Sports medicine review

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Curriculum Vitae

SAVILLE FURMAN graduated from UCT in 1973 and entered general practice in December 1974. He obtained the MFGP(SA) in 1977. Aged 38, he has a wide field of interest in medicine, the main 2 being, 'Doctor-Patient Relationship' and 'Sports Medicine'. He is President of the Balint Society of South Africa, Chairman of Western Cape Region of the SA Academy of Family Practice/Primary Care, a member of the Academy Council, leader of the Milnerton GP Discussion Group and is on the Editorial Board of SA Family Practice. He received the Louis Leipoldt Award for the best GP paper published in the SA Medical Journal in 1980: 'Unwanted Pregnancy – the Role of the GP'. He has run 12 marathons and 4 ultra-marathons since 1982. He is also a keen photographer and an avid reader. He is married to Shelly and has 2 children, Donna (11) and Graham (9).

Summary

The author reviews several publications on sports medicine and concludes that medicine in general has not kept pace with sports medicine this last decade. He highlights myths about exercise and stresses the need for the GP to be a well-trained, effective sports medicine doctor.

KEYWORDS: Sports Medicine; Physicians, family; Health; Exercise, physical.

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Definition

The Constitution of the American College of Sports Medicine defines sports medicine (SM) as: 'Knowledge concerning the motivation, responses, adaptations, and health of persons engaged in exercise'.

Introduction

In 1976 $147 million was spent on running shoes in the USA. The figure rose to $421 million in 1982. In 1973 the Boston Marathon had 1 572 entrants; in 1983, to keep down the entrants to a manageable 6 682, the men's qualifiying time was changed to 2 hours and 50 minutes.[1]

There was a record entry of 5 490 runners for the 1986 Two Oceans Marathon (56 km) in Cape Town on March 29th. Of these 2 430 were novices (44,5 % of the field). There was a total of 220 'husband-and-wife teams'.[2]

In 1921 34 entrants lined up for the First Comrades Marathon. This had grown to 1 239 in 1971 and reached over 9 000 in 1985.[3]

Figures such as these reflect sports participation, and they do not say much about sports medicine. Many groups conduct injury surveys but they are selective and often depend on voluntary reporting. The definition of injury varies according to the investigator.

Few physicians practice sports medicine full time. It is still a side-line to the physician's speciality. Not only is it a side-line, but to many physicians sports medicine is also a hodge-podge of techniques and treatments borrowed from several specialities, such as orthopaedics, paediatrics, cardiology, family practice, surgery and internal medicine. Throw in the osteopaths, physical therapists, exercise physiologists, nutritionists, dieticians, athletic trainers, podiatrists and physical educators who fall under the sprawling sports medicine umbrella, and the hodge-podge label sticks a little firmer (John Bergfield).[4]

For many doctors sports medicine is just a hodge-podge of techniques and treatments borrowed from several specialities.

We see many people claiming to be sports medicine experts. Every medical speciality is trying to get its fingers in the pie. This increases competition and there are certain territories within each speciality that people guard jealously; this reduces the quality of care and is not in the interest of the athlete, because there is no freedom to refer patients back and forth between sports medicine clinics (S Newell).[1]

Medicine has not kept pace with sports medicine in the past 10 years.

Sports Medicine is a fragmented field. It is not reserved for the physician; he is just one member of the sports medicine team. The primary care physician has been described as 'The Captain of the Ship'. Care of the whole person is a speciality of this member of the sports medicine team. He must be an expert in the use of available resources, is armed with a strong basic fund of knowledge and the skill of communication, and knows his or her limitations.[5]

THE LAST DECADE

The last decade has seen vast advances in the science of sports medicine with the advent of diagnostic aids such as CT scanning, bone scanning, echo-cardiography and computerised exercise ECG readings. People are using a bio-chemical approach to the treatment of injuries. Science has helped in the improvement of running shoes, and advances have also been made in wind-resistant cycles. Rehabilitation techniques have made great strides which assist sportsmen in returning to their sport much quicker than in the past.

In 1973 sports medicine was merely the exclusive province of the orthopaedic surgeon and its focus was care of sports injuries. The public at large, and the medical profession have recognised almost simultaneously that participation in sports is not just for the exceptional but an important part of everyone's life.[1]

In 1973 the world was not ready for sports medicine. In the past 10 years medicine has not kept pace with sports medicine. It has been disappointing to see the lethargy of the medical profession; physicians do not seem to have time to devote to wellness. "I am delighted to see the changes in the attitude of some physicians, but quite often they are changing because they are forced to keep up."[1]

Physicians do not seem to have time to devote to wellness.

During the past few years obstetricians and gynaecologists have become increasingly aware of the importance of exercise for their patients. Many who previously discouraged their patients from exercising, now accept it and even encourage their efforts and interests. In fact, increasing sports participation by so many women has led to a great awareness of the special concerns that are related to obstetrics and gynaecology.[1]

W Heintz from the Ohio State University College of Dentistry believes that the most important development in the last 10 years has been the steady increase of mouth protectors in sports. Also advances in endodontics, dental restoration and maxillo-facial repair represents great progress for athletes.[1]

Fracture bracing was perfected in the 1970s. Almost all new concepts in fracture management allow earlier mobilisation of joints and rehabilitation of muscle tendon units. Long bone or diaphyseal fractures are no longer immobilised above and below the joint. Patients with leg fracture braces are allowed to bear weight and are encouraged to move their joints. Isolated fore-arm fractures and numerous fractures are protected in a brace and allowed relatively unresticted use. Advances in medical grade fibre glass and plastic technology have allowed the practitioner to fabricate durable and inexpensive braces.[1]

Another area that has made great advances is *arthroscopy*. At first arthroscopic technology was used to improve diagnostic accuracy, but in the past

decade triangulation techniques and novel instrumentation have allowed intra-articular surgery under arthroscopic control. Arthroscopic surgery is now 'the state of the art' for loose body and meniscus derangement.[1]

THE ATHLETE'S HEART

One major advance in cardiology is the greater awareness of normal variations in the cardiac examination and laboratory studies of athletes. Echo-cardiographic studies have enhanced the understanding

Fit marathon runners can have serious cardiac disease.

of the athlete's heart. Isotonic sports (running, skiing, swimming, cycling) tend to produce left ventricular dilatation without marked left ventricular hypertrophy. Isometric activities (wrestling, weight-lifting) increase left ventricular wall thickness and mass. Non-invasive studies such as echocardiography and radionuclide stress scans can be useful in screening athletes with signs and symptoms of potentially lethal disorders.

Sudden death in youth athletes has been shown to be most commonly due to hypertrophic cardiomyopathy. In middle-aged runners, the cause is most likely ventricular fibrillation, triggered by underlying coronary disease. Regular exercise may elevate high density lipoproteins (HDL), reduce blood triglycerides, improve insulin binding to receptor sites (facilitating glucose metabolism), increase fibrinolysis, facilitate weight loss, raise endorphin level, and blunt type A personality tendencies. The latter has emerged as a major coronary risk factor, joining hypertension, hypercholesterolemia, and cigarette smoking.[1]

SOME MYTHS ABOUT EXERCISE

MYTH 1: *Running causes arthritis*

There is little in the literature to prove or disprove that running is bad for the joints. It would take a 40-year prospective study to document the effect of running on the hip and knee joints. Studies of Finnish athletes, professional soccer players, physical education teachers and even sports parachutists have shown that the incidence of osteoarthritis is no higher in these sportsmen than found in the non-athletic population.[6] Roger Sohn, an orthopaedic surgeon, conducted a retrospective study of male athletes from 7 Eastern colleges in the United States. He sent a questionnaire to all swimmers and cross-country runners who competed from 1930 to 1960. Runners reported fewer pain symptoms than swimmers. Only 2 % of runners and 2,4 % of

Running 40 km a week is not harmful for joints.

swimmers had severe hip and knee pain and when mild and severe pains were combined, runners had an incidence of 15,5 % which is still less than swimmers, 19,5 %. Furthermore, there was no relationship between heavy mileage or years of running with the incidence of osteoarthritis. Only 0,2 % of runners had surgical treatment of osteoarthritis. Sohn concluded that running about 40 kilometres per week – which he said is about the average for recreational runners – is not harmful for the joints.[7]

MYTH 2: Exercise prevents ischaemic heart disease

In May 1982, Tompson and his colleagues reported that the incidence of death during jogging for men (age group 30 – 64) was 1 per year for every 7 620 joggers or approximately 1 death per 396 000 man-hours of jogging. This rate is 7 times the estimated death rate from coronary heart disease during more sedentary activities in Rhode Island and suggests that exercise contributes to sudden death in susceptible persons. They further conclude that the occurrence of only 1 death per 7 620 joggers per year demonstrates that the risk of exercise is small and suggests that the routine exercise testing of healthy subjects before exercise training is not justified.[8]

"... fitness and health aren't the same thing."

Gary Legwald, Managing Editor of *Physician and Sports Medicine*, in May 1985 asked, 'Are we running from the truth about the risks and benefit of exercise?'[9] The American Heart Association (AHA) has questioned exercise as something that can lower risk factors for heart attacks. In the AHA 1985 edition of *Heart Facts*, the best the AHA can say for exercise is that in 1985 an average of 4 100 people in the USA will have heart attacks daily and that lack of exercise has not been clearly established as a risk factor for heart attack. But, when combined with over-eating, lack of exercise may lead to excess weight, which is clearly a contributing factor. A doctor should be consulted for the physical activities that best suit the age and physical condition of the individual.

In 1978 the American College of Sports Medicine recommended 15-16 minutes of continuous aerobic activity 3-5 times per week at 60-90 % of maximal heart rate.

In his book *'The Exercise Myth'*, Henry A Solomon ends his first chapter by saying, 'You may enjoy exercise, it may be helpful socially; it may make you look and feel better. But all the rest is a myth; exercise will not make you healthy, it will not make you live longer, fitness and health aren't the same thing'. Fitness is the ability to do physical work or physical activity. It does not reflect the presence or absence of disease and implies nothing about the actual health of your arteries or your health. Cardiovascular health refers to the absence of disease of the heart and blood vessels, not the ability of the individual to do a certain amount of physical work. He continues that running affects primarily the peripheral

The entry for the 1986 Two Oceans Marathon was 5 490.

circulation and the muscle, not the heart. There is a training effect, he admits, which leads to a lower heart rate, but there's no evidence that a slower heart rate is healthier than a faster heart rate. The fact is that not only do exercisers suffer from the usual ills that plague us all, but the leading cause of exercise-related deaths in well-trained people, is coronary heart disease.

B Franklin said that we do not have definite studies about the benefit and limits of exercise. It reduces body weight, cholesterol, and depression, but the lack of exercise is not as important a risk factor as blood pressure, diet and smoking.[9]

Paffenbarger did a study in 1984 of the health and habits of 17 000 Harvard graduates between the ages of 35 and 84 and showed the risk of coronary heart disease declines as one becomes more physically active. The report showed that coronary heart disease (CHD) was reduced substantially among men who used 2 000 calories or more per week in leisure time exercise as compared with those who did not.[10] Siscovick showed that the chances of death from cardiac arrest is slightly greater among men who regularly exercise at the highest activity level. But the overall risk of cardiac arrest among the same group was only 40 % of that of sedentary men.[11]

An editorial in the *New England Journal of Medicine* said that exercise was a protector and provoker of sudden cardiac death, but any short-term risk of exercise is out-weighed by the long-term beneficiary effects of physical activity.[12]

Noakes, in a study of 21 marathoners who died suddenly or developed symptoms of ischaemic heart disease, found that the most common diagnosis was coronary atherosclerosis and 86 % of the runners had blood lipid abnormalities; 66 % had a family history of heart disease; 81 % developed symptoms of ischaemic heart disease; and the majority ignored the symptom and continued to train or race without seeking medical advice. He concluded: *Physicians should not assume that physically fit 'marathon runners cannot have serious, life-threatening cardiac disease'.*[13] Morris et al in 1980 concluded that vigorous exercise is a natural defence of the body with a protective effect on the ageing heart against ischaemia and its consequences.[14] More recent studies further extend these observations. In a study carefully designed to exclude all known confounding variables, Siscovick and his colleagues have shown that persons who exercise vigorously have an overall risk of sudden death, approximately two-thirds lower than that of non-exercisers. Interestingly, the risk that the smaller number of sudden deaths in the exercising group would occur while these persons were exercising was increased acutely for the duration of the exercise bout, above the overall risk of the non-exercisers.[11]

Thus, although the total group of exercisers had a reduced risk of sudden death, that subset of exercisers with heart disease who would ultimately die suddenly, were more likely to die while they were exercising than when they were at rest. This finding helps to explain why the sudden death of athletes usually occurs during exercise and why such events must not be construed to indicate that exercise is dangerous and should therefore be avoided. Were the exercising group to stop exercising, their risk of sudden death would increase three-fold.

The study of Siscovick and his colleagues therefore confirms the findings that risk of sudden death is reduced in persons who exercise regularly and suggests that this is almost certainly not due to the presence of confounding variables. However, they

". . . exercise will not make you healthy."

also show that there is an increased likelihood that those persons who have coronary heart disease, despite regular exercise, die during the short period that they exercise. Were such persons to avoid all exercise, however, their overall risk of sudden death would be increased and not decreased.

MYTH 3: *Runners face the risk of lead-poisioning from car fumes*

The evidence that runners have increased risk of lead pollution is at best currently rather scanty.[15] The report from the Faculty of Dentistry at Stellenbosch University stands out as the only study in the world which shows that runners have higher blood levels than do other controlled subjects.[16] Studies done of runners in the Cape Town area were unable to show similar high blood levels as those measured by the Stellenbosch team in a group of Two Oceans Marathon runners in 1984. The blood levels among UCT runners were not greatly different from those

measured in controlled subjects. It now appears that the idea that the main source of lead in our body is what we inhaled through our lungs from a polluted environment, is incorrect. In a recent report the Department of National Health and Population Development concluded that the main sources of lead-poisoning were present in food, lead-based paint, lead-pipes and storage tanks. They argued

We eat more lead than runners breathe in.

that lead in petrol, either as a direct contributor to lead in the air or as fall-out on crops, is not the main source of lead in our body. Thus, in summary, it would seem that lead inhaled from the air is not the major determinant of body lead stores and the risks of lead-poisoning. For this reason, runners would not appear to be at any more risk of lead-poisoning than the general population.[15]

MYTH 4: *Exercise causes addiction*

Interestingly, even persons who exercise regularly to the extent that they are 'addicted', so-called obligatory exercisers, show excellent psychological health[17] and exhibit none of the severe psychological ill-health found in persons with anorexia nervosa, with whom this group has been incorrectly compared.[18] Studies by Weight and Noakes have failed to show a higher than normal incidence of anorexia nervosa in 'obligatory' female runners.[19]

In fact, physically active persons are happier, less anxious, less tense, less depressed, less nervous, less fatigued and more emotionally stable, self-sufficient and imaginative than are the inactive.[20] In addition the physically active have greater vigour, a better quality of life[21] and an enhanced body image.[22] Physically active adults also exhibit a wide range of favourable personality characteristics, including greater energy, patience, humour, ambition, and optimism, greater amiability and elation and are easy-going and good-tempered. Exercise training has also been shown to increase self-sufficiency, self-confidence and emotional stability, conscientiousness and persistence[23] as well as improve work performance, and attitudes to work. In general, therefore, regular exercise promotes a more healthy approach to life.[24]

Implications for the General Practitioner

Physicians who want to treat recreational athletes should be prepared for patients who are well-informed about fitness and sports medicine and who know their bodies. These patients present excellent histories of their own injury. They are one step ahead of (the physician's) diagnosis. At the same time physicians will also see athletes who have questions about pseudosophisticated anecdotal information about sports medicine: body wraps, vitamins, electrical muscle stimulators, and electrolyte replacement drinks. From one point of view, this is encouraging because it indicates that people are really interested in improving their health. But athletes are susceptible to misinterpretations, and physicians can help only if they can differentiate accurate sports information from the hype (Peter Jokl).[1]

The physician who previously had no interest in sports medicine is now facing a variety of illnesses induced by sports activities, such as exercise-induced asthma, urticaria, and anaphylaxis. Other disorders, such as exercise-related haematuria and secondary amenorrhea, require specific work-ups to exclude conditions or causes independant of exercise. The sports physician should be able to identify the 'pseudo syndromes' or abnormal test results in otherwise

Swimmers had more knee and hip pain than runners.

healthy athletes. These include pseudo-anaemia (low haemaglobin, concentration from plasma volume expansion with normal iron states), pseudonephritis (transient proteinuria and haematuria, clearing within 24 hours), pseudohepatitis (increased serum LDH, SGOT from muscular injury) and even pseudomyocardial infarction (increased serum MB isoenzyme of creatine kinase after prolonged strenuous exercise such as marathon running). The physician must exclude the possiblity of specific organ system dysfunction or pathology such as bona-fide iron deficiency, hepatic or renal dysfunction, and even myocardial injury and must explain abnormalities to the athlete.[1]

A survey conducted in Cape Town in 1985 revealed that only 24 % of road runners who had suffered a sports injury during the previous year initially consulted their general practitioner for their injury.

The most common reason given by the runners who elected not to see their general practitioner as their first medical contact, that they felt the GPs did not have enough knowledge, expertise, qualifications or experience to treat sports injuries.[25] Thus, there is a need for the primary care physician to be well-trained to function effectively as a sports medicine doctor. The areas in which he should be well-trained are the following:[5]

1. Musculoskeletal systems

Injuries, (primarily musculo-skeletal) are the mainstay of the sports medicine physician's work. A strong background in examination, differential diag-

nosis and treatment of musculo-skeletal problems is essential. Soft tissue injury such as sprains, strains, contusions, subluxations, dislocations, bursitis and tendonitis are the most common musculo-skeletal problems. Most sports injuries can be treated by the primary care physician. However, it is important to identify at the right time the athlete who needs referral. Knowledge and application of the principles of rehabilitation are needed to treat sports injuries. Both physician and patient will benefit from association with a physical therapist. Maintaining a close working relationship with an orthopaedic surgeon practising the state-of-the art techniques in sports medicine is essential and also helps the physician in keeping current in this area.

Musculo-skeletal injuries are the mainstay of sports medicine.

2. Exercise sciences

A basic knowledge of exercise physiology, bio-mechanics and kinesiology is essential to communicate with and guide today's athletes. The so-called facts that athletes accummulate from various sources concerning conditioning techniques, training and the effects of exercise can be contradictory and confusing. With the assistance of the exercise scientist and some basic knowledge of these areas, the physician can clarify many contradictions for athletes before they develop harmful habits.

3. Nutrition

This has been one of the most neglected areas in medicine. A knowledge of nutrition is necessary to guide the athlete through the maze of fads and fallacies. Therefore association with a registered dietician is essential.

4. Pharmacology

In the case of the athlete, effects on performance should be discussed along with the problems and contra-indications and adverse effects before choosing a medication. There are three basic types of drugs used in sports:

a. *Therapeutic:* anti-inflammatories, analgesics and beta-sympathomimetics are commonly used in sports. It is important to know the effects of beta-blockers on athlete performers. An athlete's request for therapeutic drugs so he can play, is a situation all sports medicine physicians face and should be prepared for. The health and safety of the athlete must be the physician's primary concern.

b. *Performance Aid:* Athletes have reportedly used many drugs to enhance their performances. The primary care physician should be able to inform the athlete of the facts and intelligently discuss the pros and cons of using these substances.

c. *Entertainment Escape:* Most frequently abused substances of this type are alcohol, marijuana, stimulants, depressants and cocaine. The ability to relate the effects of these drugs to the athlete's performance is helpful. Athletes may show warning signs of chemical dependancy during their chosen activity. Early identification and intervention depends on the knowledge of the signs and effects of chemical use and treatment programs to which the user might be referred.

5. Behavioural science

It is important to identify potentially harmful situations and teach athletes how to work towards optimum performance and help through emotional control. To use exercise as a therapeutic tool, the physician should understand the relationship between exercise and stress. Psychologists and psychiatrists familiar with athletes' problems can help investigate these problems and provide treatment.

6. The female athlete requires special attention in two areas

a. *Exercise and menstrual function*

b. *Exercise during pregnancy*

The primary care physician must keep up with the current knowledge about the relationship between exercise and menstrual function. The increase in exercise by pregnant women has resulted in a number of studies concerning the effects of exercise on the pregnant woman and her baby.

7. Cardiovascular pulmonary systems

He must understand the physiology, pathology and diagnosis of these symptoms. A cardiologist, exercise physiologist and pulmonary specialist are helpful, not only as a referral source for the patient but also as sources of knowledge in the attempt to keep current.

8. Dermatology

Certain dermatological problems: herpes, impetigo, scabies and lice are contra-indications to contact sports because of probable infection.

There are many other important areas in sports medicine; however, the ones above form a foundation on which a primary care physician must build to practise sports medicine successfully.

Keeping current is difficult in all areas of medicine. Advances in technology, both diagnostic and therapeutic, as well as the ever expanding data base from which information is drawn, require ongoing continuing education.

Conclusion

Some physicians still have the philosophy: 'If it breaks, we'll fix it. And when it's fixed, it will be better than it was before'. They have to adopt a new philosophy of health: 'If you take care of it to begin with, you won't have to fix it'. (Thomas Miller, Executive Director of the American College of Sports Medicine.)[1]

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