British Journal of sports medicine

The **British Journal of Sports Medicine** is an international journal published quarterly in March, June, September and December by Butterworth-Heinemann Ltd.

Publishing, Editorial Production and Reprint Offices: Butterworth-Heinemann Ltd, Linacre House, Jordan Hill, Oxford OX2 8DP, UK. Telephone: +44 (0)865 310366. Facsimile: +44 (0)865 310898. Telex: 83111 BHPOXF G.

Publisher: Charles Fry
Managing Editor: Sarah Graham-Campbell
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Editorial Assistant: Alison Cherrie

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Subscription enquiries and orders in the UK and overseas should be sent to Turpin Distribution Services Ltd, Blackhorse Road, Letchworth, Herts SG6 1HN, UK. Telephone: +44 (0)462 672555. Facsimile: +44 (0)462 480947. Telex: 825372 TURPIN G. North American orders should be sent to Journals Fulfilment Department, Butterworth-Heinemann, 80 Montvale Avenue, Stoneham, MA 02180, USA. Telephone: +1 (617) 438 8464. Facsimile: +1 (617) 438 1479. Telex: 880052. Please state clearly the title of the journal and the year of subscription.

Annual subscription (4 issues): UK and Europe £88.00; rest of the world £92.00; prior individuals certifying that copies are for their personal use and not for their libraries, and that copies are to be sent to their home address £37.00. **Single copies:** UK and Europe £26.40; rest of the world £27.60. Prices include cost of postage and packing. Copies sent to subscribers in Australasia, Bangladesh, Canada, India, Japan, Pakistan, Sri Lanka and USA are airspeeded for faster delivery at no extra cost. Airmail prices are available on request. Payment must be made with order.

US mailing agents: Mercury Airfreight International Ltd, Inc., 2323 Randolph Avenue, Avenel, NJ 07001, USA. Second class postage paid at Rahway, NJ, USA.
US Postmaster: Send address corrections to the **British Journal of Sports Medicine** c/o Mercury Airfreight International Ltd., Inc., 2323 Randolph Avenue, Avenel, NJ 07001, USA.

Back issues: For the current and 1992 volumes, these are available from Turpin Distribution Services Ltd, at the address above. Complete volumes or single issues for earlier years are available from Wm Dawson, Cannon House, Folkestone CT19 5EE, UK. Telephone: +44 (0)303 850101. Facsimile: +44 (0)303 850440.

Advertising enquiries should be sent to Mark Butler, MTB Advertising, 11 Harts Gardens, Guildford GU2 6QA, UK. Telephone: +44 (0)483 578507. Facsimile: +44 (0)483 572678.

Microfilm: A microfilm version of the **British Journal of Sports Medicine** is available from University Microfilms Inc., 300 N. Zeeb Road, Ann Arbor, MI 48106-1346, USA.

British Journal of Sports Medicine
ISSN 0306-3674/93/$7.50

Reprints: Readers who require copies of papers published in this journal may either purchase reprints (minimum order 100) or obtain permission to copy from the publisher at the following address: Butterworth-Heinemann Ltd, Linacre House, Jordan Hill, Oxford OX2 8DP, UK.

No page charges are levied by this journal.

Registered Office: Butterworth-Heinemann Ltd, 88 Kingsway, London WC2B 6AB, UK.

A member of the Reed Elsevier group

ISSN 0306-3674

Composition by Genesis Typesetting, Laser Quay, Rochester, Kent.
Printed by Cambridge University Press, Cambridge, UK

FIMS news

International Federation of Sports Medicine

The World Federation of Sports Medicine – some perspectives on its activities

Sports medicine as a science emerged at the end of the 19th century in various European countries. In 1904 in Berlin, Mallwitz coined the phrase 'Sports Physician'. The International Hygiene Exposition held in Dresden in 1911 was the stimulus for the first official sports physicians congress ever held, and took place in Oberhof, Germany in September 1912. At the same time the first official federation of sports physicians was founded. Finally FIMS was established in 1928 with 11 founder nations. Today FIMS has a total of 90 member nations.

The most important tasks of FIMS are:

1. To uphold the interests of sports medicine and to cooperate with other similar international organizations such as the World Health Organization (WHO), the International Olympic Committee, the United Nations Educational, Scientific and Cultural Organization (UNESCO), the International Committee of Sports Sciences and Physical Education.
2. To represent FIMS at official national sporting events and at sports medicine congresses.
3. To develop guidelines for the education and training of sports physicians.
4. To provide a source of information on sports medicine for national organizations.
5. To assist national sports medicine associations in their efforts to introduce higher qualifications in sports medicine at universities, and also with the legal problems.
6. To publish position statements on aspects of sports medicine, e.g. the role of physical activity in preventive health care, the benefits of exercise, rehabilitation of athletes and medical examination of athletes.

Some examples of the work done by the President of FIMS in 1992 include the following:

20 March 1992: Inaugural paper and welcome address of FIMS at the First Scientific Congress of the Asian Federation of Sports Medicine.
7 April 1992: Discussion with the Austrian Minister for Health in Vienna concerning legislation for preventive medicine.
18 April 1992: FIMS Greeting at the opening ceremony of the First Sports Medicine Centre of WHO in Tokyo, and introductory paper on preventive medicine and exercise training.
24 April 1992: Introductory paper at meeting of the Belgian Society of Sports Medicine in Brussels.
5–10 May 1992: Participation in World Consensus Congress on Physical Activity in Toronto, Canada.
14 July 1992: Malaga

A practical example of the importance of FIMS as a worldwide organization is the recommendation on the topic of AIDS and Sports. This position statement was initiated by FIMS and was passed after a meeting of FIMS with WHO in Geneva on 16 January 1989. Without FIMS such a recommendation would not have been drafted. FIMS speaks as a powerful voice in the sphere of sports medicine, and without its presence at international meetings, the significance of the discipline would be drastically reduced.

In common with other international organizations such as UNO, UNESCO and WHO, FIMS shares the common weakness of lack of funding. The fees paid to FIMS by member countries are inadequate to meet our current demands, and as a direct consequence insufficient information is being distributed to members. However, we are tackling this problem, and in future will forward more information bulletins to national organizations. Distribution will be the task of the national institution. Nevertheless despite financial constraints journals such as *World of FIMS* and *FIMS Journal* were sent to all member nations in the past few years.

Another problem faced by FIMS is representation at committee level. The Executive Committee is composed of 14 nations, with four chairpersons of the Standing Commissions. When making a choice for representation we must bear in mind that the whole world must be represented. It is impossible to select only international scientists without due regard for the necessity of representing the Third World. As far as possible we try to make a fair choice and combine all cultural aspects on our representative bodies.

FIMS is well aware of its weakness and strength. What every member nation should realise is that such a uniform world organization exists for its benefit, and actively promote its support of FIMS. The power of any world organization, including FIMS, is based on the all out support of each national member country.

Wildor Hollmann
President FIMS

British Association of Sport and Medicine

There are now active regions covering most of the UK. Most hold regular meetings, contact your regional Chairman for detail of events.

Dr Evan Lloyd, Chairman BASM Scottish Region
72 Belgrave Road
Edinburgh EH12 6NQ, UK

Dr R. Jaques, Chairman BASM South West Region
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Gloucestershire GL4 8HP, UK

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Dr P. Milroy, Chairman BASM North West Region
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Dr K. Kaur, Chairwoman BASM East Midlands Region
Department of General Practice
Queens Medical Centre
Nottingham NG7 2UH, UK

At present Wales is split between the South West and the North West regions. There is no region covering the North East. If anyone is interested in setting up a new branch in these areas, please contact the Honorary Secretary at the Department of Orthopaedics and Trauma, Queens Medical Centre, Nottingham NG7 2UH.

The Educational programme has expanded many fold over the last years. Nancy Laurenson our Education Officer has worked extremely hard to ensure the smooth running of courses, and made them very enjoyable in addition to being educationally enlightening. We wish her well as she starts maternity leave in June. It will be a struggle to maintain the very high standards she has set.

The highly successful Intermediate course is planned to run again. Unfortunately the sponsorship that we had last year has disappeared with the UK government's restrictions on non-steroidal gels. The concept behind the Intermediate course is twofold) First, I have always felt that insight into the techniques and training methods of a variety of sport has been a neglected area of teaching in sports medicine. We have invited coaches to talk to us about sports ranging from gymnastics and dance through to track and field. Second, after organizing the weekend Advanced injury courses, Graham Holloway and I realised that more formal instruction in joint examination was required. The Intermediate course uses the delegates themselves as subjects, as opposed to the Advanced courses where patients with clinical signs are brought as teaching aids!

In the March 1993 issue of the Journal there was a flyer for another course to be held at La Santa in Lanzarote. This is the resort which many of our top sports people use to prepare for their competitive seasons. The centre copes with nearly 40 different sports, and has staff on site capable of giving instruction. The aim of the course is to provide hands-on tuition for several sports, and education on injury prevention. The warm weather, excellent facilities and entertainment will make for a wonderful week. We are aiming to run the course from 7 to 14 October. Sign up! Call the BASM office on 071-253 3244 for further information.

East Midlands Region, March 1993

Sports coaches, especially those working with the young, should be advised that joints must not be overstretched, particularly when opposing muscle groups have been unequally conditioned. So said Professor W. A. Wallace at the inaugural meeting of the East Midlands Region of the British Association of Sport and Medicine at the City Hospital, Nottingham on Thursday 18 February.

Professor Wallace of the Department of Orthopaedics at Queens Medical Centre, Nottingham, gave an entertaining and instructive review of sporting injuries to the shoulder to an audience in excess of 120. This turnout on 18 February, demonstrated the great interest in sports medicine in the region and the intention of the regional committee is to have six lectures per year. The next two will be on 1 April and 3 June 1993.

Earlier in the evening Dr Frank Newton from Silverstone enlightened the audience as to the stresses experienced by the modern racing driver. He reviewed the history of track racing, showing how the driver had now become almost an integral part of the car. He demonstrated the unusual driving position, with the driver sunk deep into the 'tub' around which the car is built. The driver works in a constrained environment and is exposed to high g-forces. The stresses on the internal organs are immense. Typical training programmes were discussed. The need for training of the neck muscles became obvious when g-forces were discussed.

The consensus opinion on the evening was that it was a great success, as was shown by the warm applause at the end of each presentation.

The Chairman of BASM, Mr John King FRCS, spoke on knee injuries on 1 April, with a demonstration by Ms Judy Wright MCSP. Future meetings are planned for 16 September, 28 October and 9 December. Topics include Asthma, Running injuries, Watersports injuries and Footballing injuries. Details later, from: Dr Ian McGibbon, Honorary Treasurer, East Midlands Region, British Association of Sport and Medicine, Tutbury Health Centre, Tutbury, Staffs DE13 9NA, UK.

From the journals

Sports medicine current awareness service

Prepared by Kathryn Walter and Nancy Laurenson at the National Sports Medicine Institute (NSMI) Library

The following summaries are taken from a selection of recent journals indexed in the NSMI database. A full listing is published monthly in *Sports Medicine Bulletin.*

Copies of the complete articles are available (price 15 pence per sheet subject to Copyright Law) from the Library, NSMI, c/o Medical College of St. Bartholomew's Hospital, Charterhouse Square, London EC1M 6BQ, UK. (Tel: 071-251 0583).

A study on **The association of changes in physical-activity level and other lifestyle characteristics with mortality among men** has been published by Ralph Paffenbarger and colleagues (*New England Journal of Medicine* 1993; **328**: 538–45). Harvard College alumni who were aged 45 to 84 years in 1977 and who had completed lifestyle questionnaires in 1962 or 1966 and again in 1977 were classified according to changes between these two dates in physical activity levels, smoking, blood pressure and body weight and the relation of these factors to mortality between 1977 and 1985. Beginning moderately vigorous sports activities was associated with a 23% lower risk of death than not taking up moderately vigorous sport. Also associated with lower mortality was cessation of cigarette smoking, maintenance of lean body mass and consistently normal blood pressure. Findings on death from coronary heart disease mirrored those on death from all causes.

Advertised claims on the efficacy of **Commercially marketed supplements for bodybuilding athletes** are reviewed by Katharine Grunewald and Robert Bailey (*Sports Medicine* 1993; **15**: 90–103). Supplements include amino acids, boron, carnitine, choline, chromium, dibencozide, ferulic acid, gamma oryzanol, medium chain triglycerides, weight gain powders, Smilax compounds and yohimbine. Many performance claims made for the supplements are not supported by current research. In some instances, no published research was found to validate the claims. In other cases, research findings were extrapolated to inappropriate applications. For example, biological functions of some non-essential compounds (e.g. inosine, carnitine) were interpreted as performance claims for the supplements. Claims for others were based on their ability to enhance hormonal release or activity. The authors recommend that further research is conducted on this group of athletes and their nutritional needs. The effectiveness and safety of supplements merit further investigation.

0306-3674/93/020140-02

The use of electricity in promoting analgesia, resolving oedema, wound healing, re-education of damaged muscle, prevention of muscle atrophy and muscle relaxation is described by Robert Windsor and colleagues in **Electrical stimulation in clinical practice** (*Physician and Sportsmedicine* 1993; **21**: 85–93). The electrical modalities clinically used in sports injury rehabilitation differ mainly in the way they combine the parameters of wave form, frequency, pulse width and amplitude. Transcutaneous electrical nerve stimulation (TENS), high-voltage pulsed galvanic stimulation (HVPGS) and interferential stimulation effectively reduce pain. TENS and HVPGS can be used for acute or chronic pain; interferential stimulation is primarily indicated in acute or subacute soft tissue injuries or myofascial pain. Interferential stimulation is more comfortable and in addition promotes soft tissue healing, muscle relaxation and oedema resolution. Minimal electrical noninvasive stimulation is a new treatment concept purported to facilitate tissue healing.

The aetiology, clinical signs and symptoms and treatment of **Nerve entrapment syndromes in athletes** are described in a recent paper by Marko Pecina *et al.* (*Clinical Journal of Sport Medicine* 1993; **3**: 36–43). Specific syndromes related to individual sports are detailed – thoracic outlet syndrome is found in swimmers and throwers; compression of the brachial plexus may result from prolonged carrying of heavy backpacks and is sometimes referred to as 'backpack paralysis'; suprascapular nerve entrapment is an uncommon disorder seen in throwing athletes; radial tunnel syndrome commonly affects tennis players but may also be seen in rowers and weightlifters; ulnar nerve entrapment is encountered in throwing athletes such as baseball pitchers, tennis players and javelin throwers; ulnar tunnel syndrome is seen in cyclists and racquetball players; carpal tunnel syndrome may be seen in sports that require gripping, throwing, cycling or repetitive wrist flexion–extension; 'bowler's thumb' is the most common digital nerve entrapment; sural nerve entrapment and, rarely, peroneal nerve entrapment is seen in runners; and tarsal tunnel syndrome is an uncommon condition described in runners, ballet dancers and basketball players. Diagnosis relies on a detailed history and physical examination. In most cases non-operative treatment is sufficient and surgery is seldom recommended.

The use of orthotic shoe inserts has become a popular adjunct in the treatment of overuse injuries such as patellofemoral disorders, shin splints, Achilles tendinitis, plantar fasciitis and stress fractures (Gross ML and Napoli RC **Treatment of lower extremity injuries with orthotic shoe inserts: an overview** *Sports Medicine* 1993; **15**: 66–70). Inserts adjust the biomechanical variables associated with running injuries and reduce the effect of high stresses produced by running activities. Orthotic treatment is based on an understanding of complex coupling of rotation of the lower extremity with pronation and supination of the subtalar joint and accurate identification of the underlying biomechanical deficit. Orthotic fabrication is initiated by determining the neutral position of the foot and obtaining an accurate cast of this position. Orthotics should be used as one facet in the overall treatment programme – the use of proper conditioning and stretching are equally important for injury prevention and treatment of specific injuries.

Most investigations on the effects of exercise on the immune system have largely ignored intense anaerobic exer-

cise. However, two recent studies have examined the effects of a short bout of maximal effort on immune parameters. A. B. Gray and co-workers compared the effects of 1 min of intense bicycle ergometry on circulating leukocytes in trained and untrained males (**Anaerobic exercise causes transient changes in leukocyte subsets and 1L-2R expression** *Medicine and Science in Sports and Exercise* 1992; **24**: 1332–8). Significant changes in the peripheral concentrations and proportions of most leukocyte subpopulations were observed irrespective of training status. Only trained subjects showed a significant decrease in the percentage of CD25+ lymphocytes following mitogen stimulation of peripheral blood 6 h post exercise, while untrained subjects had a significantly greater concentration and percentage of CD8+ lymphocytes immediately after exercise. A further study (Nieman D. C. *et al.* **Effects of brief, heavy exertion on circulating lymphocyte subpopulations and proliferative response** *Medicine and Science in Sports and Exercise* 1992; **24**: 1339–45) examined blood samples before and 3 min and 1 h after 30 s of maximal effort on a cycle ergometer and found rapid perturbations in circulating levels of natural killer cells and T lymphocytes without a corresponding alteration in lymphocyte function.

Bioelectrical impedance and body composition (*Lancet* 1992; **340**: 1511). Data on the use of this straightforward, non-invasive technique for short term assessment of body composition suggests that impedance is a satisfactory and reliable method of estimating total body water in children who require critical cardiac care. Similar conclusions have also been drawn by researchers who monitor changes in hydration status after cardiac surgery in adults. Their findings suggest that the technique has potentially widespread applications to different populations, including patients with chronic renal failure, congestive heart disease, inflammatory bowel disease, diabetes, growth hormone deficiency, cancer and obesity. The theoretical understanding which supports bioelectrical impedance states that the only medium that can conduct electricity within the body is water. Thus, the anhydrous nature of fat restricts the flow of electrical current to the lean body mass. However, bioelectrical impedance is also used to predict lean body mass, the underlying assumption being that there is a constant and known level of hydration in lean tissue. This assumption could produce an uncertain and large error in estimation of lean tissue and hence fat tissue as levels of hydration vary within healthy individuals. Thus one could ask if this method should be used to assess body composition or percentage body fat in a sports person?

Is there a male counterpart to 'athletes' amenorrhoea'? It appears that weight loss and excessive training can disturb reproductive function in men, as has been shown in women, although the research results are somewhat equivocal. E. Randy Eichner describes the possible causal factors in **Exhaustive exercise and libido in men: can you keep it up?** (*Sports Medicine Digest* 1992; **14**: 5). Results of most studies of testosterone concentration in athletes find that intensive exercise for an hour or less, regardless if it is power or endurance based activity, tends to increase plasma testosterone levels. How this increase occurs is unclear. In contrast, continued exercise lasting a few hours or longer tends to reduce testosterone levels. A review of 10 other studies suggests that the point where elevated testosterone concentration begins to fall often occurs after 2–3 h of continuous exercise. How this fall occurs is also unclear, yet possible contributors include: (1) haemodilution; (2) suppression of testicular function by surges in blood cortisol; (3) suppression of the hypothalamic–pituitary axis, so as to inhibit the pulsatile release of luteinizing hormone (which drives the testicular production of testosterone). Other complaints regarding sexual function include low sperm counts and decreased libido. Of course not all studies of male endurance athletes have found such abnormalities in sexual function!

The stretch shortening cycle (SSC), a functional contraction of muscle that occurs when a muscle contracts eccentrically (lengthens under tension) and then immediately contracts concentrically (shortens under tension) is the physiological mechanism involved in plyometric training. Although this principle is well accepted little research has been performed to date examining **The stretch-shortening cycle of the quadriceps femoris muscle group measured by isokinetic dynamometry** (Helgeson K. and Gajdosik R. L. *Journal of Orthopaedic and Sports Physical Therapy* 1993; **17**: 17–23). Twenty-four subjects (19–35 years) were recruited including 12 men and 12 women, all free from current lower leg extremity pathologies or injury. Results showed a significant increase in peak torque and a decrease in time to peak torque for a concentric contraction of the quadriceps muscle group after an eccentric and isometric preload compared with a concentric contraction alone. Men could produce greater peak torque than the women, as expected; however, their standardized peak torque was also greater. This difference cannot be completely explained by factors such as body size, lean body mass and muscle cross-sectional area. It is unknown whether fibre type dominance could partially explain the differences; there is no conclusive evidence that there is any significant difference between slow and fast twitch muscle fibres in quadriceps muscle of men and women. This testing protocol could be used to compare quadriceps femoris muscle performance on an isokinetic dynamometer with functional activities such as the vertical jump or following a plyometric training programme.

Physical training by adults in endurance activities such as distance running, swimming, and cycling results in well defined anatomical, physiological and metabolic adaptations which could collectively be termed the 'fitness effect'. While these changes follow a predictable pattern, the mechanisms by which they occur are not always well known. Whether prepubertal children are as capable of improving maximal oxygen uptake from endurance training as adults is a debated question that has long interested exercise physiologists. It is, however, a significant one, since it bears importance for coaches and physical educators in providing safe training regimens. This issue is explored in **Trainability of the cardiorespiratory system during childhood** (Rowland T. W. *Canadian Journal of Sport Sciences* 1992; **17**: 259–63). It appears that studies examining the trainability of children have been beset with methodological flaws that have precluded firm conclusions about adult–child differences. Most studies of children that have involved adequate intensity, type and duration of training have demonstrated the same qualitative changes as would be expected from adult subjects. However, some information suggests that children may need a greater exercise intensity than adults to trigger cardiovascular adaptations to training. Other data raise questions regarding differences in autonomic influences in the heart and myocardial function in children that could relate to age-dependent responses to training.

Strenuous and unaccustomed repetitive, calisthenic-type exercise may result in a syndrome known as exertional rhabdomyolysis. If the exercise is accompanied by heat stress and dehydration a potentially severe complex may result between rhabdomyolysis, myoglobinuria and acute renal failure. Priscilla M. Clarkson describes this syndrome in **Worst case scenarios: exertional rhabdomyolysis and acute**

renal failure (Gatorade Sports Science Institute, *Sports Science Exchange* 1993; **4**, No. 42). Exertional rhabdomyolysis is the degeneration of skeletal muscle caused by excessive unaccustomed exercise. Symptoms include muscle pain, weakness and swelling, myoglobinuria, and increased levels of muscle enzymes and other muscle constituents in the blood. Myoglobin released from damaged muscle cells may spill over from the blood resulting in a dark colour urine. In certain situations myoglobin can precipitate in the kidneys and cause renal failure. The mechanism by which myoglobinuria can lead to acute renal failure is not completely understood. However, kidney failure most often occurs when heat stress and dehydration are present. A lack of physical conditioning for the specific exercises performed plus an insufficient degree of acclimatization to heat are contributing factors. A viral infection or an attempt at a novel diet manipulation before competition may affect this condition. Because severe cases of rhabdomyolysis and kidney failure are rare, it is thought some individuals may have a subclinical muscle disorder that only becomes apparent when the above conditions present.

Correspondence

Clenbuterol: a medal in tablet form?

Huw Perry MB
West Glamorgan Health Authority, 36 Orchard Street, Swansea, SA1 5AQ, UK

Sir

Before the last Olympic Games, few people had heard of clenbuterol, the controversial drug that was responsible for most of the expulsions from the games. There seems to be confusion about what class of drug it actually is.

Clenbuterol is a sympathomimetic agent with β_2-agonist properties. It is not a steroid but a substituted phenylethanolamine with anabolic properties. There is no licence in the UK for human use although it is used orally in Germany, Italy and Spain as a therapy for asthma. It has also been used as a bulking agent in animals. The literature contains no reputable scientific papers that show muscle-enhancing effects in humans. Papers on animal studies do exist to show that clenbuterol does have an anabolic effect on both cardiac[1,2] and skeletal muscle[1–7]. The mechanism of its skeletal anabolic effect has been suggested to be β-adrenoceptor mediated[1,6] and the effects on cardiac muscle via a cyclo-oxygenase metabolite of arachadonic acid[2]. The favourable effect of clenbuterol on muscle growth is possibly also due to a specific increase in protein deposition and not to changes in the water content of muscular tissue[3,4]. Obviously one cannot automatically extrapolate these anabolic effects in animal studies to humans. However, it should be noted that clenbuterol has been used as a pharmacological ergogenic aid in sport on a widespread basis for the past 2½ years in the UK. Initially the cost on the black market was approximately 135.00 pounds sterling for 90–100 tablets, now it is down to approximately 40.00 pounds sterling, showing the abundance of the drug on the black market. In the past year I have spoken to at least 50 clenbuterol misusers, the vast majority of whom were impressed by its anabolism, even when using it in the absence of other steroids. The current disclosure of clenbuterol is an indicator of the huge amount of sporting substance misuse (taken in megadoses) which is so prevalent in the UK at the moment, especially among non-competitive recreational 'athletes'.

Many of our clients who present themselves at drug agencies for needles and syringes to administer their anabolic steroids, reported that, in the past, while taking only clenbuterol they experienced palpitations, tremor and sweating.

Physicians seeing over-muscled young people (male and female) should bear in mind that they may be taking anabolic drugs and be aware of the side-effects, or of the drug interactions which may exist, if the physician prescribes any medication for that individual. One of the less appreciated side-effects of clenbuterol is potentially serious hypokalaemia which may result from β_2-agonist therapy.

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BASM Education Programme

The British Association of Sport and Medicine holds Introductory, Intermediate and Advanced Courses in Sports Medicine annually.

The Introductory Course held at Lilleshall Hall National Sports Centre, Shropshire, is a one-week intensive course designed primarily for general practitioners and physiotherapists although suitable for all doctors with an interest in sports medicine. This course is generally a prerequisite for the Intermediate and Advanced Courses. PGEA approval *is* given for 5 days under the categories of 2.5 days Health Promotion and 2.5 days Disease Management.

The Intermediate Course (Sports Specific Injury Management and Normal Examination of Joints) is also one week long and held at Lilleshall Hall National Sports Centre. This course concentrates on the proper examination of normal joints with regard to the management of sport specific injuries. There is a strong focus on the coaching and training involved in each sport. PGEA approval *is* given for 5 days under the categories of 2.5 days Health Promotion and 2.5 days Disease Management.

The six Advanced Modular Courses are held at weekends at various locations throughout the country. These comprise three Injury modules which focus on the clinical examination, diagnosis and management of both acute and chronic injuries; treatment and rehabilitation programmes are also outlined. Two Exercise Physiology modules examine aspects of training and fitness assessment with respect to cardiorespiratory and musculoskeletal physiology. The final module, 'Medicine of Sport and Exercise' concentrates on a range of topical issues from 'Exercise in Elderly People' and 'Osteoporosis' to 'Update on Nutrition' and 'Diabetes and Exercise'. PGEA approval is given for each module.

These courses provide the academic training necessary to sit the Society of Apothecaries Diploma in Sports Medicine as well as the Royal College of Surgeons and Physicians (Glasgow and Edinburgh) Diploma in Sports Medicine for medical practitioners.

For applications and enquiries concerning courses and membership please contact: Nancy Laurenson MSc or Sally Dixon BSc (Hons), BASM Education Officer, c/o National Sports Medicine Institute, St. Bartholomew's Medical College, Charterhouse Square, London EC1M 6BQ, UK. Tel: 071-253 3244 or 071-251 0583; Fax: 071-251 0774

Current Programme for 1993

Date	*Course*	*Venue*
January 22–24	Advanced Physiology: cardio-respiratory physiology	Bradford Royal Infirmary
March 12–14	Advanced Physiology: musculoskeletal system	Liverpool John Moores University
April 2–4	Advanced Injury: Acute and Chronic Injuries to the Upper Limb	RAF Wroughton (Swindon)
April 25–30	BASM Introductory Sports Medicine Course	Lilleshall Hall NSC (Shropshire)
September 3–5	Advanced Injury: Acute and Chronic Injuries to the Head, Neck, Spine and Pelvis	Milton Keynes General Hospital
September 26 – October 1	BASM Introductory Sports Medicine Course	Lilleshall Hall NSC (Shropshire)
October 29–31	Advanced Injury: Acute and Chronic Injuries to the Lower Limb	RAF Wroughton (Swindon)
November 19–21	BASM Congress (Eastern Region)	Cambridge
	Courses planned for 1993	
November	Intermediate Sports Medicine Course	

Notes for Authors

Scope

The British Journal of Sports Medicine covers all aspects of sports medicine and science – the management of sports injuries; all clinical aspects of exercise, health and sport: exercise physiology and biophysical investigation of sports performance; sports psychology; physiotherapy and rehabilitation in sport; and medical and scientific support of the sports coach.

Types of Paper

Original papers (not normally over 3000 words, full length accounts of original research)
Review articles (up to 4000 words, providing concise in-depth reviews of traditional and new areas in sports medicine)
Case reports (up to 1000 words, describing clinical case histories with a message).

Refereeing

All contributions are studied by referees whose names are not normally disclosed to authors. On acceptance for publication papers are subject to editorial amendment. If rejected, papers and illustrations will not be returned. Authors are solely responsible for the factual accuracy of their papers.

Manuscripts

Authors are urged to write as concisely as possible. Four copies should be submitted, typed on only one side of the paper (quarto or A4) in double spacing with a margin of 30 mm at the top and bottom and on both sides. Papers should be arranged in the following order of presentation: title of paper; names and qualifications of the authors; address of the place at which the work was carried out; an abstract of the paper (100–200 words in length); 4–6 keywords; the text; acknowledgements (if any); references; tables; abbreviated title for use as a running headline; captions to figures (on separate sheet of paper).

Illustrations

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21 Sperryn PN. *Sport and Medicine*. London: Butterworths, 1983.
22 Ellitsgaard N and Warburg F. Movements causing ankle fractures in parachuting. *Br J Sports Med* 1989; **23**: 27–9.

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Four copies of the complete manuscript and illustrations should be sent to Dr P. N. Sperryn, The Editor, British Journal of Sports Medicine, Butterworth-Heinemann Ltd., 59/60 Grosvenor Street, London W1X 9DA, UK.
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