ORIGINAL ARTICLE

The Victorian Active Script Programme: promising signs for general practitioners, population health, and the promotion of physical activity

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Background: The Active Script Programme (ASP) aimed to increase the number of general practitioners (GPs) in Victoria, Australia who deliver appropriate, consistent, and effective advice on physical activity to patients. To maximise GP participation, a capacity building strategy within Divisions of General Practice (DGPs) was used. The objectives of the programme were to (*a*) train and support GPs in advising sedentary patients, and (*b*) develop tools and resources to assist GPs.
Objective: To evaluate the effectiveness of the ASP.
Methods: A systems approach was used to promote capacity in Victorian general practice. Economic analyses were incorporated into the programme's evaluation. Participants were selected DGPs and their GP members. The programme worked with DGPs to train GPs and provide relevant resources. The main outcome measures were (*a*) changes in GP knowledge and behaviour and (*b*) cost effectiveness, based on modelled estimates of numbers of patients advised and adopting physical activity and gaining the associated health benefits.
Results: GP awareness and provision of physical activity advice increased. Although the programme's reach was modest, based on actual GP involvement, the cost effectiveness figures ($138 per patient to become sufficiently active to gain health benefits, and $3647 per disability adjusted life year saved) are persuasive.
Conclusions: The ASP increased DGPs' capacity to support GPs to promote physical activity. There is a strong economic argument for governments to invest in such programmes. However, caution is warranted about the maintenance of patients' activity levels. Programme refinement to encourage GPs to use community supports more effectively will guide future development. Further research on long term patient adherence through a multisectorial approach is warranted.

The Active Script Programme (ASP) was established in 1999 to increase the number of Victorian general practitioners (GPs) who deliver physical activity advice to their patients in a consistent, appropriate, and effective manner. The ASP was initially developed and implemented across eight Divisions of General Practice (DGPs) (phase I, 1999–2000).[1] In phase II (2000–2001), the programme was maintained in six of these DGPs and rolled out to a further three. DGPs used matched funding to employ part-time divisional liaison officers, who worked closely with a centralised team to implement the programme's strategies. Liaison officers usually conducted their ASP role in conjunction with other divisional responsibilities, both related and unrelated to physical activity promotion.

Physical activity can modify risk factors for a range of conditions including cardiovascular disease, diabetes, arthritis, stroke, cancer, mental illness, and falls injury and promote general wellbeing.[2] In Australia, direct healthcare costs attributable to inactivity are conservatively estimated as $377 million per year.[3] In Victoria alone, physical inactivity is estimated to be responsible for 6.6% of the disease burden.[4] Previous economic evaluations of physical activity interventions suggest that programmes conducted in general practice can be cost effective.[5–8] It was the aim of this study to assess the success and cost effectiveness of the ASP among GPs in Victoria, Australia

METHODS

The programme used a systems approach,[9] engaging GPs through existing infrastructure (DGPs) to develop a multifaceted, effective, sustainable public health strategy. It maximised the efficiencies of a centralised expert team in disseminating the programme, while being sufficiently flexible to accommodate cultural and contextual differences across different DGPs. It aimed to build the capacity of both GPs and DGPs[10] to enable sustainability of the interventions. This emphasis on capacity building extended the programme's scope beyond that of its contemporaries in New South Wales (Active Practice) and New Zealand (Green Prescription).

Participants

All Victorian DGPs (31) were invited to submit expressions of interest, outlining how the ASP's goals linked to their strategic plans, a measure of existing capacity. Suitable DGPs were selected. Sixteen DGPs responded in phase I, and eight were selected on the basis of criteria showing that they were focused on areas relevant to physical activity in their current strategic plans. Similarly, in Phase II, three further DGPs were selected following expressions of interest from seven of the 23 remaining DGPs.

Abbreviations: ASP, Active Script Programme; DALY, disability adjusted life years; DGP, Division of General Practice; GP, general practitioner

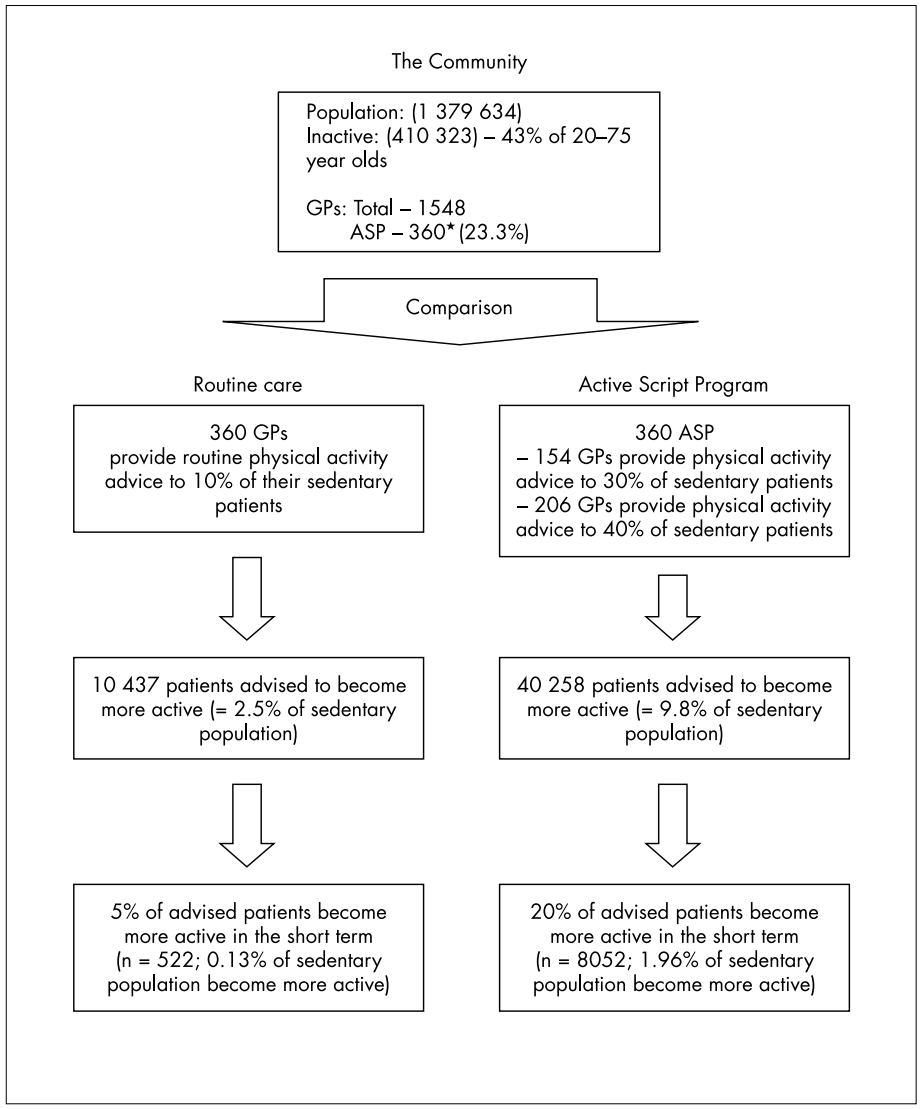

Figure 1 Assumptions of economic modelling of a hypothetical community. *The total number of general practitioners (GPs) trained over the two year period was 670. Two groups of GPs were excluded to establish the number of GPs who were providing advice more frequently or in a systematic way. The first group was the total number of GPs from the two DGPs who did not participate in the second year of the programme. (These GPs from the two DGPs were excluded because of no follow up mechanism to identify their level of involvement.) The second group was the 30% of the GPs from the nine remaining DGPs who indicated no change in their behaviour after the training. A total of 360 (54%) of GPs were included as providing advice more frequently or in a systematic way.[28]

Design

The programme was developed and implemented using an action research approach. Independent evaluators assessed achievement of programme objectives. Cost effectiveness analyses were used to compare the programme's effectiveness with routine care. These analyses provided a longer term view of the impact of physical activity advice on health gain and cost effectiveness based on elements of a real programme (ASP); other studies have focused on short term gains and estimates from the literature.

Intervention

Capacity building was underpinned by elements of leadership from the central management and the establishment of a working partnership with divisions. Resources and interventions were developed in consultation with participating DGPs, using the best available evidence. Workforce development, organisational development, and resource allocation subsequently occurred. To influence GPs' behaviour, attitudes, skills, and knowledge, a range of resources was produced. An ASP kit, disseminated to all GPs, incorporated a GP information folder, script pad, assessment tool, surgery poster, and patient record stamp. Awareness was raised through newsletters, supplemented by local media exposure. GPs were trained through seminars and individual practice visits. Practice visits followed a formal structure to disseminate information and resources; they were supplemented by phone calls or revisits as appropriate. Participating GPs could opt to conduct a clinical audit. The programme also endeavoured to establish referral and collaboration systems between GPs and community providers of physical activity—for example, local government, leisure centres, allied and community health services, and peak organisations such as Bicycle Victoria and Parks Victoria.

Evaluation method

To assess changes in GPs' behaviour, attitudes, skills, and knowledge, GP fax back surveys were sent to participating

Assumptions for the economic analyses

Programme effectiveness assumptions

- 52% of the GPs who became involved in the ASP provided advice more frequently or systematically (based on GP self report)
- 20% of patients advised by the above GPs would become active in the short term, with 50% of the advised patients becoming sufficiently active to accrue a health benefit in the long term

(In real terms this meant that a conservative estimate of 10% of patients who had seen trained GPs and been advised would be active in the long term.)

Modelling assumptions

- The ASP programme is evaluated in a ''steady state'' of operation—that is, the year evaluated is representative of a fully functioning and effective ASP
- The ''routine care'' comparator assumes that GPs are not providing advice in a systematic way; that they advise only 10% of their patients and that only 5% of these advised patients become more active. The comparator also assumes that 50% of these patients remain active
- A ''standardised approach to GP activity''. This means that all GPs are assumed to provide ''routine care''—that is, advise 10% of sedentary patients—and that GPs in the ASP were assumed to increase advice at two levels: ''more frequently'' (advised 30% of sedentary patients) and ''systematically'' (advised 45% of sedentary patients)
- The ''average'' GP is full time and has a practice population of 916 patients, of whom 290 are in the age range 20–75 and are sedentary—that is, not active enough to accrue a health benefit
- The government expenditure (State and Commonwealth) is taken as the economic cost for one year (July 2000–June 2001)
- The cost offsets are calculated for the six major diseases for which a clear and substantial causal relation is associated with increased physical activity levels[14 15]
- The total catchment population in the nine DGPs is 1 379 634,[16] and the number of adults (20–75 years old) who were not active enough to accrue a health benefit was 410 323[16 17]
- The total number of non-specialist medical practitioners in the nine divisions (1998–1999) was 1548. (The Commonwealth Government Health Insurance Commission data on GP activity in the 1998/1999 period for these nine DGPs totals 1548. This figure includes full time, part time, and casual GPs. The corresponding previous year period has the same number of GPs, indicating a stable population.) Non-vocational registered GPs are excluded from this population.

GPs at the start of phase I and completion of phase II. These data were triangulated with patient feedback data. The patient sample was recruited through the GPs who participated in the programme's clinical audit. In depth telephone interviews were conducted to ascertain patients' views on the role of GPs in promoting physical activity, the utility of written scripts, and the impact of the advice on their activity levels.

Table 1 Number of general practitioners involved in Active Script Programme activities

	Phase I	Phase II	Total
Attended training seminars	134	136	270
Received individual practice visit	204	196	400
Training seminar and practice visits	338	332	670

Data analysis

The programme's overall achievements were evaluated using a public health promotion evaluation model (RE-AIM)[11] to assess the programme's reach, efficacy, adoption, implementation, and maintenance at DGP and GP levels. Findings using this model have been published elsewhere.[12] The framework incorporated five domains:

- Reach—the proportion of the target population that participated in the intervention;
- Efficacy—the impact of an intervention, positive or negative;
- Adoption—the proportion/representativeness of settings that have adopted the intervention;
- Implementation—the extent to which the intervention is implemented as intended;
- Maintenance—the extent to which the intervention is institutionalised at individual and systems level.

The economic evaluation focused on cost effectiveness rather than efficacy per se. A cost effectiveness analysis using a modelling approach was developed to compare the ASP (an organised approach to exercise counselling) with routine GP care (based on BEACH data[13]). It was exploratory in nature, for two reasons: (*a*) the ASP was in a formative stage of development; (*b*) the results relied on a variety of programme effectiveness assumptions to model long term health outcome. A literature review on the cost of illness attributable to inactivity and past economic evaluations of physical activity programmes in primary care settings guided this cost effectiveness analysis. Increased GP screening and provision of advice to patients were used as key indicators of cost effectiveness.

The focus was on health sector costs at governmental level, which included ASP running costs and GP consultation costs paid by government (Medicare). Private sector costs, particularly those of patients and their families, were excluded. Allocative efficiency—that is, whether the programme was worth while (''value for money'')—was examined. The cost effectiveness analysis model used assumptions derived from the ASP and evidence from the literature (see the box). Two activity levels were identified for this study: (*a*) patients not active enough to accrue health benefits (<3.3 MJ (800 kcal) expended a week); (*b*) patients active enough to accrue health benefits (>3.3 MJ expended a week). The cost effectiveness analysis was thus able to identify the level of change required for health benefits across the population.

The outcome measures for the economic evaluation were the number of: patients screened; patients who become active; patients who accrue a health benefit; disability adjusted life years (DALYs) averted; premature deaths averted. The direct healthcare costs accruing from a reduced prevalence of sedentary people were estimated and deducted from the programme cost to provide an estimate of the

Table 2 Characteristics of scripts written by phase I general practitioners (GPs) (n = 628 scripts)

	Male	Female		Missing data	
Sex of patients receiving scripts	52.5% (n=330)	33.3% (n=209)		14.2% (n=89)	
	Low	**Nearly there**	**Active**	**Missing data**	
Activity level* as assessed by GP	41.4% (n=260)	32.3% (n=−203)	22.1% (n=139)	4.1% (n=26)	
	Walking only	**Walking and other**	**Other only**		
Advice prescribed	85.7% (n=538)	24.2% (n=152)	14.3% (n=90)		
	Review date specified	**Referred to activity provider in local area**			
Follow up	12.4% (n=78)	5.5% (n=34)			
	Weight control	**Hypertension**	**Hyperchol**	**Arthritis**	**Diabetes**	**Past history of heart disease**
Benefits identified by GP as relevant to patients receiving script	40.9% (n=257)	33.9% (n=213)	26.4% (n=164)	14.8% (n=93)	14.2% (n=89)	6.8% (n=43)

*Low, One or two bouts of 30 minutes of activity in seven days; nearly there, three or four bouts of 30 minutes of moderate activity in seven days; active, five or more bouts of 30 minutes of moderate activity in seven days. Hyperchol, Hypercholesterolaemia.

programme's net cost. Opportunity costs, net financial cost saving, and health benefits were estimated using the proportional attributable risk approach, plus epidemiological data on the six diseases most closely associated with physical inactivity (coronary heart disease, non-insulin dependent diabetes, colon cancer, breast cancer, stroke, and depression).[14 15] Routine care associated with the identified health benefits was also costed. These costs and benefits were deducted from the ASP. Time lags were incorporated assuming that, for all diseases, a protective effect occurs after two years.[18 19] Cost per DALY averted and cost per premature death averted were estimated.

A univariate sensitivity analysis was conducted on key areas of uncertainty (based on assumptions of numbers derived from ASP experience): number of GPs involved, the number of patients screened, the percentage of patients to become active in the short term, and the percentage of patients to accrue a health benefit. There was no evidence available on longer term benefit,[18 19] thus uncertainty arose in modelling the longer term health gain. To address this, the potential cost effectiveness was modelled assuming a 50% attrition rate over time in patients sufficiently active to accrue a health benefit. This estimate was based on previous published studies in the primary care setting with a follow up beyond 12 months[20–22] and could potentially be improved by establishing effective referral linkages to community providers of physical activity such as those of the Green Prescription Programme in New Zealand.[23]

RESULTS

Reach of programme

Phase I involved 338 GPs, approximately one fifth of all GPs within participating DGPs. In phase II, 332 additional GPs (a further 23% of GPs) were involved in the programme's activities, totalling 670 GPs for phases I and II. GP involvement included two components: attending training seminars or receiving an individual practice visit for academic detailing by a liaison officer (table 1).

Adoption, implementation, and maintenance of the programme

Copies of actual scripts written (628) from 83 of the phase I GPs were available for analysis at the end of phase I. This figure represents about 60% of the 1035 scripts returned. The remainder were received after the phase I evaluation period and were thus not available for analysis.

Table 2 illustrates characteristics of the scripts' usage by the GPs. Weight control was the most commonly nominated reason for GPs to prescribe physical activity in this sample.

GP impact

Knowledge and confidence

The response rates to the fax back survey sent to GPs were 33.5% (n = 560; start of phase I) and 45% (n = 299; end of phase II). Respondents were mainly male (66% and 62% respectively). On average they had been in practice for 17 years and saw 121 patients a week. GP knowledge was assessed using four questions to which they responded with agreement or disagreement (table 3). Over the two year period of phase I and phase II, GPs became more knowledgeable about the duration (48% *v* 70%, $p<0.05$) and type of activity (47% *v* 68%, $p<0.05$) to recommend to their patients. GPs' confidence in their ability to provide physical activity advice to their patients also increased during this period (69% to 90%, $p<0.05$).

Self reported practice

At the end of phase II, participating GPs who responded (n = 299) were aware of physical inactivity as an independent risk factor and the value of providing advice patients. About two thirds of GPs thought that more than half of their patients could benefit from physical activity advice. Most (85%) advised all inactive patients to be more active, particularly those with other risk factors, with 53% stating that they now routinely assessed activity levels of new patients.

Table 3 Results from general fax back survey

Question	1999 survey (n = 560; response rate 33.5%)	2001 survey* (n = 299; response rate 45%)
1	83% correct	94% correct
2	48% correct	70% correct
3	47% correct	68% correct
4	60% correct	73% correct
5	69% agree	90% agree
6	N/A	53% yes
7	N/A	85% yes
8	N/A	93% yes
		Subsample of 2001 survey† (n = 117; response rate 43%)
9	N/A	70% yes
10	N/A	43% yes
11	N/A	66% yes
12	N/A	74% yes
13	N/A	52% yes
14	N/A	15% yes
15	N/A	8% yes
16	N/A	11% yes

Questions (agree/disagree):
1. Being active every day in as many ways as you can will improve health.
2. At least 30 minutes of moderate intensity physical activity on most, preferably all, days is necessary to improve health.
3. Exercise that is needed for good health must be hard enough to make you puff and pant.
4. You can get added health and fitness benefits from some regular, vigorous activity.
5. I feel confident in giving appropriate advice to my patients about physical activity.
6. I routinely ask all my new patients about their physical activity level.
7. I advise all my inactive patients to be more active.
8. I advise my inactive patients with other risk factors to be more active.
9. Participation in the ASP has led me to think about inactivity as a risk factor more frequently.
10. Participation in the ASP has led me to provide physical activity advice routinely (systematically).
11. Participation in the ASP has led me to assess patients' activity levels more frequently.
12. Participation in the ASP has led me to advise patients to be active more frequently.
13. Participation in the ASP has led me to feel more confident in motivating patients to be active.
14. Participation in the ASP has led me to refer patients to outside agencies more frequently.
15. Participation in the ASP has led me to recall patients for review of their activity level more frequently.
16. Participation in the ASP has led to no change in my routine consultation practice.
*Sample selected from only general practitioners (GPs) who participated in the Active Script Programme (ASP) training seminar or received a practice visit (670).
†Sample of GPs who received the ASP intervention in 1999 (269).
N/A, not applicable.

A subsample of participating GPs who had received the intervention in phase I (total = 269) were also surveyed to ascertain changes to their practice since 1999. A total of 117 responses (43%) were received, and most GPs (74%) stated that they now advised patients to be active more often as a result of participation in ASP. Many (66%) also reported that they were assessing their patients' physical activity levels more often, and 43% reported that they were providing advice more systematically. Only 15% were referring patients to outside agencies to support their advice, and 8% reported recalling their patients more often for review. These findings indicate positive behaviour change that has been maintained over the two years of ASP, based on self reports by GPs and summarised in table 3. These results were used to guide the development of the cost effectiveness analysis model.

Patient feedback

Fifty four patients were interviewed by telephone. They were nominated by five GPs who undertook the programme's clinical audit component. The patient sample consisted of 35 women and 19 men aged 19–91 years. Patient interview findings confirmed the GP findings. Patients perceived the role of GPs in promoting physical activity as appropriate. Patients were aware of the health benefits of physical activity and the amount of activity required to achieve them. They were positive about written scripts; these helped patients remember what to do. Most (52) recalled receiving advice to be more active from their GPs, although a greater proportion recalled receiving verbal (32) rather than written (20) advice. They were more motivated to be active as a result of the advice—most reported a moderate increase in activity levels as assessed by number of minutes of moderate activity—largely by taking up walking.

Economic evaluation

Figure 1 and the box summarise the assumptions made in the economic modelling for evaluation. These assumptions were that 23.3% of GPs (n = 360) would be recruited to the programme for one year within a hypothetical community with a population of 1 379 634 (based on Australian Bureau of Statistics data for all eight participating DGPs in phase I). Of the 360 GPs, 48% (154) would provide ''frequent advice'' to 30% of their sedentary patients, and 52% (206) would provide ''systematic advice'' to 40% of their sedentary patients. (The terms relate to the extent to which GPs provide advice to their patients. ''Frequent'' is defined as GPs advising 30% of their inactive patients. ''Systematic'' is defined as GPs advising 40% of their inactive patients.) These estimates were derived from the self reported practice of GPs as part of the ASP evaluation. All dollar estimations are for the reference year of 1996 (the most recent available data for burden of disease). The total costs to government were estimated to be $552 845 (made up of $209 254 from ASP, $45 000 as contributions from divisions, and $298 591 as the cost of estimated GP consultations, where the cost of GP consultations is based on an average of four minutes per patient at a cost of $24.50 per consultation with four consultations being conducted in an hour).

Based on the specified assumptions, the health savings for six relevant diseases that would result from a 1% reduction in number of sedentary people was estimated to be $564 199 (discounted). The health benefits were 155 DALYs (discounted). The programme would prevent 12 premature deaths. The cost effectiveness ratios for the ASP were: $69 per patient to become more active in the short term; $138 per patient to accrue a health benefit; $3647 per DALY saved; $48 924 per premature death averted. Cost effectiveness results below $30 000 per DALY saved would generally be regarded as favourable in Australia, and cost effectiveness results below $10 000 per DALY saved would be regarded as excellent value for money compared with how resources are currently being deployed in the healthcare sector.

To achieve the results identified above, the average GP needed to advise 2.5 patients a week to become more active. The economic modelling indicated that, for 112 patients advised per GP, 22 patients would increase their activity level in the short term (20%), and half of these (11 patients or 10%) would maintain their activity level to accrue a health benefit over time. This estimate was based on an analysis of potential for benefit of brief counselling conducted by Bull in 1999.[24] Its impact was also addressed through the sensitivity analysis, which varied this to 5% or 2.5%, and still showed a positive economic effect. The annual average opportunity cost to the GP in spending an additional four minutes (non-reimbursed time, fewer patients seen, or longer hours

worked) advising patients was $829 (frequent GPs $644 and systematic GPs $967).

The sensitivity analysis compared the net costs and benefits of routine care with that of the ASP. Based on GP reach, the results showed that even with a reduction of GP involvement from 23.3% (current model) to only 5%, the cost would be $3921 per DALY saved, and 865 patients would accrue a health benefit over time as a result of achieving a 1 percentage point reduction in the sedentary population. Similarly, using the percentage of patients becoming more active in the short term as a result of GP advice, if this was decreased from 20% (current model) to only 5%, the programme cost per DALY would be $9248. If the percentage of these patients who maintained their activity levels over time to accrue health benefits were varied from 50% (current model), the programme could still be considered cost effective at 10% maintenance ($12 778 per DALY) but probably not at 2.5% ($63 754 per DALY).

DISCUSSION

Efficacy

The findings show that the programme affords a net health gain. The ASP can be viewed as a valuable programme, particularly compared with the costs of other lifestyle modification programmes.[6 25–26] In economic terms, it would be referred to as a ''dominant'' programme—that is, one where the total costs to government are less than the cost offsets (health savings). The assumptions for the economic analyses conducted drew not only on the evidence base, but also on the experiences of actual implementation of the ASP in Victoria. Based on the ASP experience to date, together with the assumptions used in the modelling, the economic appraisal suggests that the programme has the potential to be highly cost effective. The five key contributory features are:

(1) The high prevalence of physical inactivity as a modifiable risk factor in the population

(2) Strong epidemiological evidence that associates a number of important diseases with inactivity.

(3) Good evidence indicating GP effectiveness to promote patient change in the short term.

(4) The potential reach of GPs to a high proportion of the exposed population.

(5) The use of divisions to engage and influence GPs.

Our use of the RE-AIM framework in its totality to evaluate the programme was limited by the primary focus of ASP being on effectiveness rather than efficacy. Nevertheless, the findings support the programme's cost effectiveness. This exploratory study of GPs systematically advising patients to be physically active offers a strong economic argument for government investment in such programmes. The ASP exemplifies how State government funding can enhance and refine the focus of Commonwealth government dollars spent in general practice for the benefit of the state's community.

Reach

The ASP recruited a fifth of the GPs across the participating divisions. Thus, for the reach component of the RE-AIM model,[11] the ASP has been modestly successful in targeting DGPs and their GPs. Community reach was less successful. The development of effective community linkages is a system-wide issue in primary care. In Victoria, the state government's Primary Care Partnership (PCP) initiative, which aims to link primary care agencies to enable integrated healthcare management, is addressing this. Schemes such as ASP stand to benefit from the divisions' involvement in the PCP's GP engagement strategy. Further work is required to assess patient reach.

Take home message

GPs clearly have a role in providing brief advice on physical activity promotion. The Active Script Programme increased the capacity for DGPs to support GPs in promoting physical activity. The economic appraisal suggests that the programme has the potential to be highly cost effective. However, maintenance of activity levels is more complex and will require an integrated multisectorial approach beyond general practice.

Adoption, implementation, and maintenance

The programme has been adopted across general practice in representative settings. The programme's capacity building framework, incorporating centralised management and support combined with a local delivery model, enabled a reasonable level of adoption and implementation at the divisional and practitioner level. The programme led to self reported improvements in knowledge and frequency of advice provision, but was less successful in getting GPs to implement the ASP as intended. GPs' knowledge of the benefits of physical activity promotion increased significantly from the programme's outset (phase I). GPs generally agreed that they had a role in patient assessment and provision of physical activity advice. Most thought that ASP had afforded them skills to provide effective advice on physical activity. Improved competence was reflected in the regularity of GPs using ASP resources, promoting physical activity, and incorporating advice routinely into their practice. The generalisability of the findings is limited by the low response rate. Corroborating evidence was obtained from the patient interviews, albeit it was a small sampling frame. Many patients confirmed that they had received verbal advice on physical activity from their GP, in some instances supported by receipt of a written assessment of physical activity level.

At the consultation level, lessons have been learnt that will assist future fulfilment of the implementation and maintenance criteria. There were no short cuts to GP engagement. In line with the literature,[27] divisions found that one-off continuing medical education events and practice visits were insufficient to maintain GPs' use of ASP resources and physical activity promotion; follow up reminders were required.

There is some evidence that programme maintenance is occurring at divisional level, with ASP principles beginning to be incorporated into divisional programmes and business plans. Some caution is warranted with regard to the maintenance of patients' activity levels. Trials in the available evidence base provide limited evidence for long term health gain.[25] GPs clearly have a role in providing brief advice and can achieve high patient reach. Ensuring that patients maintain their activity levels is more complex and will require an integrated multisectoral approach to facilitate patient adherence. Indeed, multifaceted strategies at policy, structural, funding, and systems levels to involve GPs and other allied health professionals are indicated. Encouraging GP referrals to established community organisations that promote continuing physical activity seems prudent.

The ASP was implemented as a service delivery model, thus the associated data collection was not as detailed as that required by a research intervention. Nevertheless, the model has benefited from being tested ''in the field'', enhancing the generalisability and reproducibility of its findings within general practice. The programme's scope is likely to be extended after the recent introduction of an electronic form

of the script, available in the major GP software packages. This could serve as a platform for further research, in particular to assess the extent of the programme's impact on patient behaviour and health status. We endorse the recent call from the US Preventive Services Task Force for further studies of the effects of such clinician interventions on physical activity levels in all sectors of the community.[28]

We conclude that the ASP acted as a catalyst for DGPs to support GPs to promote physical activity. The ASP delivered a popular programme to DGPs and GPs which built the capacity of DGPs to support GPs to promote physical activity to their patients, and increased awareness among GPs to assess and provide physical activity advice. The cost effectiveness results of the ASP indicate that divisional funding support could usefully be supplemented by funding to assist in the maintenance of patients activity levels in the community.

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PostScript

LETTERS

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Mandatory wearing of helmets for elite cyclists: new perspectives in prevention of head injuries

Cycling related injuries, especially those to the head, are common causes of morbidity, death, and disability and could largely be prevented by the proper use of hard shell helmets.[1 2] Unfortunately, obvious evidence is often not acknowledged, and the use of such a valuable preventive measure has been too long ignored. Media coverage of elite competitions, showing most athletes racing without helmets, has unfavourably influenced amateur and young cyclists for a long time. However, owing to the progressive increase in severe and fatal injuries, especially involving elite cyclists, and the evidence that the outcome of most of these tragedies might have been prevented,[1 2] the International Cycling Union announced that, from 5 May 2003, it is mandatory to wear a hard shell helmet in elite men's events for classes 4 and above. This decision was taken in agreement with the Professional Riders Association, who supported the initiative despite some internal differences of opinion. Images transmitted world wide during the 2003 Tour de France, a sporting event second in popularity only to the Olympics, are encouraging, showing all athletes wearing helmets throughout most of the race. This is a valuable message for both amateur cyclists and adolescents, as awareness is often more productive than restrictive measures. In addition, individual persuasion to wear helmets does not have the side effect of reducing the incentive to do cycling. Less cycling, in reaction to restrictive legislation, may counterbalance the beneficial effects on head injury prevention, as regular recreational aerobic activity, such as cycling, has manifest benefits on health, preventing the development of chronic disorders, including atherosclerosis, diabetes, osteoporosis, obesity, depression, and cancer.[3]

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Complex regional pain syndrome in thoracic outlet syndrome

We read with interest the article by Casey *et al*.[1] Notwithstanding their substantial work, we have a few comments about their article. First of all, we wonder whether they performed any evaluations for coagulopathy in such a patient with severe thrombosis and endothelial damage. We also wonder why they delayed surgery for one month, whether they prescribed an exercise programme before prophylactic left cervical rib excision was planned, if the patient initially had any neurological findings, such as muscle weakness, atrophy, hypoaesthesia, or reflex abnormalities, or any objective evidence of neurogenic thoracic outlet syndrome (TOS). As the patient was diagnosed with TOS and it is generally recommended that first rib resection and scalenectomy be performed for this condition, why these were not applied is not clear from the text.

The main point that we would like to stress is the mechanism of the patient's pain relief after sympathectomy. Do the authors believe that it was due to improved circulation, which we believe is unlikely in such occluded vessels, and could it have been confirmed by imaging? We believe that some of the painful symptoms may have been due to complex regional pain syndrome, a likely diagnosis in patients with TOS, in whom the sympathetic fibres around the subclavian artery, innervating the upper extremities, become compressed by a cervical rib. The patient's good symptomatic relief despite some arm claudication after surgery also supports our hypothesis. Thus we propose that the favourable outcome after sympathectomy may rather have stemmed from its beneficial effects on complex regional pain syndrome.

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Reference

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Upper body contribution to high intensity cycle ergometer exercise: implications for blood lactate measurements and power profiles

We read with interest the article by Hunter *et al*.[1] We would like to elaborate a little on the measurement of high intensity exercise and in doing so identify possible factors that may have contributed to the conclusions drawn. We recently investigated the upper body contribution to high intensity exercise performance.[2] The purpose of the study was to examine the upper body contribution through handgrip to power profiles and blood lactate concentrations during high intensity cycle ergometry. Nine trained male subjects each completed a 20 second, high intensity cycle ergometer test twice, in a random manner, using two protocols, with a handgrip (WG) and without a handgrip (WOHG). Capillary (ear lobe) blood samples were obtained before and after exercise. Blood samples were corrected for changes in plasma volume, and analysed to determine blood lactate concentrations. In the WG protocol, mean (SEM) blood lactate concentrations sampled over the three conditions were 0.98 (0.33), 5.68 (0.46), and 9.14 (0.38) mmol/l respectively. During the WOHG protocol, blood lactate concentrations recorded were 0.99 (0.26), 5.58 (0.58), and 7.62 (0.65) mmol/l respectively. Differences were found ($p<0.05$) from rest to four minutes after exercise for both groups. Differences in concentrations were also observed between the groups at four minutes after exercise. Peak power output recorded using the WG protocol was also greater (1461 (94) *v* 1136 (88) W; $p<0.05$). No differences were recorded for mean power output, fatigue index, or work done. We also recorded the surface electromyography of the forearm musculature while performing each of the two protocols.[3] During the with grip ergometer tests, the intensity of the electrical activity in the forearm musculature was greater than the intensity of electrical activity recorded for the forearm musculature during 100% maximum voluntary handgrip dynamometer contractions, suggesting maximum isometric-type contraction during the ''with grip'' leg high intensity cycle ergometer tests. The findings of both studies indicate significant differences in power output and blood lactate concentrations between protocols. These findings suggest that the performance of traditional style leg cycle ergometry requires a muscular contribution from the whole body. Also, the upper body contribution may influence fatigue profiles of the lower limbs during this type of activity. Therefore, researchers should consider this, both in terms of the allocation of ergometer loads, and in the analysis of blood borne metabolites.

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Clinical governance is unworkable

In your editorial on clinical governance, you cited ''fragmented…evaluation'' and ''lack [of]…benchmarks of quality of care… which…impairs…improvements in patient care.''[1] If improvement in patient care is impaired, clinical governance is conceptually moribund.

Clinical diagnosis consists of evaluating patients' maladies— ''[A]t the heart of [clinical governance] is the desire to evaluate the quality of medical practice against agreed standards''[1]—and thus entails an analogy between clinical evaluation of patients and performance evaluation of physicians. The clinical biochemical literature identified a deficit that renders that analogy false: ''…total quality management (TQM) in laboratory medicine [requires]…that objective quality goals must be clearly defined *a priori*…''[2]

Obviously, an evaluator can compare care he examines with quality benchmarks in either laboratory or clinical medicine only if he has a clear, a priori, definition of quality of care in mind. Mechanistic goals of laboratory medicine may be amenable to a priori definition, but the more subjective, viewpoint dependent goals of clinical medicine are not, as Steffen inadvertently demonstrated as he sank into a conceptual quagmire in his attempt to define quality of medical care.[3]

Another logical bind little noted in the medical literature is that performance evaluation of individuals is counterproductive of Continuous Quality Improvement (CQI/TQM), because it instils fear and erodes morale,[4] so clinical governance, reliant on CQI, is likewise incompatible with it. Deming implemented CQI by substituting leadership for performance evaluation. Leadership, unlike performance evaluation, is compatible with collegial principles governing professional development in medicine.

Besides, the clinical assessor too often errs because of the customary procedure in medical peer review: without having examined the patient in question, he relies on the relevant clinical chart alone in his attempt to evaluate a physician's performance.

Accordingly, it is small wonder that ''there is…little published evidence that clinical governance makes any…difference.'' The foregoing fundamental internal contradictions render clinical governance unworkable.

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BOOK REVIEWS

Textbook of sports medicine

Edited by M Kjaer, M Krogsgaard, P Magnusson, *et al*. Oxford: Blackwell Publishing, 2003, £89.50, pp 808. ISBN 0632065095

I have long been impressed by the Scandinavian contribution to sports medicine and exercise science. Therefore a textbook that is the product of leading Scandinavian authors is eagerly awaited. This one does not disappoint. It should appeal to both sports scientists and clinicians.

The first section of the book is devoted to basic science—exercise physiology, biomechanics, and tissue repair processes. The chapters are well written and up to date, but, as a clinician, I found the information was not as well presented as in Wilmore and Costill, which for me remains the benchmark for presentation style.

The second section deals with aspects of human performance and is both detailed and accurate. In the analysis of overtraining, there is appropriate mention of the work of major contributors such as Eric Newsholme and Laurel McKinnon. In the section on altitude training, there is discussion of the live high, train low concept, which is the product of relatively recent research. This demonstrates the contemporary nature of this text.

Moving on, there are well written contributions on exercise in acute and chronic disease states. Some of the major pioneering research on osteoarthritis and sports participation was done in Finland, and this work is given due mention in the textbook. There is a 25 page chapter on imaging of sports injuries, which provides a good analysis of the strengths and weaknesses of the various imaging modalities. The images and diagrams that accompany the text are well chosen.

For sports physicians, the bulk of clinical work involves injury diagnosis and treatment, which occupies the final 250 pages of the book. Here the content is mixed. There is a good description of common and less common causes of leg pain—for example, popliteal artery entrapment. However, tendinopathy is not mentioned as such in this section of the book—rather the term tendinosis is used. Alfredson's concentric then eccentric strengthening regimen is mentioned, but no specifics are given, such as appears in the textbook of Brukner and Khan. There are only two paragraphs devoted specifically to diagnosis and treatment of stress fracture of the navicular, which is a bit light in a textbook of this size. Sadly, there is no mention of the Vienna conference consensus on concussion held in 2002.

In summary, this is a useful textbook that successfully combines sports science and medicine into a unified body of work. Its strength is the close linkage and reference to original research (each chapter starts with a reference to a classic paper). Its weakness is that, for clinicians, more detail on diagnosis and management of certain injuries would be required for those wanting a text to consult for specific advice.

It's a very good book, but in my view Brukner and Khan remains a better text for clinicians.

Analysis

Presentation	14/20
Comprehensiveness	17/20
Readability	15/20
Relevance	18/20
Evidence basis	19/20
Total	83/100

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Essentials of sports nutrition, second edition

Fred Brouns. John Wiley and Sons, 2002, £24.95, pp 227, softcover. ISBN 0471497657

The author summarises the aim of this book in his preface as ''to give a scientific but easily understandable overview of aspects related to nutrition and physical activity'', and it does just that.

Having published numerous scientific studies himself, this well respected author, Brouns, is certainly qualified to write such a text. This, together with the panel of internationally recognised experts acknowledged as having critically reviewed the manuscript, ensures that this book is a highly credible source of sports nutrition information.

As expected in a sports nutrition book, this book logically summarises the macro and micro nutrients, with chapters dedicated to each of carbohydrate, fat, protein, fluid, minerals, trace elements, vitamins, and antioxidants. Each chapter provides a detailed overview of the research relating to the topic. The key points at the conclusion of each chapter provide a simple summary without the detail and research for those just wanting the bottom line.

With almost 500 scientific references provided to support the facts, it really is a scientific reference book. It is therefore easy to understand why this book is used as an educational text in graduate courses of sports science, physical education, and sports medicine, in several countries.

Although this book is certainly not targeted towards the sports person or athlete wanting to learn how to meet their nutritional requirements, some practical information could have easily been incorporated. In my opinion this is the only ''essential'' ingredient lacking. There is a chapter dedicated to ''From theory to practice''; however, this is more of a summary of the scientific facts. There are some guidelines relating to ''what to do''—that is, nutritional requirements. However the ''how to'' component is lacking. Additional tips and strategies for applying the facts would complement this book and perhaps extend its use.

Overall, *Essentials of sports nutrition* is a very useful addition to any sports nutrition library.

Analysis

Presentation	16/20
Comprehensiveness	15/20
Readability	15/20
Relevance	17/20
Evidence basis	18/20
Total	81/100

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Musculoskeletal injection skills

Monica Kesson, Elaine Atkins, Ian Davies. London: Butterworth-Heinemann, 2003, £24.99, pp 194, softcover. ISBN 0750643722

Musculoskeletal injection skills was written primarily by British physiotherapists for a graduate educational programme or physiotherapists who perform soft tissue therapeutic injections. The secondary audience for this book, according to the authors, is general practitioners. As is true for all books, this one has difficulty being all things to all readers.

At first glance, the book is very appealing. Colourful photographs demonstrate positioning and injection sites for dozens of soft tissue, tendon, and bursa injections, accompanied by sketches of the underlying anatomy and needle trajectory. There are frequent clinical tips and ''pearls'' as well as detailed lists of equipment required.

These advantageous features, however, are exactly what make this book less valuable for the doctor with significant experience with musculoskeletal injections. The first four chapters cover very basic information, such as basic pharmacology, needle sizes and colours, and no touch sterile procedure, which is probably useful for physiotherapists but not for experienced doctors.

On the other hand, there are injections described, such as the hip joint (intra-articular) or the iliopsoas bursa, which are unlikely to be performed by primary care doctors, or by most sports physicians for that matter, without radiological guidance. Other injections are for conditions for which there is controversy (at best) about the injection's value, such as lateral epicondylitis, but the book merely hints at the lack of data and does not fully address the issue.

Although the production value of the book is high, it is difficult to recommend it wholeheartedly to any group. It is somewhat helpful for family and general doctors, although it is probably both too basic and too complex at the same time. It might be a useful introductory text for doctors training in sports medicine, but would lose its value as the practitioner's experience increased.

Analysis

Presentation	20/20
Comprehensiveness	15/20
Readability	19/20
Relevance	11/20
Evidence basis	11/20
Total	76/100

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The female athlete

Mary Lloyd Ireland and Aurelia Nattiv. London: Harcourt Publishers Limited, 2002, £48.00, pp 803, hardcover. ISBN 0721680291

This book is a very informative source, both from a practical point of view with its sports medicine content, and also from an educational angle with information on the psychosocial aspects of the female athlete, which are very relevant and are not often included in general sports medicine texts.

The book presents sex differences in injury occurrence and gives effective advice on prevention and injury management. It is targeted mainly at sports medicine professionals, but also significant sections are relevant to coaches, trainers, administrators, and, in some part, the athletes themselves and their families.

The organisation is logical, with the content divided into sections including firstly historical, psychosocial, and performance issues followed by chapters on female specific and general medical conditions, and finally sections dealing with orthopaedic, rehabilitation, and sport specific conditions. The chapters are well written and easy to read, with a considerable level of research literature and statistical data discussed within most. The presentation of the text is clear with good use of tables, figures, and other visual representation of information.

The initial section gives a good historical background to female sports participation and explores psychosocial and performance issues and how they relate to the athlete and those working with her. This is important in knowing how to create a successful working relationship by understanding the subtle differences in dealing with female rather than male athletes. This is particularly well explained. There could be more information included here, for example on race, class, and sexuality as such subjects are rarely broached in this type of literature and would improve the knowledge of those caring for the athlete.

The following section covers in great detail problems associated with nutrition, menstrual dysfunctions, and other obstetric and gynaecological issues including pregnancy as well as general medical conditions. Despite some repetition of information, there are very good chapters covering the female athlete triad and the sequelae of disordered eating, with pragmatic advice on recognising symptoms of these conditions. The chapter on the physically challenged athlete supplies detailed information on some of the unique problems faced by this group of sportswomen, about which there is very little written and will considerably enhance the knowledge of the non-expert reader.

The orthopaedic section includes all the major injuries usually seen, with relevant female specific information and advice. The chapters on stress fractures, knee, and shoulder injuries are particularly clearly written and presented. There could be a greater contribution, where appropriate, from relevant sports rehabilitation specialists to discuss the specifics of certain aspects of treatment in addition to the surgical or bracing procedures. For example, the foot and ankle chapter could be expanded with the views of a podiatrist on both assessment and management.

The following section on rehabilitation provides a general approach, giving advice on sport specific rehabilitation programmes, upper and lower limb rehabilitation, strength training and evaluation, and proprioception. Some parts of this section are excellent, with detailed practical advice and evidence based research included, particularly in the upper limb rehabilitation and strength evaluation chapters. However, others are a little basic with insufficient detail and evidence given from research literature. This could be improved by lengthening this section, with more practically orientated information provided.

The final section on sport specific conditions gives a good account of injury type and incidence in a wide variety of sports, including data on some that often receive little attention in the research literature such as cheerleading. It does not, however, include other popular sports played by females around the world such as rugby, netball, and handball. The omission of a chapter on rugby is surprising, as the USA are former world champions in this sport!

Of course not every book will please every reader all the time, and this book is no exception. However, it does, and very successfully, attempt to cover a huge area in dealing with many aspects of care of both the recreational and the professional athlete. Overall, this book makes practical and enjoyable reading and it should be on the shelf of all those managing athletes. Obviously it is impossible to include everything that each reader wants to see, but I want to commend the authors and contributors for their hard work in providing this wide reference base on the female athlete. Such a work is long overdue.

Analysis

Presentation	17/20
Comprehensiveness	13/20
Readability	16/20
Relevance	19/20
Evidence basis	15/20
Total	80/100

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Strength and power in sport, 2nd edn

Edited by P V Komi. London: Blackwell Publishing, 2003, £75.00, pp 523, hardcover. ISBN 0632059117

Enhancing strength and power is now acknowledged as an integral part of the training process for many sports, as well as being beneficial for members of the general public. However, a number of myths and misconceptions about strength and power training still exist. By encapsulating our current knowledge in this area, *Strength and power in sports* may help to dispel some of these myths and lead to better practice in the field. The range of topics covered in this book is vast, spanning most of the issues that influence the development of strength and power. These issues are examined in detail within the five sections of the book, which are: definitions; the biological basis for strength and power; mechanisms for adaptation in strength and power training; special problems in strength and power

training; strength and power training for sports.

Readers who enjoyed the first edition of this book will be delighted to see that most of the original 30 contributors (all world experts in their field) accepted the invitation to revise and update their chapter(s) for this edition. Although such multiauthor books can sometimes lack congruency and be repetitive in places, the editor should be applauded for ensuring consistency and minimising repetition. Although the structure and content area of the current edition is very similar to the first edition, some excellent new chapters have also been included. These new chapters describe: proprioceptive training; aging and neuromuscular adaptations to strength training; biomechanics of strength and power training; the application of vibration loads for strength and power development. Such additions to this edition reflect the rapid growth of research interest and knowledge in these specialist areas. On the other hand, some chapters that I valued in the first edition—for example, anthropometric factors related to strength and power, as well as training for bodybuilding and power events—have been omitted. However, the lack of such sections is a minor quibble, as the material presented in the current edition is well written and probably covers the most important aspects of strength and power development.

This book would be a great reference for anyone interested in strength and power training and development. I would recommend its purchase for sport scientists (in particular exercise physiologists and biomechanists), sports medicine professionals, university students in the field, strength and conditioning coaches, clinical exercise specialists, and perhaps personal trainers. Hence, I believe that a copy of this book should be found in the library of any institution in which sports science or medicine is taught.

Overall, I found the book to be well presented with a logical structure (both within and between chapters). The numerous figures and tables highlighted pertinent results and processes and complemented the material presented in the text. Consistent with the aims of the International Olympic Committee (IOC), this book was very comprehensive, covering (in detail) most issues that have relevance to strength and power development. However, chapters on the influence that anthropometry and nutrition have on strength and power would have been invaluable. Although some of the nutritional issues are discussed in *Nutrition in sport* (another book in the IOC Encyclopaedia of Sports Medicine series), it would be convenient to find such material in *Strength and power in sports* as well. Similarly, although one chapter described training for Olympic weightlifting, I would have also appreciated the inclusion of comparable chapters on other sports as well. *Strength and power in sports* was a pleasurable and informative read, as it was generally written in a scientifically rigorous yet reader friendly manner. However, some readers may find sections within the small number of mathematically based chapters more difficult to follow. Regardless, readers should endeavour to work through such chapters, as they will be rewarded with a greater understanding of strength and power development. As the material covered in this book is based predominantly on peer reviewed journal articles (a good number of which were written by the chapter authors), such material generally reflects the current views in the field. However, some examples of anecdotal evidence and/or personal views also appear in certain chapters. The presentation of such non-refereed material may reflect the relative infancy of research in strength and power training and/or the accumulated wisdom and experience of the authors. Although not yet experimentally validated, such speculation may act as a catalyst for further research.

Rating

• Presentation	18/20
• Comprehensiveness	16/20
• Readability	17/20
• Relevance	17/20
• Evidence basis	16/20
• Total	84/100

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Exercise and sports cardiology

P D Thompson. McGraw Hill, 2001, AUD$167.95, pp 504, hardcover. ISBN 0071347739

On numerous occasions athletes are charged with ''having no heart'' or alternatively ''having a huge heart''. According to this text they all have one, but they do vary in size considerably.

This is not ''Sports cardiology for dummies''. Pitched more at the cardiologist with an interest in sport, than the sports physician with an interest in cardiology, this text overflows with information. It assumes a basic knowledge of cardiology, for example arrhythmias, ECG interpretation, and the basics of echocardiography. If you are a little rusty, keep the basic text nearby.

Many parts are highly technical and delve deeply into cardiac and exercise physiology. For the scientist this is fantastic, the sports medicine clinicians may wish to skip it.

However, the clinical sections are excellent. The relevant topics are dealt with clearly, thoroughly, and with more than adequate depth. It describes diagnostic criteria for relevant syndromes (Marfans, HCM) affecting the heart simply and includes up to date genetic research in these areas. All appropriate sports medicine and cardiology issues are explored, with excellent sections on children, screening, and the effects of exercise on medical conditions such as diabetes and lipid disorders. Interestingly, treatment of all areas mentioned is discussed only fleetingly.

The book can be complex but the statements are reasoned, and the authors clinical perspective is interesting and thought provoking. Despite this complexity in some parts, *Exercise and sport cardiology* will be an excellent reference text for those studying and practising clinical sports medicine and is something that has been missing from the library until this point.

Rating

• Presentation	16/20
• Comprehensiveness	19/20
• Readability	13/20
• Relevance	14/20
• Evidence basis	19/20
• Total	81/100

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Campbell's operative orthopaedics, 10th ed (4 vols)

Edited by S T Canale, W C Campbell. St Louis, MO: Mosby, 2003, $495.00, pp 4283, hardcover. ISBN 032301240X

This is a book measured by the carton. In fact, just carrying the books around is liable to cause injury. Four volumes and 4283 pages is a lot of reading in anyone's language. What this represents is arguably the best orthopaedic reference around today. If you want to know about any aspect of orthopaedics, it is likely to be in these pages. Just picking a topic at random such as the complications of knee endoscopy gives a huge and somewhat mind boggling list of possibilities. Rather surprisingly for the non-orthopaedist, the book also covers non-surgical problems such as the diabetic foot. Surgical orthopaedics clearly is the focus, and the diagrams of the various surgical methods are easy to follow even for a simple sports physician such as myself.

Who should read it—obviously operative orthopaedic surgeons are the main market. After all they can afford it and are generally fairly beefy chaps capable of carrying the heavy books. Do sports physicians need such weighty tomes? No, although sports physicians in a large group practice or who have no access to an institutional library should consider having access to a copy. It would be nice for the non-orthopaedist if there were a similar detailed reference of non-operative musculoskeletal medicine. Certainly this is a void waiting to be filled.

This book began life in 1939, and the 10th edition represents a remarkable continuity of publishing as well as indicating just how orthopaedics has developed as a specialty over that period of time. This edition has 34 contributors, 10 of which are new. This gives an idea as to the desire of the editor to improve upon past editions.

The book is hugely impressive, up to date, and comprehensive. Concise it isn't.

Analysis

Presentation	8/20
Comprehensiveness	20/20
Readability	18/20
Relevance	10/20
Evidence basis	10/20
Total	76/100

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CALENDAR OF EVENTS

The 6th STMS World Congress on Medicine and Science in Tennis in conjunction with the LTA 2004 Sports Science, Sports Medicine and Performance Coaching Conference

19–20 June 2004, London, UK

Keynote speakers include Professor Per Renstrom (SWE), Professor Peter Jokl (USA), Professor Savio Woo (USA), Dr Carol Otis (USA), Dr Mark Safran (USA), Dr Ben Kibler (USA), Prof Bruce Elliott (AUS), and Professor Ron Maughan (UK).

Further details: Dr Michael Turner, The Lawn Tennis Association, The Queen's Club, London W14 9EG, UK; email: michael.turner@LTA.org.uk

9th European College of Sports Science Conference

3–6 July 2004, Clermont-Ferrand, France

More than 1500 participants from 70 countries are due to attend.

Further details: website: www.ecss2004.com

The Leeds Sports Imaging Course

6–7 September 2004, Leeds, UK.

This two day course is aimed at both radiologists and clinicians who are involved in sports imaging. The course will comprise an imaging and clinical overview of all relevant joint, bone and soft tissue sporting injuries.

The faculty will comprise internationally recognised skeletal imaging and clinical experts from the UK, Europe and North America who will deliver state of the art lectures and lead sessional discussions. Each session will cover the spectrum of injury for a specific anatomical area beginning with clinical lectures that will allow the subsequent imaging lectures to be placed in context. All aspects of imaging will be discussed but will concentrate on the use of ultrasound, conventional MR imaging and MR arthrography for the diagnosis, staging and prognosis of sporting injuries. Therapeutic image guided intervention using fluoroscopy, CT and ultrasound will also be demonstrated.

13 RCR category one CME credits have been awarded.

Further details: Carol Bailey, Course co-ordinator, MRI Department, B Floor, Clarendon Wing, Leeds General Infirmary, Leeds LS1 3EX; tel: +44 (0)113 3922826; fax: +44 (0)113 3928241; email: Carol.Bailey@leedsth.nhs.uk

2004 APS Intersocity Meeting – Integrative Biology of Exercise

October 6–9 2004, Austin, TX, USA

Abstracts due May 12, 2004

Further details: Email: meetings@the-aps.org; website: www.the-aps.org

Australian Conference of Science and Medicine in Sport

October 7–9 2004, Alice Springs, Northern Territory, Australia

Further details: website: http://www.sma.org.au/ACSMS/2004/

BASEM Conference 2004

14−17 October 2004, Belfast, UK

Main themes: Overuse Sports Injuries and Muscle Injuries. Keynote speakers include: Chris Bradshaw, Medical Director, Olympic Park Medical Centre, Melbourne and Kim Bennell, Assistant Professor, School of Physiotherapy, Melbourne University.

Further details: Email: fionnuala.sayers@greenpark.n-i.nhs.uk

The 23rd Congress of Sports Medicine of the AZ Sint-Jan AV

15−16 October 2004, Brugge (Belgium)

Further details: Tel: +32 (050) 452900; fax: +32 (050) 452231

2nd International Ankle Symposium

15−16 October 2004, Newark, DE, USA

The meeting will examine ankle instability and other related ankle pathologies from a multidisciplinary perspective. Attendees will include clinicians and scholars from the disciplines of orthopedics, podiatry, physical therapy, athletic training, biomechanics, and sports medicine. This conference aims to build on the success of the inaugural symposium held in Ulm, Germany in December 2000. Emphasis will be on oral and poster presentations of original research along with selected plenary presentations.

The deadline for abstract submissions is July 1 2004.

Further details: Jay Hertel, PhD, ATC, FACSM, Conference Co-Chair, Penn State University, email: jnh3@psu.edu, or Thomas Kaminski, PhD, ATC, FACSM, Conference Co-Chair and Host, University of Delaware, email: kaminski@udel.edu. Website: http://www.udel.edu/ias/

1st World Congress on Sports Injury Prevention

23−25 June 2005, Oslo, Norway

This congress will provide the world's leading sports medicine experts with an opportunity to present their work to an international audience made up of physicians, therapists, scientists, and coaches. The congress will present scientific information on sports injury epidemiology, risk factors, injury mechanisms and injury prevention methods with a multidisciplinary perspective. Panel discussions will conclude symposia in key areas providing recommendations to address the prevention issue in relation to particular injuries and sports.

Further details: Oslo Sports Trauma Research Centre and Department of Sports Medicine, University of Sport and Physical Education, Sognsveien 220, 0806 Oslo, Norway. Email: 2005congress@nih.no; website: www.ostrc.no

4th European Sports Medicine Congress

13−15 October 2005, Lemesos, Cyprus

Further details: Email: pyrgos.com@cytanet.com.cy

CORRECTION

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Sims J, Huang N, Pietsch J, *et al*. The Victorian Active Script Programme: promising signs for general practitioners, population health, and the promotion of physical activity (*Br J Sports Med* 2004;**38**:19–25). The authors of this paper were published in the wrong order. The correct order is: Huang N, Pietsch J, Naccarella L, Sims J. We apologise for this error.