canada) explained how some runners might become hyperthermic and others hypothermic in the same race. Medical teams should be properly trained to distinguish these conditions (by rectal temperatures) and to give the appropriate treatment. Hypoglycaemia would also present problems unless recognised and treated promptly.

Way forward

Exercise medicine is, then, at an early stage of development but it is responding to pressure from consumers. The meeting highlighted the vast areas of ignorance that still exist: in particular so long as we still do not know how exercise produces its benefits we shall be unable to give any more specific advice on the type of exercise optimum for health protection. Nor should we tell the middle aged public to go along to their doctors for advice before taking up sport if there is no consensus on what the doctor should do. Physiologists and epidemiologists will need to combine their efforts—for the physicians/exercise enthusiasts at the meeting were clearly torn between their belief as sportsmen that exercise was good medicine and their recognition as scientists that the reliable evidence is still thin and patchy.

What is the place of high dosage of oral steroids in treating severe cases of herpes zoster, particularly when the ophthalmic division of the trigeminal nerve is affected?

Both local and systemic steroids may be used in managing herpes zoster ophthalmicus. The rationale of using them is to reduce acute inflammatory oedema and subsequent tissue scarring (which may be an important factor in the aetiology of postherpetic neuralgia). Despite the theoretical risk of inducing widespread virus dissemination, many would recommend systemic steroids in all cases of herpes zoster ophthalmicus. Definite ophthalmic indications for their use include proptosis, optic neuritis, and oculomotor palsy. An initial dose of 60 mg prednisolone (or equivalent) should be rapidly reduced to a small maintenance dose for the duration of the attack. Ocular complications occur in about 50% of cases and must be suspected when vesicles extend down the side of the nose (indicating involvement of the external nasal nerve). Stromal keratitis, episcleritis/scleritis, and anterior uveitis all respond to local steroids. Care should, however, be taken to monitor the progress of the eye with particular reference to a concomitant herpes simplex infection (which occurs only rarely) or raised intraocular pressure (which is much more common). Local steroids may have to be used over a prolonged period because of the high incidence of recurrence of keratitis and uveitis if treatment is prematurely stopped.—J H HOWE, consultant ophthalmic surgeon, Newcastle upon Tyne.

Is there any hazard to schoolchildren attending a summer camp in an area where liver fluke is a common ailment in the local sheep? Should the camp drinking water be chlorinated?

Liver flukes (*Fasciola hepatica*) are common parasites of sheep and cattle in Britain but may also occur in the bile ducts of other domesticated and wild animals and in man.[1] The life cycle is rather complicated, but knowledge of its broad outlines is helpful in preventing infection. Eggs passed in the faeces of sheep develop under moist conditions to a motile stage that bores its way into a small mud snail (*Lymnaea truncatula*). Here it multiplies, and after about two months a tadpole like stage breaks out of the snail. This swims about in a film of moisture for a few minutes, after which it loses its tail, and the cyst stage, called a cercaria, sticks to a blade of grass or other vegetation and develops a protective wall around itself. This metacercaria, which is just visible to the eye, is infective to sheep—or man. Since the one snail that is suitable for the parasite is a mud snail, it is uncommon in rapidly moving streams, and, since the infective stage sticks to vegetation soon after it leaves the snail, it is unlikely that any metacercariae will be present in water from mountain streams. A much more likely source of human infection is by eating wild watercress or even chewing blades of grass on which the parasite has encysted. Strict rules are enforced for cultivated watercress so this is not dangerous, and almost all the cases described in man have been in people who have eaten wild watercress.[2] If the water source is contaminated by animal faeces or by the presence of animal carcases then certainly chlorination should be carried out to avoid any risk of infection from organisms such as salmonella.—M J CLARKSON, professor of preventive medicine, Liverpool.

[1] Soulsby EJL. *Textbook of veterinary clinical parasitology. I. Helminths.* Oxford: Blackwell Scientific Publications, 1965.
[2] Aardman EW, Jones RLH, Davies AH. Fascioliasis—a large outbreak. *Br Med J* 1970;iii:502-5.

Are hairdressers particularly prone to develop "frozen shoulder"? Can the condition be prevented, and if not what treatment is advised?

Hairdressers, in common with secretaries, tailors, dentists, and violinists, are particularly prone to develop pain in the shoulders. This is usually pain referred from the neck to the interscapular or suprascapular area, the deltoid area, etc, and depends on the particular level of nerve pressure in the cervical spine. A variety of shoulder complaints may ensue, including "frozen shoulder," but they are rarely a true involvement of the shoulder. The problem may be lessened by measures designed to raise the client—or his work—relative to the patient's head, so that the patient's head and neck are kept relatively straight. This may be achieved either by raising the client in his chair or advising the hairdresser to use a stool on wheels. Such preventive measures are, however, usually unpopular. Exercises to strengthen the cervical and shoulder girdle muscles are important and need to be continued long term.—J M GUMPEL, consultant physician (rheumatology), London.