

## ABSTRACTS

### British Association of Sport and Medicine: Annual Congress 1996.

#### A randomised controlled trial of graded exercise therapy in patients with chronic fatigue syndrome

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**Aims**—There are no established treatments for the chronic fatigue syndrome. Sufferers are often advised to rest, which can lead to physical deconditioning. This study tested the efficacy of a graded aerobic exercise programme, designed to improve fitness. **Methods**—66 subjects with the chronic fatigue syndrome, who had neither a psychiatric disorder nor significant sleep disturbance, were recruited. Equal numbers were randomly allocated to 12 weeks of either graded aerobic exercise or flexibility exercises and relaxation therapy. The main outcome measure was the self rated clinical global change score, rating very much better" or "much better" as clinically important improvements. Subsidiary outcome measures included fatigue, mood and functional capacity as well as measures of strength and fitness. **Results**—16/29 (55%) of subjects rated themselves better after exercise, compared to 8/30 (27%) who completed flexibility treatment ( $P=0.03$ ). Analysing by intention to treat gave similar results. Fatigue and functional capacity significantly improved in both groups, but more so with exercise. Physiological measures of fitness improved more with exercise, with a 13% increase in aerobic capacity. 12/22 (55%) of those subjects who crossed over from flexibility to exercise rated themselves better after completing the exercise treatment. 32/47 (68%) of subjects felt better three months after completing exercise treatment, with physiological and symptomatic improvements maintained. 35/47 (74%) of subjects rated themselves better 18 months after starting exercise treatment, with a return to pre-morbid activity levels. **Conclusions**—These findings support the use of appropriately prescribed aerobic exercise in the management of patients with the chronic fatigue syndrome.

#### The beliefs and practices of West Glasgow general practitioners in the promotion of exercise uptake in their patients

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There is an increasing body of evidence which suggests that inactivity is a serious risk to health.<sup>1</sup> There has been limited research on how general practitioners (GPs) promote exercise uptake. The aim of this study was to determine the beliefs and practices of West Glasgow GPs in the promotion of exercise uptake. All West Glasgow GPs ( $n=151$ ) were invited to complete a postal questionnaire on this subject. The response rate was 58.9%.  $\chi^2$  Analyses showed that 94% of GPs believed exercise promotion to be part of their job and 60.7% believed that practice nurses would be best at providing this. The survey also found

that: 3.6% of GPs run patient exercise classes; 17.9% prescribe exercise programmes for patients; 38.1% refer patients to leisure clubs for exercise prescription; 36.9% provide posters/leaflets in their practice, informing of local exercise classes. GPs viewed smoking, obesity and alcoholism to be of greater risk to health than inactivity. Efforts should be made to integrate non-physicians into the primary health care team and to develop a consolidated, structured, community approach towards tackling the inactivity epidemic.

1 Pate *et al.* Physical activity and public health. *JAMA* 1995;273:402-9.

#### Reliability and concurrent validity of the Scottish physical activity questionnaire

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The Scottish physical activity questionnaire (SPAQ) was designed to aid 7 d physical activity (PA) recall and provide information on work time PA as well as leisure time PA. To establish the reliability of the SPAQ subjects (drawn from an aerobics class; group 1,  $n=19$  and an exercise project; group 2,  $n=16$ ) were asked to complete an SPAQ on a Monday and again on the following Wednesday. Thus each questionnaire measured four identical days PA. Analysis revealed that group 1 reported significantly more PA over the 4 d than group 2. Additionally, the correlation coefficients for the relationship between the first and second questionnaires were significant for each group (0.991, group 1; 0.996, group 2), demonstrating test/retest reliability. To establish the concurrent validity of the SPAQ, 94 subjects completed both the SPAQ and an adapted stage of change (SOC) exercise questionnaire.<sup>1</sup> Two-sample  $t$  tests produced the expected relationship between PA and SOC (reported PA minutes: precontemplators, 452; contemplators, 395; preparers, 672; actioners, 1016; maintainers, 1234), showing that the SPAQ has concurrent validity with the SOC model.

1 Loughlan CW, Mutrie N. Recruitment of sedentary NHS staff for a workplace exercise programme using an adapted "stages of change" exercise questionnaire. *J Sports Sci* 1995;13:63-4.

#### The effect of exercise and injury on the later development of osteoarthritis in sportsmen

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Osteoarthritis (OA) is the major cause of joint pain and disability. With the growing importance of the relation between exercise and health, this study was designed to investigate the role of exercise and trauma on the later development of OA. 420 subjects (360 footballers, 60 rugby players) were contacted by questionnaire and asked about past exercise history, injury pattern, treatment (including surgery and steroid injection), present symptoms, and diagnosis of OA. The response rate was 47%; 30% had known OA of the lower limb, suggesting that sportsmen do have a higher prevalence of OA than the normal

population. Average total exercise time was 35 000 hours, with no statistical significance with the later development of OA. 380 injuries were recorded in 202 respondents, 47% of which were knee injuries. 61% of ligament and 88% of meniscal injuries had later developed knee OA. 36% of footballers had at least one knee steroid injection. Over 90% of those who had meniscal surgery later developed OA. This study confirms the role of trauma, but not exercise per se, in the development of OA and illustrates the possible long term effects of injuries and their treatments. A follow up study to include clinical and radiological assessment is planned.

#### The usefulness of an electronic pacing device in physiological testing in swimmers

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Inability to achieve a prescribed pace has affected the validity of physiological testing in swimming. The usefulness of an electronic light/sound pacing system to enable swimmers to achieve defined swimming speeds was evaluated in 11 elite swimmers (4 females, 7 males, mean age 21, SD 3.6 years, range 17-27 years) in a randomised, crossover trial. On two separate days the subjects swam 5x200 m freestyle at various target times based on their personal bests using the pacing device and self pacing. 50 m split times and total times for 200 m were subtracted from their target times as an indication of adherence to the prescribed pace and then compared using paired tests. The subjects then performed a lactate (LA) minimum test using the pacing device to determine its usefulness in physiological testing. All results are expressed as mean (SD) (see table below). U-shaped LA minimum curves were achieved in all subjects with a mean LA speed of 1.33 (0.2)  $\text{ms}^{-1}$ , and a lactate minimum level of 3.8 (1.86)  $\text{mmol L}^{-1}$ . This confirms that the pacing device improves swimmers ability to achieve a desired pace and perform physiological testing.

#### The use of the ventilatory threshold and dyspnoea thresholds for exercise prescription to asthmatics

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This study investigated the viability of prescribing exercise at an intensity equivalent to the ventilatory threshold (VT), dyspnoea onset (ONSET), and dyspnoea threshold (DT) for aerobic exercise rehabilitation of young asthmatics. Twenty males (aged 12-16 years) diagnosed with moderate (MOD,  $n=10$ ) and severe (SEV,  $n=10$ ) asthma completed a continuous, incremental exercise test on a cycle ergometer to maximum exertion. Results showed four individuals ( $n=2$  MOD and  $n=2$  SEV) were unable to use the Borg scales appropriately and two of those

Table McClure *et al*

Time (s)	Self paced	Electronically paced	P Value
Split times for 50 m	0.813 (0.61), CI (0.721, 0.901)	0.427 (0.311), CI (0.385, 0.468)	< 0.0001
Total times for 200 m	1.675 (0.677), CI (0.751, 1.819)	0.389 (0.172), CI (0.273, 0.50)	< 0.0003

subjects (MOD) experienced exercise induced asthma ( $FEV_1$  postexercise drop greater than 15% pre-exercise level). Two way mixed ANOVA revealed significant differences ( $P < 0.01$ ) between heart rate at ONSET [126 (SD14) beats  $\text{min}^{-1}$ ] and VT [156 (8) beats  $\text{min}^{-1}$ ], ONSET and DT [163 beats  $\text{min}^{-1}$ ], but not between VT and DT. There were no significant between group differences. The above data represent 59% (ONSET), 75% (VT), and 79% (DT) of peak recorded heart rates. Subjective reports of RPD and RPE portrayed wide intersubject variation particularly at the VT and DT (Borg ratings 2-7 and 2-9 for RPD and RPE respectively). It may be concluded that for the purpose of exercise rehabilitation in these asthmatic populations, the exercise intensity at the dyspnoea onset is possibly too low to enhance aerobic capacity, whereas at the VT and DT the exercise intensity appears to be appropriate for encouraging aerobic adaptations but is too severe for some individuals and induced respiratory distress. The study emphasises the importance of individualised exercise prescription in the asthmatic population.

#### Patellofemoral pain in the sports person: which rehabilitation exercises are best and is patellar taping of benefit?

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Quadriceps rehabilitator exercises are recommended in managing patellofemoral pain but selective vastus medialis obliquus (VMO) training and patellar taping remain controversial. Electromyographic (EMG) analysis of the relative activity of VMO and vastus lateralis (VL) during 10 quadriceps exercises (weight-bearing and non-weight-bearing) was performed. The influence of patellar taping on muscle activity was investigated. 20 sportspeople with patellofemoral pain underwent surface EMG during the exercises. Root mean square values for each were calculated and normalised against a submaximal voluntary quadriceps contraction to enable comparisons and proportionate muscle activity between patients. After patellar taping, using tilt and glide components, the EMG data were rechecked. Statistical evaluation of data using ANOVA in patients without patellar taping did not reveal preferential enhancement of vastus medialis over vastus lateralis in any of the exercises, with levels of muscle activation being very similar. With patellar taping significant increases in activation of both VMO and VL were observed, with statistically significant enhancement of VMO over VL in one weight-bearing and four non-weight-bearing exercises. This study suggests that non-weight-bearing rehabilitation exercises with patellar taping in sportspeople with patellofemoral pain will produce the greatest selective EMG activity enhancement of VMO over VL.

#### Gym & tonic: a profile of 100 steroid users

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**Aim**—Identification of unsupervised anabolic-androgenic steroid regimens used by athletes and physical signs of steroid use. **Methods**—100 athletes attending four gymnasias were surveyed using an anonymous self-administered questionnaire. **Results**—Anabolic steroid doses range from 250 to 3200 mg per week and users combine different drugs to achieve such doses. Inject-

able abd oral preparations are used in cycles lasting 4 to 12 weeks. Over 80% of users admit to the regular use of drugs other than steroids for various reasons including additional anabolic effects and also minimisation of steroid related side effects and withdrawal symptoms. Acne, striae, and gynaecomastia are the most frequently reported adverse effects. The estimated prevalence of steroid use by athletes attending these gymnasias is 30%. **Conclusions**—(1) Multiple drugs are combined in megadoses and self-administered in a cyclical fashion. (2) Polypharmacy is practiced by over 80% of steroid users. (3) Muscular hypertrophy along with acne, striae, and gynaecomastia are frequent physical signs associated with steroid use. (4) Grading steroid users should prove useful in clinical practice and future scientific studies.

#### The effect of a single pass VDD pacemaker on exercise capacity (VDD versus VVIR mode)

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A single pass dual chamber pacemaker (VDD) with a floating atrial sensor incorporated in a ventricular lead has the advantages of ease of insertion while still permitting A-V synchronous pacing. The effect of VDD pacemaking on exercise capacity was compared to VVIR mode in eight patients (four males, four females mean age 73, SD 5.4, years, range 67-80) with chronic complete heart block in a randomised single blind crossover trial. Cardiopulmonary exercise testing was performed in each mode using the modified Bruce protocol. Ventilation ( $\dot{V}_E$ ), oxygen consumption ( $\dot{V}O_2$ ), and heart rate (HR) were monitored continuously. Blood pressure (BP) and blood lactate [LA] were measured at rest, at peak exercise and at 3 minutes intervals during exercise and recovery. Peak values were compared for each pacing mode using paired *t* tests. The results below are expressed as a mean (SD) (see table below). As shown, peak  $\dot{V}O_2$ , HR, [LA], and total exercise time were significantly greater in VDD mode, indicating improved aerobic capacity.

#### Evaluation of peripheral vision loss using helmets with visors

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Skull and facial protection remains optional in Hurling and Camogie except at juvenile level. The aim of this study was to investigate the visual field loss using four commercially available helmets with visors [Scanda (S), Christy(CH), Mycro Round (MR) and Mycro Square (MS)]. 21 subjects with normal vision participated in this study, five males and 16 females (age range 20-30 years), all competitive in team sports. Subjects participated in two separate experiments to measure periph-

eral field using both a kinetic (Arc perimeter,  $n=11$ ) and a static (Henson 4000,  $n=10$ ) technique. In both experiments, subjects were randomly assessed wearing each helmet and no helmet (control). Results were expressed as % reduction in visual field over control and analysed using MANOVA. Mean (SEM) % reductions in kinetic visual field were 17.2 (5.4)% ( $P<0.01$ ), 11.6 (3.7)% (NS), 8.5 (2.4)% (NS), and 8.8 (3.7)% (NS) for S, CH, MR, and MS respectively. Mean (SEM) % reductions in static visual field were 19.9 (2.0)% ( $P<0.001$ ), 12.0 (2.0)% ( $P<0.001$ ), 5.5 (2.2)% ( $P<0.05$ ), and 5.1 (2.0)% ( $P<0.05$ ) for S, CH, MR, and MS respectively. Under both kinetic and static conditions the greatest % reduction in peripheral visual field was recorded when the Scanda (S) helmet was worn. Significant % reductions were observed under static conditions with the other helmets. Inter helmet comparison indicated that both MR and MS were similar and resulted in minimal % reduction in peripheral visual field. The difference between helmets may in part be due to bar thickness and geometric arrangement.

#### The effects of a graduated training programme on menstrual cycle related basal plasma 2-hydroxy-catecholestrogens

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Catecholestrogens (CE) represent a major metabolic pathway of oestrogen metabolism. They strongly inhibit the enzymatic methylation and biological decomposition of noradrenaline by COMT. It has been hypothesised that the changes in oestrogen status and gonadotropin pulsatility observed in strenuously training females are part of a complex feedback system mediated by CE.<sup>1</sup> This study attempts to partially validate that hypothesis. Nine untrained eumenorrheic women participated in a 5 d graduated programme of aerobic and anaerobic exercise on a bicycle ergometer. Mean percentage of body fat was 24.8 (SD 3.1)%. After a 5 d period of aerobic and resistance graduated training programme, the  $\dot{V}O_2$  max levels increased during the luteal phase (LPh) [from 41.5 (4.1) to 43.5 (3.4)  $\text{ml min}^{-1} \text{kg}^{-1}$ ], but not during the follicular phase (FPh). Conjugated and unconjugated total CE during basal conditions in women averaged for total 2-hydroxyoestrogens (2-OHE) 200 (72)  $\text{pg ml}^{-1}$  during the FPh and 420 (161)  $\text{pg ml}^{-1}$  during the LPh. For 2-methoxyoestrogens (2-MeOE), we found 237 (95)  $\text{pg ml}^{-1}$  during the FPh and 339 (78)  $\text{pg ml}^{-1}$  during the LPh. Basal 2-CE following standardised intensive aerobic and interval training decreased during the LPh (-21%). Following training, the 2-OHE/E ratio (measure of CE formation) at baseline was increased during the LPh (+29%), whereas the

Table Robertson *et al*

	VDD mode	VVIR mode	P Value
Time (min)	12.4 (2.65)	9.5 (3.15)	0.031
HR	139 (16)	120 (16)	0.045
Blood pressure	211 (55)	195 (27)	0.420
Systolic	85 (21)	97 (17)	0.12
Diastolic			
VE	39.5 (11.3)	37.1 (13.5)	0.400
$\dot{V}O_2$	18.7 (3.4)	16.0 (2.3)	0.014
[LA]	2.05 (0.6)	1.7 (0.5)	0.04

2-MeOE/2-OHE ratio (measure of CE activity) in both phases showed significantly higher baseline values following training (FPh +14%; LPh: +13%). These findings suggest that more CE re-O-methylated in response to intensive exercise and are increasingly competing with the enzyme COMT to help preventing degradation of neurotransmitters.

1 De Cree C. *Int J Sports Med* 1990;11:329–48.

### The effect of variation in seat height on submaximal cycling performance in man

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Optimum seat height is generally regarded as that height which produces the lowest costs for a fixed load and cadence, the scientific consensus being 96–100% of trochanteric height (TH), with no reference being made to seat tube angle (STA). The effect of seat height variation (96%, 100%, and 104% TH) at selected STA (68, 74 and 80) was evaluated in competitive road racing cyclists ( $n=14$ ) using a discontinuous protocol (200 W) on an air resistance ergometer. Cardiovascular, metabolic and two dimensional lower limb kinematic data were collected in the final 2 min of each 4 min exercise element. Subjects were randomised to complete nine different seat positions in opposite directions from 100% TH at 74 STA to eliminate any time or sequence bias. Power efficiency (%EFF) was calculated at each position (%TH, STA) from work done and  $\dot{V}O_2$ . Results were analysed using MANOVA, values of  $P<0.05$  were considered significant. At each STA studied,  $\dot{V}O_2$  and HR were significantly higher ( $P<0.001$ ) and %EFF significantly lower ( $P<0.001$ ) at 104% TH compared with 96% or 100% TH; no significant differences were recorded between 96% and 100% TH. Biomechanically, both iliac crest and greater trochanter vertical displacement (mm) increased significantly ( $P<0.001$ ) at 104% TH compared with 96% and 100% TH; in addition, ankle and knee angle (degrees) both became more extensor with increasing seat height. An analysis of %TH induced changes (%TH) at each STA studied revealed no significant interaction ( $P>0.05$ ) between STA and %TH for the parameters measured. This study concurs with previous reports that optimum seat height lies between 96% and 100% TH. During submaximal cycling, optimum seat height appears to be independent of STA over the measured range.

### Incidence of sports injuries at two south Dublin accident and emergency departments

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**Aim:** To identify the current use of A&E departments by patients with sports related injuries, their management and treatment.

**Methods:** Data collection was by questionnaire, given to each patient in the waiting area, and a retrospective review of all A&E files during the 3 month period of the study. A  $\chi^2$  test was used to compare the incidence and distribution of the injuries across sports and for comparison with previous studies. **Results:** During the study period, 6.5% of patients attended the A&E departments with sports related injuries ( $n = 675$ ), of whom only 155 (23%) completed the questionnaire. The age, sex, and sports activity profile were similar to previous studies done in the last 10 years.<sup>1,2</sup> The majority of the injuries occurred in soccer players (419), rugby (44), Gaelic games (42), and basketball (28). Highest recorded incidence (187) was for soft tissue injuries to the knee and ankle. Only 29 injuries required admission. 124 required review, 108 were referred to the fracture clinic, and 26 were referred directly for physiotherapy. Most of the injuries were treated with analgesics and RICE. **Conclusions:** Early and more frequent referrals for physiotherapy and advice on treatment and rehabilitation in the form of information cards would promote an earlier return to sport.

1 Burke P, Buckley N, McShane D, O'Conner P. Sports injuries and the Casualty department. *Ir Med J* 1983;76:127–9.

2 Murphy A, Margin C, Plunkett P, O'Conner P. Sports injuries and the accident and emergency department—ten years on. *Ir Med J* 1992;85:30–3.

### Effects of endurance training on ventilation, blood lactate, and plasma potassium during incremental exercise

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**Aim:** To discover if 5 weeks' endurance training causes a dissociation between the ventilation and lactate thresholds, and whether changes in ventilation are paralleled by alterations in plasma potassium concentration ( $K^+$ ). **Methods:** Ten untrained subjects (aged 26, SD 2 years) performed a 20 watt  $\text{min}^{-1}$  cycling test to determine maximum oxygen consumption ( $\dot{V}O_{2\text{max}}$ ), maximum workload, and maximum ventilation ( $\dot{V}_{E\text{max}}$ ). Ventilatory equivalents for  $O_2$  and  $CO_2$  were used to identify two ventilation thresholds (Tvent), and an initial rise in blood lactate above baseline and a subsequent more abrupt increase identified the lactate thresholds (Tlac). Blood lactate, plasma  $K^+$  and pH were measured from arterialised venous samples. Subjects cycled for 30 minutes three times/week at 70%  $\dot{V}O_{2\text{max}}$  during which steady state blood lactate concentrations (every 3rd session) and heart rate were measured. **Results:** After training, increases occurred in  $\dot{V}O_{2\text{max}}$ , maximum workload, and  $\dot{V}_{E\text{max}}$  ( $P < 0.01$ ), and in both Tlac and Tvent thresholds ( $P < 0.01$ ). The first and second Tvent did not differ ( $P > 0.01$ ) from the first and second Tlac respectively, before and after training. Signifi-

cant correlations ( $P < 0.001$ ) were found for  $\dot{V}_E$  v  $K^+$  before (0.996) and after training (0.995), and similarly for  $\dot{V}_E$  v blood lactate (0.987 and 0.997). Training heart rate ( $P < 0.01$ ) and blood lactate ( $P < 0.05$ ) decreased significantly by the 6th training session. **Conclusions:** Tvent and Tlac occurred simultaneously before and after training despite alterations occurring in both, suggesting a cause and effect relationship.  $\dot{V}_E$  and  $K^+$  experienced similar training induced changes; therefore  $K^+$  may be a causal factor in the ventilatory threshold.

### Physiological implications of moderate altitude training (1640 m) on sea level endurance performance in elite distance runners

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**Aim:** To determine the effects of moderate altitude training on sea level endurance performance in a group of national standard distance runners. **Methods:** 10 elite runners, (EXP) were tested 17 days before a 4 week sojourn to an altitude of 1640 m in S Africa, (PRE) and 20 d following their return to sea level, (POST). 12 elite runners continued training at sea level (CON) and were tested at the same times as the EXP group. Each athlete performed a continuous incremental treadmill test to exhaustion ( $\dot{V}O_{2\text{max}}$ ) which was followed by a 3 min recovery jog at 5  $\text{km h}^{-1}$  (REC). Three repetitions of 1000 metres with a 2 min inter-repetition recovery time were conducted on the following day (TRK). **Results:** Four athletes from the EXP group developed stress fractures at altitude and were not included in the overall analysis. There were no differences in the following selected dependent variables between PRE and POST testing for the two groups:  $\dot{V}O_{2\text{max}}$  [EXP PRE = 5.15 (SD 0.95) v POST = 5.10 (0.59)  $\text{L min}^{-1}$  and CON = 4.43 (0.95) v 4.43 (0.86)  $\text{L min}^{-1}$ ], REC whole blood lactate [EXP = 8.18 (1.76) v 8.64 (2.06)  $\text{mmol L}^{-1}$  and CON = 8.24 (1.73/0 v 8.84 (1.43)  $\text{mmol L}^{-1}$ ], and REC HR [EXP = 130 (21) v 123 (14)  $\text{b min}^{-1}$  and CON = 119 (17) v 116 (14)  $\text{b min}^{-1}$ ]. The EXP TRK running times were slower during POST testing [173 (3) v 176 (4) s,  $P < 0.05$ ] whereas CON TRK times remained unchanged [179 (19) v 179 (17) s]. **Conclusions:** Endurance training under conditions of hyperbaric hypoxia ( $PO_2 = 135 \text{ mm Hg}$ ) did not provoke an erythropoietic stimulus to significantly activate haemopoiesis [EXP PRE haemoglobin = 15.3 (0.7) v day 19 at altitude = 15.5 (1.0) v POST = 15.4 (0.7)  $\text{g dl}^{-1}$  and CON PRE = 15.1 (1.0) v POST = 14.8 (1.1)  $\text{g dl}^{-1}$ ]. This may explain why sea level endurance performance following altitude training was not improved in a group of elite runners with normal serum ferritin stores [PRE = 52 (28)  $\text{ng ml}^{-1}$ ].

## BASM education programme

The foundation course of this programme is the **Introductory Sports Medicine Course** which is designed for chartered physiotherapists and doctors with an interest in sports medicine. It is also suitable for professionals in related of healthcare. The curriculum is multidisciplinary and has a wide focus, including sessions on health benefits, exercise training principles, children and elderly in sport, exercise physiology, sports nutrition, CPR, and resuscitation. Sporting injuries and their management are also covered. Five days PGEA approval in Health Promotion and Disease Management are given for this course.

The interdisciplinary **Intermediate Sports Injury Course** concentrates on the proper examination of normal joints with regard to the diagnosis and management of sports specific injuries. There is a strong focus on the coaching and training involved in a variety of sports. Five days PGEA approval in Health Promotion and Disease Management are given for this course.

The **Practical Sport and Medicine Course** held at Club La Santa, Lanzarote, has a curriculum that varies each year. Delegates and families are welcome. This course further develops the practical examination and sporting themes of the Intermediate Course. Physiological training principles are also reviewed and the course makes use of the coaching staff from the complex to gain practical skills and knowledge of a number of different sports. Individual GPs have gained PGEA approval for this course.

In response to many requests received, an **Advanced Sports Nutrition Course** is being run for the first time. It is suitable for everyone who has previously attended the BASM Introductory Course or an appropriate alternative. Two days PGEA approval in Health Promotion have been given for this course.

### Forthcoming courses

<b>General Sports Medicine Course</b> Lilleshall Hall National Sports Centre	<b>13-18 April 1997</b>
<b>Intermediate Sports Injury Course, part two</b> (new course)	<b>13-18 July 1997</b>
<b>General Sports Medicine Course</b> Lilleshall Hall National Sports Centre	<b>21-26 September 1997</b>
<b>General Sports Medicine Course</b> Lilleshall Hall National Sports Centre (Residential)	<b>19-24 April 1998</b>
<b>Intermediate Course: Sports Specific Injury Management and Normal Examination of Joints, part 2</b> (new course) Lilleshall Hall National Sports Centre (Residential)	<b>12-17 July 1998</b>
<b>General Sports Medicine Course</b> Lilleshall Hall National Sports Centre (Residential)	<b>20-25 September 1998</b>
<b>Practical Sport and Medicine Course</b> Club La Santa, Lanzarote (Residential)	<b>1-8 October 1998</b>

For further details, application forms and membership enquiries, please contact the Education Office at British Association of Sport and Medicine, c/o The National Sports Medicine Institute, Medical College of St Bartholomew's Hospital, Charterhouse Square, London EC1M 6BQ (tel 0171 253 3244; fax 0171 251 0774).

## VOLUME 30: AUTHOR INDEX

- Abe T et al.** Subcutaneous and visceral fat distribution and daily physical activity: comparison between young and middle aged women, 297
- Akgün N** *see* Karamizrak SO *et al*
- Alacamlioglu Y** *see* Preisinger E *et al*
- Anderson AC.** Outbreak of salmonella food poisoning at Junior World Rowing Championships, 347
- Asembo JM** *see* Wekesa M *et al*
- Bailey DM et al.** Physiological implications of moderate altitude training (1640 m) on sea level endurance performance in elite distance runners, 371 *abs*
- Ball P** *see* de Créé C *et al*
- Bassey EJ** *see* Bell JM and Bassey EJ
- Batt ME et al.** Posterior element pain in an adolescent schoolgirl, 356
- Bean M** *see* Harmer PA *et al*
- Begg DJ et al.** Sport and delinquency: an examination of the deterrence hypothesis in a longitudinal study, 335
- Bell JM, Bassey EJ.** Postexercise heart rates and pulse palpation as a means of determining exercising intensity in an aerobic dance class, 48
- Bennell KL et al.** Effect of altered reproductive function and lowered testosterone levels on bone density in male endurance athletes: *review*, 205
- Bennell KL et al.** Models for the pathogenesis of stress fractures in athletes: *review*, 200
- Berglund K-A** *see* Solberg EE *et al*
- Bidwell JP et al.** Acute compartment syndrome of the thigh after weight training, 264
- Bird S** *see* Quinn S and Bird S
- Bizel P** *see* Symons EM *et al*
- Blair S et al.** The beliefs and practices of West Glasgow general practitioners in the promotion of exercise uptake in their patients, 369 *abs*
- Blair SN.** The future of sports medicine: *editorial*, 2
- Blannin AK et al.** Effects of submaximal cycling and long term endurance training on neutrophil phagocytic activity in middle aged men, 125
- Bollen S.** The footballer's fracture: *commentary*, 175
- Book reviews**
- Butler RJ. Sports psychology in action, 367
- Eston R, Reilly T, *editors*. Kinanthropometry and exercise physiology laboratory manual. Tests, procedures and data, 186
- Flood DK. Practical math for health fitness professionals, 185
- Health Education Authority. Promoting physical activity in primary health care, 367
- McCracken J, Williams I, *editors*. Sport, exercise and medicine, two volumes, 76
- O'Shea P. Quantum strength and power training (gaining the winning edge), 366
- Palastanga N, Field D, Soames R, *editors*. Anatomy and human movement. Structure and function. 2nd ed, 269
- Ray R. Management strategies in athletic training, 269
- Sports and exercise medicine: policy and provision, 366
- Borsch M** *see* Yeater R *et al*
- Bosina E** *see* Preisinger E *et al*
- Bouchard C** *see* Shephard RJ and Bouchard C
- Boyd K.** Advanced team physician course, Scottsdale, Arizona, USA, 29 February - 3 March 1996, 270
- Bradley J** *see* McClure J *et al*
- Brennan JH** *see* Woods TAJ *et al*
- Brett Kelly M** *see* McNair PJ *et al*
- Bruckner PD** *see* Bennell KL *et al*
- Bryner RW et al.** Effect of low dose oral contraceptives on exercise performance, 36
- Brynildsen J** *see* Pintaar A *et al*
- Budgett R.** The role of the British Olympic Association: *editorial*, 80
- Bullock-Saxton J** *see* Nicholas RM *et al*
- Bundoc RC** *see* Maffulli N *et al*
- Callaghan MJ, Jarvis C.** Evaluation of elite British cyclists: the role of the squad medical, 349
- Campillo JE** *see* Mena P *et al*
- Campos B** *see* Segura R *et al*
- Cantu RC.** Head injuries in sport: *review*, 289
- Carnie A** *see* Leiper JB *et al*
- Cattermole HR et al.** The footballer's fracture, 171
- Cave R** *see* Blannin AK *et al*
- Chalmers DJ** *see* Hume PA *et al*
- Chan JLC** *see* Li RCT *et al*
- Chan KM** *see* Li RCT *et al*; Maffulli N *et al*
- Chatwin LJ** *see* Blannin AK *et al*
- Cheng JCY** *see* Maffulli N *et al*
- Chong BK** *see* Batt ME *et al*
- Condon C et al.** Incidence of sports injuries at two south Dublin accident and emergency departments, 371 *abs*
- Cooper CJ et al.** A high prevalence of abnormal personality traits in chronic users of anabolic-androgenic steroids, 246
- Cramer J** *see* Harmer PA *et al*
- Critchley M** *see* MacLaren D *et al*
- Cullen M.** American College of Sports Medicine, Annual Congress, 29 May - 1 June 1996, Cincinnati, Ohio, 269
- Davies B** *see* Bailey DM *et al*
- de Créé C et al.** The effects of a graduated training programme on menstrual cycle related basal plasma 2-hydroxy-catecholestrogens, 370 *abs*
- Depledge J** *see* McNair PJ *et al*
- Dixon RM** *see* Thompson CH *et al*
- Donne B** *see* McBurney F *et al*; Price D *et al*
- Duignan C** *see* Pitsiladis YP *et al*
- Dunn AL.** Getting started - a review of physical activity adoption studies, 193
- Dunne T** *see* Cooper CJ *et al*
- Dyer J, Millac P.** Late deterioration after decompression illness affecting the spinal cord, 362
- Eagles C** *see* Head A *et al*
- Egwu MO.** The musculoskeletal effect of intense physical training of non-athletic youth corps conscripts, 112
- Ekeberg O** *see* Solberg EE *et al*
- Engen O** *see* Solberg EE *et al*
- Ernst E** *see* Preisinger E *et al*
- Eston RG.** Verbal encouragement: effects on maximum effort voluntary muscle action: *commentary*, 245
- Evans NA.** Gym & tonic: a profile of 100 steroid users, 370 *abs*
- Fallon KE.** Musculoskeletal injuries in the ultramarathon: the 1990 Westfield Sydney to Melbourne run, 319
- Fallon KE, Foster K.** Pneumomediastinum in a surf lifesaver, 359
- Featherstone T.** The accessory soleus muscle: *letter*, 185
- Fentem PH.** A national strategy for the promotion of physical activity: *leader*, 280
- Ferner R** *see* Head A *et al*
- Foster K** *see* Fallon KE and Foster K
- Fricker P.** John G P Williams: *letter*, 185
- Fricker P.** Professor John Robert Sutton MBBS MD PhD DSc FRACP FACSP FRCS FCP (Canada) FCS (Canada): obituary, 183
- Fukunaga T** *see* Abe T *et al*
- Fulcher KY, White PD.** A randomised controlled trial of graded exercise therapy in patients with chronic fatigue syndrome, 369 *abs*
- Fuller CW** *see* Hawkins RD and Fuller CW
- Gandy G** *see* Bailey DM *et al*
- Garcia de Herreros A** *see* Serrat A and Garcia de Herreros A
- Gardiner J** *see* Satterthwaite P *et al*
- Garraway WM** *see* Lee AJ and Garraway WM
- Garrido E, Javierre C.** Extreme altitude transient aphasia, 364
- Garrido E** *see also* Segura R *et al*
- Gibbons CER** *see* Bidwell JP *et al*
- Gissane C** *see* Stephenson S *et al*
- Gleeson M** *see* Blannin AK *et al*
- Godsiff S** *see* Bidwell JP *et al*
- Godsmark C.** Patrick Barnes: Tail-end Charlie of the triathlon at 81, 267
- Grant PT** *see* Wyatt JP *et al*
- Grant S** *see* McClure J *et al*
- Grayson E.** Medicolegal aspects of deliberate foul play in rugby union: *editorial*, 191
- Greenhaff PL.** Creatine supplementation: recent developments: *leader*, 276
- Gregg PJ** *see* Cattermole HR *et al*
- Grime S** *see* MacLaren D *et al*
- Guly HR.** Medical aspects of the work of a moorland rescue team, 260
- Hackney RG.** Achilles tendon rupture: *letter*, 366
- Hackney RG.** Advances in the understanding of throwing injuries of the shoulder: *review*, 282
- Handcock P** *see* Quarrie KL *et al*
- Hardy JRW** *see* Cattermole HR *et al*
- Harmer PA et al.** Distant entry pneumothorax in a competitive fencer, 265
- Hawkins RD, Fuller CW.** Risk assessment in professional football: an examination of accidents and incidents in the 1994 World Cup finals, 165

- Head A et al.** Acute effects of  $\beta$  blockade and exercise on mood and anxiety, 238
- Hillis WS** see McClure J et al; Robertson H et al; Stevenson L et al
- Hillsdon M, Thorogood M.** A systematic review of physical activity promotion strategies: *review article*, 84
- Hobson RS.** Airway efficiency during the use of SCUBA diving mouthpieces, 145
- Holloway G** see Motto S and Holloway G
- Holton L** see Blair S et al
- Hsu YC** see Li RCT et al
- Hume PA et al.** Trampoline injuries in New Zealand: emergency care, 327
- Islegen C** see Karamizrak SO et al
- Jarvis C** see Callaghan MJ and Jarvis C
- Javierre C** see Garrido E and Javierre C; Segura R et al
- Jennings D** see Stephenson S et al
- Juritz JM** see Upton PAH et al
- Kallinen M** see Manninen JSO and Kallinen M
- Karamizrak SO et al.** Evaluation of iron metabolism indices and their relation with physical work capacity in athletes, 15
- Karnezis IA, Morrison PJM.** Unusual patellar tendon injury in an adolescent runner with generalised ligamentous laxity, 178
- Kavanagh T** see Shephard RJ et al
- Kawakami Y** see Abe T et al
- Keizer HA** see de Creé C et al
- Kemp GJ** see Thompson CH et al
- Kendall MJ** see Head A et al
- Kennedy A.** The pattern of injury in fatal pedal cycle accidents and the possible benefits of cycle helmets, 130
- Keyes G** see Condon C et al
- Khanna GL et al.** A study of physiological responses during match play in Indian national kabaddi players, 232
- King JB** see Padhiar N and King JB
- Klareskov B** see Marker LB and Klareskov B
- Kristensen O** see Robertsen K et al
- Krüger-Franke M** see Kugler A et al
- Kugler A et al.** Muscular imbalance and shoulder pain in volleyball attackers, 256
- Kurata J** see Abe T et al
- Kurosawa H et al.** Complete avulsion of the hamstring tendons from the ischial tuberosity. A report of two cases sustained in judo, 72
- Lakomy HKA, Williams T.** The responses of an able bodied person to wheelchair training, 236
- Lambert MI** see Cooper CJ et al
- Langley JD** see Begg DJ et al
- Larmer P** see Satterthwaite P et al
- Laurenson N.** Effect of passive stretching and jogging on the series elastic muscle stiffness and range of motion of the ankle joint: commentary, 318
- Lee AJ, Garraway WM.** Epidemiological comparison of injuries in school and senior club rugby, 213
- Leiper J.** Radionuclide imaging of gastric emptying: *letter*, 268
- Leiper JB et al.** Water turnover rates in sedentary and exercising middle aged men, 24
- Li RCT et al.** Eccentric and concentric isokinetic knee flexion and extension: a reliability study using the Cybex 6000 dynamometer, 156
- Li RCT et al.** Isokinetic strength of the quadriceps and hamstrings and functional ability of anterior cruciate deficient knees in recreational athletes, 161
- Limb D.** Acetabular fractures: *letter*, 185
- Lizarraga MA** see Segura R et al
- Loeb M** see Solberg EE et al
- Lombardo JA.** Drug control programmes: *editorial*, 82
- Long G** see Mealing D et al
- Lorentzon R** see Tegner Y and Lorentzon R
- Lowther MP, Mutrie N.** Reliability and concurrent validity of the Scottish physical activity questionnaire, 369 *abs*
- McArthur M** see Maughan RJ et al
- Macauley D.** Child abuse in sport: *editorial*, 275
- Macauley D.** Goal setting: *editorial*, 2
- Macauley D.** Olympic dream: *editorial*, 80
- Macauley D.** Royalty, Royal Colleges, purple prose or progress: *editorial*, 190
- McBride AJ et al.** Three cases of nalbuphine hydrochloride dependence associated with anabolic steroid use, 69
- McBurney F et al.** Evaluation of peripheral vision loss using helmets with visors, 370 *abs*
- McCann C.** Sports for the disabled: the evolution from rehabilitation to competitive sport: *leader*, 279
- McCarthy PW** see Mealing D et al
- McClure J et al.** The usefulness of an electronic pacing device in physiological testing in swimmers, 369 *abs*
- McDougall C** see Robertson H et al
- Macintyre P** see McClure J et al; Robertson H et al; Stevenson L et al
- MacLaren D et al.** Use of radionuclide imaging to determine gastric emptying of carbohydrate solutions during exercise, 20: *letter*, 268
- Maclean JA** see Stevenson L et al
- Macleod DAD.** Sport and exercise medicine: *editorial*, 3
- McNair PJ.** Verbal encouragement of voluntary muscle action: reply to commentary by Roger Eston: *letter*, 366
- McNair PJ, Stanley SN.** Effect of passive stretching and jogging on the series elastic muscle stiffness and range of motion of the ankle joint, 313
- McNair PJ et al.** Verbal encouragement: effects on maximum effort voluntary muscle action, 243
- McNaughton GW** see Wyatt JP et al
- Maffulli N.** Clinical tests in sports medicine: more on Achilles tendon, 250
- Maffulli N et al.** Paediatric sports injuries in Hong Kong: a seven year survey, 218
- Maffulli N** see also Li RCT et al
- Majumdar P** see Khanna GL et al
- Malcolm SA** see Bennell KL et al
- Malik V** see Khanna GL et al
- Mandal M** see Khanna GL et al
- Manninen JSO, Kallinen M.** Low back pain and other overuse injuries in a group of Japanese triathletes, 134
- Marker LB, Klareskov B.** Posterior sternoclavicular dislocation: an American football injury, 71
- Marshall SW** see Begg DJ et al
- Maughan RJ** see Leiper JB et al; Pitsiladis YP et al
- Maughan RJ et al.** Influence of menstrual status on fluid replacement after exercise induced dehydration in healthy young women, 41
- Maynar M** see Mena P et al
- Mbubaegbu CE** see Munshi NI and Mbubaegbu CE
- Mealing D et al.** Vibromyographic recording from human muscles with known fibre composition differences, 27
- Mena P et al.** Changes in plasma enzyme activities in professional racing cyclists, 122
- Mertens DJ** see Shephard RJ et al
- Metka M** see Preisinger E et al
- Miles A** see MacLaren D et al
- Millac P** see Dyer J and Millac P
- Moffitt T** see Begg DJ et al
- Moriarty J** see Harmer PA et al
- Morise A** see Yeater R et al
- Morris FL, Payne WR.** Seasonal variations in the body composition of lightweight rowers, 301
- Morrison PJM** see Karnezis IA and Morrison PJM
- Motto S, Holloway G.** The accessory soleus muscle: *letter*, 185
- Munshi NI, Mbubaegbu CE.** Simultaneous rupture of the quadriceps tendon with contralateral rupture of the patellar tendon in an otherwise healthy athlete, 177
- Murphy MH** see Woods TAJ et al
- Mutaf I** see Karamizrak SO et al
- Mutrie N** see Blair S et al; Lowther MP and Mutrie N
- Myers PT** see Nicholas RM et al
- Nakasita H** see Kurosawa H et al
- Nakasita K** see Kurosawa H et al
- Nicholas RM et al.** Patellofemoral pain in the sportsperson: which rehabilitation exercises are best and is patellar taping of benefit? 370 *abs*
- Nicholl J** see Robertson H et al
- Njororai WWS** see Wekesa M et al
- Noakes T.** The Olympic Games and sports medicine: *editorial*, 81
- Noakes TD** see Cooper CJ et al; Upton PAH et al
- Norton R** see Satterthwaite P et al
- O'Brien M.** Osteoporosis and exercise: *editorial*, 191
- O'Brien M** see also Condon C et al; McBurney F et al; Price D et al
- O'Neill I** see MacLaren D et al
- O'Neill ME.** Maternal rectal temperature and fetal heart rate responses to upright cycling in late pregnancy, 32
- Padhiar N, King JB.** Exercise induced leg pain - chronic compartment syndrome. Is the increase in intra-compartment pressure exercise specific?, 360
- Payne WR** see Morris FL and Payne WR
- Petersen T** see McBride AJ et al
- Pils K** see Preisinger E et al
- Pintsaar A et al.** Postural corrections after standardised perturbations of single limb stance: effect of training and orthotic devices in patients with ankle instability, 151
- Pitsiladis YP et al.** Effects of alterations in dietary carbohydrate intake on running performance during a 10 km treadmill time trial, 226
- Plunkett P** see Condon C et al
- Preisinger E et al.** Exercise therapy for osteoporosis: results of a randomised controlled trial, 209
- Price D et al.** The effect of variation in seat height on submaximal cycling performance in man, 371 *abs*

- Puffer JC.** Gender verification: a concept whose time has come and passed? *leader*, 278
- Quarrie KL et al.** The New Zealand rugby injury and performance project. IV. Anthropometric and physical performance comparisons between positional categories of senior A rugby players, 53
- Quinn S, Bird S.** Influence of saddle type upon the incidence of lower back pain in equestrian riders, 140
- Radda GK** *see* Thompson CH *et al*
- Reed C** *see* Yeater R *et al*
- Reed SC** *see* Nicholas RM *et al*
- Reininger S** *see* Kugler A *et al*
- Roberts PME** *see* Roberts SNJ and Roberts PME
- Roberts SNJ, Roberts PME.** Tournament water skiing trauma, 90
- Robertson H et al.** The effect of a single pass VDD pacemaker on exercise capacity (VVD versus VVIR mode), 370 *abs*
- Robertson K et al.** Manubrium sterni stress fracture: an unusual complication of non-contact sport, 176
- Rochford K** *see* Cooper CJ *et al*
- Romer L** *see* Bailey DM *et al*
- Rosemeyer B** *see* Kugler A *et al*
- Rutherford OM.** Effect of altered reproductive function and lowered testosterone levels on bone density in male endurance athletes: commentary, 208
- Sadaki T** *see* Torii M *et al*
- Sakurai T** *see* Abe T *et al*
- Sanderson AL** *see* Thompson CH *et al*
- Sasaki S** *see* Kurosawa H *et al*
- Satterthwaite P et al.** Incidence of injuries and other health problems in the Auckland Citibank marathon, 1993, 324
- Schneider B** *see* Preisinger E *et al*
- Segura R et al.** A new approach to the assessment of anaerobic metabolism: measurement of lactate in saliva, 305
- Serrat A, Garcia de Herreros A.** Gender verification in sports by PCR amplification of SRY and DYZ1 Y chromosome specific sequences: presence of DYZ1 repeat in female athletes, 310
- Sharp C.** The sub-24-minute 10 000 metres, 2040 AD, 181
- Shephard RJ.** The athlete's heart: is big beautiful? *review article*, 5
- Shephard RJ et al.** The place of perceived exertion ratings in exercise prescription for cardiac transplant patients before and after training, 116
- Shephard RJ, Bouchard C.** Associations between health behaviours and health related fitness, 94
- Shirreffs SM** *see* Maughan RJ *et al*
- Skattum N** *see* Batt ME *et al*
- Solberg EE et al.** The effect of meditation on shooting performance, 342
- Stanley SN** *see* McNair PJ *et al*; McNair PJ and Stanley SN
- Stephenson S et al.** Injury in rugby league: a four year prospective survey, 331
- Stevenson L et al.** The effect of exercise and injury on the later development of osteoarthritis in sportsmen, 369 *abs*
- Stockdale H** *see* MacLaren D *et al*
- Styles P** *see* Thompson CH *et al*
- Sutton JR.** Cycling the Simpson Desert, 75
- Symons EM et al.** The use of the ventilatory threshold and dyspnoea thresholds for exercise prescription to asthmatics, 369 *abs*
- Takeda S** *see* Kurosawa H *et al*
- Tanji JL** *see* Batt ME *et al*
- Taskiran Y** *see* Karamizrak SO *et al*
- Taylor DJ** *see* Thompson CH *et al*
- Tegner Y, Lorentzon R.** Concussion among Swedish elite ice hockey players, 251
- Thompson B.** A review of the *British Journal of Sports Medicine* 1991-5, 354
- Thompson CH et al.** Effect of creatine on aerobic and anaerobic metabolism in skeletal muscle in swimmers, 222
- Thompson M.** Professor John Robert Sutton MBBS MD PhD DSc FRACP FACSP FRCS FCP (Canada) FCS (Canada): obituary, 183
- Thorogood M** *see* Hillsdon M and Thorogood M
- Toffle RC** *see* Bryner RW *et al*
- Toomey MJ** *see* Quarrie KL *et al*
- Torii M et al.** Effect of prewarming in the cold season on thermoregulatory responses during exercise, 102
- Tropp H** *see* Pintsaar A *et al*
- Trouillier H-H** *see* Kugler A *et al*
- Ullrich I** *see* Yeater R *et al*
- Ullrich IH** *see* Bryner RW *et al*
- Upton PAH et al.** Thermal pants may reduce the risk of recurrent hamstring injuries in rugby players, 57
- Varol SR** *see* Karamizrak SO *et al*
- Varray A** *see* Symons EM *et al*
- Vejen L** *see* Robertsen K *et al*
- Ventura JLL** *see* Segura R *et al*
- Vrinda T** *see* Khanna GL *et al*
- Wallace ES** *see* Woods TAJ *et al*
- Waller AE** *see* Quarrie KL *et al*
- Walsh M** *see* Harmer PA *et al*
- Wark JD** *see* Bennell KL *et al*
- Webborn ADJ.** Systematic review of physical activity promotion strategies: *letter*, 268
- Wekesa M et al.** Injury surveillance in a rugby tournament, 61
- White PD** *see* Dulcher KY and White PD
- Williams T** *see* Lakomy HKA and Williams T
- Williamson K** *see* McBride AJ *et al*
- Wilson BD** *see* Hume PA *et al*
- Woods TAJ et al.** Effects of endurance training on ventilation, blood lactate, and plasma potassium during incremental exercise, 371 *abs*
- Wu Y** *see* Li RCT *et al*
- Wyatt JP et al.** A prospective study of rock climbing injuries, 148
- Yacoub M** *see* Shephard RJ *et al*
- Yaman Ç** *see* Karamizrak SO *et al*
- Yamasaki M** *see* Torii M *et al*
- Yeater R et al.** Resistance trained athletes using or not using anabolic steroids compared to runners: effects on cardiorespiratory variables, body composition, and plasma lipids, 11
- Yeater RA** *see* Bryner RW *et al*
- Ytterstad B.** The Harstad injury prevention study: the epidemiology of sports injuries. An 8 year study, 64



## VOLUME 30: SUBJECT INDEX

- Accessory soleus muscle**, The accessory soleus muscle: *letter*, 185
- Accident and emergency department**, Incidence of sports injuries at two south Dublin accident and emergency departments, 371 *abs*
- Acetabular fractures**, Acetabular fractures: *letter*, 185
- Achilles tendon rupture**, Clinical tests in sports medicine: Achilles tendon rupture, 124: *letter*, 366  
Clinical tests in sports medicine: more on Achilles tendon, 250
- Acute compartment syndrome**, Acute compartment syndrome of the thigh after weight training, 264
- Adolescence**, Posterior element pain in an adolescent schoolgirl, 356  
Sport and delinquency: an examination of the deterrence hypothesis, 335  
Unusual patellar tendon injury in an adolescent runner with generalised ligamentous laxity, 178
- Aerobic dance**, Postexercise heart rates and pulse palpation as a means of determining exercising intensity in an aerobic dance class, 48
- Aggressive behaviour**, Sport and delinquency: an examination of the deterrence hypothesis in a longitudinal study, 335
- Aging**, Subcutaneous and visceral fat distribution and daily physical activity: comparison between young and middle aged women, 297
- Altitude**, Extreme altitude transient aphasia, 364
- Altitude training**, Physiological implications of moderate altitude training (1640m) on sea level endurance performance in elite distance runners, 371 *abs*
- American football**, Posterior sternoclavicular dislocation, an American football injury, 71
- Anabolic steroids**, High prevalence of abnormal personality traits in chronic users of anabolic-androgenic steroids, 246  
Resistance trained athletes using or not using anabolic steroids compared to runners: effects on cardiorespiratory variables, body composition, and plasma lipids, 11  
Three cases of nalbuphine hydrochloride dependence associated with anabolic steroid use, 69
- Anaemia**, Evaluation of iron metabolism indices and their relation with physical work capacity in athletes, 15
- Anaerobic threshold**, A new approach to the assessment of anaerobic metabolism: measurement of lactate in saliva, 305
- Ankle function**, Postural corrections after standardised perturbations of single limb stance; effect of training and orthotic devices in patients with ankle instability, 151
- Ankle joint**, Effect of passive stretching and jogging on the series elastic muscle stiffness and range of motion of the ankle joint, 313: *commentary*, 318
- Annual Congress of the British Association of Sport and Medicine**, 368 *abs*
- Anterior cruciate ligament**, Isokinetic strength of the quadriceps and hamstrings and functional ability of anterior cruciate deficient knees in recreational athletes, 161
- Anthropometry**, The New Zealand rugby injury and performance project, IV. Anthropometric and physical performance comparisons between positional categories of senior A rugby players, 53
- Anxiety**, Acute effects of  $\beta$  blockade and exercise on mood, anxiety 238
- Aphasia**, Extreme altitude transient aphasia, 364
- Asthma**, Pneumomediastinum in a surf lifesaver, 359  
Use of the ventilatory threshold and dyspnoea thresholds for exercise prescription to asthmatics, 369 *abs*
- Athletes**, Effect of altered reproductive function and lowered testosterone levels on bone density in male endurance athletes: *review*, 205: *commentary*, 208  
Models for the pathogenesis of stress fractures in athletes: *review*, 200
- Athletic screening**, The athlete's heart: is big beautiful? *review article*, 5
- Australia**, Cycling the Simpson Desert, 75
- Avulsion**, Complete avulsion of the hamstring tendons from the ischial tuberosity. A report of two cases sustained in judo, 72
- Barnes, Patrick**, Patrick Barnes. Tail-end Charlie of the triathlon at 81, 267
- Beta blockade**, Acute effects of  $\beta$  blockade and exercise on mood and anxiety, 238
- Board of Sport and Exercise Medicine**, Royalty, Royal Colleges, purple prose or progress: *editorial*, 190
- Body building**, A high prevalence of abnormal personality traits in chronic users of anabolic-androgenic steroids, 246
- Body building exercises**, Manubrium sterni stress fracture: an unusual complication of non-contact sport, 176
- Body water**, Water turnover rates in sedentary and exercising middle aged men, 24
- Bone density**, Effect of altered reproductive function and lowered testosterone levels on bone density in male endurance athletes: *review*, 205: *commentary*, 208  
Exercise therapy for osteoporosis: results of a randomised controlled trial, 209
- Borg categoric scale**, The place of perceived exertion ratings in exercise prescription for cardiac transplant patients before and after training, 116
- British Association of Sport and Medicine**, Annual Congress 1996, abstracts, 369 *British Journal of Sports Medicine* Goal setting: *editorial*, 2 *Review of the British Journal of Sports Medicine* 1991-5, 354
- British Olympic Association**, The role of the British Olympic Association: *editorial*, 80
- Caldicott, Dr Dame Fiona**, Royalty, Royal Colleges, purple prose or progress: *editorial*, 190
- Carbohydrate**, Effects of alterations in dietary carbohydrate intake on running performance during a 10 km treadmill time trial, 226  
Use of radionuclide imaging to determine gastric emptying of carbohydrate solutions during exercise, 20: *letters*, 268
- Cardiac dimensions**, Resistance trained athletes using or not using manabolic steroids compared to runners: effects on cardiorespiratory variables, body composition, and plasma lipids, 11
- Cardiac hypertrophy**, The athlete's heart: is big beautiful? *review article*, 5
- Catecholestrogens**, The effects of a graduated training programme on menstrual cycle related basal plasma 2-hydroxycatecholestrogens, 370 *abs*
- Child abuse in sport**, Child abuse in sport: *editorial*, 275  
"I was that child", 364
- Children**, Paediatric sports injuries in Hong Kong: a seven year survey, 218
- Chromosomes**, Gender verification in sports by PCR amplification of SRY and DYZ1 Y chromosome specific sequences: presence of DYZ1 repeat in female athletes, 310
- Chronic compartment syndrome**, Exercise induced leg pain - chronic compartment syndrome. Is the increase in intra-compartment pressure exercise specific?, 360
- Chronic fatigue syndrome**, A randomised controlled trial of graded exercise therapy in patients with chronic fatigue syndrome, 369
- Climbers**, A prospective study of rock climbing injuries, 148
- Compartment syndrome**, Acute compartment syndrome of the thigh after weight training, 264  
Exercise-induced leg pain - chronic compartment syndrome. Is the increase in intra-compartment pressure exercise specific?, 360
- Concentric contraction**, Eccentric and concentric isokinetic knee flexion and extension: a reliability study using the Cybex 6000 dynamometer, 156
- Concussion**, Concussion among Swedish elite ice hockey players, 251
- Conference**, American College of Sports Medicine, Annual Congress, 29 May - 1 June 1996, Cincinnati, Ohio, report, 269
- Contraceptive**, Effect of low dose oral contraceptives on exercise performance, 36
- Corrections**, 273
- Creatine**, Creatine supplementation: recent developments: *leader*, 276  
Effect of creatine on aerobic and anaerobic metabolism in skeletal muscle in swimmers, 222
- Cybex 6000 isokinetic dynamometer**, Eccentric and concentric isokinetic knee flexion and extension: a reliability study using the Cybex 6000 dynamometer, 156
- Cyclists (cycling)**, Acetabular fractures: *letter*, 185  
Changes in plasma enzyme activities in professional racing cyclists, 122  
Cycling the Simpson Desert, 75  
Effect of variation in seat height on submaximal cycling performance in man, 371 *abs*  
Evaluation of elite British cyclists: the role of the squad medical, 349  
Low back pain and other overuse injuries in a group of Japanese triathletes, 134  
Pattern of injury in fatal pedal cycle accidents and the possible benefits of cycle helmets, 130
- Dartmoor Rescue Group**, Medical aspects of the work of a moorland rescue team, 260
- Decompression illness**, Late deterioration after decompression illness affecting the spinal cord, 362



- Delinquency**, Sport and delinquency: an examination of the deterrence hypothesis in a longitudinal study, 335
- Diarrhoea**, Outbreak of salmonella food poisoning at Junior World Rowing Championships, 347
- Dietary manipulation**, Effects of alterations in dietary carbohydrate intake on running performance during a 10 km treadmill time trial, 226
- Disabled**, Sports for the disabled: the evolution from rehabilitation to competitive sport: *leader*, 279
- Diving**, Airway efficiency during the use of SCUBA diving mouthpieces, 145
- Downhill skiing**, The Harstad injury prevention study: the epidemiology of sports injuries. An 8 year study, 64
- Drugs**  
Drug control programmes: *editorial*, 82  
Gym & tonic: a profile of 100 steroid users, 370 *abs*
- Dynamometer**, Eccentric and concentric isokinetic knee flexion and extension: a reliability study using the Cybex 6000 dynamometer, 156
- Dysbarism**, Late deterioration after decompression illness affecting the spinal cord, 362
- Dyspnoea threshold**, The use of the ventilatory threshold and dyspnoea thresholds for exercise prescription to asthmatics, 369 *abs*
- Eccentric contraction**, Eccentric and concentric isokinetic knee flexion and extension: a reliability study using the Cybex 6000 dynamometer, 156
- Echocardiography**, The athlete's heart: is big beautiful? *review article*, 5
- Electronic pacing device**, The usefulness of an electronic pacing device in physiological testing in swimmers, 369 *abs*
- Endurance performance**, Physiological implications of moderate altitude training (1640 m) on sea level endurance performance in elite distance runners, 371 *abs*
- Endurance training**, Effects of submaximal cycling and long term endurance training on neutrophil phagocytic activity in middle aged men, 125
- Epidemiology**, Paediatric sports injuries in Hong Kong: a seven year survey, 218
- Equestrian injuries**, Influence of saddle type upon the incidence of lower back pain in equestrian riders, 140
- Evaporative heat loss**, Effect of prewarming in the cold season on thermoregulatory responses during exercise, 102
- Exercise**  
Acute effects of  $\beta$  blockade and exercise on mood and anxiety, 238  
Beliefs and practices of West Glasgow general practitioners in the promotion of exercise uptake in their patients, 369 *abs*  
Changes in plasma enzyme activities in professional racing cyclists, 122  
Effect of exercise and injury on the later development of osteoarthritis in sportsmen, 369 *abs*  
Effect of low dose oral contraceptives on exercise performance, 36  
Effect of prewarming in the cold season on thermoregulatory responses during exercise, 102  
Effect of a single pass VDD pacemaker on exercise capacity (VVD versus VVIR mode), 370 *abs*  
Effects of endurance training on ventilation, blood lactate, and plasma potassium during incremental exercise, 371 *abs*  
Effects of submaximal cycling and long term endurance training on neutrophil phagocytic activity in middle aged men, 125  
Evaluation of iron metabolism indices and their relation with physical work capacity in athletes, 15  
Exercise induced leg pain - chronic compartment syndrome. Is the increase in intra-compartment pressure exercise specific?, 360  
Exercise therapy for osteoporosis: results of a randomised controlled trial, 209  
Getting started - a review of physical activity adoption studies, 193  
Influence of menstrual status on fluid replacement after exercise induced dehydration in healthy young women, 41  
Maternal rectal temperature and fetal heart rate responses to upright cycling in late pregnancy, 32  
National strategy for the promotion of physical activity: *leader*, 280  
Osteoporosis and exercise: *editorial*, 191  
Patellofemoral pain in the sportsperson: which rehabilitation exercises are best and is patellar taping of benefit? 370 *abs*  
Place of perceived exertion ratings in exercise prescription for cardiac transplant patients before and after training, 116  
Postexercise heart rates and pulse palpation as a means of determining exercising intensity in an aerobic dance class, 48  
Randomised controlled trial of graded exercise therapy in patients with chronic fatigue syndrome, 369 *abs*  
Reliability and concurrent validity of the Scottish physical activity questionnaire, 369 *abs*  
Subcutaneous and visceral fat distribution and daily physical activity: comparison between young and middle aged women, 297  
Systematic review of physical activity promotion strategies: *review article*, 84: *letter*, 268  
Use of radionuclide imaging to determine gastric emptying of carbohydrate solutions during exercise, 20: *letters*, 268  
Use of the ventilatory threshold and dyspnoea thresholds for exercise prescription to asthmatics, 369 *abs*  
Water turnover rates in sedentary and exercising middle aged men, 24
- Exercise medicine**, Sport and exercise medicine: *editorial*, 3
- Exertion**  
Evaluation of iron metabolism indices and their relation with physical work capacity in athletes, 15  
Maternal rectal temperature and fetal heart rate responses to upright cycling in late pregnancy, 32
- Fasciotomy**, Acute compartment syndrome of the thigh after weight training, 264
- Fat mass**  
Seasonal variations in the body composition of lightweight rowers, 301  
Subcutaneous and visceral fat distribution and daily physical activity: comparison between young and middle aged women, 297
- Fatal accidents**, The pattern of injury in fatal pedal cycle accidents and the possible benefits of cycle helmets, 130
- Female athletes**, Gender verification in sports by PCR amplification of SRY and DYZ1 Y chromosome specific sequences: presence of DYZ1 repeat in female athletes, 310
- Fencing**, Distant entry pneumothorax in a competitive fencer, 265
- Ferritin**, Evaluation of iron metabolism indices and their relation with physical work capacity in athletes, 15
- Fetal heart rate**, Maternal rectal temperature and fetal heart rate responses to upright cycling in late pregnancy, 32
- Fibre type**, Vibromyographic recording from human muscles with known fibre composition differences, 27
- Fluid balance**, Influence of menstrual status on fluid replacement after exercise induced dehydration in healthy young women, 41
- Football**  
Footballer's fracture, 171: *commentary*, 175  
Harstad injury prevention study: the epidemiology of sports injuries. An 8 year study, 64  
Risk assessment in professional football: an examination of accidents and incidents in the 1994 World Cup finals, 165
- Foul play**, Medicolegal aspects of deliberate foul play in rugby union: *editorial*, 191: *warm up*, 190
- Future**, The future of sports medicine: *editorial*, 2
- Gamma camera imaging**, Use of radionuclide imaging to determine gastric emptying of carbohydrate solutions during exercise, 20: *letters*, 268
- Gastric emptying**, Use of radionuclide imaging to determine gastric emptying of carbohydrate solutions during exercise, 20: *letters*, 268
- Gastroenteritis**, Outbreak of salmonella food poisoning at Junior World Rowing Championships, 347
- Gender verification**  
Gender verification: a concept whose time has come and passed? *leader*, 278  
Gender verification in sports by PCR amplification of SRY and DYZ1 Y chromosome specific sequences: presence of DYZ1 repeat in female athletes, 310
- Glycogen**, The sub-24-minute 10 000 metres, 2040 AD, 181
- Hamstring**  
Complete avulsion of the hamstring tendons from the ischial tuberosity. A report of two cases sustained in judo, 72  
Thermal pants may reduce the risk of recurrent hamstring injuries in rugby players, 57
- Hamstring/quadriceps ratio**, Isokinetic strength of the quadriceps and hamstrings and functional ability of anterior cruciate deficient knees in recreational athletes, 161
- Harstad injury prevention study**, The Harstad injury prevention study: the epidemiology of sports injuries. An 8 year study, 64
- Head injuries**, Head injuries in sport: *review*, 289
- Health problems**, Incidence of injuries and other health problems in the Auckland Citibank marathon, 1993, 324
- Health related fitness**, Associations between health behaviours and health related fitness, 94
- Heart**  
Athlete's heart: is big beautiful? *review article*, 5  
Resistance trained athletes using or not using anabolic steroids compared to runners: effects on cardiorespiratory variables, body composition, and plasma lipids, 11
- Heart rates**, Postexercise heart rates and pulse palpation as a means of determining exercising intensity in an aerobic dance class, 48
- Heart transplantation**, The place of perceived exertion ratings in exercise prescription for cardiac transplant patients before and after training, 116
- Helmets**  
Evaluation of peripheral vision loss using helmets with visors, 370 *abs*  
Pattern of injury in fatal pedal cycle accidents and the possible benefits of cycle helmets, 130
- Hip synergy**, Postural corrections after standardised perturbations of single limb stance: effect of training and orthotic devices in patients with ankle instability, 151
- Horse riders**, Influence of saddle type upon the incidence of lower back pain in equestrian riders, 140  
2-Hydroxy-catecholestrogens, The effects of a graduated training programme on menstrual cycle related basal plasma 2-hydroxy-catecholestrogens, 370 *abs* 1

- Ice hockey**, Concussion among Swedish elite ice hockey players, 251
- Injury, general**, Harstad injury prevention study: the epidemiology of sports injuries. An 8 year study, 64
- Intra-compartmental pressure**, Exercise induced leg pain - chronic compartment syndrome. Is the increase in intra-compartment pressure exercise specific?, 360
- Intrathoracic injuries**, Posterior sternoclavicular dislocation: an American football injury, 71
- Iron deficiency**, Evaluation of iron metabolism indices and their relation with physical work capacity in athletes, 15
- Ischial tuberosity**, Complete avulsion of the hamstring tendons from the ischial tuberosity. A report of two cases sustained in judo, 72
- Isokinetic strength**, Isokinetic strength of the quadriceps and hamstrings and functional ability of anterior cruciate deficient knees in recreational athletes, 161
- Isokinetic testing**, Eccentric and concentric isokinetic knee flexion and extension: a reliability study using the Cybex 6000 dynamometer, 156
- Joint hypermobility**, Unusual patellar tendon injury in an adolescent runner with generalised ligamentous laxity, 178
- Judo**, Complete avulsion of the hamstring tendons from the ischial tuberosity. A report of two cases sustained in judo, 72
- Kabaddi**, A study of physiological responses during match play in Indian national kabaddi players, 232
- Knee**  
Eccentric and concentric isokinetic knee flexion and extension: a reliability study using the Cybex 6000 dynamometer, 156  
Isokinetic strength of the quadriceps and hamstrings and functional ability of anterior cruciate deficient knees in recreational athletes, 161
- Lactate**  
Effects of endurance training on ventilation, blood lactate, and plasma potassium during incremental exercise, 371 *abs*  
New approach to the assessment of anaerobic metabolism: measurement of lactate in saliva, 305
- Late paraparesis**, Late deterioration after decompression illness affecting the spinal cord, 362
- Leg pain**, Exercise induced leg pain - chronic compartment syndrome. Is the increase in intra-compartment pressure exercise specific?, 360
- Ligamentous laxity**, Unusual patellar tendon injury in an adolescent runner with generalised ligamentous laxity, 178
- Lipids**, Resistance trained athletes using or not using anabolic steroids compared to runners: effects on cardiorespiratory variables, body composition, and plasma lipids, 11
- Low back pain**  
Influence of saddle type upon the incidence of lower back pain in equestrian riders, 140  
Low back pain and other overuse injuries in a group of Japanese triathletes, 134  
Posterior element pain in an adolescent schoolgirl, 356
- Low dose contraceptive**, Effect of low dose oral contraceptives on exercise performance, 36
- Lumbosacral defect**, Posterior element pain in an adolescent schoolgirl, 356
- Magnetic resonance spectroscopy**, Effect of creatine on aerobic and anaerobic metabolism in skeletal muscle in swimmers, 222
- Male endurance athletes**, Effect of altered reproductive function and lowered testosterone levels on bone density in male endurance athletes: *review*, 205; *commentary*, 208
- Manubrium sterni**, Manubrium sterni stress fracture: an unusual complication of non-contact sport, 176
- Marathon**  
Incidence of injuries and other health problems in the Auckland Citibank marathon, 1993, 324  
Musculoskeletal injuries in the ultramarathon: the 1990 Westfield Sydney to Melbourne run, 319
- Maximum aerobic capacity**, A study of physiological responses during match play in Indian national kabaddi players, 232
- Maximum oxygen consumption**, Effect of low dose oral contraceptives on exercise performance, 36
- Medical screening**, Evaluation of elite British cyclists: the role of the squad medical, 349
- Medicolegal aspects**, Medicolegal aspects of deliberate foul play in rugby union: *editorial*, 191
- Meditation**, The effect of meditation on shooting performance, 342
- Menstrual cycle**  
Effect of low dose oral contraceptives on exercise performance, 36  
Effects of a graduated training programme on menstrual cycle related basal plasma 2-hydroxy-catecholestrogens, 370 *abs*  
Influence of menstrual status on fluid replacement after exercise induced dehydration in healthy young women, 41
- Mental training**, The effect of meditation on shooting performance, 342
- Metabolic fitness**, Associations between health behaviours and health related fitness, 94
- Mood**, Acute effects of  $\beta$  blockade and exercise on mood and anxiety, 238
- Moorland rescue team**, Medical aspects of the work of a moorland rescue team, 260
- Mountain rescue team**, Medical aspects of the work of a moorland rescue team, 260
- Mouthpieces**, Airway efficiency during the use of SCUBA diving mouthpieces, 145
- MRI diagnosis**, The accessory soleus muscle: *letter*, 185
- Muscle**, Vibromyographic recording from human muscles with known fibre composition differences, 27
- Muscle stiffness**, Effect of passive stretching and jogging on the series elastic muscle stiffness and range of motion of the ankle joint, 313; *commentary*, 318
- Muscle weakness**, The place of perceived exertion ratings in exercise prescription for cardiac transplant patients before and after training, 116
- Muscular imbalance**, Muscular imbalance and shoulder pain in volleyball attackers, 256
- Musculoskeletal effect**, The musculoskeletal effect of intense physical training of non-athletic youth corps conscripts, 112
- Musculoskeletal injuries**, Musculoskeletal injuries in the ultramarathon: the 1990 Westfield Sydney to Melbourne run, 319
- Myalgia**, The musculoskeletal effect of intense physical training of non-athletic youth corps conscripts, 112
- Nalbuphine hydrochloride**, Three cases of nalbuphine hydrochloride dependence associated with anabolic steroid use, 69
- National strategy**, A national strategy for the promotion of physical activity: *leader*, 280
- Near-infrared spectroscopy**, Effect of creatine on aerobic and anaerobic metabolism in skeletal muscle in swimmers, 222
- Neutrophils**, Effects of submaximal cycling and long term endurance training on neutrophil phagocytic activity in middle aged men, 125
- New Zealand**  
Incidence of injuries and other health problems in the Auckland Citibank marathon, 1993, 324  
New Zealand rugby injury and performance project. IV. Anthropometric and physical performance comparisons between positional categories of senior A rugby players, 53  
Trampoline injury in New Zealand: emergency care, 327
- Obesity**, Associations between health behaviours and health related fitness, 94
- Obituary**, Professor John Robert Sutton MBBS MD PhD DSc FRACP FACSP FRCS FCP (Canada) FCS (Canada), 183
- Olympics**  
Olympic dream: *editorial*, 80; warm up, 80  
The Olympic Games and sports medicine: *editorial*, 81
- Opioid dependence**, Three cases of nalbuphine hydrochloride dependence associated with anabolic steroid use, 69
- Osteoarthritis**, The effect of exercise and injury on the later development of osteoarthritis in sportsmen, 369 *abs*
- Osteoporosis**  
Exercise therapy for osteoporosis: results of a randomised controlled trial, 209  
Osteoporosis and exercise: *editorial*, 191
- Overhead sports**, Muscular imbalance and shoulder pain in volleyball attackers, 256
- Oxygen debt**, A study of physiological responses during match play in Indian national kabaddi players, 232
- Pacemaker**, The effect of a single pass VDD pacemaker on exercise capacity (VVD versus VVIR mode), 370 *abs*
- Pacing device**, The usefulness of an electronic pacing device in physiological testing in swimmers, 369 *abs*
- Paraparesis**, Late deterioration after decompression illness affecting the spinal cord, 362
- Patella tendon**, Simultaneous rupture of the quadriceps tendon with contralateral rupture of the patellar tendon in an otherwise healthy athlete, 177
- Patellar traction injury**, Unusual patellar tendon injury in an adolescent runner with generalised ligamentous laxity, 178
- Patellofemoral pain**, Patellofemoral pain in the sportsperson: which rehabilitation exercises are best and is patellar taping of benefit? 370 *abs*
- Penetrating wound**, Distant entry pneumothorax in a competitive fencer, 265
- Peripheral vision**, Evaluation of peripheral vision loss using helmets with visors, 370 *abs*
- Personality trait**, A high prevalence of abnormal personality traits in chronic users of anabolic-androgenic steroids, 246
- Perturbation**, Postural corrections after standardised perturbations of single limb stance: effect of training and orthotic devices in patients with ankle instability, 151
- Physical activity**  
Associations between health behaviours and health related fitness, 94  
Beliefs and practices of West Glasgow general practitioners in the promotion of exercise uptake in their patients, 369 *abs*  
Getting started - a review of physical activity adoption studies, 193  
National strategy for the promotion of physical activity: *leader*, 280

- Reliability and concurrent validity of the Scottish physical activity questionnaire, 369 *abs*
- Subcutaneous and visceral fat distribution and daily physical activity: comparison between young and middle aged women, 297
- Systematic review of physical activity promotion strategies: *review article*, 84: *letter*, 268
- Physical performance**, The New Zealand rugby injury and performance project. IV. Anthropometric and physical performance comparisons between positional categories of senior A rugby players, 53
- Physical training**, The musculoskeletal effect of intense physical training of non-athletic youth corps conscripts, 112
- Physician**, Advanced team physician course, Scottsdale, Arizona, USA, 29 February - 3 March 1996, report, 270
- Plasma enzymes**, Changes in plasma enzyme activities in professional racing cyclists, 122
- Pneumomediastinum**, Pneumomediastinum in a surf lifesaver, 359
- Pneumothorax**, Distant entry pneumothorax in a competitive fencer, 265
- Polymerase chain reaction**, Gender verification in sports by PCR amplification of SRY and DYZ1 Y chromosome specific sequences: presence of DYZ1 repeat in female athletes, 310
- Posterior sternoclavicular dislocation**, Posterior sternoclavicular dislocation: an American football injury, 71
- Potassium**, Effects of endurance training on ventilation, blood lactate, and plasma potassium during incremental exercise, 371 *abs*
- Pregnancy**, Maternal rectal temperature and fetal heart rate responses to upright cycling in late pregnancy, 32
- Prevention**, Epidemiological comparison of injuries in school and senior club rugby, 213
- Prewarming**, Effect of prewarming in the cold season on thermoregulatory responses during exercise, 102
- Protective equipment**  
Footballer's fracture, 171: *commentary*, 175  
Injury surveillance in a rugby tournament, 61  
Thermal pants may reduce the risk of recurrent hamstring injuries in rugby players, 57
- Pulse palpation**, Postexercise heart rates and pulse palpation as a means of determining exercising intensity in an aerobic dance class, 48
- Quadriceps tendon**, Simultaneous rupture of the quadriceps tendon with contralateral rupture of the patellar tendon in an otherwise healthy athlete, 177
- Radiolabelling**, Use of radionuclide imaging to determine gastric emptying of carbohydrate solutions during exercise, 20: *letters*, 268
- Randomised controlled trial**  
Review of the *British Journal of Sports Medicine* 1991-5, 354  
Systematic review of physical activity promotion strategies: *review article*, 84: *letter*, 268
- Rehydration**, Influence of menstrual status on fluid replacement after exercise induced dehydration in healthy young women, 41
- Relaxation techniques**, The effect of meditation on shooting performance, 342
- Repeated sampling**, A new approach to the assessment of anaerobic metabolism: measurement of lactate in saliva, 305
- Reproductive function**, Effect of altered reproductive function and lowered testosterone levels on bone density in male endurance athletes: *review*, 205: *commentary*, 208
- Resistance training**, Resistance trained athletes using or not using anabolic steroids compared to runners: effects on cardiorespiratory variables, body composition, and plasma lipids, 11
- Risk factors**, Risk assessment in professional football: an examination of accidents and incidents in the 1994 World Cup finals, 165
- Rock climbing**, A prospective study of rock climbing injuries, 148
- Rowers (rowing)**  
Outbreak of salmonella food poisoning at Junior World Rowing Championships, 347  
Seasonal variations in the body composition of lightweight rowers, 301
- Rugby**  
Epidemiological comparison of injuries in school and senior club rugby, 213  
Injury in rugby league: a four year prospective survey, 331  
Injury surveillance in a rugby tournament, 61  
Medicolegal aspects of deliberate foul play in rugby union: *editorial*, 191  
New Zealand rugby injury and performance project. IV. Anthropometric and physical performance comparisons between positional categories of senior A rugby players, 53  
Thermal pants may reduce the risk of recurrent hamstring injuries in rugby players, 57  
Warm up: *editorial*, 190
- Runners**  
Effects of alterations in dietary carbohydrate intake on running performance during a 10 km treadmill time trial, 226  
Physiological implications of moderate altitude training (1640 m) on sea level endurance performance in elite distance runners, 371 *abs*
- Saddle type**, Influence of saddle type upon the incidence of lower back pain in equestrian riders, 140
- Saliva lactate**, A new approach to the assessment of anaerobic metabolism: measurement of lactate in saliva, 305
- Salmonella enteritidis**, Outbreak of salmonella food poisoning at Junior World Rowing Championships, 347
- Schoolboys**, Epidemiological comparison of injuries in school and senior club rugby, 213
- Screening**, The athlete's heart: is big beautiful? *review article*, 5
- Scuba**, Airway efficiency during the use of SCUBA diving mouthpieces, 145
- Seasonal variation**, Seasonal variations in the body composition of lightweight rowers, 301
- Seat height**, The effect of variation in seat height on submaximal cycling performance in man, 371 *abs*
- Shin guards**, The footballer's fracture, 171: *commentary*, 175
- Shooting competition**, The effect of meditation on shooting performance, 342
- Shoulder**, Advances in the understanding of throwing injuries of the shoulder: *review*, 282
- Shoulder pain**, Muscular imbalance and shoulder pain in volleyball attackers, 256
- Simpson Desert**, Cycling the Simpson Desert, 75
- Simultaneous rupture**, Simultaneous rupture of the quadriceps tendon with contralateral rupture of the patellar tendon in an otherwise healthy athlete, 177
- Single pass VDD pacemaker**, The effect of a single pass VDD pacemaker on exercise capacity (VVD versus VVIR mode), 370 *abs*
- Skeletal muscle**, Effect of creatine on aerobic and anaerobic metabolism in skeletal muscle in swimmers, 222
- Skiing**, The Harstad injury prevention study: the epidemiology of sports injuries. An 8 year study, 64
- Somatotype**, A study of physiological responses during match play in Indian national kabaddi players, 232
- Sound**, Vibromyographic recording from human muscles with known fibre composition differences, 27
- Speech disorder**, Extreme altitude transient aphasia, 364
- Sports injuries**  
Incidence of sports injuries at two south Dublin accident and emergency departments, 371 *abs*  
Paediatric sports injuries in Hong Kong: a seven year survey, 218
- Sports medicine**  
American College of Sports Medicine, Annual Congress, 29 May - 1 June 1996, Cincinnati, Ohio, report, 269  
Review of the *British Journal of Sports Medicine* 1991-5, 354
- Sports medicine, training**, Sport and exercise medicine: *editorial*, 3
- Sternum fracture**, Manubrium sterni stress fracture: an unusual complication of non-contact sport, 176
- Steroids**, Gym & tonic: a profile of 100 steroid users, 370 *abs*
- Stress fracture**  
Manubrium sterni stress fracture: an unusual complication of non-contact sport, 176  
Models for the pathogenesis of stress fractures in athletes: *review*, 200
- Stretching**, Effect of passive stretching and jogging on the series elastic muscle stiffness and range of motion of the ankle joint, 313: *commentary*, 318
- Subcutaneous fat mass**, Subcutaneous and visceral fat distribution and daily physical activity: comparison between young and middle aged women, 297
- Submaximal cycling**, Effects of submaximal cycling and long term endurance training on neutrophil phagocytic activity in middle aged men, 125
- Sudden death**, The athlete's heart: is big beautiful? *review article*, 5
- Surf lifesaving**, Pneumomediastinum in a surf lifesaver, 359
- Sutton, Professor John Robert**, Obituary, 183
- Swimmers**  
Effect of creatine on aerobic and anaerobic metabolism in skeletal muscle in swimmers, 222  
Usefulness of an electronic pacing device in physiological testing in swimmers, 369 *abs*
- Sydney to Melbourne run**, Musculoskeletal injuries in the ultramarathon: the 1990 Westfield Sydney to Melbourne run, 319
- Team physician course**, Advanced team physician course, Scottsdale, Arizona, USA, 29 February - 3 March 1996, report, 270
- Team sport**, Sport and delinquency: an examination of the deterrence hypothesis in a longitudinal study, 335
- Teeth**, Airway efficiency during the use of SCUBA diving mouthpieces, 145
- Temperature**, Maternal rectal temperature and fetal heart rate responses to upright cycling in late pregnancy, 32
- Ten thousand metre record**, The sub-24-minute 10 000 metres, 2040 AD, 181
- Tendinitis**, Musculoskeletal injuries in the ultramarathon: the 1990 Westfield Sydney to Melbourne run, 319
- Testosterone levels**, Effect of altered reproductive function and lowered testosterone levels on bone density in male endurance athletes: *review*, 205: *commentary*, 208
- Thermal pants**, Thermal pants may reduce the risk of recurrent hamstring injuries in rugby players, 57
- Thermoregulation**, Effect of prewarming in the cold season on thermoregulatory responses during exercise, 102
- Thigh**, Acute compartment syndrome of the thigh after weight training, 264

- Throwing**, Advances in the understanding of throwing injuries of the shoulder: *review*, 282
- Tibial fracture**, The footballer's fracture, 171: *commentary*, 175
- Tournament water skiing**, Tournament water skiing trauma, 90
- Training**  
 Effects of submaximal cycling and long term endurance training on neutrophil phagocytic activity in middle aged men, 125  
 Postural corrections after standardised perturbations of single limb stance: effect of training and orthotic devices in patients with ankle instability, 151  
 Sport and exercise medicine: *editorial*, 3
- Trampoline**, Trampoline injury in New Zealand: emergency care, 327
- Treadmill running performance**, Effects of alterations in dietary carbohydrate intake on running performance during a 10 km treadmill time trial, 226
- Triathlon**, Low back pain and other overuse injuries in a group of Japanese triathletes, 134
- Two thousand and forty AD**, The sub-24-minute 10 000 metres, 2040 AD, 181
- Ultramarathon**, Musculoskeletal injuries in the ultramarathon: the 1990 Westfield Sydney to Melbourne run, 319
- Urination**, Water turnover rates in sedentary and exercising middle aged men, 24
- VDD pacemaker**, The effect of a single pass VDD pacemaker on exercise capacity (VVD versus VVIR mode), 370 *abs*
- Ventilation**, Effects of endurance training on ventilation, blood lactate, and plasma potassium during incremental exercise, 371 *abs*
- Ventilatory threshold**, The use of the ventilatory threshold and dyspnoea thresholds for exercise prescription to asthmatics, 369 *abs*
- Verbal encouragement**, Verbal encouragement: effects on maximum effort voluntary muscle action, 243: *commentary*, 245: *letter*, 366
- Vibromyography**, Vibromyographic recording from human muscles with known fibre composition differences, 27
- Visceral fat mass**, Subcutaneous and visceral fat distribution and daily physical activity: comparison between young and middle aged women, 297
- Visors**, Evaluation of peripheral vision loss using helmets with visors, 370 *abs*
- Volleyball**, Muscular imbalance and shoulder pain in volleyball attackers, 256
- Voluntary muscle action**, Verbal encouragement: effects on maximum effort voluntary muscle action, 243: *commentary*, 245: *letter*, 366
- Warm up**  
 Effect of passive stretching and jogging on the series elastic muscle stiffness and range of motion of the ankle joint, 313: *commentary*, 318  
 Effect of prewarming in the cold season on thermoregulatory responses during exercise, 102
- Water skiing**, Tournament water skiing trauma, 90
- Water turnover**, Water turnover rates in sedentary and exercising middle aged men, 24
- Weight lifter**, Simultaneous rupture of the quadriceps tendon with contralateral rupture of the patellar tendon in an otherwise healthy athlete, 177
- Weight reduction**, Seasonal variations in the body composition of lightweight rowers, 301
- Weight training**, Acute compartment syndrome of the thigh after weight training, 264
- Wheelchair training**, The response of an able bodied person to wheelchair training, 236
- Williams, John GP**, John G P Williams: *letter*, 185
- World record**, The sub-24-minute 10 000 metres, 2040 AD, 181
- Youth**, The musculoskeletal effect of intense physical training of non-athletic youth corps conscripts, 112