What is sport and exercise medicine?

Sport and exercise medicine involves the provision of preventative and reactive care for all aspects of health in relation to sport and the use of exercise prescription in the management of health and disease. This article gives an overview of the specialty as it develops in the UK.

Sport and exercise medicine is an area of medicine that was practiced in Greco-Roman times by Herodicus (480BC), then Hippocrates and Galen, and yet only became a recognized specialty in its own right in the UK in 2005 (Department for Culture, Media and Sport, 2002; Department of Health, 2004). The specialty has a number of remits:

1. To provide expert medical care for musculoskeletal injuries
2. To provide medical care for all aspects of health in relation to sport
3. To develop the use of exercise for health-related benefit in (a) the general population and (b) special populations (in particular those with chronic diseases, children and seniors).

Sport plays an important role in our culture and in our national identities. From a medical perspective, in other countries sport medicine has been recognized openly in various formats, with the focus being upon 'sport'. However, in recent years the importance of exercise medicine has become paramount, and the term 'sport and exercise medicine' in the UK is by far the most appropriate title for this multifaceted discipline.

The development of the new specialty offers many advantages to health care as a whole. The challenges of the diagnosis and management of sports injuries presents the opportunity to improve musculoskeletal care through advances in diagnostics, in particular imaging, new medical and surgical approaches to promote healing and repair and enhanced rehabilitation strategies. More can be learned about the human body during activity than at rest, and furthering the understanding of the athlete's response to physiological and psychological stress can provide insights into models of health and disease.

Components of the specialty

A significant and most widely recognized aspect of sport and exercise medicine consists of injury prevention and management in individuals and teams. However, the non-musculoskeletal components of sport and exercise medicine are equally important. These include:

1. Management of medical problems in relation to the exercising individual
2. Sporting event management (medical cover)
3. Safe optimization of performance in the healthy athlete
4. Supporting and advising athletes and allied individuals (e.g. coaches and regulatory bodies) on areas such as travelling team issues, doping and recovery strategies
5. The use of prescribed exercise programmes as part of the management of patients with a wide range of chronic diseases
6. The promotion of regular physical activity for health-related benefit in the general population.

Pre-participation screening is also an important area of sport and exercise medicine, albeit one that is not without controversy. Prevention is better than cure, and avoiding illness and injury caused by sport is important for every physician to prioritize. Pre-participation screening includes musculoskeletal screening to identify areas where injury may occur, but the identification of risk factors for sudden cardiac death is also a particular priority. The content of such screening programmes continues to promote debate (Corrado et al, 2005; Maron et al, 2009).

Of the non-musculoskeletal remits described above, the latter two have the greatest importance for the future health of our nation, represented the driving forces in establishing the new specialty (along with the prospect of the 2012 Olympic Games), and will form a major component of a consultant's work in sport and exercise medicine in the future. The UK population is increasingly obese, sedentary and over-supplied with calories. The statistics are alarming. About 46% of men in England and 32% of women are overweight (body mass index of 25–30 kg/m^2), and an additional 17% of men and 21% of women are obese (body mass index of more than 30 kg/m^2). There is a clear age trend: about 28% of men and 27% of women aged 16–24 years are overweight or obese but 76% of men and 68% of women aged 55–64 years are overweight or obese. These figures represent a doubling of obesity since the mid-1980s. Exercise prescription – an important remit for the physician in sport and exercise medicine – is an over-simplified term for a holistic approach to patient education, lifestyle modification, risk reduction, promoting confidence and motivation, and nutritional modification, as well as focusing upon short- and long-term physical activity goals.

The benefits of exercise are considerable and broad. These include reduced morbidity and mortality from coronary artery disease, diabetes, hypertension, obesity,

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stroke, peripheral vascular disease, cancer, arthritides, and osteoporosis, reduced anxiety and depression (at least as effective but less commonly offered than antidepressants), enhanced cognitive function, prevention or slowing of the effects of ageing, improved wellbeing and improved physical function in work, sport and play. Inactivity is an independent risk factor for coronary artery disease and exercise can halve the risk of cardiac disease. One third of deaths from coronary heart disease could be prevented if people started taking more exercise.

In spite of the clear evidence for health-related benefit for exercise in most circumstances, support for the importance of sport and physical activity is still lacking in many areas of the medical fraternity (Petrella et al, 2007). Currently exercise habits are assessed only by the minority of clinicians working in specialty medical clinics, and exercise is rarely prescribed – neither for the general population nor for those with chronic diseases. (*Tables 1* and *2*). Individuals who are proactive about maintaining physical fitness through sporting activities frequently encounter 'stop' as the major medical treatment suggested by a doctor for an injury rather than treatment and further prevention. Running is a good example: 'Don't run, it's bad for you' or 'Running will hurt your knees' are not uncommon medical views. Yet man is evolved as a hunter gatherer: much as the risk of injury needs to be addressed, it is a minor threat compared to the threat of calories and couches (*Figure 1*).

Those who do not run as part of their sporting activities can, and should, at least walk. Hamer and Chida (2008) pooled data from 18 prospective studies incorporating 459 833 participants free from cardiovascular disease at baseline with 19 249 cases at follow-up. From their meta-analysis the pooled hazard ratio of cardiovascular disease in the highest walking category compared with the lowest was 0.69 (95% confidence interval 0.61–0.77, $P<0.001$), and was 0.68 (95% confidence interval 0.59–0.78, $P<0.001$) for all-cause mortality. These effects were robust among men and women. Walking pace was a stronger independent predictor of overall risk compared with walking volume (48% *vs* 26% risk reductions respectively). There was also evidence of a dose–response relationship across the highest, intermediate and lowest walking categories in relation to the outcome measures (Hamer and Chida, 2008).

The patient or athlete

'Everyone's an athlete, some just train harder than others' is a common expression and is perhaps a useful turn of phrase to describe the diversity of individuals who may form the patient population. The spectrum spans from the elite or recreational athlete to those with chronic diseases such as diabetes, cardiorespiratory disorders, arthritis or obesity who all need to exercise for health-related benefit. The age range represented by this population is also broad, from young children to older people.

Figure 1. Running and the evolution of man. From Bramble and Lieberman (2004).

'Running has substantially shaped human evolution. Running made us human – at least in an anatomical sense.'

Table 1. American College of Sports Medicine and American Heart Association guidelines for physical activity in the general population

Do moderately intense* aerobic (endurance) 30 minutes a day, 5 days a week
Or do vigorously intense aerobic (endurance) 20 minutes a day, 3 days a week
And do eight to ten strength-training exercises, eight to twelve repetitions of each exercise, twice a week

*Moderate-intensity physical activity means working hard enough to raise your heart rate and break a sweat, yet still being able to carry on a conversation. It should be noted that to lose weight or maintain weight loss, 60–90 minutes of physical activity may be necessary. The 30-minute recommendation is for the average healthy adult to maintain health and reduce the risk of chronic disease. From Haskell et al (2007)

Table 2. American College of Sports Medicine and American Heart Association guidelines for adults over the age of 65 years (or adults aged 50–64 years with chronic conditions such as arthritis)

Do moderately intense* aerobic exercise 30 minutes a day, 5 days a week
Or do vigorously intense aerobic exercise 20 minutes a day, 3 days a week
And do eight to ten strength-training exercises, 10–15 repetitions of each exercise, twice to three times per week
And if you are at risk of falling, perform balance exercises
And have a physical activity plan

Both aerobic and muscle-strengthening activity are critical for healthy ageing. *Moderate-intensity aerobic exercise means working hard at about level 6 intensity on a scale of 10. You should still be able to carry on a conversation during exercise. From Nelson et al (2007)

Diagnosis and management of the sportsperson requires an understanding of the mechanical and physiological demands of specific sports and the associated training and competition. A thorough understanding of the potential injuries or illnesses is vital. Some injuries are seen only in particular sports or training activities. The sportsperson often presents medical symptoms that may not affect the more sedentary population; minor illnesses or injuries that affect sporting performance but not daily life. However, many medical complaints that develop in relation to sport may result in significant pain, disability and time lost from work, with an inevitable socioeconomic impact. Efficiency of diagnosis and management is hence important. In addition, the management of illness and injury in such individuals demands a keen insight into the 'athletic psyche': often one of high motivation, high levels of anxiety and a tendency towards somatization. Non-compliance can occur (too early return to sporting activity) but over-compliance – doubling the recommended rehabilitation regimen – is also common. Time away from training and/or competition can have a significant impact on psychological wellbeing. A good outcome relies on good 'mind management' by the physician, focussing on strategies that promote and maintain fitness while optimizing injury and illness management.

At the other end of the spectrum is the sedentary, often overweight individual, who frequently has comorbidities. Exercise prescription, including lifestyle management, is vitally important, but compliance is often poor. Assessment of those with high cardiovascular or other risk factors is essential before writing an exercise prescription and supervision of exercise sessions is often necessary. As with any prescription, the legal responsibility lies with the physician who writes the exercise 'script'. 'Special populations' – those who are at higher risk with exercise and/or have special needs – require highly customized approaches and/or supervision. This includes those with cardiovascular disease, musculoskeletal complaints (especially arthritis), osteoporosis, diabetes mellitus, pulmonary disease, and those who are pregnant, children, the elderly and those with medical complaints who have been non-compliers in the past. Compliance is often the issue, but is improved by individually tailored programmes, moderate intensity regimens, written educational materials and the keeping of diaries, making objective goals, providing ongoing support, follow up and access to expert advice (American College of Sports Medicine, 2009).

Choosing the specialty

Sports and exercise medicine is the broadest of specialties, encompassing areas of primary care, emergency medicine, public health, psychology and most if not all of the medical and surgical specialties. Individuals working in the field may do so from another specialty – e.g. a cardiologist with an interest in the athlete's heart or sports cardiology, the immunologist dealing with the influence of physical training on immune system responses, the palliative care specialist with an interest in palliative exercise therapy, the radiologist with an interest in sport-related musculoskeletal injury or the orthopaedic surgeon specializing in the sporting foot and ankle.

Then there are those who may choose a specific career in the specialty of sport and exercise medicine, who need to be aware of the challenges and uncertainties. As a new specialty, consultant posts are few, most will be community based and it is likely that most can expect to depend upon a job portfolio involving different responsibilities. These include exercise prescription, musculoskeletal and sports injuries, and team care. The working lifestyle of an sport and exercise medicine physician frequently differs from that experienced in other specialties. In particular, he/she often works outside conventional clinical settings. While many sport and exercise medicine clinics are carried out in a hospital or community clinic, the sport and exercise medicine physician may find him or herself at track, pool or pitch side, or on the side of a mountain. Regardless of the setting, the priority must be providing the best medical care.

The sport and exercise medicine physician usually has the privilege of working within an interdisciplinary framework. This is a form of medicine with fewer walls, and a closely integrated team approach is needed to ensure holistic care of the individual. Overlap with other specialties will occur, in particular in relation to exercise prescription, and with other allied professionals in injury management. In the sporting arena the physician is required to interact with others associated with the individual athlete or patient, such as the coach or parent, while adhering strictly to standard codes of conduct and confidentiality.

High performance sport medicine – management of the high performance ('elite') athlete – is a small area of sport and exercise medicine, and yet is often that with greatest profile. It represents an unusual area of medicine and focuses upon not only providing general medical care, but also faces many challenges, in particular to safely optimize health to enhance performance in circumstances where the patient is under extreme physiological and psychological stress. Athletes – and their coaches – are frequently disinterested in 'health' but highly focussed upon 'performance'; the physician's role is to act as a medical guardian, promoting best care and preventing harmful practices.

Conclusions

So, is sport and exercise medicine for you? Those who choose it because they are 'sporty', enjoy watching sport, or are motivated by working specifically with the elite sector, would be best redirected to another field and maintaining sport as a hobby. If you are excited by the spectrum of work that the specialty offers, the potential

for interesting, diverse and intellectually stimulating clinical and academic work, enjoy working in an interdisciplinary setting, are blessed with flexibility in your working hours, working settings and the frequent necessity to travel, and you are willing to accept the uncertainties that currently exist in the job market at this current time, then sport and exercise medicine might be your ticket. You will need to have good groundings in exercise physiology, functional anatomy and clinical general medicine; the basic curriculum is discussed in a subsequent article (see p. 627). For those who choose to pursue a different specialty, there is still the opportunity – some would argue a necessity – of incorporating aspects of sport and exercise medicine into your practice. **BJHM**

Conflict of interest: none.

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Useful web resources

Faculty of Sport and Exercise Medicine (UK) (www.fsem.org.uk)

American College of Sports Medicine (www.acsm.org)

KEY POINTS

- Sport and exercise is a new and exciting medical specialty in the UK.
- The specialty has much to offer to the general medical profession and provision of specific areas of health care.
- Components of the specialty include injury and illness prevention and management in sport, and specialized exercise prescription.
- Most consultants in sport and exercise medicine in the future will have a job portfolio involving a range of remits.